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ANNUAL REPORT 2010-'11



KERALA AGRICULTURAL UNIVERSITY

KAU (PO) - 680 656, Thrissur

ANNUAL REPORT 2010'11

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GENERAL REPORT

The Executive Committee of the Kerala Agricultural University presents to the General Council its annual administration report for the year 2010-2011 (1st April 2010 to 31st March 2011).

The report pertains to the General Administration, Education, Research, Extension, Library and Information service, Students welfare, Engineering works, Estate and Campus development and Finance and accounts. The lists of members of the statutory authorities, staff at various campuses, projects operated under Directorate of Research are also appended.

Officers of the Kerala Agricultural University as on 31.3.2011

Designation	Name	Period	
Vice-chancellor	Dr.K.R.Viswambharan	28.3.2007	Continuing
Registrar i/c	Dr.Jobi.V.Paul	25.1.2007	11.6.2010
	Dr.C.B.Manomohan	11.6.2010	11.1.2011
	Dr.T.R.Gopalakrishnan	11.1.2011	28.2.2011
	Dr.P.B.Pushpalatha	28.2.2011	Continuing
Comptroller	Sri.R.Jayakumar	5.10.2009	Continuing
Director of Research	Dr.D.Alexander	19.11.2005	3.7.2010
	Dr.T.R.Gopalakrishnan	3.7.2010	3.7.2010AN
	Dr.D.Alexander	3.7.2010AN	17.7.2010
	Dr.T.R.Gopalakrishnan	17.7.2010	Continuing
Director of Extension	Dr.M.K.Sheela	1.9.2008	3.7.2010
	Dr.P.V.Balachandran	3.7.2010	Continuing
Director of Physical Plant i/c	Sri.K.Suresh Babu	15.5.2007	Continuing
Director of Students Welfare i/c	Dr.Jose John Chungath	17.6.2007	Continuing
Director (Acad & P.G.Studies) i/c	Dr.P.K.Asokan	19.8.2008	Continuing
Deputy Director of Students Welfare i/c	Sri.E.U.Rajan	17.6.2007	Continuing
University Librarian i/c	Sri.K.P.Sathian	30.4.2007	Continuing
Dean (Agriculture)	Dr.L.Rajamony (i/c)	26.5.2010	3.7.2010
	Dr.V.Sverup John	3.7.2010	Continuing
Dean(Veterinary)	Dr.E.Nanu	10.6.2009	30.4.2010
	Dr.P.C.Saseendran	30.4.2010	7.2.2011
	Dr.H.Subrahmanian	7.2.2011	Continuing
Dean(Agrl.Eng)	Dr.V.Ganesan (i/c)	11.1.2010	3.7.2010
	Dr.M.Sivaswami	3.7.2010	Continuing

Other Officers

Designation	Name	Period	
Associate Dean (Horticulture)	Dr.K.A.Mariam	22.10.2009	10.5.2010
	Dr.C.T.Abraham	10.5.2010	Continuing
Associate Dean (Forestry)	Dr.B.Mohankumar	31.8.2009	Continuing
Associate Dean (CCB&M)	Dr.U.Ramachandran	7.2.2006	30.4.2011
	Dr.A.Sukumaran	30.4.2011	Continuing

Associate Dean CoA, Padannakkad	Dr. M. Govindan	16.10.2009	Continuing
Associate Dean COVAS, Pookot	Dr. V. Jayaprakasan	13.7.2009	19.5.2010
	Dr. A. Jalaludeen	19.5.2010	11.10.2010
	Dr. P. I. Geevarghese	11.10.2010	1.12.2010
	Dr. A. Jalaludeen	1.12.2010	19.1.2011
	Dr. P. I. Geevarghese	19.1.2011	21.2.2011
	Dr. Leo Joseph	21.2.2011	Continuing
Associate Dean, CDST, Mannuthy	Dr. R. Rajendrakumar	15.9.2008	Continuing

EDUCATION

The following ten educational institutions functioned under the university during the period. Various courses offered in these institutions are given below:

<i>Name of College</i>	<i>Courses offered</i>
College of Agriculture, Vellayani	B.Sc. (Hons.) Ag., M.Sc. (Ag.), Ph.D. (Ag.), M.Sc. (Integrated) Biotechnology
College of Horticulture, Vellanikkara	B.Sc. (Hons.) Ag., M.Sc. (Ag.), Ph.D. (Ag.), M.Sc. (Integrated) Climate Change Adaptation
College of Agriculture, Padannakkad	B.Sc. (Hons.) Ag., M.Sc. (Ag.)
College of Forestry, Vellanikkara	B.Sc. (Hons.) Forestry, M.Sc. (Forestry), Ph.D.
College of Co-operation, Banking and Management, Vellanikkara	B.Sc. (Hons.) C&B, M.Sc. (C&B), MBA Agri-Business Management
College of Veterinary and Animal Sciences, Mannuthy	B.V.Sc. & AH., M.V.Sc., Ph. D.
College of Veterinary and Animal Sciences, Pookot	B.V.Sc., M.V.Sc.
College of Dairy Science and Technology, Mannuthy	B. Tech. (D.Sc & Technology)
College of Fisheries, Panangad	B.F.Sc., M.F.Sc., Ph. D.
Kelappaji College of Agricultural Engineering and Technology, Tavanur	B. Tech. (Ag. Engg.), M. Tech. (Ag. Engg.)

The number of students admitted :

A. (1) UG programme

	<i>No. of students admitted</i>
B.Sc. (Hons.) Ag.	216
B.V.Sc. & AH.	114
B.Sc. (Hons.) Forestry	30
B.F.Sc.	50
B.Sc. (Hons.) C&B	40
B. Tech. (Ag. Engg.)	46
B. Tech. (D.Sc. & Tech.)	23
Total	519

A. (2) PG programme

	<i>No. of students admitted</i>
Agronomy	10
Plant Pathology	4
Plant Breeding and Genetics	4
Agricultural Extension	8
Agricultural Entomology	5

Soil Science and Agricultural Chemistry	3
Meteorology	1
Agricultural Economics	5
Plant Physiology	1
Forestry	9
Plant Biotechnology	6
Co-operation and Banking	1
Fisheries	4
Veterinary Sciences	38
Agricultural Statistics	1
Home Science	3
Horticulture	14
M. Tech. (Ag. Engg.)	8
MBA (Agri-business Management)	35
Total	160

A.(3) Ph. D. Programme

Agriculture	19
Veterinary	17
Total	36

No. of students passed out from 01.04.2010 to 31.03.2011.

UG programme

B.Sc. (Hons.) Ag.	97
B.V.Sc. & AH.	102
B.Sc. (Hons.) Forestry	20
B.F.Sc.	36
B.Sc. (Hons.) C&B	34
B. Tech. (Ag. Engg.)	61
B. Tech. (D.Sc. & Tech.)	19

PG programme

Agronomy	2
Plant Pathology	1
Plant Breeding and Genetics	2
Agricultural Extension	1
Agricultural Entomology	2
Soil Science and Agricultural Chemistry	1
Meteorology	0
Agricultural Economics	0
Plant Physiology	0
Forestry	2
Plant Biotechnology	5
Co-operation and Banking	2
Fisheries	1
Veterinary Sciences	38
Agricultural Statistics	0
Home Science	2
Horticulture	4
M. Tech. (Ag. Engg.)	0
MBA (Agri-business Management)	57

Ph. D. Programme

Agriculture	7
Veterinary	6
Home Science	0

Extra-curricular and co-curricular activities of the students were co-ordinated by the Director of Students Welfare through various colleges.

The Kerala Agricultural University continued to be a member of the Association of Indian Universities and the Indian Agricultural Universities Association, New Delhi.

Research

Kerala Agricultural University, the only Farm University in the state provides human resources, skills and technologies required for the sustainable development of agriculture in Kerala. Research activities are being undertaken to increase the productivity of crops, livestock and fisheries through genetic improvement, improved management practices, management of pests and diseases, value addition of agricultural produce, fabrication and refinement of farm machineries suitable for Kerala.

The research programmes of the University are mainly operated through six Regional Agricultural Research Stations located in six agro-ecological zones.

Dr. D.Alexander, Professor was holding the charge of Director of Research upto 3rd July, 2010. Dr.T.R.Gopalakrishnan was appointed and assumed holds the position of Director of Research on 3.7.2010. The Associate Directors of Head Quarters were Dr.A.Augustin (Adaptive Research & Training), Dr.Sajan Kurien (Planning), Dr.M.Subramonia Iyer as Monitoring & Evaluation upto 22-05-2010 & Dr.S.Pathummal Beevi from 23-05-10, Dr. P.C. Alex (V&AS), Dr. V.K.Raju (Farms) and Dr.T.R.Gopalakrishnan as Officer on Special Duty (Seeds) upto 30-08-2010 & Dr. V.S.Devadas from 31-08-2010.

Associate Directors of Research of various zones:

High range Zone, Ambalavayal	Dr.V.S.Devadas upto 15-06-2010 & Dr.Lyla Mathew from 16-06-2010
Northern Zone, Pilicode	Dr.B.Jayaprakash Naik
Central Zone, Pattambi	Dr.S. Pathummal Beevi upto 22-05-2010 & Dr.Johnkutty.I.from 23-05-2010
Special Zone of Problem Areas, Kumarakom	Dr.K.G.Padmakumar
Onattukara Zone, Kayamkulam	Dr.Sverup John upto 02-07-2010 & Dr.T.N.Vilasini from 03-07-2010
Southern Zone, Vellayani	Dr.P.Sivaprasad

In addition to the above, five Associate Directors were in charge of the activities related to food security mission of the state. They are as follows:

Dr.P.V.Balachandran (Paddy Mission) upto 26.11.2010 & Dr.S.Leenakumary from 27.11.2010

Dr.P.C.Balakrishnan (Coconut Mission)

Dr.L.Rajamani (Vegetable Mission) upto 22.10.2009 and Dr.T.R.Gopalakrishnan from 23.10.2009

Dr.M.Subramonia Iyer (Soils)

Dr.M.S.Sheela (Plant Protection&Biocontrol Agents Production)

Dr.G.S.L.H.V.Prasada Rao (Meteorology & Disaster Management)

Director of Research visited different agricultural research stations for monitoring research activities. He attended various meetings like launching workshop of Soil test based Nutrient Management

Plan for agro-ecosystems of Kerala at Trivandrum, meeting on Kuttanad package chaired by Agrl Minister at CDS and Review of AICRP (Fodder) at Vellayani, Kuttanad project meeting at RARS, Kumarakom; Subject Committee Meeting at Legislature complex; CAC of NAIP at RARS, Ambalavayal; Pepper conference at Spices board etc. He also participated in meetings for distribution of GI Registration certificate at Waynad, GoK plan schemes at Govt Secretariate, Thiruvananthapuram, FRC meeting at College of Agriculture, Launching of mealy bug at KVK Tavanur, inauguration of Market intelligence Centre at Thrissur, 29th Group meeting of AICRP (Vegetable crops) at Junagarh, ZREAC meeting at Vellayani and National Symposium on Vegetable Biodiversity at JNKVV, Jabalpur. He chaired a session of homestead vegetable cultivation in Kerala Padana Congress at Thiruvananthapuram and attended a discussion on BT Rubber by Agriculture Minister at CPCRI Kayamkulam chaired.

ADR (Planning) attended IVth Annual Review of ICAR Niche Area of Excellence at NAAS, New Delhi, Bt. Brinjal meeting at Mararikulam, SHM Executive Committee meeting at Thiruvananthapuram, Varietal release committee meeting at CoA, Vellayani, Research Extension Sub Committee meeting of Executive Committee, Kuttanad Package meeting, NAIP workshop, plan review meeting at Secretariat, RKVY SLMC meeting at Secretariat, State Nutrient Mapping Plan meeting, RIDF project discussions at Thiruvananthapuram, Plan proposal meeting at SPB, Pattom, International Pepper Community meeting at Cochin, SLSC meeting of RKVY at Secretariat and Meeting of PMC of FTTF project of NABARD.

ADR (M&E) visited various Research Stations and Colleges for the Monitoring and Evaluation of research and development activities, convened review meetings of the Project Coordinators of Research Coordination groups in the Faculty of Agriculture and Agricultural Engineering, AICRPs of Agriculture & Agricultural Engineering Faculties, RKVY projects in KAU, CSS (NHM) projects on spices and medicinal plants, Kuttanad package at the KAU headquarters. She had participated in the review meeting of Kuttanad Package held at the RARS, Kumarakom, RKVY Central Review Team meeting, SHM review meeting by JIT at Thiruvananthapuram, Workshop on Pesticide recommendation in POP, review meeting of "Sugandhi" Pepper development project in Wyanad district as monitoring committee member, Planning & Resource mobilization Committee meeting at the KAU, headquarters.

ADR (AR&T) discharged the duties of Director of Research in his absence, processed consultancy charges for project preparation and expertise, represented Directorate of Research in subject committee meetings and Kerala Legislative Assembly, formulated terms and conditions and signing of MoUs' of the projects of outside students, functioned as Public Information Officer in the Directorate of Research.

ADR (Farms) is pursuing earnest efforts to improve the farming efficiency and internal income generation. Farms attached to CRS, Anakkayam; CBF, Thumburmuzhi and FS, Puduveypu have putforth commendable performance in this regard. He also looked after the implementation of the ICAR project "Modernisation of SAU farms" which has greatly helped to improve the infrastructural facilities and income from farms. The MGNREG scheme co-ordinated by ADR (Farms) helped KAU to carryout various farm operations and reduce expenditure.

OSD (Seeds) conducted regular monitoring of the seeds and planting material production in various centres under KAU, attended discussion on amendment of Seed Bill 2001 at Trivandrum, seed authority meeting convened by APC at Trivandrum, International Pepper Community meeting at Kochi, Seed Industry Training Programme at Hyderabad, NAIP annual review meeting at Lucknow, review meeting of Idukki and Wayanad Special Package convened by APC at Trivandrum and proposed scheme for RARS, Ambalavayal under Wayand Package. Convened and attended NAIP meetings and review meeting of the project entitled "Refinement of technological innovations in vegetable".

ADR (Paddy Mission) was actively involved in the activities for increasing rice production in the state by bringing fallow lands and uplands under rice cultivation, technology interventions, farm machinery service backup and training, promotion of organic rice, soil fertility mapping, extending Mobile Rice Clinic facilities to the rice farmers, quality seed production, strengthening of seed processing and marketing facilities, paddy procurement and marketing, rice knowledge bank and museum, participatory technology development, conducting training programmes, workshops and awareness campaigns.

ADR (Coconut Mission) prepared an action plan to enhance the productivity of coconut palms, discussed and presented before the three tier panchayath authorities of Kannur, Kasaragod, Ernakulam, Alleppy, Pathanamthitta and Thiruvananthapuram districts. Efforts were initiated to enhance the production of hybrid coconut seedlings in various centers of KAU, by starting production units for hybrid coconut seedlings at other centres and also by adopting seed village concept. Concerted efforts were made to curtail the spread of bud rot disease of coconut in Calicut, Kannur and Kasaragod districts. Involved in the management of root (wilt) affected palms (selected 2000 palms) in the Thazhakkara and Pathiyoor Grama Panchayat of Alleppy district. Participated in the workshop on organic farming held at Thiruvanthapuram for the development of organic package for coconut, actively participated in the technology week at KVK, Kannur. He also attended various meetings at state and national level.

ADR (Vegetable Mission) is a member of State Vegetable Mission. A project entitled "Boosting Vegetable Production in Kerala through Technology Innovation and Mission mode Activity for Food and Nutritional Security" for Rs.200.17 lakhs, approved under RKVY is under implementation. A new project entitled "Augmentation of Vegetable Production Through Technological Intervention" for Rs.450.25 lakhs was approved under RKVY and started implementation in different stations of the University.

ADR (Plant Protection & Biocontrol Agents Production) attended State level expert committee meeting on pest surveillance and advisory service at Directorate of Agriculture, workshop on "Bio-security and Plant health management and required policy interventions" at NIPHM, Hyderabad, meetings convened by the Minister of Agriculture to discuss the issues related to use of banned insecticides and use of insecticides after expiry date and dumping of insecticides in rayoram river, Kannur District, revision of POP and constituted a state level committee to initiate action on this, discussed the list of chemicals to be deleted from POP and for restricted use, testing of new chemicals, tapioca leaf extract evaluation etc. Specific remarks were offered on the project "Supply side analysis of pesticide markets in Kerala", recommendation of Takumi against leaf roller infestation in paddy, issue of insecticide application in Pineapple and residue estimation, rubber plantations etc., recommendation of Lamdacyhalothrin for tea mosquito control in cashew, biological control potential of red ant and mealy bug management. Acted as member of the Research Advisory committee of the women scientists cell of KSCSTE and reviewed the research projects, Pollution of Pamba river by agrochemicals, Screening of cowpea varieties against drought tolerance, Impact of abiotic factors on the growth and yield of medicinal plants. Also reviewed the DST project 'Impact of botanicals on the sensory receptors of sucking pests of tobacco'. Attended a national Congress "IndiaBio 2010" at Bangalore and presented a research paper. Proposed to conduct a refresher course entitled "Participatory approaches for integrated Crop Management in Tropical Horticultural Crops" during October 2011 with the financial assistance of Centre for Development of Innovation (CDI) at Wageningen University and Research, Netherlands.

ADR (Meteorology & Disaster Management) is a member of the Disaster Management cell constituted by the Revenue department, Govt. of Kerala for assessing natural disaster calamities across the state. He participated in the team to assess the heat stroke/ sun stroke incidence that occurred during February and March in Thrissur and Palakkad. Also took initiative to start the M.Sc (Integrated) Climate Adaptation Degree Programme at the Kerala Agricultural University during the academic year 2010-11 in collaboration with the University of Western Australia.

Research support for sustainable development of agriculture sector in the state is rendered by KAU in close association with Indian Council of Agricultural Research, Commodity Boards and Development departments of the State and Central Governments. Over 500 research projects were in operation, including 36 All India Co-ordinated Projects/Network Projects, 3 NAIPs, 287 Other Externally Aided Projects, 350 projects funded by Government of Kerala. Faculty Research Committee (FRC) constituted in all the four faculties vets the KAU research projects. The 69th FRC meeting of the Faculty of Agriculture was held on 03-12-10. The 51st FRC meeting of the Veterinary & Animal Sciences Faculty was held on 07-07-10.

During the period under report the Director of Research and ADRs of Head Quarters visited various research stations of KAU. They participated in high-level meetings of the University including FRC. convened /attended ZREAC meeting of different zones, review meetings of externally aided projects,

seeds and planting material production at different centres, paddy mission activities. ADR (M&E) and ADR (Farms) monitored the research and farm development programmes at various centres under KAU.

Directorate of Research took initiative for the release of fourteen improved varieties of different crops developed by KAU for cultivation in the state. 60 new technologies developed were approved for inclusion in the Package of Practices Recommendations of KAU. Application for registration of 20 prominent rice varieties has been sent to DRR, Hyderabad. For addressing food security issue, mission programmes on rice, coconut and vegetable have been taken up and KAU provided the technical support for the development departments. Revenue through the sale of seeds and propagation materials of different crops and sales of biocides could be significantly improved and the total receipt was Rs.5.58 crores during the year. Annual income of ₹ 5.10 lakhs was generated from field tests, analysis of chemicals, consultancy and ToT.

Research Highlights

Rice and Rice based Cropping System

- Culture SD 36 (KAU M 108- 262-1) developed at RRS, Moncompu was released as “Prathyasa” (MO. 21) for general cultivation in Kuttand.
- Cul. OM-2, developed at ORARS, Kayamkulam was released as “Thulam” for cultivation in the eastern lateritic region during second crop season.
- C3-2 KM, a culture developed at RARS, Pattambi was released as “Samyuktha” (Ptb 59) for cultivation as first crop variety in Koottumundakan cultivation.
- Swarnaprabha Sel 3-1, a red kernelled selection from the white kernelled Swarnaprabha was released as “Vaisagh” (Ptb 60) for upland cultivation.
- Cul.1009, developed at RRS, Vytilla from the cross IR 4730-94-43-1 / CSR-10 was released as VTL-8 for cultivation in Pokkali area.
- JK 70 and JO 345, two high yielding saline and flood tolerant cultures developed at Pepper Research Station, Panniyoor were released as “Ezhome -1” and “Ezhome -2” for cultivation in Kaippad region.
- Three newly developed Kaipad varieties/cultures were tested in farmers’ field under different upland cropping systems.
- The varietal suitability trials under this project indicated that the Pokkali rice variety Vyttila-6 is suitable to Kari soils.
- Two TGMS lines, TS29-1 and TS29-2 which were genetically dissimilar but uniform in the expression of pollen sterility in planes and fertility in higher altitudes were identified for use in the breeding for two line hybrids in rice (*Oryza sativa*. L).
- UBC 251₇₀₀ was indicated as a putative molecular marker for salinity resistance/ tolerance in rice which can be used to differentiate the saline resistant / tolerant rice genotypes from susceptible genotypes and can be used for transfer of this trait in breeding programmes. However the trait is not controlled by single gene and thus additional efforts are needed to validate these markers using a large germplasm set.
- The level of proline and peroxidase activity under saline stress can be used as molecular markers in screening for salinity tolerance.
- In Advanced Variety Trial, (Very Early -AVT-VE), eight entries were tested and entry 701 and 703 were identified as the top ranking entries.
- Radiation Use efficiency (RUE) was computed using ORYZA Model based on weather and crop parameters such as phenology and TDM. RUE was highest at panicle initiation stage and lowest at flowering stage. IET 21478 performed well among twenty improved rice cultures of medium and long duration and local checks Jyothi, Aathira, Vaishakh and Samyuktha.
- In the elite rice genotypes, IET 21605 exhibited comparatively good performance under rainfed conditions due to comparatively better drought tolerance

- Application of Boron has increased the grain number and reduced the number of unfilled spikelet suggesting that boron application improved the fertility of the spikelet.
- In the elite rice genotypes, high temperature during anthesis prevents anther dehiscence, pollination, pollen germination and result in blank hulls with no grain inside and smaller and lighter kernels. Low quality grains were obtained due to high night temperature during grain filling stage. At high night temperature, the grain filling enzyme- starch synthase is greatly affected
- The data on the observations in relation to yield decline in rice in kole lands was used as a supporting data to prepare report on the "Paddy crop loss in Kolelands of Thrissur during second crop season 2009-2010"(by the technical committee appointed by Hon.Minister for Agriculture. Based on this report crop loss compensation was given to affected farmers).
- Evaluation on production physiology, including photosynthetic efficiency of rice under rice-duck model cultivation in Karuthani kole land was evaluated.
- Variation in UV –B absorbing pigments in vegetables and rice varieties was observed.
- Morphological and biochemical characterization of aromatic rices of Wayanad was completed.
- GI registration was obtained for Wayanad Jeerakasala Rice and Wayanad Gandhakasala Rice.
- Fallowing the field during summer season exhibited a negative trend in rice yield during subsequent kharif season. The green manuring and raising vegetable crop of bhindi during kharif resulted in significant increase in grain and straw yield.
- Higher grain and straw yield of rice during kharif and rabi when green manure crops of sun hemp and cowpea raised during summer and incorporated into the soil revealing the positive residual effect of incorporated legumes on subsequent crop yield.
- Tillage was found essential for realizing higher yield from Rice- Rice- Fallow cropping system in the double crop wetlands of Kuttanad.
- Concurrent growing of green manure crops in dry and wet seeded rice and its subsequent incorporation is a management alternative to increase the productivity, profitability and sustainability of Rice-Rice cropping system.
- The best integrated nutrient management treatment for high grain and straw yield in rice is that which supply 25% recommended dose of fertilisers (RDF) through organic manure in kharif and 75% of RDF through inorganic fertilisers in rabi with a saving of 25% of the chemical fertilizers and superior physico chemical and biological properties of the soil.
- Application of higher dose of fertilizers than POP recommendation is not found profitable in Kuttanad soils. Nitrogen fertilization is a must for economic rice production, but for P and K, the internal nutrient supply capacity of the soil is found sufficient.
- Balanced application of N, P and K in recommended dose is highly required for realizing maximum grain and straw yield in all rice growing tracts
- Mineral nutrition with Phosphorus is found to be relevant than K nutrition in the rice growing tract of Kuttanadu. While K nutrition is becoming more important in the sandy loam tracts of Onattukara as compared to mineral nutrition with P.
- An economically viable fertilizer schedule of 90:45:15 kg/ha (6:3:1) is recommended for the medium duration rice crop of Kuttanad
- Application of biofertilizer Azospirillum @ 2.5 kg/ha (mixed with sand or compost in the ratio 1:25) helps in reducing the rate of fertilizer nitrogen application by about 25%
- Sodium as common salt can substitute potassium as muriate of potash to the extent of 25% for rice in well drained wetland soils.
- Skipping phosphorus continuously for years significantly reduced crop growth and yield in rice, delayed flowering and prolonged maturity by about two weeks.

- Sulphur application @ 15 kg/ha is sufficient for sustaining economic production in rice based cropping systems
- An organic package for rice production consisting of application of vermicompost and oil cakes along with biofertilizers viz. *Azospirillum*, *Phosphobacter* and *Fraturia* could be evolved and the package could enhance the biological activity of the soil as evident by the increased presence of beneficial microbes especially *Pseudomonas* and *Azospirillum*
- Raising green manure crop of sunhemp or cowpea significantly enhanced the yield of subsequent crop of rice. Growing grain or vegetable cowpea also resulted in a similar increase in rice yield.
- The results of the past fifty years of permanent manurial experiment on tall indica rice variety indicated the excellent option of integrated nutrient management viz. cattle manure + NPK applied treatment, with the highest record of grain and staw yield. It also emphasized the detrimental effects of applying nitrogenous fertilizers alone or NPK without organic manure by its negative impact on the growth & yield of crop, soil properties and available nutrients in soil.
- INM is the best for higher rice yield and better soil health.
- Effect of FYM +90:45: 45 NPK kg/ha and in situ green manuring + 90: 45: 45 NPK kg/ha were found on par for enhancing straw and grain yield of rice.
- Line sowing (mechanical row seeding) of adequate quantity of seed (60 kg/ha), using vermicompost along with 50 per cent NPK fertilizers, N in 3 splits (50 per cent at 15 DAS, remaining 50 per cent in two equal splits at maximum tillering and panicle initiation stage) were found promising in increasing the grain yield of rainfed upland rice.
- The major constraint in the productivity of rice in Kerala is observed to be the maintenance of optimum plant stand in the field rather than any other factors
- Intensification of rice fallows with vegetable crops gives more net return to the farmers. The cropping system consisting of rice-rice-yard long bean and rice-rice-Amaranthus recorded higher economic returns
- Pyrazosulfuron ethyl @20 g ai ha⁻¹ at 10 DAT can be recommended as an efficient and economic weed management practice for low land rice as it ensures the highest net income and BC ratio. The bioassays and residue analysis ensures the safety of the chemical to soil environment and also the safety of the produce for human and animal consumption. In addition to its potent use in weed management in the rice ecosystem, PSE has shown immense suppressive effect on some of the dreaded soil pathogens affecting the crop.
- A summer crop of bhindi or green manure crop of daincha enhanced the yield in subsequent rice crop. Depending on the length of growing period a short duration cassava can also be taken as summer crop without any reduction in the yield of subsequent rice crop. After three year cropping cycle a significant decline in major weed species *Echinochloa crusgalli* was observed.
- In basmati rice, organic nutrition is found possible without any appreciable reduction in yield and quality.
- Bispyribac-sodium, a new herbicide molecule was proved to be effective for weed control in transplanted rice and no crop toxicity was observed at any doses (25 g to 50 g a.i/ha) of the herbicide applied at 8 – 15 days after transplanting.
- Application of Glyphosate before land preparation followed by pre-emergence herbicides either Butachlor or Bensulfuron + Pretilachlor were found effective for weed control in rice. Cono weeding was also found effective.
- *Solanum*, an alien invasive weed suspected to be introduced through wheat imported during 2006, has been located at many places in Pathanamthitta, Idukki and Kollam.
- New weeds spreading in the aquatic areas are *Alternanthera philoxeroides*, *Limnocharis flava* and *Cabomba caroliniana* and that of uplands are *Alternanthera bettzickiana*, *Croton hirtus*, *Sesamum radiatum*, *Merremia vitifolia*, *Ipomoea cairica*, *Wedelia calandulacea* and *Tithonia diversifolia*

- A large number of variants of weedy rice was observed in the rice field which may be due to inter crossing. Variation was seen in almost all the characters studied.
- Management techniques suggested for weedy rice include stale seed bed and contact application of herbicides using Wick applicator.
- No build up of butachlor and pretilachlor herbicide residues in soil was noticed after application of herbicides for 19 seasons in rice- rice system. Grain and straw samples also did not register any residues.
- The herbicide metsulfuron methyl was more persistent than chlorimuron ethyl in rice soil.
- At the recommended rate of 0.1 kg/ha or at its double dose, Cyhalofop butyl herbicide residue was not detectable in rice soils.
- Residue of paraquat applied on *Eichhornia* was detected in water upto 15 days after spraying.
- In the column leaching studies with pretilachlor, maximum residue was remained in the upper 0-4 cm of the soil column.
- The leachate collected from > 60 cm depth of the soil column contained 0.005 ppm pretilachlor residue indicating the mobile nature of the herbicide
- The concept of Food security Army initiated at ARS, mannuthy was launched and large area in Thrisuur Kole lands were transplanted in record time by the Food Security Army. The style, dress code and discipline of the Food Security Army and formation of Agromachinery Service Centre and training to develop Agromachinery Service Executives were greatly appreciated at state and national level,
- Formed Food Security Army comprising 80 members in four traditional Kaipad Panchayaths of Kannur district under Malabar Kaipad Farmers Society which was formed and registered. Documentation of Kaipad organic rice production tract was completed and the application procedure for getting Geographical Indication tag for Kaipad rice is in progress.

Coconut and Other Palms

- A unique germplasm collection of coconut consisting of 40 indigenous and 35 exotic cultivars is being maintained at RARS, Pilicode. Among the 51 steady yielding cultivars of coconut, Andaman Giant and Philippines Ordinary out yielded the other cultivars.
- Among the 11 hybrid parental combinations planted in 1994, the combination, Malayan Yellow Dwarf x Ayiramkachi and AYK x WCT were found more vigorous.
- The hybrid WCT x CGD ranked top in all the four locations in cumulative nut production and was on par with Kerasree.
- Optimum physiological maturity of tender nut having maximum quality, quantity and consumer acceptance was found at 210 DAIE.
- COD, MGD and Gangabondam were identified as the best cultivars for tender nut purpose
- Long term fertilizer experiments conducted at coconut Research Station, Balaramapuram have shown that in the absence of potash, nitrogen application has antagonistic effect on coconut.
- Identified Annur coconut for the development of short statured coconut hybrid.
- The coconut palms under Comprehensive coconut care programme at Thazhakkara and Pathiyoor panchayath from May 2009 onwards showed improvement in health, reduction in pests & diseases.
- Fifty or 75% substitution of K by Na as common salt, is identified as a viable practice in coconut plantations in Kerala
- In Srikrishnapuram and Mannarkadu blocks of Palakkadu District, Coconut + Pepper + Nutmeg + Vanilla was identified as the most sustainable cropping system
- In Coconut - pineapple systems, where pineapple residues were recycled and mulched, improvement in the soil organic carbon and soil enzyme status was noticed.

- The most sustainable perennial crop based cropping system for Wyanad District is reported as Arecanut + Pepper + Banana + Coffee. Livestock components viz. cow, goat, poultry can be included based on the preference of the farmers. Apiculture is also recommended for integration in perennial crop based farming system of Wyanad.

Vegetables

- Two improved varieties namely Vellayani Samridhi in *Capsicum fruitiscence* and Anupama in drumstick were released by the state seed sub-committee for large scale cultivation in the state.
- The improved culture like Rx JM-selection, CA-118xJM Selection and CC-30(Chilly), BH-1, BH-2, BH-3 and BH-12 (Ash gourd) AM-88(Green Amaranth), LE-643-1, LE-1-2 and LE-66 (tomato) were cleared by ZREAC meetings of various zones and are in the advanced stage.
- Evaluation of cool season vegetables like cabbage, cauliflower, carrot resulted in the identification of lines like NS-183, NS-180 and NS-43 in cabbage and NS-60, Basant, Pusa Magna in cauliflower suited to tropical conditions of Kerala during winter season.
- A mega project on maintenance breeding for purification and maintenance of already released vegetable varieties are in progress at different research stations of the university
- In chillies and ash gourd the varietal development programme is in advanced stage
- Standardization of population density and nutrients in snake gourd in the riverine alluvium is advanced to farm trial
- The number of normal seeds was significantly reduced in watermelon variety Sugarbaby when female flowers were pollinated with irradiated pollen. Durgapuralal fruits resulted from the pollination of irradiated pollen exhibited high quality.
- Among the thirteen pumpkin accessions collected from different parts of Western Ghats of Kerala, the accession PN-09/34A recorded the highest yield. In spine gourd (*Momordica dioica*) the accession PS-10/10 collected from Peechi forest range was the highest yielding.
- A high yielding indeterminate tomato culture LE 643-1 suited for rainshelter and open field cultivation is under multilocational trial. LE 665-1, another indeterminate tomato culture was identified as high yielding.
- Seed quality enhancement in cowpea by film coating technique revealed that seed viability, vigour and vegetable yield were higher when seeds were treated with *Pseudomonas* 10 g/kg seed and *Trichoderma* 4g/kg seed.
- Farmers of Wyanad district raised vegetable gardens, farms and seed production units in Wyanad district using the seeds of improved varieties of vegetables and other inputs and technology supplied by KAU leading to quantum jump in vegetable production in the district.
- The fertilizer dose for brinjal can be reduced to 90 per cent of the POP recommendation if the fertilizers are applied in the form 14:5:5 Factmix.
- Application of enriched vermi compost with *Trichoderma* is found to be fruitful with respect to yield, shelf life and organoleptic aspects in amaranthus
- Vermicompost application with bioinoculants *Pseudomonas* and *Trichoderma* recorded maximum yield from cowpea, tomato and bhindi in cropping system I (cowpea + tomato + bhindi) and II (cowpea+chilli+bhindi) and the yield was on par with RDF
- Highest level of organic nutrient combination (100 % of nitrogen equivalent – 17 t FYM + 2.83 t vermicompost + 1.47 t glyricidia leaves per ha) recorded highest number of fruits/plant, highest fruit yield/ha for bindi and highest yield of amaranthus (residue crop) compared to lower levels of organic nutrition.

Sugar and Tuber Crops

- In sugarcane, Culture No CoTI 527/85, CoTI 1153, CoTI 1358 and CoTI 2002-16 were accepted for AICRP (S) Zonal varietal trial for the Peninsular Zone

- CoT1 1358 ranked among top three in 11 trials for CCS t/ha, 18 trials for Cane yield t/ha, 11 trials for CCS % and 13 trials for Sucrose % under zonal trials
- Under fluff exchange programme, promising cultures viz., Culture No 1/96, 21/96, 12/97, 119/98 and 58/99 were advanced to farm trial
- High yielding red rot resistant sugarcane cultures, Viz., Culture no 12/97, 119/98 and 58/99 have been advanced to farm trial
- In Zonal varietal trial for identifying early maturing varieties- 2005-2006 series Co 0209, 2007-2008 series CoSnK 03632 and 2008-2009 series CoSnk 05103 recorded highest cane yield, CCS and sucrose content
- In Zonal varietal trial for identifying midlate maturing varieties- 2005-2006 series CoM 0265 and 2007-2008 series CoM 0316 recorded maximum cane yield, CCS and sucrose content
- 100% NPK as organics + trash application with cellulolytic culture + biofertilizers in ratoon crop had produced the highest cane and sugar yield with optimum juice quality.
- Zinc nutrition in the form of zinc sulphate @ 20kg/ha was significantly superior in sugar yield and quality.
- Ethrel application at 750 ppm resulted in least flowering in sugarcane.
- Technology developed for hygienic preparation of cube jaggery with stainless steel moulds was developed and handed over to "Sugarcane Farmer's Society" viz., Madhya Thiruvithankore Karimbu Vikasana Samithy on 01-03-2011 which is new to the region.
- GI registration was obtained for Central Travancore Jaggery
- Incorporation of coir pith, rice husk or saw dust had no added advantage over the POP recommendation for coleus.
- In coleus, yield is low for early/late planted crops. Late planted crops produced bulged stem rather than fully formed tubers. Crop establishment in hot season was poor.
- Use of biofertilizers (AMF / *Pseudomonas* or AMF+ *Pseudomonas*) facilitates 25% reduction in the dose of chemical fertilizers in coleus. At the highest level of nutrient (100% recommended dose), the biofertilizers failed to express any beneficial effect.
- For cassava variety Vellayani Hraswa, application of NPK @ 75:50:100 kg/ha gave significantly higher yield in reclaimed alluvial soils of Kuttanad.

Fruits

- Twenty nine new collections of banana were added to the field gene bank. Germplasm from NBPGR collected as proliferating cultures were regenerated and planted out. Characterization of germplasm was continued with IPGRI descriptors and molecular techniques.
- The fifteen morphotaxonomic groups of plantains are maintained. The Nendran morphotypes were characterized employing RAPD.
- The hybrid variety Yangambi Km 5 (AAA) exhibited very high resistance to sigatoka leaf spot disease and was recommended for cultivation in Kerala
- The varieties Rasthali and Martaman showed similarity to the local clone Poovan (AAB Silk). Gandevi Selection is a giant Cavendish with longer crop cycle and higher productivity compared to Dwarf Cavendish. Rajapuri resembled the clone Kullan. Karpoorachakkarakeli was similar to local Palayankodan.
- *In vitro* multiplication protocol for Manjeri Nendran II and Big Ebanga was standardized and large scale multiplication was carried out.
- TC banana plants were produced and provided to the local farmers
- No variation was observed among the Mysore Poovan clones Alpan, Karpurachakkarakeli, local Palayamkodan (AAB) and Pisang Ceylon for growth and yield characters. Molecular characterization using RAPD is being done.

- Seed set was obtained in the cross Matti x Calcutta-4. Seeds were germinated and seedling progeny was field planted for evaluation.
- The F1 hybrid (Nendran x Calcutta-4) set seed when pollinated with Calcutta-4 and the introduced diploid TMP2 x 2829-62, which is a plantain derived diploid from IITA, Ibadan. Seedlings are under evaluation. Open pollinated seeds from the F₁ hybrid germinated and field established for evaluation.
- Development of mapping population was initiated by crossing Sigatoka leaf spot resistant and susceptible cultivars.
- Development of molecular markers has been initiated.
- Highest bunch weight with respect to individual plants, number of hands and number of fingers were obtained for normal planting. But yield per hectare and B : C ratio (2.6) were the highest when three plants were accommodated in a pit at a spacing of 2 m x 3 m with 100 percent recommended dose of fertilizers (RDF).
- Plant height, girth, bunch weight, number of hands, fingers and B: C ratio were highest in Control followed by application of 100 % RDF in three splits with 80 % nitrogen and 20 % K₂O in the first stage. Reduction in nutrient levels resulted in lower plant height, girth, bunch weight and yield.
- Inorganic nutrient requirement for each yield target was computed using fertilizer adjustment equations after assessing initial soil NPK and availability of nutrients through organic sources in banana.
- Irrigation at 80% ER at all growth stages is the most effective to maintain proper growth and yield in Nendran.
- The hybrid introductions of banana TMB 5295-1, SH-3640 and FHIA-03 are under testing in farm trials in three districts - Thrissur, Palghat and Ernakulam of Central Kerala. TMBx5295-1 is also suited for the preparation of chips.
- Popoulu (AAB), a unique introduction with thick blunt fruits, is used as a dessert and cooking cultivar. Unripe fruits are suited for chips, while ripe fruits resemble Nendran in taste. *In vitro* multiplication has been taken up to facilitate evaluation.
- New additions of banana made from NBPGR, NEW Delhi, NRCB, Trichy during 2009-10 are being field evaluated and identified Kluai Namwa Khom (ABB), a semi dwarf cultivar under Pisang Awak (ABB) group, an accession with orange yellow fruit pulp and several resistant accessions.
- Turmeric was found to be the most remunerative intercrop in banana with a B: C ratio of 2.11 followed by banana pure crop (2.02) and banana + ginger (2.01).
- In banana- vegetable cropping system under partially shaded condition of homesteads in the midland (laterite) farming situation of Kottarakkara, cowpea (Bush) was found to be the best among the inter crops (Cowpea, Bhindi, Sweet potato and Cucumber) tried and the application of vermicompost as the source of nitrogen recorded a better yield than chemical fertilizers.
- Soil and water conservation measures have a positive impact on the growth and yield of banana cv. Nendran. Vetiver planted plot showed early bearing and higher yield.
- Fibre recovery percentage was the highest for machine extraction. Among the retting treatments boiling in NaOH 1% for 30 minutes recorded maximum fibre recovery percentage in Nendran and Mysore Poovan.
- Five promising jack fruit types were identified including a profusely bearing small fruited type from Vellanikkara and a orange yellow flaked type from Pollachi.
- The most effective propagation method in jack was inarching where the graft take was 90% with a final success percentage of 50 per cent.

- The success percentage of jackfruit was found 50% when seedlings of Ainipala were used as rootstocks and inarched with local varieties.
- Under Varietal trial, Muttom vanikka and Pechiparai-1 are vigorous growing and observed regular flowering and fruiting. Palur-1 is less vigorous than Pechiparai-1.
- Among 2064 hybrids and 98 mutants of pineapple evaluated for yield and quality parameters, nine hybrid lines produced fruits having weight more than 1.9 kg and TSS more than 19%.
- Various types of passion fruits collected from southern states to identify a passion fruit variety suitable for low altitude areas in Kerala are being evaluated.
- Maintained germplasm of mango with 160 varieties. The hybrids Ratna & H.151 and varieties Prior & Muvandan recorded higher yields.
- Floral biology and crossability behaviour of selected trees of Moovandan, Priyur etc. were studied in the College orchard
- The treatments Paclobutrazol @ 5.0 g/tree, Paclobutrazol @ 5.0 g/tree + NAA 30ppm, Paclobutrazol @ 5.0 g/tree + KNO₃ (3%) after 90 days were found to be beneficial for inducing flowering and to improve yield in mango in all the three varieties, Alphonso, Prior and Neelum. Cauliflorous flowering could be noticed in Bangalora variety of mango following the treatment which indicates the possibilities of rejuvenation of trees by these methods
- Seedling growth of mangosteen in the nursery was improved in the medium containing vermicompost. GA200ppm+BA100ppm followed by GA 100ppm+BA100ppm and GA100ppm were the superior treatments for enhancing growth of mangosteen grafts in the main field. Application of Paclobutrazol 2.0 g a.i./tree could improve yield and yield attributes in mangosteen.

Floriculture

- Established a Model Floriculture unit for protected cultivation of commercial flowers with the financial assistance of State Horticultural Mission.
- Spike pruning in *Phalaenopsis* has revealed its significant influence on production of new spikes/keikis
- Standardized the post harvest handling technology of selected varieties of *Heliconia*.
- Orchid germplasm including 192 species of sympodial and monopodials are maintained and evaluated.
- Performance evaluation of 41 *Dendrobium* varieties was done. Eight varieties were added to the existing collection.
- Performance evaluation of 40 monopodial orchids belonging to monogeneric, bigeneric and trigeneric origin was done. They were grouped under tall climbing, intermediate and short stemmed epiphytes according to their nature of growth.
- Among the tall climbing orchids, *Aranthera* Anne Black, *Aranthera* Lily Brook Red, *Aranthera* Deborah, *Aeridachnis* Apple Blossom and *Arachnis* Maggie Oei Red Ribbon, together with intermediate climbing types, *Mokara* Chark Kuan Pink, *Mokara* Walter Oumae White and *Mokara* Calypso Pink showed immense potential for use as cut flower.
- Short stemmed *Phalaenopsis* hybrids and intermediate climbing epiphytes like *Ascocenda* varieties were found to be excellent pot plant varieties.
- Germplasm collection of 63 species/varieties of anthurium is maintained and evaluated. Ten new varieties were added to the existing collection.
- In the collection of under-exploited ornamentals, 11 species/varieties of *Heliconia* and 4 *Alpinia*, *curcumas* and gingers were collected and evaluated.

- Among the cut foliage different species of *Asparagus*, *Philodendron Nephrolepis* and the filler, *Solidago* were collected and evaluated.
- Dry flower production technology in selected tropical flowers and foliage was initiated.
- Forty two aquatic plants were collected and evaluated based on the growth habit. Twenty two aquatic plants suitable for water gardening were identified.
- High value ornamentals like gingers and costus were introduced and evaluated.

Spices and Plantation crops

- Assessed the productivity and production constraints of black pepper, ginger and turmeric in the major spices growing districts of Kerala consecutively for two years and documented.
- Ten *Piper* species and over 150 genotypes of *Piper nigrum* are being maintained. One hybrid seedling (P2 x P n 21-09) was found promising in terms of field tolerance to diseases and has very bold berries (100 berry weight 18.24 g and 100 berry volume 17.25 ml).
- Among the new germplasm accessions in Pepper Angamaly, Chalakudy, ICP 48 and Vattamunda were promising with spike yield more than 3 kg/vine. The number of spikes/vine were maximum for Angamaly accession (1300) followed by Chalakudy accession (854).
- In pepper, a combination of irrigation at IW/CPE ratio of 0.25 and a dose of 100:100:300 kg NPK per ha was found to be superior
- Nutrient management as per Package of Practices of KAU resulted in significant increase in green berry yield of pepper (21 percent) over Organic Package of Practices involving FYM 10kg vine⁻¹, Neem cake 1 kg vine⁻¹ and Vermi Compost 1 kg vine⁻¹.
- Integrated nutrient and pest and disease management utilizing FYM 10 kg vine⁻¹, Phosphobacteria 50g vine⁻¹, Bordeaux mixture 1%, Trichoderma 50g vine⁻¹, Pseudomonas 50g vine⁻¹, 50:50:150g NPK vine⁻¹, Copper Oxychloride drench 0.2% and Quinalphos 0.05% significantly superior green berry yield in pepper over fully organic treatment and fully inorganic treatment.
- Evaluated 30 accessions of ginger and identified Accessions 2-0-100 and 2-0-104 as superior ones in terms of fresh rhizome yield.
- Advanced six selected somaclones of ginger for farm trial during 2010-11 season.
- Evaluated 337 ginger somaclones regenerated through indirect methods and selected 10 somaclones for AVT.
- Evaluated 60 germplasm accessions in turmeric and the superior performance of turmeric accession VK-230, in terms of fresh rhizome yield was observed.
- Cocoa germplasm with additional clones imported from the Cocoa Quarantine Centre, University of Reading, UK is being maintained.
- For evolving cocoa varieties resistant to black pod rot disease, artificial cross pollination with resistant varieties was taken up and resulted in 89 hybrid seedlings which were field planted for further evaluations/investigations.
- The cocoa hybrid seedlings raised as a result of hand pollination to evolve varieties resistant to vascular streak die back were field planted for further studies.
- To impart high yielding nature to the seven cocoa hybrids resistant to VSD, they were crossed with released varieties of cocoa viz. CCRP-1 to CCRP-10 and the resulting pods are in different stages of development.
- Selfing in 59 imported/ exotic clones of cocoa germplasm revealed that two of them are self incompatible (SI).
- To obtain advanced generations of inbreds of cocoa, selfing in 58 selected plants resulted in five pods, the seeds of which are sown in the nursery for further evaluation.
- The two inbred S₁ x S₁ crosses of cocoa yielded 29 inbred cross hybrids.

- To cater to the ever increasing demand for hybrid seed pods of cocoa, a new polyclonal seed garden extending to 1.0 ha was raised.

Pulses and oilseeds

- Released two cowpea varieties – Sreya and Hridya and seed production was taken up
- Out of seventeen cowpea entries evaluated, the entry CP-30 recorded higher yield with resistance to collar rot, pod borer, aphids etc. and the variety is further recommended for promoting to farmers fields.
- Front Line Demonstration on horse gram variety CRIDA-18R from CRIDA, Hyderabad revealed the adaptability of the variety to Kerala as well as various cropping systems including pure crop in rice fallows, intercrop in coconut, banana, vegetables etc.
- Hybridization and selection in cowpea to evolve short stature pulse crop for summer fallows is advanced to F3 generation with 122 entries.
- Six PGPR (*P. fluorescens*) isolated from rhizosphere soil showed antagonistic activity to anthracnose caused by *Colletotrichum lindemuthianum*, dry root rot caused by *Macrophomina phaseolina* and collar rot caused by *Rhizoctonia solani* under *in vitro* conditions
- One hundred and fifty cowpea accessions were subjected to morphological, biochemical and molecular characterization and were reclassified into 22 taxa and a dichotomous key was developed to identify different taxa
- In a study to develop black gram varieties suitable for central zone of Kerala, 18 hybrids were produced and F2 population is under evaluation.
- In sesamum twenty local "Ayali" types were collected and evaluated. These are crossed with high yielding varieties viz; Kayamkulam-1, Thilak and Thilarani and hybrid derivatives were selected.
- Popularization of high yielding varieties of sesamum released by KAU was done in Onattukara region through varietal demonstration under FLD on oilseeds.

Forage and Green manure Crops

- Application of 100 percent above the recommended dose of 200:50:50 kg NPK/ha in guinea grass cv. Riversdale significantly increased green fodder yield, dry fodder yield, crude protein content, crude protein yield and net returns in both pure crop and intercrop in coconut gardens.
- Perennial bajra-napier hybrid is the best in fodder based cropping system with highest yield and net returns under irrigated condition.
- Fodder maize varieties DMRF-26, DMRF-27, DMRF-28, EC-3135 and EC-3136 were found high yielding and suitable for Kerala and application of 60 kg N/ha resulted in significantly higher yield and quality of fodder.
- Fodder cowpea varieties UPC-618, UPC-619, UPC-621, UPC-622 and UPC-623 were significantly superior in fodder yield and responded up to 40 kg/ha of phosphorous.
- Soil application of zinc sulphate @ 10 kg Zn/ha¹ along with FYM@10tha⁻¹ and NPK 120:60:40 kg/ha¹ improved the yield and quality of fodder maize var. African Tall
- Farm trials conducted at 10 locations in Thiruvananthapuram, Kollam and Pathanamthitta districts using two advanced cowpea cultures (hybrid derivatives) showed that Culture 1 recorded the maximum green fodder yield followed by Culture 2.
- Farm trials using two selections of fodder rice bean with high yield and adaptability under partial shade and in rice fallows showed that Selection 1 recorded the maximum green fodder yield followed by Selection 2 in partial shade as well as in rice fallows.
- Two guinea grass clonal selections developed are found to be promising with high green fodder yield, quality and adaptability.
- Cassava based fodder production system involving alley cropping in cassava cv. Vellayani Hraswa, with two rows of palisade grass (*Brachiaria brizantha* cv. mulato) interplanted with one

row of fodder cowpea (*Vigna unguiculata* cv. COFC-8) is the most efficient with respect to biological productivity, quality of feed, economic returns and land use efficiency.

Aromatic and Medicinal Plants

- Germplasm of 420 accessions of lemongrass, 16 accessions of palmarosa, 22 accessions of citronella, 21 accessions of vetiver and a collection of over 450 medicinal plants are maintained at the Aromatic and Medicinal Plants Research Station, Odakkali.
- Several medicinal plants were identified to possess very high antioxidant capacities under *in vitro* assay conditions. This indicates wide scope for developing nutraceuticals based on these plants or their extracts.
- *In vitro* antioxidant power of a wide variety of traditional and proprietary Ayurveda medicines (choornas, arishtams and lehyas) were assayed. It was found that medicines slowly lose their antioxidant capacity under conditions of storage.
- HPLC fingerprint of polyphenols in important medicinal plants, crude drugs and medicines were developed which will help in their qualitative identification.
- Among the various accessions of brahmi (*Bacopa monnieri*) collected, accessions AMP 11 and 42 were found to show exceptionally high bacoside content of 3.87% and 4.71% respectively.
- A spacing of 20 cm x 10 cm spacing was found to be optimum for irrigated brahmi (*Bacopa monnieri*).
- Developed the technology for date of planting, water management, harvesting interval and best storage method for brahmi
- Nature and occurrence of common pests and diseases of brahmi were studied and noticed larvae of *Spodoptera littura* during September-October and jassids during dry months
- Anti-inflammatory activity of *Argyreia speciosa*, *Ipomoea mauritiana* and *Artanema sesamoides* is confirmed by *in vivo* studies. Use of these plant drugs for cure of inflammatory conditions in traditional medicine system is scientifically validated. Ethanol extractives of *Artanema sesamoides* and *Argyreia speciosa* roots showed highest antioxidant activity, anti-inflammatory activity and very high total phenolic content.
- Root decoction of *Artanema sesamoides* was found to be most active in curing inflammation but inferior to successive ethanolic extract of root and both do not possess acute toxicity. No death or fatal symptoms had been noticed up to a dosage of 5000mg/ kg of animal (Wistar rat).
- Somaclone mutants of chethikoduveli (*Plumbago indica*) having higher tuber number and plumbagin content were developed through *in vitro* mutagenesis.
- Two promising accessions of asokam (*Saraca asoca*), IC 566487 and IC 566492 possessing vigorous growth rate, higher bark yield and tannin content were identified.
- Air layering was found to be the best method for true to type propagation of asokam (*Saraca asoca*).
- Good agricultural practices (GAP) for higher root yield and ephedrin content of *Sida cordifolia* were developed.
- High yield and quality of chethikoduveli (*Plumbago rosea*) were obtained in sandy clay loam soil.
- A TLC fingerprinting technique for differentiation of asokam (*Saraca asoca*) bark from that of the major adulterant, polyalthia (*Polyalthia longifolia*) was developed and tested in market samples.

- Formulated the package of practices for the domestication and cultivation of the valuable medicinal orchid *Seidenfia rheedii*. Pseudo bulbils each weighing 7g and 75% shade ideal for propagation and growth respectively. Medicinal qualities did not change on domestication.
- Successful organic cultivation packages were evolved for *Rauvolfia serpentina*, *Desmodium velutinum*, *Pseudathelia viscida*, *Nervilia aragona* and *Seidenfia rheedii*.
- Tribals were empowered in the large scale cultivation of medicinal plants, observing GAP and GMP and market linkage was established with Oushadhi.
- A low cost technology for the cultivation of medicinal plants, *Ganoderma lucidum* was standardized.
- Time of anthesis and anther dehiscence in *Piper longum* is observed to be from 7.30 am to 4.30 pm with a peak between 10.30 am to 12.30 pm; Time taken for complete opening of flowers is seven days. NAA 25 mg l⁻¹, GA3 50 mg l⁻¹, BA 100 mg l⁻¹, 500 mg l⁻¹ and boron 3 mg l⁻¹ were effective in inducing fully bisexual spikes. Seed set was reported for the first time in *Piper longum*.
- 60 accessions of thippali were collected and the plants show wide variability with respect to leaf, plant growth habit and spike characters. Two plants identified as bisexual types.

Post Harvest Technology

- Developed protocol for the extraction of colour pigments from Marigold and their application in food products.
- Standardized the technology for extraction and value addition of mango seed kernel flour.
- Standardized the time, temperature and duration of vacuum concentration of jackfruit pectin extract and pineapple pulp.
- Standardized the procedure for preparing fruit toffees, chunks, fruit bars, candy and jujube from jack fruit.
- Extracted pectin from jack fruit rind and concentrated in vacuum concentrator. Time, temperature and duration of concentration was standardized. Pectin concentrate was found to be an excellent additive in jam for getting good consistency.
- Pineapple pulp vacuum was concentrated. Time, temperature and duration of concentration standardized. The products prepared using concentrated pulp viz., jam, toffee and fruit bar were of excellent quality.
- Standardized the procedure for preparing fruit toffees, chunks, fruit bars, candy, jujube.
- Preliminary survey to identify potential beneficiaries engaged in processing activities was conducted and six training programmes were conducted. Fruits and vegetable processing units were established in rural areas of Thrissur (4), Palakkad (2), Malappuram (1), Emakulam (6) districts.
- Technology for production of different products from underexploited fruits and vegetables like pickles (20 types), dehydrated products (40 types) jams (3 types), Osmo- dehydrated products (3 types), squashes (10 types) and wine (10 types) were developed.
- Through survey traditional processed products from fruits and vegetables were collected from the districts of Thrissur, Malappuram, Palakkad and Wayanad districts and were documented
- The protocol for the presentation of mango seed kernel flour (MSKF) was developed
- Value addition studies were conducted with composite flour of MSKF and cereal flour. Sensory evaluation of products indicated that MSKF could be used as a substitute up to 50% for refined flour in biscuit, 70% for cocoa powder in cake, 50% for corn flour in pudding and 30 % for rice flour in *puttu*
- A biowaste management strategy for house hold level adoption was perfected. The clean energy and organic manure thus produced can partially replace LPG and fertilizers, resulting reduction in carbon emission.

Soils and Agronomy

- Various organic and inorganic nutrient sources did not have any significant effect on yields of selected underexploited crop species, viz., *Boerhaavia diffusa*, *Cassia tora*, *Centella asiatica*, *Curcuma amada* and *Alternanthera sessilis*.
- Among the selected underexploited crop species, *Alternanthera sessilis* and *Centella asiatica* have comparatively high contents of potassium (4.6% and 4.4%), while *Boerhaavia diffusa* and *Cassia tora* were high in calcium (3.52% and 6.7%). Except for *Cassia tora*, all the plant species were rich in iron and manganese.
- Phosphogypsum was identified as a potential source of ameliorant for the laterite soils of black pepper gardens
- Common extractants for the available micronutrients in laterite soils were identified. Mehlich No.3 was identified as a common extractant for Zn, Cu, B & Mo.
- Application of S @ 30 kg ha⁻¹ and B @ 2.5 kg ha⁻¹ could favourably enhanced the yield and quality of Sesame.
- The application of different amendments viz. lime @ 9.1 t ha⁻¹ and green manures *Pongamia pinnata* and *Cleistanthus collinus* both @ 20 tons ha⁻¹ were helpful in the transformation of P in soil and improved the status of available P.
- *Eichornia crassipes* and *Cyperus pangorei* were identified as good phyto extractors for heavy metals and the fungi *Trichoderma virens* and *Pseudomonas fluorescens* synergise the heavy metal extraction by plants from soil.
- Formulated STCR targeted yield equations for pumpkin and conducted test verification experiments on Mundakan rice
- Provided data base and adhoc recommendations for soil based plant nutrient management plan for agro ecosystems of Kerala
- Co-ordinated the data on micronutrient research in different crops of Kerala and formulating adhoc recommendation for lime, secondary and micronutrients based on soil test results
- A manual on suitable soil test methods for Kerala was released to be followed in all soil testing labs of the state including those of ICAR institutions, commodity boards and stations of KAU and KVKs
- Soil health cards based on the soil nutrient status were distributed to the farmers of the different Padashekarams of Karilands.
- For soil fertility mapping of Kuttanad soils, about 1000 soil samples from 31 Padashekarams of Kottayam district were collected and analyzed for pH, EC, major nutrients and micro nutrients based on which soil fertility mapping was undertaken.
- Developed a model including components such as crop, animal, poultry, apiary and ornamental fish unit at FSRS, Kottarakkara.

Seed Technology

- Nucleus seeds of twenty one popular rice varieties and 57 vegetable varieties were multiplied.
- Relationship of ODVs (Other Distinguishable Varieties) identified in Seed Testing Laboratory (STL) samples with genetic impurity in GOT (Grow Out Test) was assessed and more than 90 per cent ODVs were off types. This confirms the utility of ODV in identifying the genetic purity of varieties.
- Seed quality standard of different seed lots of rice in relation to seed vigour was identified. The highest vigour index was exhibited by the newly released upland variety Vaisakh.
- In participatory seed production programme at farmer's field, farmers of Malappuram and Palakkad districts were participated.
- The seed quality of 727 samples of Rice, Vegetables, pulse and oilseeds submitted by the Department of Agriculture and Seed production centres of the University were analysed

Plant Protection

- In the screening of rice entries provided through coordinated trials forty entries showed moderate resistance to rice leaf folder with less than 10 per cent leaf damage while entries IET 21687, 20863, 21119 and 21540, JGL 17644 and 17786 showed resistance to gall midge. Forty six entries showed moderate resistance reaction to whorl maggot.
- Gall midge biotype studies with screening of 17 rice entries could confirm the presence of biotypes other than biotype 5.
- Rice blue beetle *Leptispa pygmaea* infest the rice crop during early tillering stage and incidence was lower at closer spacings (10 cm x 15 cm and 10 cm x 10 cm) than at wider spacing (20 cm x 15 cm). Two grassy weeds viz., *Panicum repens* and *Isachne miliacea* act as alternate hosts and the beetle eggs are parasitized by *Trichogramma chilonis*, *T. japonicum*, *Telenomus* sp. and *Tetrastichus* sp. None of the existing varieties show varietal resistance to the insect. Application of *B. bassiana* at 10^7 spores/ml significantly reduced the population as well as leaf damage and hill damage by blue beetle.
- Studies showed that conservation of the spiders (*Arachnafauna*) in rice fields is of utmost importance, through which natural bio control will be effectively executed.
- Studies on screening of new insecticide molecules showed that combination insecticides namely Flubendiamide + Buprofezin @875 ml/ha was effective against rice stem borer and whorlmaggot of rice with highest grain yield among all other tested insecticides during rabi season.
- Pesticides and fungicides compatibility tests with two new insecticides: Flubendiamide (0.25g/lit), spinosad (0.25 ml/lit) and fungicides: Isoprothiolane (1.50 ml/lit) and Tricylazole (0.60 g/lit) alone and in combination were tested. The results showed that insecticides alone or in combination with fungicides were effective against stem borer and leaf folder of rice. Highest grain yield was obtained from Flubendiamide (0.25 g/lit) + Isoprothiolane (1.50 ml/lit) treated plots.
- The studies on insect collection with light trap showed highest population of stem borer (128 numbers/day) during 2nd week of January, gall midge (32 numbers/day) during 3rd week of September, green leaf hoppers *N. nigropictus* (720 numbers/day), *N. virescens* (640 numbers/day) during last week of January, brown plant hopper (172 numbers/day) during 2nd week of May, caseworm (29 numbers/day) during last week of August and rice bug (85 numbers/day) during 3rd week of March respectively .
- Virulence analysis of blast pathogen of rice *Pyricularia grisea* showed that some of the tested differentials containing resistance offered resistance to the local isolate of blast pathogen eg: Tetep and Tadukan showed resistance reaction.
- Screening for blast, bacterial blight and sheath blight identified source of resistance.
- As a part of search for new molecules for management of diseases, two new molecules, Hexaconazole 75 WG and Kresoxymethyl 40 per cent + hexaconazole 8 per cent WG were tested and found effective against brown spot of rice.
- For the combined infestation of sheath blight and leaf folder, combination product of fungicide and insecticide (Flubendiamide 3.50 per cent + hexaconazole 5 per cent WG) was tested against sheath blight and leaf folder in comparison with hexaconazole and Flubendiamide individually.
- Combined application of 2 % cowdung slurry supernatant and 2 % *P. fluorescens* suspension was found to be effective against Bacterial blight of Rice.
- Botanicals viz., Achook, Spictaf, Neem gold, Neem azal, Tricure, Wanis and biocontrol agents viz., *Pseudomonas fluorescens*, Biotos, Biofer, Defender and Florezen P, Trichozen-T etc. were found effective in reducing the sheath blight severity in rice. Application of green manures, green gram, daincha and sunhemp (2.5t/ha) was also effective in reducing sheath blight severity and increased grain yield.

- Plant extracts (10%) of Subabul, Ocimum, Catheranthus, Nux vomica and Neem and homoeo medicine Sulphur Q were found effective in reducing the brownspot disease. Seed infection was minimum with Ocimum extract followed by Subabul extract.
- Integrated disease management strategies including host plant resistance, use of bio control agents like *Pseudomonas fluorescens* and vermicompost are effective for the control of rice blast.
- Under the field experiment on management of cowpea pests "azadirachtin 300 ppm (nimbecidene) 0.2% was found to be effective in managing cowpea pests viz pea aphid, epilachna beetle, pod borers and pod bugs when applied at 7th and 20th DAS and at pod formation stage if necessary .
- Breeding works carried out in vegetable cowpea, KMV-1 with Co-6 has helped to identify 12 promising lines of vegetable cowpea with resistance/tolerance to cowpea aphid borne mosaic virus and the trial is in progress.
- Thirty fungal plant pathogens isolated from diseased specimens of various crop plants and maintained pure cultures of these organisms at ORARS, Kayamkulam.
- The causal agent of black rot of cauliflower is identified as *Xanthomonas campestris* pv. *campestris*
- *In vitro* evaluation and field trials on disease management showed that, Garlic 5%, turmeric 10%, Tetracycline 200ppm and Kocide 0.2% are effective against black rot of cauliflower.
- During the survey conducted in vegetable growing areas of Thrissur district, four types of mosaic symptoms were noticed and snake gourd, bottle gourd, coccinia, tomato, chilli and cluster bean are the hosts of mosaic virus
- Ekalevyan- a local variety of Ashgourd (farmer Joy, Puthenchira) showed resistance to mosaic disease.
- *Trichoderma harzianum* (1%) + *Datura stramonium*(20%) + Garlic bulb extract (10%) completely inhibited the growth of *C.gloeosporioides* causing fruit rot of Chilli
- *Paecilomyces lilacinus* was found to be the most promising fungus for the management of melon fly. Mass multiplication was found to be best in rice bran. Soil drenching + spraying with *P.lilacinus* recorded higher yield in bittergourd.
- Amrutneem 5ml/L was the best in controlling the pod bugs on cowpea.
- Plant Health Clinic started functioning under SHM at RARS, Pattambi, the field problems of the farmers are addressed and suggestions are being given to the farmers
- Pathogenicity of one new isolate in sugarcane (Isolate I Co Tl 88322) along with five designated pathotypes viz., cf4 (Co 419), cf5 (Co 997), cf6 (CoC 671), kr I and kr II was tested on 14 differentials and there is a possibility of emergence of a new pathotype on Madhuri variety (Co Tl 88322).
- In a survey conducted in three districts of South Kerala, Ring spot, Banded sclerotial disease and Red rot in one pocket at Thiruvananthapuram, Alappuzha district. Pokkah boeng disease was noticed during May June, but the plants could recover from the disease after south monsoon showers in sugarcane.
- Sugar cane entries are being screened for susceptibility/ tolerance to red rot disease by plug method of inoculation and nodal method of inoculation through IVT (Early, midlate) and AVT. Out of the 18 entries tested in the IVT (Early), CoC 671 showed moderately susceptible reaction and Co JN 07091 showed susceptible reaction to plug method of inoculation. All the varieties showed resistant reaction to nodal method of inoculation. Out of the 16 entries tested in the IVT (midlate), Co 07006 showed moderately resistant reaction and Co JN 07093 showed susceptible reaction to plug method of inoculation. All the varieties showed resistant reaction to nodal method of inoculation. Out of the 8 entries tested in the AVT (Early I plant), Co 06001, Co 85004 and Co 94008 showed moderately resistant reaction and Co 06002, Co 06022, CoM 06082 and CoC 671

showed moderately susceptible reaction to plug method of inoculation. All the varieties showed resistance reaction to nodal method of inoculation.

- Banana varieties Rasthali (AAB) and Monthan types (ABB) were highly susceptible to fusarium wilt disease. Rasthali (AAB) and Njalipoovan recorded 100% incidence.
- Nendran, Rasthali and Popoulu were found susceptible to Bacterial wilt
- Banana accessions Matti and Njockon recorded 60 per cent infestation by pseudostem borer.
- Pseudostem borer population in banana started to build up by 6th month after planting.
- Pseudostem borer can also be managed by cutting and removing the dry leaves and spraying chlorpyrifos at 0.05 % at monthly intervals for three times, at 6th, 7th and 8th month after planting. Placing 30 cm long, split pseudostem pieces of harvested banana, treated with formulation of *Beauveria bassiana* @ 15 gm/ piece, at weekly intervals starting from 5th month till harvest gave good control of the borer.
- The root mealy bugs in banana occurred in 117 Panchayats in 10 districts of Kerala and except Trivandrum, Kollam, Alleppey and Kasaragod. Highest population in the month of July followed by June and August and started declining from August to May. Root mealy bug can be managed by application of recommended dose of lime, i.e., 1 kg/ plant in split doses, regular removal of weed flora in banana gardens (which harbour the mealy bugs), followed by application of entomopathogenic fungus, *Verticillium lecanii*, either alone / or in combination with neem oil (3%) and hostathion in alternate months
- Presence of root mealybug colonies and white mealy wax deposits on roots and in the soil were the clear symptoms of infestation. There are two species of root mealy bugs infesting banana, namely, *Geococcus citrinus* Kuwana and *G. coffeae* Green.
- One coccinellid predator, *Scymnus (Pullus)* sp. was found feeding on the eggs and grubs of *G. citrinus*. A bug predator (unidentified) resembled the mealybugs was found feeding on the eggs. One entomogenous fungus, namely, *Paecilomyces lilacinus* was found infecting the mealybugs in the field and *Paecilomyces* is a fungus being widely used for the management of mealybugs.
- Isolated an entomopathogenic fungus, *Paecilomyces lilacinus* for the first time from the root mealy bug, *Geococcus* sp
- The nematode genera commonly encountered in banana were *Rotylenchulus* and *Tylenchorynchus* and very low population of *Radopholus*, *Helicotylenchus* and *Meloidogyne*. *Hoplolaimus* and *Heterodera* were observed from few sites.
- Papaya mealybug was recorded on 72 host plants. Severe infestation (>90 %) could be observed on papaya, plumeria, jatropha, hibiscus, brinjal, guava, etc.
- Major diseases of banana on the basis of survey were Sigatoka leaf spot disease, Cordana leaf spot, Black leaf spot, Freckle disease, Rhizome rot disease, Banana bunchy top disease, Banana bract mosaic disease, Infectious chlorosis, Banana Streak, Cigar end rot, Anthracnose and Pseudostem rotting. Panama Wilt recorded in Rasthali (AAB), Njalipoovan and Kadali and pseudostem rotting in Kadali.
- New introductions of the germplasm such as SH-3640, TMB5295-1, FHIA-25, FHIA- 21, FHIA03, TMB2 x 9128-3, TMB 3x15100-6 found to be resistant to sigatoka leaf spot disease
- Spraying Propiconazole (Tilt 25% EC) 1 ml/l (0.1%) + Spraying of *Pseudomonas fluorescence* @ 5g/litre three times. + Petroleum based mineral oil 1%) showed to be the most effective for Sigatoka leaf spot disease and seen least at flowering
- A centre for virus indexing has been established at BRS, Kannara. Various techniques standardised and validated in this lab are:- 1. BBrMV: RT-PCR and ELISA, CMV: RT-PCR and ELISA, BSV: PCR, IC-PCR 4.BBTV: PCR and ELISA. All the TC plants produced from the TC lab of BRS are being indexed. The indexing facility is rendered to other TC lab of the University as well as to private tissue culture labs on payment basis. The genotypes in germplasm and all

planting material are being screened using ELISA and the procedure for the molecular indexing has been standardised.

- Intensive studies on Banana Streak virus disease was carried out. Immunocapture PCR technique was also standardised for indexing BSV
- The BSV disease incidence recorded on seven accessions viz., Mottapoovan, Mysorepoovan, Kalibale, Chandrabale, Chinali, Nendran and FHIA-3 and per cent infection varied from 13.25 to 32.16.
- Natural transmission was through planting materials and mealy bugs, *Dysmicoccus brevipes* and *Ferrisia virgata* are the insect vectors of the virus.
- The molecular diagnosis of BSV using polymerase chain reaction (PCR) from infected samples was standardised using specific primers.
- Immunocapture Polymerase Chain Reaction for detection of virus infection directly from crude sap was also standardised.
- Survey on the incidence of diseases in jackfruit showed the occurrence of leaf spot, fruit rot, Rhizopus fruit rot and Algal Rust.
- The fungicides viz. 1% Bordeaux mixture, 0.15 % copper hydroxide, 0.3% Captan, 0.1% hexaconazole and the bioagents, *Trichoderma viride* and *Pseudomonas fluorescens* (2% each) were equally effective in the management of dieback disease of mango grafts. The varieties, Alphonso and Mugoa were found highly resistant to dieback disease.
- The fungicide Samarth @ 0.4% (Hexaconazole 2% SC) was found highly effective against collar rot and other diseases of pineapple. Hexaconazole 0.4% is safest with good disease control efficiency
- Isolated *Sclerotium rolfsii* from infected fruit crops and ornamentals viz., banana, mango, chrysanthemum and marigold. Symptomatology study revealed variation in the symptom developed by the pathogen on these crops. Cross inoculation study revealed that isolates obtained from these crops could infect each other.
- Three different talc based consortial formulations of antagonists (Trichoderma combination, bacterial combination and Trichoderma + bacterial combination) with shelf life of 6-12 months have been developed for the management of rhizome rot of ginger and bacterial wilt of chilli and ginger
- The highest germination percentage (95%) was recorded in the plots in which ginger rhizomes were treated with rhizobacterial antagonist and endophytic bacterial antagonist respectively.
- The viruses infecting black pepper in Kerala, were identified as pepper yellow mottle virus and cucumber mosaic virus. These viruses were found to be transmitted by *Ferrisia virgata* (mealy bugs) and *Toxoptera aurantii* (aphids), grafting and seed.
- The multiple modes of action of *Vitex negundo* against insect pests has been identified and hence there is good scope of its utilization as an efficient component in Integrated Pest Management programmes against *Spodoptera litura* and *Henosepilachna vigintioctopunctata*.
- The combination treatment of Rogor 0.25% + *Azadirachta indica* 5% oil based spray gave good control against American Serpentine Leaf Miner in cucumber
- Studied the diversity of phytophagous mites in important crops of Kerala
- Developed and distributed of MAT (pheromone) blocks for the effective management of mango and cucurbit fruit flies
- Combined application of *Trichoderma harzianum* (MTCC 5179) 10^8 CFU 50g/vine with 1 kg neemcake and consortium of bacteria (50g / plant) (IISR – 6 & IISR – 859) @ 10^8 CFU/g was found to be the best treatment for managing the Phytophthora foot rot disease in the existing plantation of Black Pepper followed by Potassium Phosphonate 0.3% spray and basal application of *Trichoderma harzianum*

- Survey conducted revealed that gall wasp infection on Erythrina was limited to a few pockets of Pampadumpara, Erattayar, and Chakkupallam area. In all the other areas the infection was found to be less. The infection was found only in black thorned Erythrina
- Plots treated with *Trichoderma harzianum* and consortium of bacteria (10^8 CFU/g) in combination @ 50g / plants was found effective in the management of rhizome rot and Capsule rot disease in new cardamom plantation followed by consortium of bacteria alone @ 50g / plant.
- A combined application of Entomopathogenic nematode (EPN) *Heterorhabditis indica* @ 100 ij /grub and imidacloprid 0.006% was found to be the best treatment for the management of root grub in cardamom.
- Six round sprays of Quinalphos 0.05% was found to be the most effective for the management of Cardamom shoot and capsule borer and cardamom thrips.
- Native antagonistic microflora like *Trichoderma* species, and *Bacillus subtilis* were isolated from pepper rhizosphere of CRS Pampadumpara and screened against pollu disease and Fusarium wilt of pepper. Tale based formulations of selected antagonists were prepared and is being used for field trials.
- A survey of nematodes in cardamom rhizosphere revealed that spiral nematode *Helicotylenchus* sp was the major nematode pest in major cardamom growing areas of idukki district.
- In farms practicing organic cardamom cultivations the population of bacterivorous, fungivorous and predatory nematodes were found to be highest and that of plant parasitic forms were lowest
- The population of endophytic microflora in cocoa plants varied among different locations and parts of the plant, and in general, the population was more in roots.
- Out of the 325 endophytic isolates, 82 were found exerting antagonism towards the pathogen and among these five isolates viz., EB-31, EB-35, EB-40, EB-65 and EF-81, which were selected as promising endophytes
- Induction of systemic resistance by the promising isolates was studied by assay of defense related compounds and enzymes and the study revealed more accumulation of phenols and proteins, higher activity of PO, PPO, and β -1,3-glucanase noticed in treated seedlings
- The endophytes were proved to be more effective in reducing PPR in field compared to conventional practices.
- Based on cultural, morphological and biochemical characters coupled with results of molecular characterization, the promising bacterial endophytes were identified as *Pseudomonas putida* (EB-31), *Bacillus subtilis* (EB-35), *P. plecoglossicida* (EB-40) and *P. aeruginosa* (EB-65). The isolate EF-81 was identified as *Penicillium minioluteum*.
- Capacity of endophytes to enter and colonize the interior of plants on external application was tested and noticed that *Bacillus subtilis* (EB-35) and *P. aeruginosa* (EB-65) entered the cocoa seedlings when applied on leaves and also inside the pods on application on the intact surface in cocoa.
- Population density of birds of agriculturally important was recorded on crops viz., rice (both kole land and other irrigated rice crops), vegetables, cashew, fruit crops and organic agricultural fields.
- Population density of agriculturally important birds was recorded on crops viz., rice (both kole land and other irrigated rice crops), vegetables, cashew, fruit crops and organic agricultural fields. On rice the bird damage occurred during seeding, vegetative and maturity stages. The main depredatory birds on rice were baya, pigeon, moorhen, parakeets, etc. the damage ranged from 2.2 to 48.0 per cent at different stages of the crop.
- In vegetables mainly the cow pea and bhindi were damage by the parakeets (15%).
- In Kole lands the species richness was 77 with cattle egret be the most dominant bird followed by the teals. There was no significant difference existed among the organic and the traditional fields as for as the birds are concerned.

- Metalized reflective ribbons were used against the depredatory birds in the rice and vegetable fields. The scarring effect against the birds was well beyond two weeks.
- Automatic cracker station was fabricated and evaluated for scarring the depredatory birds in Pokhali rice fields.
- Pellet analysis of barn owl showed that the bird survive mainly on rodents and shrews (99%). Artificial nesting sites were provided for the owls and other beneficial cavity nesting birds.
- The house sparrow population studies showed that the bird confined to the market places mainly and only in the hilly areas the birds could be recorded in the agricultural fields.
- Bird mortality in the vicinity of crop fields was very less during the period under report. The tissue samples analysed for the insecticide residue showed below detectable level (BDL) of residues.
- In rice the population of natural enemies like spiders and coccinellids was high in Bio Intensive Integrated Pest Management plots compared to conventional farming.
- The aphid count/plant and percentage infested plants/plot low in *Cheilomenes sexmaculata* (coccinellid predator) released plot and chemical control plot compared to control in vegetables and high incidence of natural predators like coccinellids and syrphids observed in control plot throughout the cropping period
- Survey on the papaya mealybug *Paracoccus marginatus* and their natural enemies revealed that 60 per cent of papaya plants was found affected and the intensity of damage was medium
- By the introduction of the mealybug specific parasitoid, the population of the papaya mealybug had come down significantly. The parasitoid had established throughout Kerala and the papaya mealybug is under control now.
- The anthocorid predator *Blaptostethus pallescens* was found to be a promising bio control agents against spider mites.
- Biocontrol of *Chromolaena odorata* utilizing *Cecidochares connexa* by inoculative releases. *Cecidochares connexa* produces galls in *Chromolaena* plants. In plants with galls there was significant decrease in plant height and number of branches when compared to control plants.
- The population of *O. arenosella* significantly reduced after release of the natural enemies *Cardiastethus exiguus* and *Goniozus nephantidis* in the surveillance and need-based control of coconut leaf caterpillar, *Opisina arenosella*

Pesticide Residue

- In a study to generate residue data of the insecticide deemed to have registered for pest control in pepper the mean initial deposit of quinalphos in dry pepper observed in four locations ranged from 5.09 to 6.56 mg/kg which dissipated to BDL of 0.05 mg/kg on 35th day after second spray. The mean half life worked out is 6 days. Soil samples collected from all the four location at 20 days after the second spray were BDL of 0.05 mg/kg.
- Residues of dimethoate in coffee beans and in soil samples collected at harvest were below the detectable level of 0.05 mg/kg in four coffee plantations in Wayanadu District.
- Spiromesifen (Oberon 240 SC) applied at the fruiting stage of tomato @150g ai/ha resulted in a mean initial deposit of 0.488 mg/kg which dissipated to 0.09 mg/kg on 5th day after application, while when applied @300 gai/ha the mean initial residue was 0.73 mg/kg and the residue got dissipated to 0.34 mg/kg in 7 days with half life of 2.08 days @ 150gai/ha and 6.39 days @ 300 gai/ha. The residues reached below the detection level of 0.05 mg/kg in 8.83 and 26.45 days, respectively in the above two doses. The residues of spiromesifen in soil samples taken from tomato plots on 15 days after the last application were below the reporting limit of 0.05 mg/kg, in both the doses.
- Flubendiamide (Fame 480 SC) when applied at the fruiting stage of brinjal @ 90g a.i/ha resulted in a mean initial deposit of 0.41 mg/kg which dissipated to BDL of 0.05mg/kg on 3rd day after application with a half life of 0.81 days, while when applied 180g a.i/ha, the mean

initial residue was 0.96 mg/kg and the residue got dissipated to BDL on 5th day with half life of 0.82 days. Harvest time residues of flubendiamide in field soil were below detectable level of 0.05 mg/kg. Des-iodo flubendiamide, the metabolite of flubendiamide was not detected either in brinjal fruits or in field soil.

- Studies on the dissipation of a new combination product of spirotetramat + imidacloprid, on chilli following three spray applications @1000 ml/ha and 2000 ml/ha at fruiting stage indicated that the initial deposit after the third application were 1.2 and 2.53 mg/kg, respectively for lower dose. The corresponding level at the higher dose were 1.75 and 3.15mg/kg.
- Studies on the dissipation of trifloxystrobin +tebuconazole (Nativo 75 WG) in banana following four spray applications @ 350 g /ha and 700 g /ha at fruit setting indicated that the initial residues of trifloxystrobin, tebuconazole and trifloxystrobin metabolite in raw (green) fruits with peel were 0.915, 2.628 and 0.018 mg/kg respectively, in the lower dose. In the case of fruits without peel, the initial residues of trifloxystrobin and tebuconazole were 0.059 and 0.2461 mg/kg respectively and no metabolite was detected. The initial residues of trifloxystrobin, tebuconazole and trifloxystrobin metabolite in raw banana fruits (with peel) were 1.19, 3.15 and 0.038 mg/kg respectively when applied at the higher dose. In the case of fruits without peel, initial residues of trifloxystrobin and tebuconazole were 0.283 and 0.574 mg/kg, respectively and no metabolite residue was reported for the higher dose tested. The limit of quantification of the method is 0.05 ppm for trifloxystrobin, tebuconazole and trifloxystrobin metabolite.
- In a study of the dissipation of Flubendiamide (Fame 480SC) in cardamom following three applications @1.5 and 3.0 ml/ 10 litres of water at 21 days interval indicated that the initial deposit of flubendiamide in cardamom capsules were 0.35 and 0.68 mg/kg, which dissipated at the half-life of 0.76 and 0.94 days, respectively in the first location. Harvest time residues of flubendiamide in field soil were below detectable level of 0.05 mg/kg. Des-iodo flubendiamide, the metabolite of flubendiamide was not detected either in cardamom capsules or in field soil. The residues were 0.30 and 0.53mg/kg in the second location dissipated with a half life of 0.89 and 1.0 day

Beneficial Organisms

- Established a biocontrol & biofertilizer production unit at College of Agriculture, Vellayani in which mass production of biocontrol agents –*Pseudomonas* & *Trichoderma* and Biofertilizers-*Azospirillum*, *Azotobacter*, *P-solubilizers* and AMF and quality analysis of microbial inoculants and samples are being undertaken.
- A formulation technology with emphasis to sustain virulence and higher shelf life of Microbial inoculants including insect biocontrol agents-*Beauveria*, *Metarrhizium* and *Verticillium* has been developed.
- Organisms suitable for organic waste decomposition have been isolated from Kerala soils and highly efficient organisms for lignin and cellulose degradation has been obtained. These isolates would be highly useful for organic waste decomposition and manure production.
- Isolation and screening of native biofertilizer and biocontrol organisms is in progress.
- Efficient strains developed under various projects are being maintained as pure culture and supplied to various production centers in the state as and when required.
- The mother culture and production technology have been transferred to the 35 production centers in Kerala and technical help is being given to these centers as part of the project.
- Consultancy service is being provided to all the 32 microbial inoculant production centers functioning with our technology.
- Native *Bradyrhizobium* sp and AMF were isolated from cowpea growing areas using appropriate media and efficiency testing is in progress.
- Efficient biocontrol organisms, *Pseudomonas*, *Trichoderma* and *Bacillus* capable of suppressing *Phytophthora capsici* and *Rhizoctonia solani* have been isolated and identified through dual culture technique.

- Ten potential *Trichoderma* isolates antagonistic to *Ralstonia solanacearum*, *Phytophthora capsici*, *P. meadii* and *Pythium* spp. were screened for tolerance to copper oxychloride fungicide. All ten potential *Trichoderma* isolates are tolerant to the recommended doses of (0.2% - 0.5%) of copperoxy chloride. Among the ten, six isolates showed sporulation at 2 % concentration and 5 isolates at 5 % concentration of COC.
- Addition of one per cent fresh coconut water found to increase the strength of *Pseudomonas fluorescens* suspension and thereby reduced the dose of formulation.
- Isolated endophytic actinomycetes from tomato plants collected from Vellanikkara, Cherumkuzhy, Elanad, Ozhalapathy & Eruthiampathy. *In vitro* evaluation of antagonistic effect of endophytic actinomycetes against *Ralstonia solanacearum* was studied and maximum effect was showed by Vellanikkara isolate. Maximum IAA production was showed by Ozhalapathy isolate. Siderophore, ammonia and non volatile metabolite production were positive and HCN production was negative for all isolates.
- Pot culture experiment to evaluate the effect of promising endophytic actinomycetes showed that Ozhalapathy isolate (*Streptomyces griseolus*) is effective against bacterial wilt of tomato.
- Developed four consortial formulations of bioagents with shelf life of 6-12 months viz., *Trichoderma harzianum* + *Bacillus magaterium*, *Trichoderma harzianum* + *T. viride*, *Trichoderma harzianum* + *Pseudomonas fluorescens* and *Bacillus magaterium* + *Pseudomonas fluorescens* for the management of *Phytophthora* rot of black pepper and Vanilla and bacterial wil of chilli.
- Out of thirty three native isolates of *Bacillus thuringiensis* screened by polymerase chain reaction, eight isolates were positive for parasporin 4 (cry45) and seven for parasporin 1 (cry31) in the evaluation of anti-cancer properties of crystal proteins of *Bacillus thuringiensis* isolates from the Western Ghats of Kerala
- Crystal protein isolated from KAU 5 resulted in 81% cell death in the cancer cell line DLA, as revealed by MTT assay.
- Homology search by BLASTn revealed that amplicons from KAU 5, 14, 102 and 160 shared more than 82% homology with parasporin 4 gene in NCBI database
- Collected soil and leaf samples from Aryankavu, Achan Kovil and thenmala forest range of Kollam districts and Nilambur range of Malappuram districts and isolated 35 N fixing bacteria, 85 P-solubilizers, 9 *P. fluorescens*, 25 cellulose degraders, 19 lignin degraders and 9 *Trichoderma* and 8 P solubilising fungi
- Twenty two endophytes, 14 phylloplane bacteria and 5 phylloplane fungi were isolated
- In quantification assay, the range of P solubilisation was from 30µg/ml to 120 µg/ml. The maximum amount of soluble P (120 µg/ml) was in the case of *Bacillus* sp. and this was also supported by pH drop in the broth in 20 days.
- 12 P solubilizing and 3 N fixing bacterial isolates produced IAA. An isolates (K2P3) produced a maximum of 62.0µg/ml, 14 P solubilizing and 3 N fixing isolates produced siderophore, 19 isolates were good ammonifiers.
- Five P solubilising isolates were found to produce cellulase, nine isolates degraded lignin and produce clear zones, Five isolates degraded both lignin and cellulose *in vitro*.
- Five P solubilising and 7 N fixing bacterial isolates could produce protease.
- Seven Cellulose degrading bacterial isolates solubilized inorganic phosphate *in vitro*. Four *P. fluorescence* isolate solubilised inorganic P and 2 isolates produce IAA
- Ten antagonistic bacteria were isolated against *Rhizoctonia solani*, three isolates against *Xanthomonas campestris*, and Nine against *Sclerotium rolfsii*
- 8 fungal cultures were deposited in NBAIM
- 26 isolates identified by 16SrRNA sequencing & deposited in NCBI, eight bacterial isolates were deposited in NBAIM culture collection bank.

- 15 mushrooms were collected viz. *Calocybe indica*, *Auricularia*, *Clitocybe*, *Inocybe*, *Macrolepiota*, *Dictyophora*, *Agaricus* sp, *Termitomyces*, *Schizophyllum*, *Coprinus*, *Ganoderma*, *Pleurotus tuberrigium*, *Tricholoma*, *Boletus*, Puffball
- Maintained cultures of Oyster mushroom viz. *P. eous*, *P. sajor caju*, *P. florida*, *P. tuberregium* (native) and milky mushrooms viz *Calocybe indica* (native & DMR), *C. gambosa*, *Volvarella volvaceae*, *Auricularia* and *Ganoderma lucidum*.
- Coconut palm wastes, petiole and bunch wastes were found to be the best substrates for mushroom cultivation other than paddy straw.
- Standardized the technology for the cultivation of *Pleurotus spp* & *Calocybe indica* on rubber dust.
- Standardized and popularized the value added products of Oyster mushroom viz. mushroom wine (Koonamruthu), dried mushroom powder and mushroom sauce.
- Laid out beds with inedible plant parts of coconut namely leaves, petiole, bunch waste, saw dust and coir pith. Excellent results were obtained in saw dust and bunch waste. The variety *Pleurotus eous* was found to grow well in all substrates.
- *Pleurotus tuberregium* collected from dried mango tree was brought into pure culture, spawn prepared and cultivation trials are going on.
- Nature isolates of *Auricularia sp.* and *Calocybe indica* were purified and studies regarding spawn production and cultivation are in progress.
- Drying trials with Oyster mushroom, *Pleurotus florida* and *Pleurotus eous* indicated best results with mechanical drying at 50°C.

Biotechnology

- Six selected somaclones in ginger (292R, 88R and 478 R of cultivar Rio-de-Janeiro and 488 M, S4 and FP 1056 of cultivar Maran) superior in yield and quality attributes were advanced to farm trials.
- Molecular markers (ISSR, SSR & cDNA AFLP) and defense genes were identified for Bacterial Wilt and ToLCV resistance in tomato. The markers developed could be utilized in Marker assisted selection in crop improvement programmes. The sequence information of the markers are deposited in the public domain (NCBI). The variability among genotypes were characterized mostly at the expression level.
- Protocol for seed set and development was standardized for ginger, turmeric and kacholam. Embryogenic callus induction was obtained from endosperm and embryo cultures of ginger seeds of parental combination Z0-122 X Rajatha. In kacholam, embryogenic callus induction was obtained in endosperm and embryo cultures from seeds produced through in vitro fertilization.
- Full length Cry1Ac gene cloned from native *Bacillus thuringiensis*.
- Full length Cry 4B gene cloned from native *Bacillus thuringiensis* strain KAU 23
- A repository of 500 native *Bacillus thuringiensis* isolates was prepared
- Full length Cry1Ac gene from the isolate KAU 474 was cloned
- 10 isolates recorded 100% mortality in bioassay experiments with the test insect *Diaphania indica*
- The parasporal crystal protein Cry46 from the native isolate KAU 41 produced cytoplasmic blebbing, cytoskeletal alterations and nucleus condensation in Dalton's Lymphoma Ascites tumour cells under *in vitro* conditions
- Difference in copy number for β 1,3 glucanase gene and its better expression in *P. colubrinum* was detected as the key factor enhancing its disease resistance compared to *P. nigrum*
- Differential gene expression status and specific heat shock related genes were detected in black pepper. Forty DNA sequences were characterized and deposited in EST database
- One RAPD based Race primer was detected to characterize female nutmeg plants. The marker is being validated on larger population for its commercial exploitation

- Intraspecific hybrids by crossing superior clones of *Vanilla planifolia* were produced through embryo culture technique. Interspecific hybrids of cross *Vanilla planifolia* X *Vanilla tahitensis* Moore were also produced. These are being multiplied for field evaluation. Forty six genotypes are available.
- 76 Nitrogen fixers, 81 P solubilizers, 25 *Pseudomonas fluorescens*, 22 *Trichoderma* and 16 lignin degraders were isolated
- The P-solubilizing bacterium PBI solubilized 34.5µg/ml within 7 days
- Two pigment producing bacteria were identified by 16S rRNA sequencing as *Serratia marsecens* and *Chromobacterium violaceum*
- The native isolate Pf-10 of *Pseudomonas fluorescens* produced maximum antagonism index of 199.2 on the bacterial wilt pathogen *Ralstonia solanacearum*
- Mother cultures were established for Nendran ecotypes ie Attunendran, Nedunendran & Chengalikodan and dwarf Cavendish types, Grandnane& Robusta. Plants are at various stages of multiplication.
- Cultures developed for anthurium, orchids, black pepper, curry leaf etc. for mass multiplication.
- Y3 medium supplemented with 600µM 2,4-D induced embryogenic callus from coconut inflorescence cultures. Somatic embryos were produced from the callus. Embryos differentiated into various stages and started germinating
- Standardised the total mRNA isolation protocol from mature and immature berries and spikes of black pepper
- Studied the distribution of piperine in various plant parts. Fresh, green, immature seed contains 2.7 percent piperine of which the major part is concentrated in the seed whereas the pericarp contributes only a very minor portion. The quantity in mature leaf, stem and inflorescence was very low (0.01-0.03%). The alkaloid was absent in tender leaves.
- Studied the action of photochemicals Convolvine and Curcumin with parkin protein, which could be used as a promising leads to treat Parkinson's disease.
- Studied the efficacy of natural anti oxidants, curcumin (*Curcuma longa*), Cirsilineol, Rosmarinic acid (*Ocimum sanctum*), Hydroxychalcone (*Cinnamomun verum*), and Eugenol (*Eugenia caryophyllata*) in the treatment of stress induced insulin resistance via Type II diabetes
- Identified the action of piperine against lung cancer.
- Predicted the anti -oxidant properties of curcumin and baccoside against Amyloid beta A4 protein against Alzheimers disease
- Studied the antiviral properties of *Eupatorium odoratum* against Chikungunya Virus
- A Plant Molecular Biology and Biotechnology Centre (PMBBC) has been established at CoA,Vellayani which provides facilities for UG and PG teaching, M.Sc. project works and other student programmes such as experiential learning and trainings and to conduct external aided projects. The centre also maintains *in vitro* cultures of various medicinal plants like *Bacopa monnieri*, *Catharanthus roseus*, *Plumbago rosea*, *Smilax chinensis*, *Centella asiatica* and various other horticulture crops like banana, orchid and black pepper.
- Flower bud break in the orchid *Dendrobium Sonia 17* could be initiated within a period of 16 weeks in the semi solid medium of half strength MS supplemented with Benzyl Adenine (4.5 mg/l) over layered with a liquid medium of the same composition.
- For introgression of saline tolerant gene into the rice variety Jyothi through MAS, markers were selected, procured and parental polymorphism study is being done (parents -Jyothi, FL-478, Pokkali), the markers for saline tolerant gene have also been selected and procured, hybridization followed by back crossing has been done upto BC2F2 generation and the genotypic analysis is being done at RRS, Vyttila.
- The protocols for micro propagation of banana varieties Nendran and Robusta have been standardized.

- Hybridization between Dendrobium varieties, Phalenopsis varieties and Vanda varieties of orchids has been done at RRS, Vyttila and the hybrids are being multiplied through Micropropagation.

Agricultural Meteorology

- 1981-90 was the warmest and driest decade in Kerala. 1987 was the warmest year. The State of Kerala was moving from wetness to dryness within the humid type (from B4 to B3).
- The mean annual maximum temperature over the State has increased by 0.72°C, mean minimum by 0.22°C and annual mean by 0.48°C during the period from 1956 to 2009. The rate of increase in maximum temperature across the highranges of Kerala is more (1.46°C) when compared to that of coastal (1.09°C) and midlands (0.25°C) of the State during the study period from 1956 to 2009.
- Rice yields in Kerala are unlikely to decline directly due to long term climate change such as increase in temperature, but bound to decline to some extent indirectly through the abrupt short term changes such as unusual summer showers and extended rains during the monsoon period as noticed in 2008, 2009 and 2010. Similar was the trend in the case of majority of plantation crops. The frequency of occurrence of such weather abnormalities is likely to increase in the ensuing years under the projected climate change scenario.
- There is a need for pro-active measures against weather abnormalities for sustenance of agriculture as a part of climate change adaptation. A crop mix of black pepper and coffee may be a better choice under the projected climate change scenario since the crop output of one crop declines another one picks up in the same weather conditions.
- High maximum temperature during summer with heavy rainfall during rainy season is likely to affect the annual cocoa yield adversely.
- The duration of dry spell and wet spell during four critical phases of coconut decides the final female flowers production in addition to variety and better management practices under rainfed conditions.
- The annual coconut production depends up on the weather factors three - and - half - years ahead. However, the decline in coconut production due to severe summer droughts could be seen in the following year under rainfed conditions.
- Good summer showers with less duration of dry spell are likely to influence the coconut yield favourably in the following year to a considerable extent.
- The effect of long term climate change on coconut productivity is seen marginally decreasing.
- A sound database is maintained on onset of monsoon and rainfall of Kerala for a period of 141 years (1870-2010)
- If the onset of monsoon is on or before 25th May, the total monsoon rainfall over Kerala is likely to be below normal or normal. Such trend is not seen if the monsoon on or after 8th June.

Social Science

- Demonstrations in the farmers field covering 39 hectares on System of Rice Intensification and 10 hectares under Micro Irrigation in Coconut, Arecanut and Bannana and 10 hectares under Mulching technology was completed under the first phase of Farmer Participatory Action Research Programme(FPARP)
- Guide lines were prepared for enhancing and sustaining the income of 12 farmer's clubs in Trivandrum districts and a detailed road map was also prepared.
- Two modules on production technology of cowpea and amaranthus are prepared and are now available for access through Agri-Diagnostic Centre of College of Agriculture, Vellayani
- The findings of the secondary data analysis of Competitiveness and Trade Security in Indian Pepper – A Policy Analysis Matrix (PAM) published as “ Trade performance and Transmission of Price Volatility: The case of Indian pepper” as part of the National Research Programme on Plantation at Centre for Development Studies, Thiruvananthapuram
- The production of bio fertilizers in agriculture is dominated by the private sector
- The emphasis on the use of bio fertilizers by the extension system was found to be weak

- The cropping intensity of the existing farms revealed that the available area was not utilized in an effective manner so as to derive the maximum benefits. A modified cropping pattern with higher cropping intensity was suggested for maximum utilization of the available resources of land, labour and capital.
- The BC ratio of the modified farming system in Kerala was 1.41 in Mookannur and 1.67 in Ulliyeri villages. The BC ratio of the modified farming system in Tamil Nadu was 1.56, 1.60, 1.42 and 1.47 for the villages of Naraseepuram, Jabbukulam, Kanai and Semdamaram respectively.
- The BC ratio of the modified farming system in Andhra Pradesh were 1.74, 1.65, 1.59 and 1.57 for Ampolu, Inampudi, Eravaligud and Racharlapad respectively.
- Considerable differences among the stakeholders viz. rice farmers, extension agents, CBO members and people's representatives on the four different dimensions of the food security concerns of communities which throws light on their concern about these dimensions.
- The study developed a participatory methodology for quick assessment of food requirement based on the consumption pattern of the households utilizing wealth ranking and memory recall method which could be used elsewhere.

Agroforestry and Silviculture

- Papua New Guinean provenances of *Acacia mangium* performed better in the humid high rain fall conditions of Kerala. Other better performers include Balimo, Arufi Village, (R) sso Kuranda and Oriomo WP.
- Among the 30 teak accessions collected from south India, Nilambur provenances such as Nedumkayam-1, Nellikuthal & 2 and Cherupuzha confirmed their better performance.
- Among the 25 year-old stands of MPTs (*Artocarpus heterophyllus*, *Artocarpus hirsutus* and *Acacia auriculiformis*), *Acacia auriculiformis* had the highest aboveground biomass accumulation and C-sequestration potential.
- Under mature *Acacia mangium* stands the medicinal herbs *Curcuma longa* (turmeric) and *Kaempferia galanga* (kacholam) were found suitable as intercrops. Results are indicative of possibility of integrating shade tolerant medicinal crops with fast growing MPTs such as *Acacia mangium*.
- Black pepper integration in thinned *Acacia mangium* showed better vine growth under heavily thinned stand. Results suggest the possibility of intercropping black pepper with *Acacia mangium* through judicious regulation of stand density.
- Poor response of host plants on the growth and water relations were observed in Sandal seedlings. However, in general, better growth for sandal was observed when *Erythrina indica* was used as the host.
- The suitability trial with MPTs as standard for pepper suggested *Acacia auriculiformis* as the best support for black pepper in terms of pepper yield and tree growth characteristics. *Artocarpus heterophyllus* was another promising candidate as pepper standard.
- Biomass and volume production tables have been prepared for all the nine multipurpose trees under investigation.
- *Ailanthus triphysa* is a better candidate for Agroforestry plantings on account of its lower lateral spread and deep-rooted nature and recommended for widely spaced boundary planting and/or mixed species stands
- Intercropping ginger in *Acacia mangium* stands managed at moderate to high thinning intensity offer better results as compared to un-thinned stands
- Closer spacing (2x1 m) is suggested for early biomass/ volume production such as for pulpwood/ fuel wood while wider spacing (2x4m and 4x4m) can be adopted for producing quality saw logs for *Acacia mangium*. Stem taper in general increased with decreasing planting densities.

Forest management and wildlife

- Studies on Plant diversity at Attapadi indicated that 475 species of plants coming under 107 families were existing in the study sites. A total of 117 herbs, 91 shrubs, 194 trees and 73 climbers were included in the total 475 species.
- Mangrove forests are characterized by low floristic diversity which constituted 12 species under 9 genera belonging to 7 families. Structural analysis of the entire mangroves of Kannur unveiled the domination of *Avicennia officinalis* where as *Acanthus illicifolius* has contributed very low biomass. Among various nutrients accumulated in close ground bio mass of different mangrove species, carbon and Nitrogen accumulated maximum in *Avicennia officinalis* where as maximum sulphur (447.1 kg/ha) was in *Bruguiera cylindrica*.
- Nine accessions of Jatropha (*Jatropha curcas*) have been identified and seeds were collected.
- Macropropagation of Jatropha was standardized with GA₃-200 (24 hr.). Stem cuttings of *Jatropha* treated with IAA-200 (12 hr.) showed maximum success
- For pongam (*Pongamia pinnata*), superior trees were identified and seeds were collected. So far eleven accessions have been made.
- Macropropagation of pongam (*Pongamia pinnata*) was standardized. Cold water treatment of seeds for 12 hr and stem cuttings treated with IAA-200 (12 hr.) showed maximum percentage of success.
- In Mahagony (*Swietenia macrophylla*), application of soil: partially decayed Tea waste: Sand (1:1:1) recorded maximum growth and soil: Partially decayed municipal waste: Sand (1:1:1) indicated the highest biomass accumulation.
- For germination of seeds of four Calamus species studied treatment with GA₃ and cold water gave a relatively higher germination percentage in all the Calamus species except *C. travancoricus*. Among the four species, *C. thwaitesii* was found superior in growth attributes and biomass.
- Treatment of *Pongamia pinnata* seed with GA₃ and cold water was found effective in enhancing seedling growth. The shoot: root ratio and total biomass was maximum for seedlings kept under 75 per cent shade.
- CO₂ enrichment technique can be used as an economically viable nursery technology for production of more healthy and vigorous planting stock in tree nursey.
- Among for SPP of cropical pinus studied, *Pinus caribaea* was found to perform better with wood properties within the accepted range suitable for pulping and paper making. *P. oocarpa* had better performance with higher cellulose and lower lignin content.
- Rapid Biodiversity Assessment of Peechi- Vazhani Wildlife sanctuary showed the presence of 48 species of mammals, 218 species of birds ,32 species of reptiles ,six species of geckos, four species of lizards, four species of snakes, 15 species of amphibians and 40 species of fishes.
- Rapid Biodiversity Assessment of Chimmony Wildlife sanctuary showed the presence of 53 species of mammals, 181 species of birds, 22 species of reptiles, two species of geckos, three species of lizards, four species of snakes and nine species of amphibians.
- Rapid Biodiversity Assessment of Silent Valley National Park showed the presence of 40 species of mammals, 193 species of birds, 34 species of reptiles, two species of geckos, five species of lizards, two species of snakes and 19 species of amphibians .
- Prepared the Biodiversity Conservation Plan for the Kole wetlands for the long term conservation of these immensely biodiversity rich area.
- Mammals such as small carnivores, rodents, insectivores and bats play very crucial role in the ecosystem functioning. A total of 22 species of these lesser known mammals belonging to 10 families were recorded from the Chimmony Wildlife Sanctuary.

Food Science and Nutrition

- *L. acidophilus* MTCC 447 was found to be positive for probiotic activity like acid and bile tolerance and antimicrobial activity

- Foods selected for developing the probiotically fermented food mixtures were banana (Nendran), defatted soya flour, green gram flour, ripe mango, papaya and tomato. Based on maximum shelf life qualities and viable counts of probiotic organisms, three fermented food mixtures namely 70% banana flour, 20% per cent defatted soy flour and 10% mango, 60% banana flour, 20% defatted soy flour and 10% tomato pulp and 60% banana flour, 20% defatted soy flour, 10% mango and 10% tomato pulp were selected.
- Food mixture with added skim milk powder at 5% level showed high acceptability and an increase in nutrients and viable count of *L. acidophilus* after storage.
- Germination for 36 hours and 5 minutes of pressure cooking was the best method in bengal gram, green gram and horse gram for improving extractability of calcium (67.63%, 29.78% and 52.35% respectively) and phosphorus (55.08%, 56.66% and 52.13% respectively) while germination for 36hrs and 30 minutes ordinary cooking increased iron extractability in green gram (70.19%) and in horse gram iron (70.23%). Germination for 24 hours and 30 minutes ordinary cooking showed maximum zinc (76.01%) extractability in green gram.
- All the processing and cooking methods improved the extractability of minerals, maximum improvement was brought about by germination (24 and 36 hours) followed by pressure cooking and ordinary cooking after milling.
- Differences were not observed in the analysis of chemical constituents between the three fruit juices viz, pineapple, grape and lime juice collected from street vending sites and restaurants.
- High counts of bacteria, yeast, fungi and pathogenic microorganisms like *E.coli* and *salmonella* were observed in the juices collected from street vending sites while the juices collected from restaurants had low counts of bacteria, yeast and fungi and no harmful bacteria was observed. So fruit juices sold in the street vending sites were unsafe in terms of microbial quality though they possess almost similar nutritional qualities to juices collected from restaurants.
- Among the four species of edible bamboo shoots namely *Bambusa bambos*, *Bambusa tulda*, *Dendrocalamus hamiltonii* and *Dendrocalamus strictus* four species, fresh shoots of *Bambusa tulda* was observed to have the highest content of crude fiber, soluble fiber, reducing sugar, iron, sodium and total free amino acid and among processed shoots, *Bambusa bamboos* had the highest content of fibre, protein, calcium, potassium, sodium and nitrates.
- Based on the nutritional quality and availability of processed bamboo shoots, *Bambusa bamboos* was selected for the development of two products namely pickle and vattal and quality attributes were studied .
- Bamboo seeds were evaluated for cooking, biochemical, nutritional and organoleptic qualities. Physical, organoleptic and keeping qualities of bamboo seed flour were also assessed after three months.
- Three products namely cooked rice, *kanji* and *payasam* were prepared to evaluate the organoleptic qualities of bamboo seed and among these products *payasam* was the most acceptable one. For organoleptic evaluation of roasted and unroasted flours, products like *puttu*, *idiyappam* and *ada* were prepared using roasted flour, out of which *puttu* was the most acceptable product while the products prepared using unroasted flour were *appam*, *unniyappam* and *murukku* out of which *unniyappam* was the most acceptable one.

Gender Studies

- Conserved and perpetuated the traditional farmer wisdom of kadhakula (special banana bunch) cultivation, by developing 52 women master farmers of the technology in Thrissur District.
- Developed a model of SHG based women empowerment through natural resource management, and its linkage to the pilgrimage based needs of the community in the case of Kadali Banana production and its supply to the Guruvayoor Temple in Thrissur. This model was then emulated by other agencies like Kudumbasree, Kerala.

- Evaluation of various schemes envisaged in the work plan for 2009-10 for the development of agriculture under Macro management Schemes in Thrissur and Alappuzha Districts of Kerala showed that the share of allotment for various schemes revealed that the major share of allotment is for Rice development and all the schemes recorded achievement percentage around 90 per cent at the state level.
- Status of Public- Private Partnership and institutional arrangements for gender mainstreaming of agricultural development initiatives in the state were collected and analysed.
- Detailed study has been conducted in selected cases where a definite Public Private Partnership component was involved either in formal or informal way. The identified cases have been broadly categorized into five based on the major areas of partnership as (a) PPP in Agricultural Research. (b) PPP for facilitating backward and forward linkages in entrepreneurship development and self employment. (c) PPP in capacity building and skill development. (d) PPP for market support and buy back of agriculture products and (e) PPP category for promotion of organic products.

NAIP- Multi enterprise farming systems in Wayanad

- Productivity of paddy was increased by 20% by adopting scientific management practices, and by introducing high yielding varieties and IPM practices. Area under paddy cultivation in the project was increased by 6% . Farm mechanization and cultivation of vegetables were also popularized. Use of pesticides is being considerable reduced in the cluster areas.
- As a part of women empowerment through income generating activities, SHGs were formed and started functions in fields of vegetable seed production, nursery management, vegetable and fruit processing.
- Farmer-participatory procurement and marketing of farm produces was initiated through 13 collection points and 105 tones of vegetables and 234 t of fruits were traded.
- Backyards poultry units and goat units were established.
- By promoting organic farming and value addition in spices and their marketing the farmers are getting about 20-30% higher income for their organic produces.

NAIP- Agricultural Market Intelligence

- 8 commodity price forecasts for Pepper (3 Nos.), Coconut (2 Nos.), and Cardamom (3 Nos.) and 3 updates for Pepper (1 No.) and Cardamom (2 Nos.) were released. 11,68,000 voice messages on price forecasts and updates sent to Green card mobile customers through IFFCO Kisan Sanchar Limited. 3 infoserries were released .
- Portal developed by the AMICKAU Centre was inaugurated on 21 December 2010 by Dr.P.K.Suri, Senior Technical Director, National Informatics Centre, New Delhi It is available at www.amickau.nic.in
- 8 Price Forecasts - three for cardamom, two for coconut and three for pepper, and 3 updates - two for cardamom and one for pepper were released.
- 97 News Paper releases, 17 TV telecasts and 11 Radio broadcasts for disseminating the price forecasts.
- 7 Officers' training and 7 Farmers' training involving 354 Officers and 423 farmers respectively to sensitize on the issues on market intelligence.
- Voice SMS to 11, 68,000 Green Card Mobile holders through tie up with IFFCO KISAN SANCHAR LTD and BHARATI AIRTEL LTD.
- An Impact study was conducted on the Price Forecasts released for Cardamom and impact was quantified.

Veterinary & Animal Sciences

- Established a superior herd of 41 Murrah buffaloes in the station with purchase from the native tract in Haryana and ensued breeding programmes.

- Progeny testing programme initiated with Murrah buffalo bull semen test doses supplied from Central Institute for Research on Buffaloes.
- Studies were done on the productivity and adaptability of Murrah buffaloes based on recordings of growth, milk production and reproductive parameters.
- The individual daily milk yield of murrah buffaloes found to be as high as 13.7 Kg and average age at first AI was found to be 1025.36 ± 71.47 days
- Average number of inseminations required for conception was found to be 2.27 ± 0.36 and average age at first calving was found to be 1432.8 ± 140.42 days
- Average birth weight of buffalo calves were found to be 36.4 ± 1.5
- Production performance of the native Attapady black goat evaluated based on fortnightly weight and other body measurement recordings of the kids.
- Breeding performance evaluation of Attapady black bucks in the unit and selection of superior bucks.
- Reproductive performance of the breeding does evaluated based on selected reproductive parameters.
- The performance of crossbred cattle through the years was evaluated and found that the milk production is getting reduced over the period.
- A method to detect early pregnancy in cows from 25 day post insemination was evolved.
- An NAIP project to develop Herbal Acaricides as Means to Overcome the Development of Resistance in Ticks to Conventional Acaricides was continued.
- One laboratory selected diazinon resistant tick line generated.
- α - Asarone and Rutin have been identified as active component in *Acorus calamus* and NBA/13/B/2 extracts.
- Biochemical test standardized for detection of OP resistant ticks.
- Biochemical test standardized for pyrethroid resistant ticks.
- *In vivo* data of efficacy of herbal products generated.
- Number of sequence data of genes submitted to gene bank: 34.
- Ten generations of *Rhipicephalus (Boophilus) microplus*, IVRI strain exposed thirteen times to NBA/13/B/2 extract (2%) did not show sign of resistance development.
- Selected 20 bucks of Malabari breed and eight bucks on the basis of body weight and growth rate from the home tract
- Information generated from the ICAR Field Progeny Testing Scheme have been helpful in formulating the state cattle breeding policy and prediction factors developed using the field records have been incorporated in the package and practice of the University.
- Vechur cattle conservation unit is functioning as a central germplasm centre for Vechur cattle. One of the Vechur cow maintained at the centre is recognized as the smallest cow in the world as per Guinness World Record Book released during last year.
- A Vechur bull station is also maintained to make available good quality semen to farmers.
- The rabbit farm is functioning as a source of seed material for broiler rabbits. Four breeds viz., Soviet Chinchilla, New Zealand White, White Giant and Grey Giant are maintained at this centre.
- Blood samples were collected from different breeds of rabbits in Kerala and genomic DNA was isolated using Phenol Chloroform method.
- Growth hormone and Myostatin genes were partially amplified and sequenced, sequences were analyzed for homology.
- The supplementation of chromium propionate did not affect the growth or feed conversion efficiency of growing (Large White Yorkshire X Desi) cross bred pigs.

- There was non-significant decrease in triglycerides and increase in HDL cholesterol level and it can be beneficially used to improve the lipid profile of the cross bred pigs.
- A new whey based beverage "Healthy way" using natural flavours was developed released.
- An anthropometric data base for the women agricultural workers is generated. Based on the analysis of data necessary modifications have been done in the equipments like direct paddy seeder, KAMCO reaper, rotary weeder and mini thresher.
- The Vigova broiler duck production was found to be a viable and profitable enterprise suitable for wide adoption.

Agricultural Engineering

- The moisture content in the basins of coconut palms under micro catchment is higher than that in the basins of rainfed coconut palms and is almost in the same range as that of drip irrigation at 75% pan evaporation. The gentle slope of micro catchment and thick mulch provided in the coconut basin helped to retain moisture in the soil.
- In bhindi, micro irrigation (drip) with a lateral spacing of 2.4m & plant spacing of 30 cm x 30 cm gave higher benefit cost ratio.
- For the efficient operation of drum seeder and cono weeder, there should be 1 to 2 cm depth of water in the field. Weeding with cono weeder at 15, 30 & 40 DAS recorded minimum weed growth.
- Maximum yield was obtained from the bhindi plants irrigated with inline drippers at 100% PE. The study revealed poor performance of porous pipe with regard to clogging.
- All the available base maps and attribute information were collected for the Ernad Taluks in Malappuram district and the GIS digitalization works were done. Land use map has been prepared using satellite imagery. All the micro watersheds have been delineated using SWAT model and field work for ground truthing and prioritisation of the micro watersheds has been done and the Detailed Project Report (DPR) for the development of each of the micro watershed has been prepared.
- For the development of Pokkali Harvester, the wheels of the Pokkali Harvester have been fabricated. The traction wheels are ready for testing the tractive force in the pokkali field.
- Bed former suitable for Pokkali area was developed with float unit as an attachment to KAMCO barbieri mini tiller. Some minor modifications suggested by the expert scientists of Rice Research Station, Vytilla have been incorporated in the design and is ready for testing again in the field.
- The development of rotary coconut dehusker (power operated coconut dehusker) is in the final stage with a 2 HP electric motor.
- Motorized pepper harvester was developed for solving the tedious harvesting work of pepper.
- The ginger harvester was attached to the IC engine of 3 HP for developing the new model of ginger harvester. The harvester ensured the quality of tubers while in operation by reducing the damage and breakage to the rhizomes
- A self propelled harvester was developed to alleviate the drudgery of farmers associated with harvesting ginger. Its effective field capacity is highest for angular tynes at $0.01245 \text{ ha h}^{-1}$. The highest harvesting efficiency was found to be 64% for angular tynes. The cost of operation of the harvester is Rs.77.25 per hour and its total cost is Rs. 20,000/-.
- A coleus peeler was developed to reduce the drudgery while peeling the coleus. Maximum capacity of the peeler is 3.0 kg in a single run. Average time for peeling 1 kg of coleus is around two minutes.
- Black pepper decorticator was developed.
- Samples packed under LDPE had minimal weight and increased vanillin content in a study to standardize the suitable packaging material for vanilla beans and untied vanilla beans packed under LDPE tube were found to be the best.

- To enhance the efficiency, the final model of banana (CV Nendran) peeler for making chips was developed and tested. It consists of a feeding section, peeling section and a product outlet. The capacity, material loss and peeling efficiency of the peeler was found as 35kg/hr, 9% and 88% respectively.
- Based on the standardized process parameters, a vanilla oleoresin plant of capacity 3kg of cured vanilla was fabricated and testing is going on.
- A prototype percolation type vanilla extractor and an indigenous, cost effective method of extraction of natural vanilla from *Vanilla planifolia*, were developed and its performance was evaluated. A combination of concentration 60%, 30% and 15% ethanol; each percolated at the rate of 2 hours per day for 5 days gave maximum vanillin content in the extract and the extraction efficiency of the extractor was 60% and evaporative loss was 12.9%.
- A Black Pepper Decorticator was developed and standardized concentration (30%), soaking time (3hr) and temperature(40°C) on the basis of water loss, solid gain, weight reduction, retention of green colour and volatile oil for osmotic dehydration of green pepper. The maximum volatile oil content was observed for non osmosed samples for both drying.
- In the evaluation of mini tiller with attachments, KAMCO Barbiery covered more area in specified time. Field efficiency was more for Asia cultivator followed by KAMCO Barbiery. Asia cultivator was more accepted by farmers due to better soil tilth and easy handling of the machine and it was stable in slop more than 50%. The Agria mini tillers are found suitable for homestead farms, gardening operations because its depth of cut is low than other machines.
- Designed and constructed a check dam at Nellikandam puzha, in Meenangadi Panchayat, Wayand for water harvesting at community level as part of NAIP project
- A portable split biogas plant suitable for farmers with one cow or only small animals was developed at KVK as part of its on farm testing programme.
- A portable light trap for pest monitoring in rice was developed at KVK Palakkad and is being demonstrated in several districts.

Fisheries

- Fish Biodiversity for Livelihood Enhancement, an open water cage fish farm of 225 cages was established in the open Kayal adjacent to RARS campus. Cage farming of Karimeen and endemic fishes is undertaken by involving women Self Help Groups. This is the first cage fish farm of this kind in the country for Karimeen operated in this scale by involving women groups. This is now a major training centre for prospective farmers and officers of the Department of Fisheries and as cage culture of Karimeen is a new technology developed by RARS through a series of studies.
- An aquarium centre for endemic fishes has been commissioned
- A fish feed unit has been commissioned where feed for local fishes is formulated, manufactured and sold to farmers.
- Effective nursery management providing supplementary feed and adequate water exchange enabled to achieve optimum survival of post larvae and fry of *Chanos chanos* (Milk fish-Poomeen), *Mugil cephalus* (Grey mullet – Thirutha) and *Liza parsia* (Mullet – Kanambu)
- Polyculture of mud crabs, *Scylla serrata* and *S. tranquebarica* along with brackish water fish species enabled to achieve better production from wet land farming system.
- A combination diet of trash fish along with pelleted feed was found to be an efficient diet for achieving better growth and production of mud crab under culture condition.
- Mollusc meat (clam & squid) was seen to be ideal diet for berried mud crabs in hatching tanks.

CHAPTER I

GENERAL ADMINISTRATION

The Kerala Agricultural University came into existence on 1st February 1972 under the KAU Act 1971 (Act 33 of 1971).

Main Campus of the University at Vellanikkara is 13 km east on the Thrissur – Palakkad Highway (NH – 47). The College of Horticulture, College of Forestry and the College of Co-operation, Banking and Management are located at the Main Campus. The University has seven other teaching campuses, viz. College of Veterinary and Animal Sciences, Mannuthy, College of Fisheries, Panangad, College of Agriculture, Padanakkad, College of Agriculture, Vellayani, Kelappaji College of Agricultural Engineering and Technology, Tavanur, College of Dairy Science and Technology, Mannuthy, College of Veterinary and Animal Sciences, Pookode. In addition to this, the University has 30 major research stations distributed throughout the State. Some of the Stations are also recognized as centres for PG research of the University. When the NARP was implemented in the University, five of these stations were recognized as Regional Agricultural Research Stations. They are located at Pilicode, Ambalavayal, Pattambi, Kumarakom and Vellayani. ORARS, Kayamkulam was started on 12.04.2000 so as to continue the works in root wilt disease of coconut and to implement a comprehensive coconut care programme.

University received financial assistance mainly from the State Government and ICAR. Financial assistance was also received from other agencies like Department of Science and Technology, DBT, Department of Atomic Energy, Spices Board, Coconut Development Board among others.

OFFICERS OF THE UNIVERSITY AND ADMINISTRATIVE SETUP

Officers of the University are the Chancellor (Government of Kerala), the Pro-Chancellor (Minister of Agriculture). The Vice-Chancellor is the principal executive and academic officer of the University.

The Vice-Chancellor is also the ex-officio chairman of the Executive Committee and the Academic Council. The Vice-Chancellor is assisted by Registrar, Comptroller, Deans of Faculties, Directors of Research, Extension, Physical Plant, Students Welfare and Librarian holding tenurial positions. In addition, the Director of Academic and Post Graduate Studies assists the Vice-Chancellor in Academic affairs.

The general administrative control is vested with the Registrar while the Comptroller is responsible for budgeting, finance, statements of accounts, and audit. The co-ordination, direction and administration of the research activities in the University are vested with the Director of Research. The Director of Extension charge is responsible for the extension education. The Deans and Associate Deans of the various colleges are in charge of resident teaching and instruction of the respective colleges. The Director of Physical Plant is the custodian of the University properties and in charge of the construction and maintenance of buildings, roads, vehicles and the machinery.

AUTHORITIES OF THE UNIVERSITY

The statutory authorities of the University are the General Council, the Executive Committee, the Academic Council, the Faculties and the Board of Studies of each faculty. The list of members of these bodies are appended

General Council

Sl.No.	Meeting	Date
2)	108 th	24.7.2010
3)	109 th	27.11.2010
4)	110 th	26.3.2011

Assurance Committee

SLNo.	Meeting	Date
1)	109 th	24.02.2011

Executive Committeemeetings

Sl.No.	Meeting	Date	Venue
1)	468 th	17-04-2010	ATIC, Mannuthy
2)	469 th	20.05.2010	KAU Hqrs, Vellanikkara
3)	470 th	10.06.2010	ATIC, K A U Mannuthy
4)	471 th	03.07.2010	ATIC, K A U Mannuthy
5)	472 th	13.07.2010	Paristhithy Commission Office, Trivandrum
6)	473 rd	21.07.2010	YMCA Hall, Trivandrum
7)	474 nd	29.07.2010	Paristhithy Commission Office, Trivandrum
8)	475 rd	08.10.2010	IMG, Trivandrum
9)	476 th	16.11.2010	KAU Hqrs, Vellanikkara
10)	477 th	01.12.2010	IMG, Trivandrum
11)	478 th	15.12.2010	IMG, Trivandrum
12)	479 th	03.03.2011	KAU Hqrs, Vellanikkara
13)	480 th	15.03.2011	KAU Hqrs, Vellanikkara

LABOUR

During the year 2010-2011, 891 Permanent Labourers & 133 Casual Labourers were engaged in various farms/ stations under Kerala Agricultural University. During this year selection of casual labourers was undertaken to the existing vacant posts and the process was completed in 12 stations/ farms. 134 permanent labourers and one casual labourers were retired on 31.03.2011 from various stations/farms. Two new universities viz. Kerala University of Fisheries & Ocean Studies, Pannagadu, and Kerala Veterinary University, Pookot, were come into existence during this period. 177 permanent labourers, 6 security guards and 5 casual labourers were transferred to the and Kerala Veterinary University, Pookot. Labourers attached to College of Fisheries, Panangad, and Fisheries Station Puduveyppu were attached to Kerala University of Fisheries & Ocean Studies, Panangadu

Engagements and activities of Dr. K.R. Viswambharan, Vice Chancellor, Kerala Agricultural University during 2010-2011

Filed visit and village stay in connection with the "Tharissurehita Nelvayal Grama Prakhyapanam" organized at Mannahcerry Grama Panchayat on 07-04-2010.

Inaugural function of the modernized cow sheds at Livestock Research Station, Thiruvazhamkunnu on 08-04-2010.

Attended the One Day Workshop on "Kerala State Organic Farming Policy" inaugurated by the Hon'ble Chief Minister of Kerala at Vengeri Market, Kozhikode on 09-04-2010.

Inaugurated the KAU Pavilion at Thrissur Pooram Ground; attended the Koithulsavam at Tholur Padasekharam; attended a Public Meeting at Pattikkad and returned to Headquarters on 12-04-2010.

Attended One day Seminar on "Climate change – Monsoon calamities" at Hotel Muscut, Thiruvananthapuram on 13-04-2010.

Attended the Farm Fest-2010 organized by the All India Radio, Tvm (Vayalum Veedum) held at Cheriyanad Grama Panchayat, Mavelikkara, Alappuzha Dist. on 23-04-2010.

Attended the inaugural function of Seed Complex at College of Agriculture, Vellayani on 11-05-2010.

Attended the XXIInd ICAR Regional Committee meeting held at IVRI Regional Centre, Hebbal, Bangalore during 13th to 15th May 2010.

Attended the programme on "*Jaivakrishi Nayaprakkyapanam*" by Hon'ble Chief Minister of Kerala held at Vengeri Market, Kozhikode on 17-05-2010.

Meeting with Hon'ble Central Agricultural Minister Shri. Sharad Pawarji in New Delhi on 03-06-2010

Visited Kolahalamedu Station on 08-06-2010 and proceeded to Trivandrum for attending the Subject Committee meeting held on 09-06-2010 at LA Complex, Trivandrum.

Attended Press Conference at Ernakulam Press Club on 11-06-2010.

Attended the RKVY meeting at Government Secretariat, Trivandrum on 14-06-2010.

Attended the Zonal Research Workshop organized at RARS, Pattambi on 22-06-2010.

Attended the meeting and tree planting at Cochin Corporation, Ernakulam on 30-06-2010.

Attended the meeting on 03-07-2010 at College of Fisheries, Panangad - Asian Pacific Aquaculture-2011 (APA-2011) organized by KAU at Kochi during January 2011.

Attended the meeting on 12-07-2010 at College of Fisheries, Panangad - Asian Pacific Aquaculture - 2011 (APA-2011) organized by KAU at Kochi.

Meeting with the Hon'ble Minister for Food, Civil Supplies & Animal Husbandry at LA Complex, Trivandrum on 13-07-2010.

Meeting with the Hon'ble Minister for Food, Civil Supplies & Animal Husbandry - setting up of Veterinary University at Pookkot on 16-07-2010.

Meeting with Hon'ble Minister for Agriculture, GoK at Thycaud Guest House, Trivandrum on 21-07-2010.

Meeting at College of Fisheries, Panangad - Asian Pacific Aquaculture-2011 (APA-2011) organized by KAU at Kochi during January 2001 on 27-07-2010.

KAU Executive Committee at LA Complex, Trivandrum on 29-07-2010.

Attended the function of Laying foundation stone for the new Veterinary University at Pookkod by the Hon'ble Chief Minister of Kerala on 02-08-2010.

Attended the Planning Board meeting held on 04-08-2010 at Trivandrum

Launching of Hi-Tech Farm Programmes - Laying foundation stone for K.R. Narayanan College of Dairy Science & Technology at Kolahalamedu - stone laid by Hon'ble Central Minister Prof. K.V. Thomas on 07-08-2010.

Attended function "*Celebration of Farmers Day (Chingam 1st) and distribution of Farmers Award 2009*" - at Kadakkal with Hon'ble Agriculture Minister on 16-08-2010.

Attended the meeting on 02-09-2010 at Fisheries College, Panangad about the inaugural function of the new Course "*Climate Change Adaptation*" to be held on 06-09-2010 at KAU Central Auditorium.

Attended the programme of Dr. Devadasa Menon Endowment Lecture held at College of Fisheries, Panangad on 09-09-2010.

Attended the steering committee of the International Asia-Pacific Aquaculture Meet-2011 - chaired by Shri. K.V. Thomas, Hon'ble Central Agril. Minister and Shri. S. Sharma, Hon'ble Finance Minister, GoK. held at Hotel Le Meridian, Kochi on 11-09-2010.

Attended KAU Subject Committee meeting a LA Complex, Trivandrum on 22-09-2010.

Discussion with Prof. M.S. Swaminathan, Member of Parliament at Chennai on 1st October 2010.

Attended the meeting "*Formation of Kerala Veterinary University*" held at Government Secretariat, Trivandrum in the chamber of Agril. Production Commissioner on 07-10-2010.

KAU Executive Committee Meeting at IMG Conference Hall, Trivandrum on 08-10-2010.

Attended the meeting on 12-10-2010 at College of Fisheries, Panangad regarding *International Asia Pacific Aquaculture meet-2011* held at Kochi

Meeting with the Hon'ble Minister (FCS&AS) at Govt. Secretariat, Tvm regarding the newly formed Kerala Veterinary University on 08-11-2010.

85th Annual Meeting of the Association of Indian Universities (AIU) and National Seminar on *Governance of Higher Education* held at Bharati Vidyapeeth University, Pune on 12-11-2010.

Attended the seminar on *Endosulphan and violation of Human Rights* – organized by Kerala State Human Rights Commission, Trivandrum - held at Municipal Conference Hall, Kasargod on 28-11-2010.

Attended: 1. Higher Education - Governing Council meeting at Tvm. (01-12-'10). 2. KAU Executive Committee meeting at Tvm. (02-12-'10). 3. Inaugural function of International Horti Expo-2010 at Tvm. (02-12-'10)

4. Chair the session "Future Farming" in connection with the Horti Expo-2010 at Tvm.(03-12-2010).

Indian Agricultural Universities Association - Vice-Chancellor's Convention held at Orissa University of Agriculture and Technology, Bhubaneswar on 06-12-2010.

Meeting at Government Secretariat – formation of Veterinary University on 14-12-2010.

Meeting at College of Fisheries, Panangad – Asian Pacific Aquaculture Meet 2011 on 27-12-2010.

Attended the Workshop organized by NARP (SR) at College of Agriculture, Vellayani on 01-02-2011

Attended the Subject Committee meeting at LA Complex, Trivandrum on 03-02-2011.

Attended urgent official meeting at the chamber of Hon'ble Minister for Agriculture, Trivandrum on 10-02-2011.

Attended Karshaka Seminar and the function of laying foundation stone for the building complex by Hon'ble Minister for Agriculture at Rice Research Station, Moncompu on 15-02-2011.

Attended the programme "Kerala University of Fisheries & Ocean Studies (KUFOS) dedicated to the Nation by the Hon'ble Chief Minister of Kerala – at COF Panangad on 20-02-2011.

Attended the Agricultural University Vice-Chancellors Conference from 21st to 23rd and attended an International Conference on "Relevance of Policy Reforms on Development: Challenges before Emerging Economies" organized by University of Jamia Millia Islamia, New Delhi on 24th Feb. 2011.

Attended an official meeting at Government Secretariat, Trivandrum on 09-03-2011.

CHAPTER II
EDUCATION
FACULTY OF AGRICULTURE
COLLEGE OF AGRICULTURE, VELLAYANI

Academic programmes

Intake capacity		Number of students				Out turn of students 2010-2011	
		Ph.D	MSc		Ph.D	MSc	Ph.D
KAU	ICAR						
PG Discipline wise							
Agronomy(MSc)							
KAU	ICAR						
5	1	2	5	0	1		
Agrl.Entomology							
KAU	ICAR						
5	1	2	1	0	1		
Agrl.Extension							
KAU	ICAR						
5	1	2	1	1	0		1
Plant Breeding and Genetics							
KAU	ICAR						
4	1	3	1	1	0		
Plant Pathology							
KAU	ICAR						
5	1	2	1	0	1		
Soil Science & Agrl.Chemistry							
KAU	ICAR						
3	1	2	1	0	0		
Plant Physiology							
KAU	ICAR						
1	1	1	0	0	0		
Horticulture							
KAU	ICAR						
6	2	4	4	2	1		
Home Science(FS& N)							
KAU	ICAR						
3	1	2	1	0	0		1
Plant Biotechnology							
KAU	ICAR						
3	1	2	0	0	0		
Agrl.Microbiology							
KAU	ICAR						
2	00	0	0	0	0		
Agrl.Economics							
KAU	ICAR						
2	0	1	2	0	1		
Total	44	11	24	17	4	5	1
							1

- Study tours**
1. All India study tour 2007 B.Sc (Ag.) - 52 students
 2. All India study tour 2008 B.Sc (Ag.) - 57students
 3. South India study tour 2009 B.Sc.Hons.(Ag.) - 58 students

Agronomy

Study tours

Dr. Shalini Pillai and Dr.Usha C Thomas accompanied 2007 batch students for North India Study Tour Programme during 20.02.2011-13.03.2011

Pomology and floriculture

Study tours conducted :

- Dr. Jayalekshmy V.G. Associate Professor accompanied the 2009 batch of students for the South Indian study tour.

Students Union activities

- Dr. D Wilson, Professor is the Associate Patron of Students Union
- Dr. D Wilson, Professor, organized the interclass Arts festival of the students
- Dr. D Wilson, Professor, accompanied students to the Intercollegiate arts festival held at Central Auditorium, Vellanikkara.

Dr. Jayalekshmy V.G. Associate Professor is the Staff editor for the Students magazine

Processing and Technology

Intake capacity & No. of students enrolled during 2010-2011			Out turn of students during 2009-2010		
	Male	Female		Male	Female
UG			UG		
PG (discipline-wise)	1	1	PG	NIL	NIL
Ph.D. (discipline wise)			Ph.D.		
Study tours conducted					
M.Sc students of 2010 admission	Regional Research Station, Directorate of Oil palm Research, Palode and Mercckiston Tea Estate, Ponmudi		study tour of PG course PRT 503 " Processing and value addition of Plantation crops and spices"		
B.Sc (Ag) students of 2007 admission	industrial units (i) Key Vees Products, Thalikulathur, Kozhicode and (ii) Parrisons Foods, Kinfra park, Kakkancherry, Kozhicode		EDP module and industrial attachment in connection with the RAWE programme on 11 th -18 th October 2010		
M.Sc students of 2010 admission	Cashew Development Corporation factory, Ayathil, Kollam and Cashew Exploit Promotion Council Laboratory, Kollam		study tour of PG course PRT 503 " Processing and value addition of Plantation crops and spices"		

Bio technology

Thesis submitted during 2010-11:

Name: Arpitha Y. R (2007-11-117)

Title: Effect of green leaves used in traditional food preparations on DNA repair.

Study tours : South India Study Tour for M. Sc. (Integrated) Biotechnology Course

Other activities:

P.G. and Ph.D guidance

Name of faculty	PG/Ph.D	Major advisor	Member of advisory committee
Dr. B.R. Reghunath	P.G.	1	2
Dr. B.R. Reghunath	Ph.D		1
Dr. Swapna Alex	P.G.		5
Dr. K.B.Soni	P.G.	1	4

Member in Govt. bodies:

Dr. B. R. Reghunath

- District Level committee of State Horticulture Mission, Tvm. 2010 – 2011
- State Medicinal Plant Board, Thrissur 2010-2011.
- RKVY Project on Multidisciplinary Diagnostic Support to farmers of Southern Kerala 2010-11.

Plant Physiology

Other activities

- NSS activities : Dr. Roy Stephen serving as Programme Officer, NSS
- Associating with RAWE Programme
- Served as External Examiner for PG thesis evaluation of Anand Agriculture University, Gujarat
- Dr. Roy Stephen - Meeting of DSW at head quarters
- Dr. R.V. Manju- Visit to Rajiv Gandhi Centre for Biotechnology (RGCB)

Agri.Entomology

Intake capacity and no: of students enrolled during 2010 - 2011	Out turn of students during 2010 - 2011	
	M	F
PG	-	1
Ph.D	-	1

Study tours : Dr. C.Gokulapalan , Professor accompanied the UG students , 2007 admission their All India Study Tour Programme

- Students union activities
- Extra curricular activities ;
- NSS activities:
- Sports and games:
- PTA : Dr. C.Gokulapalan , Professor is acting as PTA President .

Agri.Statistics

Offered 3 U.G. courses and 7 P.G. courses (regular) to Agricultural Students and the teachers were involved in the conduct of Mathematics and Computer courses of M.Sc. Integrated Biotechnology students, Compulsory non credit courses of P.G. students and other re examination courses.

The teachers were also involved in the conduct of examinations of a number of other universities as question paper setters, thesis evaluation / viva voce examiner etc.

The teachers were also acted as members of the advisory committee of about 17 M.Sc. and 8 Ph.D. students during the period.

Home science

Intake capacity & No. of students enrolled during 2010-11	Out turn of students during 2010-11	
	Male	Female
PG(MSc. Home Science(Food Science & Nutrition)		1

Study Centre for IGNOU

Programme Co-Ordinator: Dr. Mary Ukkuru. P., Professor

Offer MSc. Programme in Dietetics & Food Service Management (DFSM) (Through Distance Learning)

Students enrolled during 2010-11 : 7

RAWE Activities : Dr.Beela.G.K functioned as course teacher for RAWE during 2010
Dr.P.Geetha is functioning as course teacher during 2010 for one batch

Research programmes

Agronomy

Major research achievements

Under the WGDG project on "Analysis of Homestead based fodder production and interventions for economic milk production in the homesteads of Trivandrum District Of western ghat region of Kerala", evaluation studies conducted with different fodder crops in the Anapad watershed Malayinkil Panchayath of Trivandrum district indicated Guinea grass (*Panicum maximum*) cv. Harithasree, Bajra napier Hybrids CO 3 and suguna and *Brachiaria brizantha* are highly productive in the homesteads

- Cassava based fodder production system involving alley cropping in cassava cv. Vellayani hraswa with two rows of palisade grass (*Brachiaria brizantha* cv. Mulato) interplanted with two rows fodder cowpea (*Vigna unguiculata* cv. CoFc-8) is the most efficient with respect to biological productivity, quality of feed, economic returns and land use efficiency.

WGDG project on Strategies for eco friendly exploitation of arrow root in the western ghat region of Kerala for mini-agri-buisness

- Field trials have been initiated during 2007-2008 and 2008-2009 in the identified homesteads in Parassala, Pallichal, Kattakada, Poovachal and pullempara panchayaths in the western ghat region of Trivandrum district for deriving an organic nutrient schedule for sustained yield of arrowroot. At all locations, application of FYM@ 10 t/ha produced significant increase in rizome yield over control (no manure, no bio fertilizer). Higher rhizome yield (18.62 t/ha), net income (Rs. 74450) and BCR (1.99) could be obtained by the application of FYM@15 t/ha + bio fertilizer treatment.

Plantation Crops and Spices

National Horticulture Board funded project on 'Re-domestication and popularization of true kashhuri turmeric (*Curcuma aromatica* Salisb.) an endangered cosmetic cum medicinal plant'

Pomology and Floriculture

Major research achievements under the RKVY project, the 27 Mango varieties and 5 Jack varieties collected and planted in the field were managed and cared for.

Olericulture

Major research achievements

A full fledged seed processing unit and seed testing laboratory was established. Seed production of breeder seeds and truthfully labeled seeds of different vegetables with revolving fund on vegetable production being continued. Seeds worth Rs.10.5 lakh were sold.

Ongoing Projects

Two RKVY projects are implemented in this department.

1. "Boosting Vegetable production in Kerala through Technological innovation and mission mode activities for food and nutritional security". Under this project three sub projects are handled by three scientists of this department.

a) Sub Project - (1) "Collaborative Vegetable Seed Production by KAU and Department of Agriculture through farmer participatory approach"- Dr. M. Abdul Vahab

In this project seeds of crops like Cowpea, Ashgourd, Clovebean, Brinjal, chilli, bittergourd, snake gourd, etc are being produced.

b) Sub Project- (2) "Vegetable production by utilizing cultivable wasteland" – Dr. V. A. Celine
Wasteland cultivation implemented at various locations and crops like cowpea, amaranthus, tomato etc. are being grown. Seminars are also organized at various locations.

c) Sub Project –(3) " Innovation in vegetable production through perennials and under utilized native crops of Kerala." – Dr. I. Sreelathakumary

Seeds and planting materials of underexploited crops like dolichos, ridgegourd, bottle gourd, clovebean, wingedbean, clusterbean, bird chilli, hot chilli coccinia and drumstick are being produced.

11. "Augmentation of vegetable production through technological interventions."
Component 1 - Genetic up gradation and seed production. Under this project maintenance breeding and seed production of the following crops was initiated.

Crop	Variety	Co-PI
Bhindi	VarshaUpkar	Dr.M. Abdul Vahab
Bittergourd	Preethi	Dr.M. Abdul Vahab
Tomato	Vellayani Vijay	Dr. V. A. Celine
Yard Long Bean	Vellayani Jyothika	Dr. V. A. Celine
Chilli	Vellayani Athulya	Dr. I. Sreelathakumary
Bird Chilli	Vellayani Samrudhi	Dr. I. Sreelathakumary

Plant Breeding and genetics

Research programmes:

Major research achievements

In the project entitled "Development of high yielding leaf curl virus resistant varieties in chilli from segregating generations of inter specific crosses" plants from fourteen selected F6 plants for further advancement of generations is in progress and individual plants are in good stand and being evaluated for selection and forwarding to CYT.

In the project on "Evaluation of seedling variability in selected varieties of *Anthurium andreanum* Linden about 55 genotypes of Anthurium are being maintained and promising hybrids are under evaluation. Many new hybrids have started flowering. New crossings are being undertaken.

Nine yard long bean accessions were evaluated in CYT for two seasons for yield and mosaic resistance during the period in the project "Evaluation of yard long bean germplasm for yield and mosaic resistance". The data for the second CYT is being tabulated for statistical analysis.

In the project "Development of high yielding anthracnose resistant chilli varieties from among the segregating generations of three way cross hybrids", selection of superior progenies from among the segregating generations of three way cross hybrids for yield and anthracnose resistance is in progress.

In the project entitled "Genetic variability studies for yield and fruit fly resistance in bitter gourd (*Momordica charantia* L.)". conducted at the Department of Plant Breeding and Genetics, College of Agriculture, Vellayani during 2008-2010 to assess the genetic variability for yield and different yield attributes and resistance to fruit fly in bitter gourd and to identify high yielding genotypes tolerant to fruit fly, 29 genotypes were evaluated. Genetic divergence (D2 analysis) grouped the 29 genotypes into seven clusters. High yielding genotype Kanakakunnu local was grouped into cluster I where as and fruit fly resistant genotypes Madhurai local and Changanassery local – I were grouped into cluster V and VI respectively. This emphasizes scope for further improvement by selecting donor parents from these clusters. Selection indices revealed that Kanakakunnu local had maximum index value and Madhurai local had minimum index value. As per the techniques and rating system of Nath (1966) the percentage of fruit damage was minimum in Madhurai local and Changanassery local – I under bother natural and

artificial screening. So these two genotypes were rated as resistant/highly resistant genotypes. There for Kanakakunnu local., Changanassery local – I and Mdhurai local were identified as potent donors for appropriate breeding programme for improving fruit yied and quality character like resistance to fruit fly.

In the PG student project entitled “Genetic analysis of yield and leaf curl virus resistance in chilli (*Capsicum* spp.)” The hybrid Mavelikkara Local x Jwalasakhi & Nenmara Local x Vellayani Athulya were found to be superior in perse performance, standard heterosis and sca effect. Hybridisation & recombination breeding can be followed for further genetic improvement.

In the project entitled “Development of mutant varieties in Neelayamari from segregating generations” biochemical analysis and data tabulation of the first experiment is in progress and mutants were raised for evaluation in M4 generation and the plants are in their vegetative phase.

RKVY Project

Maintenance breeding of two chilli varieties (Jwalakukhi and Jwalasakhi) two okra varieties (Anjitha and Manjima) and two vegetable cowpea varieties (Sarika and Malika) and one Amaranthus variety (Arun) are in the field and the trial is in progress.

Agri. Extension

Research programmes

Major research achievements :

Two externally aided projects and two plan funded projects were concluded during the report period

Towards strengthening Vocational Higher Secondary Education in Agriculture in Kerala

The funding agency was Directorate of Vocational Education. The major objectives of the project were to assess the course content and curriculum of VHSE in Agriculture, Animal Husbandry and Fisheries and propose new courses in these areas with course content and curriculum

As part of the project

Evaluation of the content of the existing courses of VHSE in Agriculture, Animal Husbandry and Fisheries were done Evaluation of OJT was also done and facilities required for effective conduct of Vocational Programmes in Schools were assessed. Three regional workshops were organized at Trivandrum, Thrissur and Kannur to collect the relevant information regarding constraints, infrastructure facilities required, skill and capability building required by teachers, and issues related to OJT programme. Based on all these information detailed report was prepared emphasizing the guide lines to be followed for improving the courses being offered and to be offered through VHSE.

Crop productivity enhancement through capacity building of members of farmers club in Thiruvananthapuram District

This project was funded by NABARD. The major objectives of the project were to asses the status of farmer's clubs operating in Thiruvananthapuram District through SWOT analysis, identify the innovation gaps and innovation capacity scarcity among farmer's club members, conducting innovation capacity strengthening programmes, continually provide information back stopping to farmer's club through ICT programmes, conduct front line demonstration, and systematically document the process.

The 46 farmers clubs were contacted and its present status was assessed of these 18 farmer's clubs were found to be functioning. SWOT analysis was done on these 18 farmer club's. The major strengths identified were promotion of participatory and democratic decisions, skill enhancement of production and productivity, formation of SHG's and checking corruption by maintenance of records and registers. The major weakness identified were lack of interest on part of lending bank in providing loan, high interest of loan, and lack of monitoring. The opportunities identified were by updating knowledge and skill by organising training programmes and explore the possibility of organic farming. The major threat identified were withdrawal of assistance by NABARD and withering away of bank patronage. From among the 18 farmer's clubs 7 which were having agriculture as major avocation of members were selected for further interventions. Based on detailed analysis of profile characters and other variables and discussion with members and officials of farmers club, the necessary extension intentions were identified, planned and carried out. Most of the training programmers were on safe cultivation practices especially

on pest and diseases in banana and vegetables. Training programmes were also organized on terrace cultivation, value addition in fruits and vegetables, dairy unit and fodder cultivation, homestead cultivation of vegetables and mushroom cultivation. Demonstrations were conducted on organic management of pests and diseases in banana and vegetables, vermicompost unit making and terrace cultivation.

In three farmer's clubs farm schools were also organised giving emphasis on safe agricultural practices in vegetable and banana production

A set of CD's were also prepared and distributed to all clubs on various cultivation aspects and agri related enterprises.

Based on discussion with project monitoring committee, club volunteers and project team guide lines were prepared for enhancing and sustaining the income of farmer's clubs and a detailed road map was also prepared.

Establishment of Technology Development Centre cum Information KIOSK

The overall objective is to establish an Information KIOSK centre and ensuring the participation of rural youth in information KIOSK management and sustainable agricultural development.

Based on a workshop conducted, two crops were indentified (cowpea, amaranthus) and detailed informations were collected from seed to seed. These technical Information were transferred to visual media material following the principle of KIOSK establishment. The materials were refined with the help of information technology experts and SMS and was pilot tested. These two modules are now available for access through Agri-Diagnostic Centre of College of Agriculture, Vellayani.

Effective Technology Dissemination through farmer field school and improve the capacity of farmer leaders through various training techniques

The Objectives were,

to develop a team of master farmer trainers in vegetable cultivation in selected panchayats of Thiruvananthapuram, to establish agro-techniques demonstration units on good agricultural practices in vegetables and to establish FFS to ensure effective technology dissemination

A preplanning workshop was conducted on 21.1.11 in which the scientists decided to start FFS at Kovilnada, Koliyakode and Kunnathukal and concentrate the activities on two crops viz amaranthus and cowpea. Two days training programmes were organised for master farmers on group dynamics, leadership, and communication skills.

Field demonstrations were started on selected farmer's field during February on cultivation aspects on amaranthus and cowpea, giving emphasis on IPM & INM. As part of this periodic training programmes were organised on IPM, INM and Vermi composting in the selected areas. Inputs such as feeds, fertilizers, bio-fertilizers compost, Pseudomonas, Trichoderma culture, worms, NPK consortium organic pesticide etc, were supplied to selected farmers. Two unemployed youth in Kunnathukal were trained in repair and servicing of PP equipments to provide facility to needy farmers.

Agri.Entomology

Plan Projects & Externally Aided Projects

The field dose of the wetttable powder formulations of the fungi *Metarhizium anisopliae* and *Beauveria bassiana* was standardized. Shelf life of the formulations was also assessed by testing against the grubs of banana pseudostem weevil.

Evaluation of the efficacy of extracts of *Annona squamosa* (seed), *Andrographis paniculata* and *Clerodendron infortunatum* (plant) alone and as mixtures with bird chilli, garlic, ginger and neem seeds at different concentrations against various pests of vegetables were continued during the period for confirmatory results. Additionally, extracts of *Lantana camara*, *Calotropis gigantea*, *Vitex negundo* and *asafoetida* alone and as mixtures too were tested for their bioactivities at different concentrations against several pests. Two of these extracts viz., *L. camara* 20% + *C. gigantea* 20% and bird chilli 5% + garlic

5% were observed to be effective against the pests in the laboratory, in addition to the three promising plant extracts identified earlier. Trials conducted with Annona seed extract 2% proved its safety to the fungal pathogen *Fusarium pallidoroseum* and coccinellid predators. With the exception of bird chilli extract, all the other extracts were safe to *Beauveria bassiana* too.

A laboratory was established for the production of biocontrol agents and pheromone traps. Twenty one trainings were conducted in three districts of Kerala (Trivandrum, Kollam and Alappuzha). One thousand and forty five farmers were trained for effective fruit fly management in mango and vegetables. Twenty six demonstration plots were maintained in three districts. The trials in farmers field at Thiruvananthapuram, Kollam and Alappuzha districts revealed significant reduction in fruit fly incidence in mango and cucurbitaceous vegetables when IPM was followed. Two thousand leaflets were printed and supplied. A CD on fruit flies and their management was released. Farm advisory service was given to 229 farmers. The technologies related to pheromone traps and production and use of *Beauveria bassiana* and *Paecilomyces lilacinus* for fruit fly management were refined. The density of pheromone traps was standardized as 1 trap/15cents. Food bait preference for melon fly and mango fruit fly were identified. Bran and talc based formulations of fungi were developed and dosages were standardized for spraying as well as soil application for fruit fly management in mango and cucurbitaceous vegetables.

A full-fledged biocontrol lab (2000 sq. ft) was established. The entomopathogenic fungus *Beauveria bassiana* was multiplied and distributed (389 kg). free of cost to 535 farmers. Farmer participatory research to demonstrate the effectiveness of entomopathogens was carried out in three locations, Kalliyoor, Kakkamoola and Udyankulangara.

The pathogenicity of *B. bassiana* and *M. anisopliae* were evaluated against cowpea pod bugs. 88 % mortality was caused by *M. anisopliae* @ 2.3×10^9 spores/ml. whereas 91 % mortality was caused by *B. bassiana* @ 2.5×10^9 spores/ml. Two crops of vegetable cowpea were raised in the Instructional farm, Vellayani. The talc based formulations of the fungi prepared and stored for different intervals (15, 30, 45, and 60 days) and at different concentrations were sprayed on the crop. All the treatments were effective in controlling aphids.

PG Projects

Management of major sucking pests in cowpea *Vigna unguiculata*(L.) Walp with entomopathogens and plant defense inducing rhizobacteria

Among the PGPR viz., *Pseudomonas putida*, *Pseudomonas* sp., *Bacillus subtilis*, *Bacillus pumilus* and *Serratia marcescens* tested, *B. subtilis*, *B. pumilus* and *S. marcescens* were suited for growth promotion and suppression of aphid in cowpea. The entomopathogens viz., *Fusarium pallidoroseum* and *S. marcescens* were more effective against the aphid *Aphis craccivora* and the pod bug, *Riptortus pedestris* than *Beauveria bassiana* and *Metarhizium anisopliae*. Seed treatment with *B. subtilis* followed by application of *F. pallidoroseum* and *S. marcescens* could manage both the pests.

Management of melon fly (*Bactrocera cucurbitae* (Coquillett) using local isolates *Beauveria bassiana* (bals.) Vuill, *Paecilomyces lilacinus*(Thom.) Samson and *Aspergillus candidus* Link. Fries.

Paecilomyces lilacinus was identified as the most promising fungus for the management of the fruit fly of cucurbits. Among several locally available solid and liquid substrates evaluated for mass multiplication of the fungus, rice bran proved the best. Soil drenching with the fungus multiplied on rice bran at a spore concentration of 1.3×10^9 spores/ml + spraying the fungus at 2.4×10^7 spores/ml destroyed the pupae of the pest and thereby reduced the incidence of fruit fly and increased the yield significantly.

AICRP on Nematode Pests

Hot spot areas of cysts and root-knot nematodes were identified in paddy. The root knot nematode, *Meloidogyne graminicola* was a major problem in paddy in ten locations. In banana, the burrowing nematode *Radopholus similis* and the cyst nematode *Heterodera oryzaicola* caused damage equally. The burrowing nematode was widely distributed with twenty hot spot areas of infestation in the state. Twenty five hot spot areas were identified for *Meloidogyne incognita* in pepper. Among the

medicinal plants, 12 and 4 hot spot areas of infestation were noted for *M. incognita* and *R. similis*, respectively for kacholam. A similar trend was noticed in thippali (*Piper longum*) and koduveli (*Plumbago rosea*). Impact analysis in yield due to nematode infestation indicated 30 % loss due to *M. graminicola* in paddy, 10% due to *M. incognita* infestation in vegetables, 12 % due to *R. similis* in banana and 20% due to *M. incognita* in pepper.

Screening and confirmation of varieties/ lines of vegetable crops- tomato, brinjal, chilli, and okra against root-knot nematode.

The KAU varieties of okra viz. Kiran, Salkeerthi and Susthira when screened against *M. incognita* race 4 were found susceptible. The amaranthus varieties Kannara local, Arun and Mohini too were susceptible to *M. incognita* race 4. The chilli varieties Jwala, Jwalasakhi, Jwalamukhi and Ujwala were moderately resistant.

Evaluation of bio-pesticides (IHR strains) for the management of root-knot nematodes in brinjal

Application of the bio pesticides (*P. lilacinus*, *P. fluorescens*, *P. chlamydosporia*) reduced the population of the root knot nematode and improved the yield of brinjal in comparison with the untreated plots. Maximum yield was recorded in *P. chlamydosporia* (3.66 kg / plot) treatment giving 53.89 per cent increase over untreated. The incremental yield ranged from 19 to 24q/ha with ICBR ratio of 1:1.35 to 1:1.56.

Evaluation of IHR bio-pesticide for the management of root-knot nematode in okra

The results of the trial showed that biometric characters like weight of shoot and root were improved by the application of biopesticides. While treatment with *T. harzianum* resulted in 43.23% increase in yield, *P. lilacinus* recorded 25 % increase in yield. The ICBR was high in *T. harzianum* (1:2.3) treatment. The nematode population in root and soil also showed reduction. Maximum reduction was recorded in *T. harzianum* (26.09) followed by *P. lilacinus* (23.21).

Demonstration of promising vegetable based cropping systems for the management of root knot nematodes by adopting crop rotation/ cropping sequences prevalent in different agro climatic zones

Rotation with sweet potato resulted in drastic reduction in the nematode population in two locations, the reduction being 50.46 and 27.88 per cent respectively .

Management of major nematodes on banana using bioinoculants

Among the bioagents evaluated, *T. viride* showed maximum girth (35 cm) followed by *P. fluorescens* (34.16) and these two were statistically on par and better than untreated. However, the yield did not vary significantly in the different treatments. Maximum yield was obtained in *T. viride* (8 kg) and it is not as effective as the chemical treatment carbofuran, but same as the standard check (paring + hot water treatment +carbofuran +neem cake).

Development of technology for application of bioinoculants in banana for nematode management

Sucker treatment and pit application of bioinoculants were equally effective in reducing the nematode population. Maximum yield was recorded in *Bacillus macerans* pit application (8.33 kg) followed by *B. macerans* sucker treatment (8.27 kg) .

Pest Risk Analysis

Pest risk analysis in rice was carried out at four locations viz. Perumatti in Palakkad (two trials) and Nemom and Ullamath in Thiruvananthapuram district. In Perumatti an average loss of 0.5 -1 ton per ha was recorded at a population level of 295 *M. graminicola* and 29 *H. oryzae* /200 g soil. At Nemom, an average loss of 1.5 t/ha was recorded at a population level of 321 *M. graminicola* and 121 *H. oryzae* /200 g soil. At Ullamath, an average loss of 0.75 t/ha was recorded at a population level of 211 *M. graminicola* and 97 *H. oryzae* /200 g soil.

In banana, pest risk analysis was carried out at three locations viz., Chengal, Kalatharakkal and Palode in Thiruvananthapuram district. In Chengal, an yield loss of 3.5 kg/ plant was recorded at population level of 266 *Radopholous similis* and 217 *Helicotylenchus multicinctus*/200 g soil. In Kalatharakkal 5-7 kg yield loss / plant was recorded at population level of 214 *R. similis* and 398 *H.*

multicinctus /200 g soil. At Palode 90 % of crop toppled and showed a loss of 3-5 kg / plant at a population level of 327 *R. similis* and 328 *H. multicinctus* /200 g soil.

In yam, a crop loss of 60 % in seed material and 30% in field was recorded at a population level of 322-378 *Scutellonema bradys* /200 g soil. A crop loss of 4 kg / plant in healthy and 1.2 kg in diseased was recorded at a population level of 267 *M. incognita* and 14 *R. similis* /200 g soil in pepper.

AICRP on Honey bees and pollinators

Diversity and species characterization of stingless bees in Kerala.

A new stingless bee was obtained from Kannur district of Kerala. The specimen has been sent to Dr. Roubik, STRI, USA for identification.

Domestication and management technologies of stingless bee *Trigona iridipennis*

A wooden hive with a volume of 1500cc was observed to be the most suitable size for hiving and division of the stingless bee colonies. The hive has to be prepared in two equal halves with the following measurements for easy division of the colonies. The inner measurement of one part is length – 35 cm, breadth- 3.5cm, height – 4 cm. During division, two pieces of the hive with brood, pollen, honey and worker bees could be separated easily without any damage to the colony and brood. Each half of the colony could be closed with new empty pieces and used as a new daughter colony. The technology generated is ready for dissemination to the public.

Standardization of technology for enhanced yield of Indian honey bee *Apis cerana indica*

The colonies with desirable characters were selected and maintained in the apiary during the brood rearing season. The colonies were fed with artificial feed on need basis so as to get maximum population of worker bees. Super chambers were provided to accommodate the emerging bees. A longitudinal piece of comb taken from brood chamber was provided to ensure fast development of combs. The colonies were migrated to the rubber estates, prior to the honey flow in rubber to assess yield potential. The average yield potential per year could be enhanced from 2-3 kg per year per hive to 15-20 kg by adoption of management technologies standardized by the centre. This was achieved through providing 3-5 honey chambers in the colonies before the onset of honey flow in rubber plantations.

Revolving fund

Distribution of disease free Indian bee colonies, bee appliances and good quality honey to the public was done.

AINP on pesticide residue

Studies on the dissipation of imidacloprid when applied in chilli at 50g ai/ha (250 ml/ha) indicated that the initial deposit of 0.66 mg/kg dissipated to 0.02 mg/kg on the 5th day after application. The mean residues when applied @100 g a.i/ha (500 ml/ha) was 1.03 mg/kg which dissipated to 0.01 mg/kg in seven days in green chilli fruits. No residue of imidacloprid was detected in any of the subsequent samples. The half life of imidacloprid at 50g a.i/ha & 100g a.i/ha were estimated as 1.027 & 3.27 days, respectively. Soil samples analyzed on 20th day after spraying at 50 or 100 g a.i/ha did not show any residues. Residues of imidacloprid in red chilly at harvest (20 days after application) were below the detectable level of 0.01 mg/kg, when sprayed either at 50 or 100 g a.i/ha.

Studies conducted under the Deemed Registered Pesticides indicated that Oxydemeton methyl (Metastox 25 EC) when applied in chilli at 500g ai/ha resulted in an initial deposit of 0.967 mg/kg which dissipated to 0.041 mg/kg on 15th day after application. Residues of oxydemeton methyl in chilli fruit samples reached BDL (0.03 mg/ kg) on 20 days after treatment, when treated at 500g a.i/ha. Soil samples analyzed on 10th day after spraying did not show any residues of oxydemeton methyl following application at 500g a.i/ha.

Residues of methyl parathion were below the detectable level of 0.03 mg/kg in samples of paddy grain collected at harvest (30 days after application) following application of methyl parathion 50 EC and 2 DP at the rate of 500g a.i/ha at earhead formation stage of the crop. Similarly, soil samples collected from paddy fields at harvest following application of methyl parathion 50 EC and 2 DP at the rate of 500g a.i/ha, at the earhead formation stage of rice did not show any residues (BDL- 0.03 mg/kg)

Following application of Quinalphos 25 EC at the rate of 500g a.i/ha, at the earhead formation stage of rice, residues of quinalphos were below the detectable level (0.06 mg/kg) paddy grain samples and in the soil collected at harvest.

Mancozeb 75 WP was sprayed @450g/ha at vegetative stage of ginger and residue in rhizome and soil at harvest were analyzed adopting spectrophotometric technique. No residue of mancozeb (Manganese ethylene bis dithiocarbamate) was detected in the rhizome and soil.

Six sprays of Zineb 75 WP were given at @450g/ha in the vegetative stage of turmeric at an interval of 30 days and residues in rhizome and soil at harvest were analyzed adopting spectrophotometric technique. A mean residue level of 0.022 ppm zineb (zinc ethylene bis dithiocarbamate) was detected in the fresh rhizomes at harvest. Soil was found to be free from the residue.

Following application of phorate in green gram and cowpea at the rate of 1.5 kg a.i/ha at the time of sowing, residues of either phorate or its metabolites could not be detected (LOQ 0.03 mg/kg) in the green gram and cow pea samples collected at harvest. Similarly, no residues were detected in soil samples collected at the time of harvest from the treated field.

Following application of Quinalphos (Vazra 25 EC) twice in pepper at 15 days interval at 750g ai/ha, samples of pepper analyzed for the residues at 0, 1, 3, 5, 7, 10, 15, 21 and 28 days after the second spray resulted in an initial deposit of 5.09 mg/kg, which dissipated to 0.50 mg/kg on 28th day after application.

Studies on pesticide use pattern and dissipation behavior of commonly used pesticides in the rice based cropping system of Kuttanad.

Studies on dissipation of 2,4-D following application @ 1.0 kg ai per ha indicated that in soil the initial deposit of 0.102 ppm got dissipated to BDL within 96 hours while in water the initial deposit of 1.337 ppb got dissipated to BDL in 96 hours.

Dissipation of Quinalphos following application @ 0.09 kg ai per ha indicated that in soil the initial deposit of 0.24 ppm got dissipated to BDL within 10 days while in water the initial deposit of 2.59 ppb got dissipated to 0.013ppb in 96 hours.

Dissipation of chlorpyrifos following application 0.1 kg ai per ha indicated that in soil the initial deposit of 0.262 ppm got dissipated to BDL within 30 days while in water the initial deposit of 3.516 ppb got dissipated to 0.013ppb in 108 hours.

Dissipation of Triazophos following application 0.2 kg ai per ha indicated that in soil the initial deposit of 0.160 ppm got dissipated to BDL within 10 days while in water the initial deposit of 1.268 ppb got dissipated to 0.013ppb in 96 hours.

In situ bioassays using juveniles of fresh water Guppy fishes, *Poecilia reticulata* Peters as the test organism

The LC 50 values for 24 and 48 hours of exposure to chlorpyrifos were 0.243 and 0.112 ppm respectively. Based on the probit analysis the regression equation for chlorpyrifos at 24 and 48 hours of exposure were $Y = 5.4369 + 0.7122x$ and $Y = 5.881 + 0.930x$ respectively.

The LC 50 values for 24 and 48 hours of exposure to Triazophos were 0.264 and 0.188 ppm respectively. Based on the probit analysis the regression equation for Triazophos at 24 and 48 hours of exposure were $Y = 5.5609 + 0.970x$ and $Y = 5.6841 + 0.944x$ respectively.

The LC 50 values for 24 and 48 hours of exposure to Lambda cyhalothrin were 0.046 and 0.023ppm respectively. Based on the probit analysis the regression equation for Lambda cyhalothrin at 24 and 48 hours of exposure were $Y = 5.8869 + 0.6643x$ and $Y = 6.2325 + 0.757x$ respectively.

Strengthening existing extension machinery and other NGOs for extensive adoption of GAP in rice production in the region

Six training programmes were conducted to the farmers and agricultural assistants on Integrated pest and disease management and Integrated Nutrient management under GAP in Rice in different locations of Kottayam District.

Ongoing PG projects

Ph. D projects

1. Impact of pesticides on abiotic and biotic components in rice ecosystem of Kuttanadu.
2. Bio-efficacy and safety evaluation of biorational insecticides for the management of sucking pest complex of chilli (*Capsicum annuum* L.)
3. Evaluation of entomopathogenic fungi for the management of major coleopteran pests and characterization of pesticide tolerant strains.
4. Bioecology and management of
5. Efficacy and biosafety of new generation insecticides for the management of fruit borers of cowpea, brinjal and okra.

M.Sc projects

1. Pesticide use pattern and monitoring of pesticide residue in cardamoms in Idukki district
2. Infestation of the pumpkin caterpillar *Diaphania indica* (Saunders) in cucurbits and its management
3. Shoot feeders of mango and their management
4. Evaluation of native and introduced natural enemies for the management of papaya mealy bug *Paracoccus marginatus* (Hemiptera: Pseudococcidae) on vegetables

Plant Pathology

Research programmes

Major research achievements

- A Talc based formulation of *Trichoderma harzianum* was made and its shelf life was found to be more than 180 days. Among the plant products tried, highest inhibition was obtained from Garlic bulb extract at 10% concentration. *Trichoderma harzianum* (1%) + *Datura stramonium* (20%) + Garlic bulb extract (10%) completely inhibited the growth of *C.gloeosporioides* causing fruit rot of chillies.
- Characterization and management of viral disease of black pepper (*Piper nigrum* L). Viruses were characterized and identified as cucumber mosaic virus and pepper yellow mottle virus, transmitted by *Ferrisia verugata* (mealy bugs), *Toxoptera aurantii* (aphids), through grafting and seed. This disease can be managed by strict quarantine and use of disease free planting material.
- RKVY Project on "Spawn production and commercial Mushroom cultivation" - A full fledged spawn production unit was established in the Instructional Farm.
- Developed a POP recommendation for the management of pests and contaminants of Oyster mushrooms
- Standardised a low cost technology for the cultivation of medicinal mushroom, *Ganoderma lucidum*
- Standardised a technology for the cultivation of *Pleurotus* sp and *Calocybe indica* on rubber saw dust.
- Collected and identified 81 mushrooms at genus level.
- standardized the preparation of value added products of Oyster mushroom viz., mushroom wine (koon amruthu), dried mushroom powder and mushroom sauce.

Soil Science and Agricultural Chemistry

Research Programmes

Major research achievements

Detailed field and laboratory investigations on the effect of S and B nutrition on the yield and quality of sesamum in Onattukara soil of Kerala showed that the treatment combination of 30 Kg S ha⁻¹ and 2.5 kg B ha⁻¹ was the best. For foliar diagnosis petiole at 30 DAS (branching stage) and petiole at 20 DAS (4-5 leaf stage) were adjusted as the best part and stage for S and B respectively.

Studies conducted on the dynamics of Zn in typic kandiustults under fodder maize indicated that Zn @ 15 kg ha⁻¹ as soil application along with NPK 120:60:40 kg ha⁻¹ and FYM 10 t ha⁻¹ for the first crop of fodder maize will help to skip Zn application to the succeeding crop.

As per the mandate of the RKVY Project 'Karshaka Santhwanam' the multidisciplinary diagnostic team under the leadership of the P.I., Dr. Sam T. Kurumthottal has been making visits to the farmers' fields as and when soil or crop problem was reported. Although the southern districts of Thiruvananthapuram, Kollam and Pathanamthitta only were originally envisaged in the program, the service of the team has been now extended to Idukki and Alappuzha as well. After detailed field physical investigation and if required, chemical analysis of soil and plant specimen suitable recommendations are being provided to redress farmers problems.

Under the RKVY Project "Establishment of the Centre for Organic Farming of Kerala Agricultural University at Vellayani" two model organic farms were established with scope certificate issued by the authentic certifying agency 'INDOCERT' 12 Nos. of demonstration plots and 18 Nos. of vermi composting units were established in farmer's fields in Trivandrum and Kollam districts. At 10 locations training classes were organized to impart scientific skills in organic farming, which benefited more than 1500 farmers. Field experiments are being undertaken at College of Agriculture, Vellayani to standardise organic POP recommendations for all the important crops of Kerala.

The stationary soil testing laboratory established under the 'National Project on Management of Soil Health Management and fertility' offers facilities to farmers, research students and R & D institutions to have their soil, water, plant and manure samples chemically analysed at rates fixed separately for each group.

Under the State Planning Board funded project ' Soil based plant nutrients management plan for Agro eco systems of Kerala training was imparted to members of Nehru Yuvak Kendra on scientific Soil sampling

Agri.Statistics

Major research activities: Actively participated in almost all research projects (both external and university level) carried out in the University as members or otherwise in the design of the experiments, sampling/ survey designing and analysis of the project works.

Home Science

Project operated in consultancy Mode: Oceano Gate Cliff Project establishing Horticulture Therapy Garden & Training of the personnel. An amount of Rs. 50000/- was paid as consultation fee by MD, Oceano Gate to the Agricultural University.

Extension Programmes

Agronomy

Under the RKVY project' Establishment of centre for Organic Farming of KAU at College of Agriculture, Vellayani, Thiruvananthapuram, the following activities are undertaken

- Dr.S.Lekshmi, conducted 5 training programmes and 11 demonstrations for dairy farmers in the districts of Trivandrum, Kollam and Pathanamthitta on Homestead fodder cultivation

Radio talks/TV programmes /Audio-video cassettes

Topic	Date	Name of Scientist	Chanel
'Veettuvalappile krishi'	31.03.2011	Dr.O Kumari Swadija	AIR, Trivandrum
Adukkala thottavum Jaivakrishi sadhyathakalum	7.01.2011	Dr.Shalini Pillai	DD, Trivandrum

- Dr.Sansamma George is a member of the diagnostic team, Santhwanam
- She was also a member of the Scientific team to discuss "Possible areas of mutual co- operation" with high level diagnostic team from BASF, Germany on 17/1/2011

Distribution of planting material

Under the research project on fodder cultivation, dr,S. Lekshmi , has procured and distributed 3.73 lakh cuttings of different fodder crops/varieties from the planting material production units in the farmers

field for promotion of fodder cultivation in 14.92 ha in the districts of Trivandrum, Kollam and Pathanamthitta.

Plantation Crops & Spices

Training classes handled:

Dr. B.K. Jayachandran, Professor and Head handled the following classes during the period :

Class on 'Kasthuri Turmeric' at Farmers club meeting, World market Anayara TVM on 03.03.2010.

Class on 'Kasthuri Turmeric' at Kilimanoor as part of the NHB project on kasthuri turmeric

Class on 'Kasthuri Turmeric' at Kunnathukal Krishibhavan as part of the NHB project on kasthuri turmeric

Dr. P.C.Jessykutty, Associate Professor handled the following classes during the period :

Class on mediculture as part of the On job training programme for VHSE students (plant protection) on 11.10.2010 23.11 2010 and 08.12.2010

Dr. P.C.Jessykutty, Associate Professor had the following extension activities during the period

Served as Judge for the Flower show 2011 at Kanakakkunnu Palace

Participated in the village stay module of RAWE 2007 batch at Kottukkal farm, Anchal

Served as resource person in 3 day workshop to generate project proposal in the area of rural technology conducted at Mithranikethan, Vellanad

Details of activities

Training programmes organized :

Training programmes were conducted in two districts viz., Trivandrum and Kollam for popularization of kasthuri turmeric as part of the project National Horticulture Board funded project on 'Re-domestication and popularization of true kasthuri turmeric (*Curcuma aromatica* Salisb.) an endangered cosmetic cum medicinal plant'.

Farm Advisory Services :

In person	Over telephone	Through letters
12	23	16

Field visit

As part of the EAP "Re-domestication and popularization of true kasthuri turmeric (*Curcuma aromatica* Salisb.) an endangered cosmetic cum medicinal plant' field visits in famers field in Trivandrum and Kollam Districts are undertaken as part of the front line demonstrations.

Pomology & Floriculture

Dr. C. S. Jayachandran Nair, Dr. Sheela V. L, and Dr. Sabina, G.T. attended RAWE training with students at State Farm, Anchal and Chithara Block on 3-09-10 to 04-9-10 and 17-9-10 to 18-9-10.

Dr. Dr. C. S. Jayachandran Nair, Dr. Sheela V. L, and Dr. Sabina, G.T. functioned as judges for the Flower Show organized by the Agri-Horti Society on 06-01-11 and 07-01-11.

Radio talks / TV programmes / audio-video cassettes

Topic	Date	Name of scientist
Doordarshan: Employment potential of Commercial Floriculture	19-09-10	Dr. V.L.Sheela

Olericulture

Extension activities

1. Dr. M. Abdul Vahab took class on Namukkum oru Pachakkarithottam to farmers , students of different schools in different loactions of Thiruvananthapuram, Kollam , Pathanamthitta and Thrissur districts.
2. Dr. M. Abdul Vahab, V.A. Celine and Dr. I. Sreelathakumary took classes on budding, grafting and layering respectively to VHSE students from Thiruvallam, Parassala, Kulathur and Veeranakavu from 4-12- 10 to 16-12-10.

3. Dr. M. Abdul Vahab presented the results of the work of the SHM project in the ZREAC workshop on 1.2.11 at the College of Agriculture, Vellayani.
4. Dr. M. Abdul Vahab handled class on organic vegetable production for the residents of Kavalloor Residents Association on 6.2.11.
5. Dr. M. Abdul Vahab took class on Namukkum oru pachakkarithottam to students of MGM School, Ayroor, Varkala on 10.2.11.
6. Dr. M. Abdul Vahab attended the Palode mela on 14.2.11 and took class on scientific vegetable cultivation.
7. Dr. M. Abdul Vahab and Dr. V. A. Celine participated the workshop on Content Development on Information Kiosk at the seminar hall of Agriculture Extension department on 7-9 February 11.
8. Dr. M. Abdul Vahab participated the Farm Field school at the Extn. Department on 7-8, February 11.
9. Dr. M. Abdul Vahab took classes on organic vegetable cultivation of vegetable for farmers and Agricultural Demonstrations at Agricultural Training Centre, Kavarathy, Lakshadweep on 21-23, February, 11
10. Dr. V.A. Celine took class on vegetable cultivation for Farmers club at Balaramapuram on 2.2.2011.

Processing and Technology

Radio talks/ TV programmes/ Audio-Video programmes

Topic	Date	Name of Scientist	Chanel
Scope of Fruit processing in Kerala	17-3-2011	Dr. Mini C	Doordarsan Kendra, Trivandrum

Plant Physiology

Field visit: Dr. Roy Stephen -Consultancy regarding identification and correction of nutritional deficiency and physiological disorders.

Plant Breeding and Genetics

Highlights of extension activities

- Dr. P. Manju, Professor, is compiling a "Compendium of crop varieties of Kerala"
- Dr. K.M. Abdul Khader attended a meeting of ICAR Programme on District Disaster Contingency Plan preparation for Agriculture & Allied Sectors Meetings on 30th June 2010 at KAU HQ, Vellanikkara
- Smt. Seeja G, Asst Prof (Sr.Sc) was a resource person and delivered a talk on Breeding techniques in Agricultural crops in the National Seminar on Plants and Medicine held on 8th and 9th October, 2010 at TBGRI, Puthenthope, TVM
- Smt. Seeja G, Asst Prof (Sr.Sc) was a member of the screening subcommittee for conducting screening/skill test for the selection of casual labourers on 20th, 24th, 25th, and 27th of January, 2010.
- Smt. Seeja G, Asst Prof (Sr.Sc) is in charge of the compilation of monthly progress report of the Department
- Dr. Jayalekshmy V.G. Associate Professor accompanied the 2007 batch for RAWE programme
- Dr. Jayalekshmy V.G. Associate Professor, conducted farm trial for two cowpea cultures in 15 farmer plots in three districts
- Dr. D. Wilson, Professor, accompanied the 2007 batch for RAWE programme for their NGO training, Village stay and Research Station training as module leader.
- Dr. Arya K. Professor, was an external expert in an interview for four DBT/CSIR projects at TBGRI, Palode to select JRF/Data Operators/Technical Assistants on 16/8/10
- Dr. Arya K. Professor, accompanied the 2007 batch for RAWE programme in their KVK training on 3rd and 4th Nov, 2010

Details of activities

- Dr. Sunny K. Oommen, Professor, is in charge of the vehicles of College of Agriculture, Vellayani Agri. Extension

Highlights of extension activities

- An agricultural exhibition was organised at Mannanchery in Alappuzha District as part of "Tharisurehitha Nel vayal grama Prakhyapanam". The programme was started with harvest festival inaugurated by Hon. Minister of finance Dr. Thomas Isacc. The final year students of College of Agriculture Vellayani actively participated in this programme. The agricultural exhibition was inaugurated by Hon. Agricultural Minister. Sri. Mullakkara Ratnakaran
- The scientists of the Department of Agricultural Extension are members of SAMETI's programmes
- Dr. C. Bhaskaran is acting as member of State Biodiversity Board and is regularly attending the meetings.
- Dr. S. Mothilal Nehru is acting as member of curriculum steering sub committee of Vocational Higher Secondary Education.
- Dr. S. Mothilal Nehru, Dr. C. Bhaskaran are acting as members of State level Task Force on local Self Government Programmes.
- Teachers of the Department of Agricultural Extension are acting as resource person of IMG, IOB, RESET at Vazhuthacaud.
- Dr. V.B. Padmanabhan is acting as the Public Relation Officer of the College of Agriculture, Vellayani
- Dr. S. Mothilal Nehru is acting as the Public Information Officer of the College of Agriculture, Vellayani.
- Dr. Allan Thomas is acting as the Programme Officer of NSS
- The teachers are acting as external examiners of various Agricultural Universities.
- Two Rural Agricultural Work Experience Programmes were organized during the period under report. As a part of the UG RAWE programme many training programmes, Agri-clinics and Exhibitions were organized in Ittiva panchayath and Kadakkal Panchayath of Kollam District.

Radio talks/TV programmes Audio-video cassettes

No	Topic	Date	Name of Scientist	Channel
1	Question Answer	August 2010	Dr. V.B. Padmanabhan	AIR
2	Talk on farming in house terrace	August 2010	Dr. V.B. Padmanabhan	AIR
3	Radio report on RAWE	11.11.2010	Dr. V.B. Padmanabhan	AIR

Agri. Entomology

Scientists of the department visited farmers fields to tackle the following problems

- Pest problems of rice, vegetables, banana and coconut
- Nematode problems of vegetable and banana
- Scientific management of bee keeping against TSBV.
- Judicious use of pesticides

Farm advisory services

In person	Over telephone	Through letters
55	350	15

TV Programmes / radio talks

Name of Scientist	Topic	Channel	Date
Dr.S.Devanesan	Mazhakkala paricharanam (Monsoon management of honey bees)	Doordarshan	16.07.10
Dr.S.Devanesan	Documentary about AICRP on Honey bees and pollinators	All India Radio	07.09.10
Dr.K.S.Premila	Question - answer - bee keepers	All India Radio	

Dr. Reji Rani O.P	Question answer - Interview on role of pollinators on food safety Interview on pest and diseases of honey bee Mampazha eechaudae niyanthranamargangal	All India Radio	12.2.2010
		All India Radio	8.10.2010
		All India Radio	19.11.2010
		Asianet	Jan.2011

Plant Pathology

Highlights of extension activities

- Scientists of the department acted as Resource personnel for training programmes conducted in various departments of the college.
- Faculties of the department acted as experts for the diagnosis and management of diseases of crop plants.
- Giving technical advice to problems of farmers as well as on Mushroom production technology.
- Off campus advices in mushroom production technology, plant disease diagnosis and management.
- Teachers of the department handled classes to students from college and schools
- Prepared and presented the VISION D2030 proposal.
- Associated with the visit of QRT for assessing mushroom research work in the centre.
- Attended the state level meeting on Pesticide Policy at DE's Office, Mannuthy.
- Attended the State level meeting on Pesticide Policy at Trivandrum and Kollam.
- The HOD is acting as Designated Inspection Authority for Plant Quarantine.
- The HOD is attending various Meetings at University level viz., Board of Studies, Co-ordination Group meetings, Council meetings etc.,
- Attending the RAWE programme of final year B.Sc. (Ag) students.

Farm Advisory service

In person	Over Telephone	Through letters
40	160	14

Soil Science and Agrl.Chemistry

Highlights of extension activities

Detailed demonstration classes on topics like organic farming, vermi composting, organic manures, scientific soil sampling and testing were handled by the teachers of the department for the various target groups of the society which included officers of the department of Agriculture, farmers, unemployed youth, house wives, members of resident association etc.

Radio talks/TV Programmes/Audio-Video Cassettes

Topic	Date	Name of Scientist	Chanel
Soil testing	11.03.2011	Dr.Usha Mathew, Professor	Doordarshan Kendra

Micro Biology

Training programmes organized -9 nos.

Consultancy service is being provided to all the 32 microbial inoculant production centers functioning with our technology

Farm Advisory services

In Person	Over telephone	Through Letters
70	25	2

Radio talks/ TV programmes/ Audio-video Cassettes

Topic	Date	Name of scientist	Channel
Microbial inoculant technology	November 2010	Dr.P.Sivaprasad	DD4

Home Science

Highlights of extension activities

1. Dr.S.Chellammal. Professor and Head attended the 38th Indian Science Congress at Chennai from 3/1/2011 to 7/1/11
2. Dr.Mary Ukkuru attended FRC Meeting on 3/12/2010 as co-ordinator.
3. Dr.Mary Ukkuru attended Board of Studies Meeting of Health Sciences under University of Kerala 8.12.2010.
3. Dr.Rejani.M participated in the SRC community college Board meeting at Educational Secretaries chamber on 10/12/2010 organized by SRC
4. Dr.Suma Divakar presented a paper on Post harvest technologies for homesteadfarm at Mitranikethan on 3/12/2010 organized by Mitranikethan. Abstract and paper submitted.
5. Dr.Beela.G.K participated in the seminar of Horti-Expo Future Farming on 3rd & 4th December.
6. Dr.Beela.G.K participated in the workshop of Indian Bio Diversity Congress and functioned as secretary of the congress on 28th and 29th. She attended the valedictory function on 31st December.

T.V.Programme

Dr.Rajani.M participated in the live programme in doordarshan krishidarshan on 15/10/2010 on fruit and vegetable processing .

List of Publications:

Agronomy

a. Scientific Papers

- Effect of different planting date and varieties on yield dry matter production and nutrient uptake in rice - T.Sajitharani, G. Raghavanpillai & V.L.Geethakumari, Planted Archives Vol-9 No:2 2009 Page 909-914
- Organic Nutrient scheduling for Okra & Cowpea - V.L. Geethakumari, Annama George & Usha C Thomas, Green Farming Vol-3 No:2 Feb 2010 Page 106-108

b. Technical Bulletins

"JAIVA VETILA KRISHI"

"VEETUVALAPPILE VILA VAIVIDHYAVALKARANAM"

"PACHILAVAPRAYOGAM JAIVAKRISHIYIL"

Dr.S.Lakshmi prepared 2000 leaflets each on

- Bajra Napier Hybrid
- Guinea grass
- Fodder cowpea

b. Books

M.Abdul Salam and K.V.Peter.2010. Cashew- A monograph. Strudium Press India Pvt.Ltd.New Delhi

Chapter Of Book - V.L. Geethakumari, Pushpakumari. R & Pillai. S. Shalini - 2011 - Organic Farming in Vegetable Crops in : Current Basics in Vegetable Production (Ed. Rana. M.K) - New India Publishing Agency, Pritampura, New Delhi-110088 - Chapter 6 - pp 117-145

Plantation Crops and spices

Research papers

J.D.Nirmalatha, G.R. Sulekha and B.K.Jayachandran 2010. Effect of organic manures on yield attributes of kasthuri turmeric (*Curcuma aromatica* Salish.) *Plant Archives* 10:2; 745-748

K.Nihad, P.C.Jessykutty and P.Sivaprasad, 2010. Effective utilization of bioresources for yield improvement in *Plumbago rosea* intercropped in coconut garden. *Int. Conf. Coconut Biodiversity for Prosperity*, 25-28 Oct.2010.Central Plantation Crops Research Institute, Kasaragod. Abstract:105.

K. Nihad and P.C. Jessykutty,2010. Long term effect of organic manures and microbial inoculants on nutrient uptake and yield of *Plumbago rosea* when grown as an intercrop in coconut garden. *Journal of Medicinal and Aromatic Plant Sciences*.32(3): 257-261.

Books/ chapter in Books: A book on kashuri turmeric is in the final stage of printing.

Pomology and Floriculture

Scientific papers

1. A. Sheena and Sheela, V.L. 2010 Role of water lilies in phytoremediation of contaminated water bodies. Souvenir - National Conference on Plant Diversity for Aesthetic Values and Landscape Gardening 26-28 November 2010,TNAU, Coimbatore p132.
2. I. Priyakumari and T. Sabina George 2010 Influence of plant growth regulators on in vitro clonal production of dendrobium cv. Miss Snow White. Souvenir - National Conference on Plant Diversity for Aesthetic Values and Landscape Gardening 26-28 November 2010,TNAU, Coimbatore p59.
3. I. Priyakumari and T. Sabina George 2010 Influence of plant growth regulators on in vitro clonal production of orchid Dendrobium cv.Earsakul. Souvenir - National Conference on Plant Diversity for Aesthetic Values and Landscape Gardening 26-28 November 2010,TNAU, Coimbatore p. 59.

Books - Sheela V.L. 2011 Trade in Floriculture (In) The Science of Horticulture Vol II. K.V.Peter (ed.) New India Publishing Agency, New Delhi pp 323-348

Olericulture

Articles published

Scientific

Sl. No.	Title	Journal /Proc.	Name of the author	Other details
1.	Screening for shade tolerant genotypes of chilli for homestead cultivation	Indian J. Hort. 2010	I. Sreelathakumary and L.Rajamony	67 (1), 122-126
2.	Multivariate and RAPD marker analyses in ashgourd genotypes	Indian J. Hort. 2010	Resmi, J. and I. Sreelathakumary.	67 (4), 482-488

Popular Articles/ Other publications

Sl. No.	Title	Magazine/ News Paper	Author	Other details
1.	Enrich homesteads with vegetables -Solanaceous vegetables	Kerala Karshakan 2010.	Dr.I. Sreelathakumary	56(4): 21-25
2.	Enrich homesteads with vegetables - Leguminous vegetables, Amaranth and Bhindi	Kerala Karshakan 2010.	Dr. V.A. Celine	56 (4) : 26-31
3.	Enrich homesteads with vegetables -Cucurbitaceous vegetables	Kerala Karshakan 2010.	Dr. M. Abdul Vahab & Dr.I. Sreelathakumary	56(4): 32-35

Chapter in Book

Sreelathakumary,I. 2010. Ashgourd - *Biodiversity in Horticultural crops*-Vol. 3. K.V.Peter (eds)- Daya Publishing house. Delhi. 1-15.

Processing and Technology

Books -1 (Cashew Research and Development in Humid tropics)

Chapters in book: 1

Mini C. 2010. Minor greens and salads. P.5-89. In. Peter, K.V. (Ed.). *Under utilized and under exploited Horticultural Crops*. Vol.5. New India Publishing Agency. New Delhi.

Plant Biotechnology

Scientific papers:

Smitha Bhasi, Swapna Alex, Rajmohan K and Soni K.B. 2010. Morphological and Genetic variability among black pepper *Piper nigrum* L. variety Panniyur-1 clones. *International Journal of Tropical Agriculture* 28 (3-4), 465-470

Kavitha B. and Thankamani V. 2010 .Isolation and characterization of a Novel Protease Enzyme from *Bacillus Cereus*. *Research Journal of Biotechnology* Vol. 5 (4): 39-45.

K. Rajmohan , K. B. Soni, A. Swapna , P. A. Nazeem and S. Shimi Suku. 2010. Use of copper sulphate for controlling systemic contamination in black pepper (*Piper nigrum* L.) cultures. *Journal of Food, Agriculture & Environment* Vol.8 (3&4): 569 - 571. 2010

Popular articles

Dr. Swapna Alex, Dr.K.B.Soni. 2010. "Black pepper – The King of spices" in *Agrobios*, Vol.9(7), 15-16

Reghunath, B.R. 2009. Three in one sugandhavumayi sarvasughandhi. *Kerala Karshakan*, Jan. 2009, 54 (8): 25-26

Swapna Alex, Vineetha G, Soni, K.B. 2010. *Invitro* flowering – An aid fro orchid improvement, Oct. 2010, IX(5): 10

Swapna Alex, Soni, K.B. 2010. Intellectual Property Rights (IPR) & Intellectual Property Protection (IPP) in Biotechnology, Oct 2010, Vol. 7 (1) 11-13

S. Kamala, K. B. Soni and Swapna Alex. 2010. Recent advances in flow cytometry. *Millenium Zoology*, Vol.11 (1), 54-57

Plant Physiology

Manju R.V. and Soni K.B. 2010. Identification of morphophysiological traits contributing towards water stress tolerance in Nendran clones. In. *Climate change adaptation strategies in Agriculture and allied sectors*. Eds GSLHV Prasada Rao.

Scientific publishers ISBN :978-81-7233-679-0

Plant Breeding and Genetics

Scientific papers

Muthuswamy,A. and Khader,K.M.A.2010.Genetic variability for yield and leaf curl virus resistance in varieties of chilli(*Capsicum annum* L.).*Int.J.Mendel*.27(1-2):pp.5-6

Jayalekshmy V.G.,John P.S.,Nazeem P.A.2010 Random Amplified Polymorphic DNA for clustering cashew genotypes. *Journal of Plantation Crops*.38 (3)

Chapter in Book

Methodology for gene sequencing in Plants by Jayalekshmy V.G. in the book *The Science of Horticulture* Vol. I edited by Dr. K.V. Peter

Agri. Extension

Scientific papers

Sl. No.	Title	Magazine/News Paper	Author	Other details
1	Categorization and analysis of indigenous Horticultural practices in Kerala	Journal of Extension Education	Dr. A. Sakeer Husain & M. Sudaramari	
2	Convergences of MGNREGS with watershed development		A. Sakeer Husain & M. Sundaramari	Jan 2011

Technical Bulletins/ Popular article

Name	Title	Publisher
Dr. R. Prakash	Chembarathiyude jeevitha margam	Kerala Karshakan
Dr. R. Prakash	Lakshyam Sakthamayirikkanam	Balasalabham

Books

Swayamthozhil Samrambhangaal – Karshikamekhalayil - Dr. R. Prakash – Published by State Institute of Languages, Trivandrum.

Agri.Entomology

Scientific papers

- Jiji, T., Nisha, V.G., Sarika Mohan and Abraham Verghese. 2010. Food bait preference of melon fly *Bactrocera cucurbitae* and oriental fruit fly *B. dorsalis*. *Insect Environ.* :15(4). p 147
- Jiji, T., Abraham Verghese, Suja G., Naseema A., Nisha, V.G, Sarika Mohan and John D. Mumford. 2010. Impact of the project integrated management of fruit flies in India (IMFFI) on fruit and vegetable cultivation in Southern Kerala. Paper presented in the 8th International Symposium on fruit flies of economic importance, Valencia, Spain. Sept. 2010.
- Jiji, T., Naseema, A. and Praveena, R. 2010. Biocontrol strategies for the management of vegetable pests using entomopathogenic fungi. In: H.R. Sardana, O.M. Bambawale and D.Prasad (ed.) *Sustainable crop protection strategies*. 582-599
- Devanesan, S., Shailaja K.K. and Premila, K.S. 2010. Meliponiculture for yield enhancement and food safety in Kerala. *Advances in pollen spore research XXVIII*: 57-62
- Thomas George. 2010. Adsorption and Desorption of Alachlor. *Pestic. Res. J.* 22: 14-18
- Thomas George. 2010. Persistence in submerged acid soils. *Pestic. Res. J.* 22
- Ambily Paul, Nandakumar, C and Hebsy Bai. 2010 management of coreid bug *Paradasynus rostratus* Dist. On coconut palm in homesteads having mixed cropping. *Entomon.* 34 (2) 63
- Ambily Paul, Nandakumar, C. 2010 . Biology of coreid bug *Paradasynus rostratus* Dist. In different hosts. Paper presented in the International conference on biodiversity of coconut for prosperity . Octo. 25 th to 27th CPCRI. Kasaragod
- Sheela. M. S. 2010. Nematode menace in medicinal plants and their management. Paper presented in the National conference on Innovations in nematological research for agricultural sustainability. TNAU, Coimbatore. 2 .9.10 to 3.9. 10 Abstr.p. 50.
- Siji,J.V.,Jayaprakash,C.A.,Sheela,M.S. and Mohandas,C.2010.Efficacy of certain plants for the management of *Meloidogyne incognita* in okra. Paper presented in the National conference on Innovations in nematological research for agricultural sustainability. TNAU, Coimbatore. 2 .9.10 to 3.9. 10 Abstr.p. 159
- Sheela,M.S,Nisha, M.S and jiji,T.2010.Bioefficacy of *Bacillus macerans* for the management of root knot nematode *Meloidogyne incognita*. Paper presented in the National conference on Biological Control, Bangalore, India. Abst.p.23.
- Siji,J.V.,Jayaprakash,C.A.,Sheela,M.S. and Mohandas,C.2010. Efficacy of Cleome viscosa against *Meloidogyne incognita* infestation in okra. *Thai.J.Agrl.Sci.*43:151-56.
- Reji Rani O.P and Ambily Paul.2010. Population dynamics of mango fruit fly *Bactrocera dorsalis* (Hendel) Tephritidae:Diptera and evaluation of methyl eugenol trap in Integrated pest management and Kerala University. January 2010.p.265.

Popular Articles

- Devanesan, S. and Shailaja K.K. 2010. Cheruthenadukku velakkarikalae thurathathe. Karshakan.
Devanesan, S., Premila, K.S. and Shailaja, K.K. 2010. Then – oushadavum aharavum. Karshakasree.

Book

- Sudharma, K. 2010. Jaivakeeda niyanthranam. Kerala Agricultural University, Thrissur pp: 93

Chapters

- Nandakumar, C. 2010. Jaiva keedaniyanthranam–charithram, avashyakatha. In: *Jaivakeeda niyanthranam* (ed.) Sudharma, K. Agricultural University, Thrissur. pp: 1-7
Hebsy Bai and Neena Lenin. 2010. Jaiveeka keedaniyanthranam upadhikal. In: *Jaivakeeda niyanthranam* (ed.) Sudharma, K. Agricultural University, Thrissur pp: 8-17
Sudharma, K, Sarika Mohan, S and Sahi Beegam. 2010. Paradangal. In: *Jaivakeeda niyanthranam* (ed. Sudharma, K.) Agricultural University, Thrissur pp: 18- 33
Anitha, N. Ambily Paul and Bineesh, G.S. 2010. Irapidiyanmar. In: *Jaivakeeda niyanthranam* (ed. Sudharma, K.) Agricultural University, Thrissur pp: 34-42
Sudharma, K and Archana P.A . 2010. Sooshmanukkaludae prathyegathakal In: *Jaivakeeda niyanthranam* (ed. Sudharma, K.) Agricultural University, Thrissur pp: 43- 48
Sudharma, K. Naseema, A and Archana, P.A. 2010. Keedaniyanthranathinu mithrakumil In: *Jaivakeeda niyanthranam* (ed. Sudharma, K.) Agricultural university, Thrissur pp: 49-66
Ambily paul and Anitha, N. 2010. Bacteria. In: *Jaivakeeda niyanthranam* (ed. Sudharma, K.) Agricultural university, Thrissur pp: 67-73
Rejirani, O.P., 2010. Keedaniyanthranam virusukaliloodae In: *Jaivakeeda niyanthranam* (ed. Sudharma, K.) Agricultural university, Thrissur pp: 74-84
Sheela, M.S., 2010. Nemavirayum jaiveekaniyanthranavum. In: *Jaivakeeda niyanthranam* (ed. Sudharma, K.) Agricultural university, Thrissur pp: 85-93

Hand Books

- Reji Rani O.P and Ambily Paul 2010. Keeda roga nimayavum niyanthranam margangalum. Kerala Agricultural University, Thrissur. pp 50.
Ambily Paul and Reji Rani, O.P. 2010. Krishiyida vidyalayam. Kerala Agricultural University, Thrissur.

Leaflets

- Sheela, M.S 2010. Nematode management in vegetables.
Sheela, M.S and Jiji, T. 2010. Pachakarikalile nimavira niyanthranam
Sheela, M.S and Jiji, T. 2010. Nimavira niyanthranam vazhayil.
Reji Rani O.P and Ambily Paul 2010. sasyangalude pariposhanathinum prathirothaseshikkum pseudomonas.
Reji Rani O.P and Ambily Paul. 2010. Keeda naashini prayogam-karshakaringirikkenda kaaryangal.

Plant pathology

Scientific papers

- Naseema, A. and Manju Elizabeth, P. 2010. Protoplast fusion enhances mycoherbicidal efficiency of *Fusarium pallidroseum*- a pathogen of water hyacinth. *Journal of Tropical Agriculture*. 48(1-2):58-60.
Geetha, D., Suharban, M., Arthor Jacob and Kamala Nayar. 2010. Prospects of milky mushroom cultivation in Kerala . *First Kerala Women Science Congress*, St. Theresas College, Ernakulam on August 10th 2010 pp83.
Kamala Nayar, Arthor Jacob, Sajitha Rani, Lekha Rani and Geetha, D. 2010. A women success story in the adoption of biocontrol agents in banana . *First Kerala Women Science Congress*, St. Theresas College, Ernakulam on August 10th 2010 pp76.

- Geetha, D., Suharban, M., Gokulapalan, C. and Arthor Jacob 2010. A low cost technology for the cultivation of medicinal mushroom, *Ganoderma lucidum*. Indian Journal of mushrooms (Accepted for publication)
- Geetha, D., Suharban, M., Gokulapalan, C. and Arthor Jacob 2010. Suitability of different substrates for the cultivation of milky mushroom, *Calocybe indica*. Indian Journal of mushrooms (Accepted for publication)
- Lulu Das 2010. Utilization of coconut palm wastes for cultivation of Oyster mushrooms. *International conference on Coconut biodiversity for prosperity*. At CPCRI, Kasaragod on 26-28th October 2010.
- Suharban, M., Geetha, D. and Hajilal, M.S. 2010. Oyster mushroom cultivation – an ideal agribased enterprise for women in Kerala. *First Kerala Women Science Congress*, St. Theresas College, Ernakulam on August 10th 2010 pp77.
- Suharban, M., Geetha, D. and Hajilal, M.S. 2011. Prospects of mushroom cultivation in Kerala. *National Seminar in the National Institute for Inter disciplinary Science and Technology*, Trivandrum on 8th Feb. 2011.

Popular articles

- Naseema, A. and Girija, V.K. 2010. Jaivaroga niyandranam pachakarikalil, Kerala Karshakan, September 2010, pp 38-41.
- Geetha, D., Suharban, M. and Arthor Jacob. 2010. Ganoderma oushadakoonukalil onnaman Kerala Karshakan, October 2010, pp 38-41.

Chapter to Book

- Jiji, T., Naseema, A. and Praveena, R. 2010. *Biocontrol strategies for the management of vegetable pests using entemopathogenic fungi*. In: Sustainable crop protection strategies. Vol. II (Eds H.R. Sardana, O.M. Bombawale and D. Prasad) pp582-599.
- Suharma, K., Naseema, A. and Archana, P.A. 2010. *Keedaniyandranathine mithrkumil*. In Jaiveekakeedaniyandranam, (Ed, Suharma, K) KAU, pp49-67 (Malayalam).

Book

- Umamaheswaran, K. and Hebsybai (2011). Field Card on Identification of Diseases of Vegetables. VRPCK p.65

Soil Science and Agri. Chemistry

Technical Bulletins: 1

Dr.K.C.Manorama Thampatti, Professor
Educational, research, extension and development initiatives 2006-10, College of Agriculture, Vellayani (May, 2010)

Popular Articles : 3

Dr.Sumam George, Professor
r[^]mkv[^]dkv hf[^]n[^]p]lc;mc³, Rubbers, July 2010

Dr.K.C.Manorama Thampatti, Professor :
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Dr.K.C.Manorama Thampatti, Professor:
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Home Science

Popular Articles

Title	Author	Publication
'Sensory evaluation of rice based cuisines based on rice varieties released from KAU'	Dr.Suma Divakar	Journal of dairying and Home Sciences
"Horticulture Therapy on self esteem and motor skills of the physically Challenged"	Dr.Beela.G.K	the Physiotherapy & Occupation Therapy Journal (Page No. 17-23, Quarterly edition Dec. 2010)

Plant pathology

Important visitors

External Examiners from TNAU, CTCRI, ICAR QRT and Director NRCM, Solan Soil Science & Agri.Chemist

Important visitors

1. Dr.Kaushik Majumdar, Director (India South), International Plant Nutrition Institute, Hyderabad
2. Dr.T.Sathyanarayana, Dy. Director (India South), International Plant Nutrition Institute, Hyderabad

Other details if any

Olericulture

Dr. M. Abdul Vahab continued as the Project Coordinator (Vegetables) in KAU.

Agri.Extension

During this period 6 PG students were enrolled for M. Sc (Agri. Ext.) programme. Two plan funded projects were implemented viz Effective Technology Dissemination through farmer field school and improve the capacity of farmer leaders through various training techniques and Establishment of Technology Development Centre cum Information KIOSK. Two externally aided projects were concluded during the report period namely Towards strengthening Vocational Higher Secondary Education in Agriculture in Kerala and Crop productivity enhancement through capacity building of members of farmers club in Thiruvananthapuram District. The end product of the project is effective tools for technology transfer and further scaling up.

During the period we wer able to establish two class rooms in the roof of the Social Science block, and also renovated the Seminar Hall and Examination Hall.

Plant Pathology

1. Dr. K. Umamaheswaran was deputed as resource person for the Training programme on Agriculture at Administrative training Institute, Kavarathi, Lakshwadeep from 21to 23 Feb.2011. and conducted classes on the following topics:

- Biocontrol of pest and diseases of fruits and vegetables.
- Participatory technology in fruits and vegetables
- Group and retail marketing of fruits and vegetables.

Out side students on project work

Students from outside university viz., Sree Sankara College, Kalady, Noorul Islam College of Arts and Science , Thakkalai and CAS in Botnay, Madras have conducted research work as part of their P.G. Programme. The details of the projects are as follows:

Ecofriendly management of leaf blight in *Plumpago rosea L.*

Aspergillus fumigatus, Salicylic acid and Amrut neem are effective for the management of Leaf and stem blight caused by *F. oxysporum*.

Ecofriendly management of Bacterial blight of Anthurium.

Bacterial blight of anthurium can be managed by Turmeric powder and sodium bicarbonate (10:1), bacterial antagonist (R1) and antibiotics(streptomycin).

Use of fungal pathogens of chromolaena for its biological control.

Among the fungal pathogens *Alternara alternata* and bacterial isolates (3no) were the most efficient pathogens for the biological control of chromolaena. Also studied the effects of phylloplane microbes on these were pathogen.

Study on Leaf blight of Anthurium caused by *C. gleosporiodes*

Isolation, purification , establishing the pathogenicity causing folia blight caused by *C. gleosporiodes* were studiedWeb blight of cowpea

Study on Leaf blight of Amaranthus caused by *R.solani*

Isolation, purification, establishing the pathogenicity of the fungus causing folia blight of amaranthus were carried out.

Study on Web blight of cowpea caused by *R.solani*

Isolation, purification, establishing the pathogenicity of the fungus causing web blight of cowpea were carried out.

Antracnosis of pepper caused by *C. gleosporiodes*

Isolation, identification, symptomology and proving pathogenicity were carried out.

Expression of PR proteins and detection of plant viruses in cow pea

Purified the virus, studied the transmission. Isolation of PR proteins by SDS page. Sprayed salicylic acid and Acibenzolar (bion) on cowpea and found were disease suppression. ELISA test were carried out and detected the virus as BICMV (Black eye cowpea mosaic virus). Standardization of 5 amino acid by TLC were carried out.

As part of the training imparted, Four trainees started mushroom spawn production unit and Twelve trainees started mushroom production units.

Finance

Head	Expenditure	Receipts
Non-plan	10,77,44,139	
Plan	95,12,543	
ICAR/KSCSTE Fellowship	4,15,568	
Other EAPs (RKVY)	38,74,709	
Development Grant	35,28,334	
Revolving Fund		
Internal receipts		52,78,701/-
STATION TOTAL	12,50,75,293	

COLLEGE OF HORTICULTURE, VELLANIKKARA

Awards/Scholarships to staff

Name and Designation of staff member	Details of award
Dr.P.S.John	FISA- Fellow of Indian Society of Agronomy for the year 2007
Dr. C. T. Abraham	NIWS Recognition Award given by Directorate of Weed Science, Jabalpur
Dr.D.Girija	Won the second prize for a poster entitled <i>Isolation and screening of cellulose and lignin degrading bacteria from decayed plant materials for vegetable waste degradation</i> during National Symposium on Waste Management: Experiences and Strategies held at KAU, Thrissur, 5-7, Jan, 2011
Dr. T. Pradeepkumar, Assoc Professor	Best paper award in the 4 th Indian Horticulture Congress held at New Delhi from 18-11-10 to 21-11-10
Dr. Beena,S	Best Poster Award to an article titled "Studies on <i>Paecilomyces lilacinus</i> , an entomopathogen on the root mealy bug of Banana", co authored by Dr. Beena,S. in the "Global conference on meeting the challenges in Banana and Plantain for emerging biotic and abiotic stress" held at Tiruchirappalli, Tamil Nadu, during Dec. 10-13, 2010
Processing Technology	Best paper Award in a National symposium on "Waste management-Experiences and strategies" at College of Hort.

Dr. Sujatha. R., Asst. Professor	Best poster award – 4 th Indian Horticulture Congress 2010 by The Horticulture Society of India held at New Delhi (18-21 st Nov, 2010)
Sreejisha P.S, Sreejisha P.S, Shidhi P.R, and R. Keshavachandran	Best Poster Award on National Conference on Herbal Medicine held in the Department of Botany, School of Life Sciences, Bharathiar University, Coimbatore
Emma Jose, V.Neena Antony and R. Keshavachandran	Best Poster Award on National Consultative meet on Bioinformatics in Horticulture “Hortinformatics” organized by Indian Institute of Spices Research, Calicut.
Dr.Jiju P.Alex	Best Poster Award in the Kerala State Science Congress conducted by KSCSTE, Jan 2011

Academic programmes

The first semester of PG (2010-2011) commenced on 11-08-10 and the second semester on 02-02-11.

Intake capacity and No of students enrolled during 2010-11			Out turn of students during 2010-11		
PG (Discipline wise)			PG		
	Male	Female		Male	Female
M.Sc.(H.Sc)	nil	3	M.Sc.(H.Sc)	Nil	3
M.Sc.(Stat)	1	Nil	M.Sc.(Stat)	Nil	Nil
M.Sc.(Hort)	4	8	M.Sc.(Hort)	2	2
M.Sc.(Ag)	11	25	M.Sc.(Ag)	4	4
Ph.D			PhD		
PhD.(H.Sc)	Nil	2	PhD.(Ag)	Nil	5
PhD.(Ag)	1	7	Ph.D (Hort)	1	Nil
Ph.D(Hort)	1	Nil			

Study tours conducted

- All India Study Tour –UG 2007 Batch - Dr.K.E. Usha
- South India Study tour –UG 2009 Batch - Dr.P.A.Joseph
- Tour as part of Agro 1102 – UG 2010 Batch - Dr.P.S.John, Dr.P.Prameela

Dr. T. Girija, accompanied the UG students of 2008 batch for North India Study tour during during the period 13th February – 7th March 2011. M.Sc(Hort) students (10 Nos) visited Vattavada and Kanthalloor of Idukki district as a part of their PG course. Dr. Vimi Louis, Associate Pfressor accompanied All India Study Tour of 2008 Batch B.Sc (Ag) students from 1-3-11 to 23-3-11. Students were taken for visit to Fruit Processing Units CAICO and Sudha Products Thrissur. Dr. B. Ajithkumar, accompanied the UG students of 2008 batch for North India Study tour during during the period 13th February – 7th March 2011. Study tour to Pavizham Rice Mill, Kalady as apart of the Course Engg 3101 “Protected cultivation and Post Harvest Technology” during September 2010. Study tour to Kerala Engineering Resaerch Institute, Peechi as a part of the Course “Engg 1101 Fundamentals of Soil and Water Conservation Engineering” during February 2011. Second B.Sc (Ag.) students were taken to Coimbatore, Mettupalayam, Conoor and Ooty for two days(7-1-2011 and 8-1-2011) as a part of the course ‘Landscaping and Ornamental Horticulture’. Third B.Sc. (Ag.) students were taken to Periyakulam and Kodaikanal for two days (6-1-2011 and 7-1-2011) as a part of the course on ‘Fruit Crops’.

Other activities

a) Students Union activities

The Students’ Union was framed with Dr. K.A. Mariam as the patron & Dr. P.K. Rajeevan as the Associate Patron. But later on, as part of the administrative changes, Dr. C.T. Abraham took charge as the patron. The following members took charge as the staff advisors to the Union.

Dr. K. Satheesh Babu -Advisor, Arts club

Dr. Jim Thomas -Advisor, Planning forum

Dr. P.K. Sudhadevi -Staff editor
Dr. K.E. Usha -Advisor, Quiz club
Dr. N.K. Parameswaran -Advisor, Social service league
Dr. E.U. Rajan -Advisor, Sports club

The Union activities gained momentum only because of the wholehearted support & guidance offered by the staff advisors. We, the students community express our sincere gratitude to our staff advisors for their valuable services.

INAGURATION

The Students' Union 2009-'10 was officially inaugurated on 11th February 2010. The inaugural function 'SONOROUS-'10 turned out to be a stage of cultural displays a night of celebrations. After a long period it was a dream come true for the students to have a union inauguration at the central Auditorium. The inaugural function was presided over by Sri. Jijo Joseph, President, Students Union. The students' union was inaugurated by Dr. K.R. Viswambharan, Hon: Vice Chancellor KAU. We were privileged to have a film director Sri. Renjith Shankar to inaugurate the arts club & cine artist Sri. Babu Swamy to inaugurate the literary club. Dr. K.A. Mariam who delivered the patron's address was of full praise to the splendid performance made by union in the past. Dr. P.K. Rajeevan in his message conveyed the importance of students' unions it's impact in students community. The general secretary extended vote of thanks to the gathering. The night witnessed the talent exhibition of students and an orchestral performance by 'Beats India'.

ARTS CLUB

The eminent leadership of Sameer Ali as secretary & Dr. K. Satheesh Babu as the advisor paved the way for a variety of programmes which explored the hidden talents in students. The club took the initiative for conducting the film festival of the year in a grand manner with some outstanding movies, knowing the nerves of the new generation. It was conducted from 12-14th May, 2010. In the film festival named "BIOSCOPE -10" Seven , movies including English, Malayalam, Hindi, & Tamil movies were screened. Much applauded 'AVATHAR' & 'PALERIMANIKYAM' were the highlight of the film festival.

College day celebrations conducted on 25th Feb were geared up by the outstanding cultural programmes conducted by students. The 'magnum opus' of student's union - Interclass Arts festival 'NADAM - 10' was conducted from 1st to 5th June 2010. It witnessed the crowning of the outstanding talents of the college. AVALON - '08 was adjudged as the winners & POSEIDON' -07 bagged the runners - up trophy. Mr. Vysaghan was awarded the Kalaprathibha & Deepti - Kalathilakam, Minnu Sebastian as the best actress and Mr. Jijo Joseph & Isna karimban shared the special jury award. The prizes were given by Dr. P.C Saseendran, Dean COVAS Mannuthy in the Valedictory ceremony.

The college completed a hat trick in being the runners up in intercollegiate arts festival 'DYUTHI' under the leadership of the club. The students fighting off a hectic exam schedule through their hardwork, dedication along with the moral support of the staff once again added a golden feather in the crown of Horticos. Mr. Vysaghan was declared as the kalaprathiba.

The Christmas day celebration 'GLORIA -10' was conducted on Dec 22nd Aristeus -10 bagged first prize in crib making. A variety of programmes were conducted as part of the celebrations. The winners list include carol song competition (AVALON -' 08), miling competition (Vysaghan V.S), Treasure hunt Avalon -' 08) & Tug of war (PG (boys) batch, Avalon - 08' (girls). The celebrations came to an end by singing carols with santa claus distributing sweets.

MAGAZINE CLUB

The splendid performance of the club is attributed to the efficient leadership of Mr. Nithin K and Dr. P.K. Sudhadevi. First of all the club launched a wall magazine named 'Thanal maram'. All batches were assigned to look after the wall magazine for a term of one month each. AVALON -' 08 bagged the first prize for their craft in presenting the wall magazine in most attractive manner. In the interclass handwritten magazine competition Avalons 'chillu' was selected as best magazine. The interclass contests were held on 1st & 2nd June 2010 along with Nadam'10. Ms.Nayana K was awarded Sahityaprthiba & Sargaprathibha. Jishnu. K.J got the chitraprathibha award. The club organised a X'mas

card making competition as part of X'mas day celebrations. Ms. Aiswarya Mohan secured first prize in the competition. The most promising contribution from the club the 'Reader's Forum' formation.

SPORTS CLUB

The club made a historical footprint under the strong leadership of Mr. Mruthul T & Dr. E.U. Rajan. The club initiated and encouraged the participation of college team for intercollegiate Football, volleyball, table tennis, basketball, badminton & Athletics. Our volleyball women's team put up a great show and bagged the runners-up trophy. The club reinforced the union activities by bringing back the 'sports meet' in the college ground after 4 years. The meet was inaugurated by Dr. C.T Abraham, patron & Asso. Dean by receiving the flag of honour. March past by the students was the main attraction. After the conduct of 20 events 'PG batch' clinched the overall trophy followed by 'KALLISTO'. Mr. Kannan D. & Mr. Shatanu kumar shared the best athlete award in Men and Ms Hajira. was adjudged as the best woman athlete. As a continuation of the interclass sports meet our athletes continued their sparkling performance in the intercollegiate athletic meet also. Our college bagged the runners-up trophy in women's section. Mr. Kannan received the best athlete award. Interclass football competitions were conducted on 26th and 27th Nov & interclass cricket competitions were held on 29th & 30th Nov. In both the events KALLISTO -09 emerged as the champions. It is also prestigious that our students Mr. Najeeb. N, Mr. Semsheer & Mr. Aswin were selected to the university football team. Also Mr. Avinash Reji Thomas was selected to the university men's basketball team. Ms. Priya, Ms. Fahida & Ms. Farzana were selected to the women's basketball and volleyball team.

QUIZ CLUB

The club functioned with Ms. Rubeena A as its secretary and Dr.K.E Usha as its Advisor. The club took initiative of the interclass quiz competition conducted along with NADAM-'10, ARTS FEST. Mr. Avinash was the quiz master and the representatives from batch were the winners. As part of the biodiversity year celebrations, a quiz competition - "Biodiversity" -10' was conducted by Dr. Nameer Prof. college of Forestry and the team Kallisto won the 1st prize. The entire college was present to witness the war of Knowledge. Mr. Amal Jamal & Mr. Jithin V.V participated in the state level biodiversity quiz competition held at Forestry college and bagged 2nd Position, keeping up the Prestige of our college.

SOCIAL SERVICE LEAGUE

Inspired the last year's performance the club carried out its activities with great enthusiasm under the able leadership of Mr. Akshay sasidharan as the secretary and Dr. N.K. Parameswaran as the advisor. The Club joined hands with planning forum in collecting clothes for pain and palliative care society. The club decided to conduct a survey on 22nd October to assess the living standards of people in Pattikkad panchayath. The motive was to identify the circumstances favouring mosquito spread and also to explain the remedial measures to the local people. Students visited over 200 houses and gave awareness to people about the need of cleanliness to be strictly followed in order to prevent the mosquito spread. The much appreciated activity of the club was the visit to SOS-children's orphanage, Mulayam Junction on 4th February 2010. The students mingled with the kids in the orphanage and within no time became their favourite 'chettan & chechi'. Club distributed over 200 notebooks to the children. The visit was a great experience to understand the privileges we enjoy and also a call for being socially committed.

PLANNING FORUM

Under the dynamic leadership of Ms. Reshmika P.K as the secretary & Dr. Jim Thomas as the advisor, the club conducted lionshare of the union activities. Its activities were kicked off by display and hands on training of handicraft products for home use on 11th March 2010. The programme was conducted by smt. Lata santhosh, Team leader, Biodale of ABARD, KAU. Students made about 100 paper bags & a goodshare of teaching staff & non-teaching staff actively involved in paper bag making & the display of the handicraft items which was a crowd puller.

As a collaborative effort of planning forum & social service league an awareness programme on Pain & Palliative care society was conducted on 18th March. The members of the society -Dr. Kumudam unni & Dr. Sujatha gave a brief talk about the activities of the society. As a help to the society the students union contributed over 300 pairs clothes & a contribution of Rs - 12,550/- The programme got wide acclamation from staff & university officials. On 25th March, the club organized a film show in

which the film - 'RITHU' was screened. With a view to give awareness to the IFS aspirants IFS winners from forestry college - Ms Deepa, Ms. Neenu & Ms Neethulaksmi were felicitated by the club on 6th April. The IFS winners shared their experience and also gave guidelines to the Students.

The planning forum organised 'photography for the common man' on 8th July in order to expose the students to the world of photography. The high information session was handled by Dr. A.M. Renjith (Professor, Dept entomology). The do's & Dont's was explained by him in a simple manner. The club took initiative of conducting a talk on 'Importance of character in personality development' on 15th July. The message conveyed by Sri. A.R. Menon from Satyasai evaorganisation remains fresh in the hearts of one and all.

The NSS day celebration and live demonstration of Bonsai technique was conducted on 23rd september in collaboration with National service scheme unit of college. Certificates were distributed to the outgoing NSS volunteers. A powerpoint presentation & live demonstration of Bonsai technique was made by Sri Joseph, Retd. Agrl. officer and free lance expert on conservation of Biodiversity. A bonsai club was formed after this with 48 students under the guidance of Dr. Jim Thomas. 10 Plants were planted in bonsai pots and students are taking care of their plants. On 18th Nov. A 'professional motivation for agrl students was given by Dr. P. Ahamed, prof. of Agrl.Extension. It was very inspiring & motivating session especially for the freshers.

Professional & academic movements

All the students union activities are carried out with professional development of the students as the pivotal point. Students union felicitated the stars of our college - the JRF & MBA winners on 17th July 2010. Because of the commanding position secured by horticos - KAU completed hatrick for maximum JRF winners. Mr. Vijithkrishnan (social science - 1st rank), Anuja A.R. (social science 2nd rank), Renjith P.S (Agronomy 2nd rank), Renu Balakrishnan- Social science 6thRank, Neethu C. Narayan -Agricultural chemicals (11thrank)and sheethal K. Radhakrishnan - environmental science 26thrank got admission at IARI. Anusha S, Vinod K.H, Tapasya babu, Aswathy T. Vasu, Durga A.R, Suvana Sukumaran , Arun E.K, Aiswarya M.V. Ankitha Jha & Renjini V.R. got JRF. Abdul Rahman (IIM), Arun S (IIFM) Asha Eapen, Lubaina P.A (IIFM) were the MBA winners.

OTHER ACTIVITIES

The Students union activities helps to maintain rythm of college & apart from club activities Union also took initiative of the conduct of many programmes.

- * The students' Union was the first forum to felicitate Dr. C.T. Abraham as soon as he took charge as the Associate Deam of the college on 1th may 2010.
- * A freshers day was conducted on 19th october to welcome our younger brothers & sisters to the students union family.
- * Under the aegis of students Union -An awareness seminar on GAP by Dr. N. Sundar, Technical director Euregap, FICCI was conducted on 10th June.
- * The placement cell was recharged by students union. Mr. Ahamed Shahab Mr. Suraj, Mr. Sunil shelke got placement in Federal Bank & south Indian Bank respectively. Bank of Baroda selected candidates for a walkin- interview from the list of students handed over by placement cell and 13 Students got placement. The efforts & guidance of Dr.N.K Parameswaran, Advisor placement cell and leadership of Rijith. P are incomparable.
- * An office room for Union members to keep the union records, trophies and a place for discussions students union office room was renovated during the tenure of students, Union 2009 - '10. It was a dream come true for the students community.
- * The Union joined hands with santhi Asram in 'Arms down campaign' the signature campaign conducted among Students was handedover in united nations assembly by Dr. S.R Subramanian, Director santi Asram.
- * The students Union & NSS took effort in giving awareness about 'Car free day'
- * The Union demanded & Succeeded in installing new water filters in college, renovation of seminar hall & expanding the students computer club.

b) Extra curricular activities

Dr. K. Nandini: Member in the committee constituted by Govt to study, evaluate and prepare an action plan for crops in Kerala in the context of climate change

c) NSS activities

Two units of the National Service Scheme continued the activities during 2010-11 also. Dr. D. Girija, Professor and Dr. Allan Thomas, Assistant Professor served as Programme Officers. Dr. Ajith Kumar, Asst. Professor took charge as NSS Programme Officer, consequent to the transfer of Dr. Allan. Sri. Nithin and

Orientation programme

Orientation programme was conducted for the first and second year B.Sc. (Ag) students on 24th April 2010. The Associate Dean Dr. K.A. Mariam gave an inspiring talk on the role of NSS in building up the personality of students. Dr. D. Girija, NSS Programme Officer gave an insight into the objectives of NSS, various activities, special camping programmes etc.

Mothers' Day

Second Sunday, May 2010 was observed by conducting a poetry competition for the NSS volunteers. The topic was 'Mother's love' and the entries were in English, Hindi and Malayalam.

World Environment Day

In connection with the World Environment Day on 5th June, 150 teak saplings were planted in the campus of Sree Ramakrishna Gurukula Vidyalaya Higher Secondary School (SRK GVHSS).

Participation in Adventure Camp

Aksahay Sasidharan and Jamaludheen of 2009 batch participated in the Adventure Camp organized at Dharamshala, HP, from 22nd June to 1st July 2010.

Sadbhavana Day

Sadbhavana Day was observed on August 20th by taking the pledge for National Integration in the College quadrangle where Associate Dean, teachers and students assembled.

Campus beautification programme

The weeds on both sides of the road from College of Forestry to Medicinal plant unit were removed by NSS volunteers on 5th September. Teachers and staff members also took part.

Car-free Day

September 2010 was observed as Car-free Day at College of Horticulture, to create an awareness about 22 energy conservation and to make the environment less polluted. Posters were placed at key points in the campus and teachers were requested to utilize public conveyance on the day

NSS Day

NSS day (24 September) was celebrated in a befitting manner. There was a lecture and demonstration on 'Bonsai making' by Sri K.J. Joseph, an alumnus of the College and retired from the Dept. of Agriculture on how to make bonsais. The Associate Dean presided over the meeting. Dr. Jim Thomas, Staff Advisor of the Environment Club and Planning Forum welcomed the gathering. The chief guest also gave away prizes to students who won prizes in poetry writing competition.

Participation in Refresher Course

Dr. D. Girija, NSS Programme Officer participated in the Refresher Course held at Training and Orientation Centre, Rajagiri College, Kalamassery from 27th September to 1st October 2010.

Special camp

Special camp of seven days 'Aavani' was organized at Nenmara Panchayat from 3rd to 9th November 2010. 53 students participated in the camp. Seminars on organic farming, nutritional disorders in children, integrated pest management, making of paper bag, preparation of jam and squash, socio economic survey in SC/ST colony, demonstration of power tiller and coconut climbing machine etc. The camp was inaugurated by Dr. C.T. Abraham, Associate Dean, College of Horticulture and the chief guest for the valedictory function was Dr. P.K. Rajeevan, Associate Patron of the Students' Union. Students

visited Pothundy dam and the orchards of Nelliampathy. A cultural Programme was also arranged for school children in Nennara.

Research Programmes

Major research achievements (highlights)

Agronomy

Project on "Sustainable Livelihood Options for Rural Women by Utilization of Under Exploited Crop Plants – An experiment on the use of bio inoculants revealed that application of bio inoculants could improve the yield of the selected under exploited plants though the results were not significant. Analysis of plant samples is progressing. A training was conducted for rural women on the cultivation and processing of under exploited plants. The women were trained on the preparation of several new products like bilumbi candy, mango ginger pickle, bilumbi and rose apple squash, etc.

AICRP on Weed Control

1. Weed Survey and Surveillance

In rice field, infestation of weedy rice and the Chinese sprangletop are seen spreading in large areas. Commonly used herbicides are not effective against these weeds and hence very difficult to manage them.

Solanum, an alien invasive weed suspected to have got introduced through wheat imported during 2006, has been located at many places in Pathanamthitta, Idukki and Kollam.

New weeds spreading in the aquatic areas and uplands are listed below.

Aquatic areas

Alternanthera philoxeroides, *Limnocharis flava* and *Cabomba caroliniana*

Uplands

Alternanthera bettzickiana, *Croton hirtus*, *Sesamum radiatum*, *Merremia vitifolia*, *Ipomoea cairica*, *Wedelia calandulacea* and *Tithonia diversifolia*

2. Biology and Management of Wild Rice

A large number of variants was observed in the field which may be due to inter crossing. Variation was seen in almost all the characters studied.

3. Weed Seed Longevity associated with major cropping systems under arable condition

Continuous weeding for the past three years has caused a substantial decline in the population of the major weeds of the coconut and arecanut plantations.

4. Survey and Management of Parasitic weed Loranthus

- (b) Padding with 2,4-D @ 0.8 g a.i in 25 ml water after puncturing the bark of Loranthus
- (c) Common Salt (NaCl) padding was effective in summer.

5. Herbicide residues in the Long term herbicide trial

No build up of butachlor and pretilachlor residues in soil after application of herbicides for 20 seasons in rice- rice system. Grain and straw samples also did not register any residues.

6. Studies on herbicide residues in food chain, soil and ground water

Metsulfuron methyl + chlorimuron ethyl [(Almix) @ 4 and 8 g a. i. ha⁻¹] and cyhalofop butyl [@ 0.1 and 0.2 kg kg ha⁻¹] residues in soil

Metsulfuron methyl was more persistent than chlorimuron ethyl in rice soil. At the recommended rate of 1 kg/ha or its double dose, the Cyhalofop butyl residues were not detectable in rice soils

7. Studies on herbicide persistence in water

Residues of paraquat applied on *Eichhornia* were detected in water upto 15 days after spraying.

8. Characterization of leaching behaviour of Pretilachlor in soil

- Maximum residue is remained in the upper 0-4 cm of the soil column
- The leachate contained 0.005 ppm. residue indicating the mobile nature of the herbicide

Agri. Microbiology

- Evaluation of anti-cancer properties of crystal proteins of *Bacillus thuringiensis* isolates from the Western Ghats of Kerala (PI: Dr. D. Girija)
 - Out of thirty three native isolates of *Bacillus thuringiensis* screened by polymerase chain reaction, eight isolates were positive for parasporin 4 (cry45) and seven for parasporin 1 (cry31)
 - Crystal protein isolated from KAU 5 resulted in 81% cell death in the cancer cell line DLA, as revealed by MTT assay.
 - Homology search by BLASTn revealed that amplicons from KAU 5, 14, 102 and 160 shared more than 82% homology with parasporin 4 gene in NCBI database
- Diversity of Agriculturally Important Microorganisms in the Western Ghats of Kerala (PI: Dr. D. Girija)
 - Collected soil and leaf samples from Aryankavu, Achan Kovil and thenmala forest range of Kollam districts and Nilambur range of Malappuram districts
 - Isolated 35 N fixing bacteria, 85 P-solubilizers, 9 *P. fluorescens*, 25 cellulose degraders, 19 lignin degraders and 9 *Trichoderma* and 8 P solubilising fungi
 - Twenty two endophytes, 14 phylloplane bacteria and 5 phylloplane fungi were isolated
 - In quantification assay, the range of P solubilisation was from 30µg/ml to 120 µg/ml. The maximum amount of soluble P (120 µg/ml) was in the case of *Bacillus* sp. and this was also supported by pH drop in the broth in 20 days
 - 12 P solubilizing and 3 N fixing bacterial isolates produced IAA. An isolates (K2P3) produced a maximum of 62.0µg/ml, 14 P solubilizing and 3 N fixing isolates produced siderophore, 19 isolates were good ammonifiers.
 - Five P solubilising isolates were found to produce cellulase, nine isolates degraded lignin and produce clear zones. Five isolates degraded both lignin and cellulose *in vitro*.
 - Five P solubilising and 7 N fixing bacterial isolates could produce protease.
 - Seven Cellulose degrading bacterial isolates solubilized inorganic phosphate *in vitro*. Four *P. fluorescence* isolate solubilised inorganic P and 2 isolates produce IAA
 - Ten antagonistic bacteria were isolated against *Rhizoctonia solani*, three isolates against *Xanthomonas campestris*, and Nine against *Sclerotium rolfsii*
 - 8 fungal cultures were deposited in NBAIM
 - 26 isolates identified by 16SrRNAsequencing & deposited in NCBI, eight bacterial isolates were deposited in NBAIM culture collection bank.

RTL

- Responsible for co-ordinating the data on micronutrient research in different crops of Kerala and formulating adhoc recommendation for lime, secondary and micronutrients based on soil test results which is now included in the latest POP to be released shortly.
- A manual on suitable soil test methods for Kerala was released during August, 2010 which is uniformly followed in all soil testing labs of the state including those of ICAR institutions, commodity boards and stations of KAU and KVKs

Economics

- ❖ **Title: Establishing and Networking of Agricultural Market Intelligence Centres in India (funded by NAIP)**
 - 8 commodity price forecasts for Pepper (3 Nos.), Coconut (2 Nos.), and Cardamom (3 Nos.) and 3 updates for Pepper (1 No.) and Cardamom (2 Nos.) were released
 - All the forecasts released by the Centre were disseminated through major regional as well as national newspapers.
 - 11,68,000 voice messages on price forecasts and updates sent to Green card mobile customers through IFFCO Kisan Sanchar Limited
 - 3 infoserries were released on the following topics:

- The ASEAN-India FTA: Were the fears premature
 - Shift in Kerala's Agriculture: What Acreage Ratio indicates
 - Farm Harvest Prices in Kerala: Growth and Instability
- 7 Farmers' training involving 423 farmers and 7 Officers' training involving 354 officers' were conducted
 - Portal developed by the AMICKAU Centre was inaugurated on 21 December 2010 by Dr.P.K.Suri, Senior Technical Director, National Informatics Centre, New Delhi. It is available at www.amickau.nic.in
- ❖ **Title: Is farm labour compensated for occupational risk-An Attempt employing Hedonic wage model (funded by ICSSR)**
 - The higher risk associated with pesticide application was compensated by higher wages received by the pesticide applicators
 - The awareness level with respect to the handling of pesticides were comparably high, but the personal protection against potential risks were not satisfactory.
 - ❖ **Title: Supply Side Constraints in Organic Agricultural Production - A Study of Organic Input Markets in Kerala (funded by DBT)**
 - The production of bio fertilizers in agriculture is dominated by the private sector
 - The distribution network for bio agents were not strong
 - The emphasis on the use of bio fertilizers by the extension system was found to be weak
 - ❖ **Title: Economics of Diversification in agriculture under different farming systems (funded by IFFCO)**
 - The cropping intensity of the existing farms revealed that the available area was not utilized in an effective manner so as to derive the maximum benefits.
 - A modified cropping pattern with higher cropping intensity was suggested for maximum utilization of the available resources of land, labour and capital.
 - The BC ratio of the modified farming system in Kerala was 1.41 in Mookannur and 1.67 in Ulliyeri villages
 - The BC ratio of the modified farming system in Tamil Nadu was 1.56,1.60,1.42 and 1.47 for the villages of Naraseipuram, Jabbukulam,Kanai and Semdamaram respectively.
 - The BC ratio of the modified farming system in Andhra Pradesh were 1.74,1.65,1.59 and 1.57 for Ampolu, Inampudi, Eravaligud and Racharlapad respectively.

Olericulture

Polyploidy was induced in watermelon variety Sugarbaby through seed seedling treatment with colchicine solution (0.1% and 0.5%). Polyploids were characterised by more number of chloroplast in tomato guard cell (17-22) against control (12). The number of normal seeds was significantly reduced in watermelon when female flowers were pollinated with irradiated pollen. Durgapuralal fruits resulted from the pollination of irradiated pollen exhibited high quality.

Thirteen pumpkin accessions collected from different parts of Western Ghats of Kerala were evaluated and the accession, PN-09\34A, recorded the highest yield. In spine gourd (*Momordica dioica*) an accession PS-10\10 collected from Peechi forest range was the highest yielding. Among 33 accessions of French bean

A high yielding indeterminate tomato culture LE 643-1 suited for rainshelter and open field cultivation is under multilocational trial. LE 665-1, another indeterminate tomato culture was identified as high yielding.

Results of the study on seed quality enhancement in cow pea by film coating technique revealed that seed viability, vigour and vegetable yield were higher when seeds were treated with *Pseudomonas* 10 g/kg seed and *Trichoderma* 4g/kg seed.

Seeds of improved varieties of vegetables and other inputs were supplied to farmers of Wyanad district. Training programmes were conducted to these farmers on Commercial vegetable production.

Vegetable seed production and Kitchen gardening. Farmers had set up vegetable gardens and farms and seed production units in Wyanad district using these inputs leading to quantum jump in vegetable production in the district.

Fruit yield in brinjal was maximum in treatments receiving 100% and 90 % of POP recommendations as 14:5:5 Factmix at individual plant level and plot level in and these treatments were significantly superior to the rest including the one receiving 100% of POP recommendation as straight fertilizer. The results thus gave an indication that the fertilizer dose for brinjal can be reduced to 90 per cent of the POP recommendation if the fertilizers are applied in the form 14:5:5 Factmix.

Plantation Crops

- Formulated the package of practices for the domestication and cultivation of the valuable medicinal orchid *Seidensia rhedii*. Pseudo bulbils weighing 7 g was found ideal for propagation. 75% shade was ideal for better growth and yield. Medicinal qualities did not change on domestication.
- Successful organic cultivation packages were evolved for *Rauwolfia serpentina*, *Desmodium velutinum*, *Pseudatharia viscida*, *Nervilia aragona* and *Seidensia rheedii*.
- Tribals were empowered in the large scale cultivation of medicinal plants, observing GAP and GMP and market linkage was established with Oushadhi and the produces could be sold at Oushadhi at a remunerative price.
- Assessed productivity and production constraints of black pepper, ginger and turmeric in the major spices growing districts of Kerala consecutively for two years and documented.
- Morphology and floral biology of *Piper longum* were studied (Time of anthesis and anther dehiscence from 7.30 am to 4.30 pm with a peak between 10.30 am to 12.30 pm; Time taken for complete opening of flowers is seven days.) NAA 25 mg l⁻¹, GA3 50 mg l⁻¹, BA 100 mg l⁻¹, 500 mg l⁻¹ and boron 3 mg l⁻¹ were effective in inducing fully bisexual spikes. Seed set was reported for the first time in *Piper longum*.
- 60 accessions of thippali were collected through survey and chosen for the PYT. The plants show wide variability with respect to leaf, plant growth habit and spike characters. Two plants identified as bisexual types.
- Ten piper species and over 150 genotypes of *Piper nigrum* are being maintained. One hybrid seedling P₂ x P_n 21-09 was found promising in terms of field tolerance to diseases and has very hard berries (100 berry weight 18.24 g and 100 berry volume 17.25 ml).
- Advanced six selected somaclones of ginger for farm trail during 2010-11 season.
- Evaluated 337 ginger somaclones regenerated through indirect methods and selected 10 somaclones for AVT.
- Evaluated 60 germplasm accessions in turmeric and the superior performance of turmeric accession VK-230, in terms of fresh rhizome yield was observed.
- Evaluated 30 accessions of ginger and identified Accessions 2-0-100 and 2-0-104 as superior in terms of fresh rhizome yield.
- Application for registration of two turmeric varieties Sona and Varna released from the Department, under the PPVFR Act was submitted.

Pathology

1. **Endophytic microorganism mediated systemic resistance in Cocoa against *Phytophthora palmivora* Butler (Butler) - PhD Project, completed**
 - The population of endophytic microflora varied among different locations and parts of the plant, and in general, the population was more in roots. Bacteria and fluorescent pseudomonads were more abundant than filamentous fungi and yeasts. Out of the 325 endophytic isolates, 82 were found exerting antagonism towards the pathogen.
 - These antagonistic endophytes were further evaluated in *in vitro* by dual culture and by inoculation on detached cocoa pods, and leaves. It was found that, 25 isolates were more efficient antagonists which

were evaluated for growth promoting ability in cocoa seedlings. It was observed that eight isolates had a profound effect on growth promotion.

- These eight potential endophytes along with two reference cultures were evaluated in *in vitro* for various attributes, which underlay their beneficial effects. The plant growth promoting index worked out based on aforementioned attributes was high for five isolates viz., EB-31, EB-35, EB-40, EB-65 and EF-81, which were selected as promising endophytes and were subjected to further studies and *in vivo* evaluation.
- Induction of systemic resistance by the promising isolates was studied by assay of defense related compounds and enzymes. In general, the study revealed more accumulation of phenols and proteins in treated seedlings. Higher activity of PO, PPO, and β -1,3-glucanase was also noticed.
- Promising endophytes were evaluated for efficiency in reducing *Phytophthora* pod rot in field in comparison with two reference cultures and chemicals. The endophytes were proved to be more effective in reducing PPR in field compared to conventional practices.
- Based on cultural, morphological and biochemical characters coupled with results of molecular characterization, the promising bacterial endophytes were identified as *Pseudomonas putida* (EB-31), *Bacillus subtilis* (EB-35), *P. plecoglossicida* (EB-40) and *P. aeruginosa* (EB-65). The isolate EF-81 was identified as *Penicillium minioluteum*.
- Capacity of endophytes to enter and colonize the interior of plants on external application was tested by radiotracer experiment. It was found that EB-35 and EB-65 entered the cocoa seedlings when applied on leaves and also inside the pods on application on the intact surface.

2. Symptomatology and Molecular Diagnosis of Banana Streak Virus Disease – MSc Project- Completed

- Symptoms of Banana Streak Virus (BSV) Disease are discontinuous/ continuous linear small chlorotic streaks which turn necrotic on leaf lamina, dark brown linear lesions on petiole, midrib, pseudostem and bunches; necrosis and death of cigar leaf and absence of flowering under severe condition .
- The per cent disease incidence recorded on seven accessions viz., Mottapoovan, Mysorepoovan, Kalibale, Chandrabale, Chinali, Nendran and FHIA-3 and varied from 13.25 to 32.16.
- Natural transmission is through planting materials. Mealy bugs, *Dysmicoccus brevipes* and *Ferrisia virgata* are the insect vectors of the virus.
- The molecular diagnosis of BSV using polymerase chain reaction (PCR) from infected samples was standardised using specific primers.
- Immunocapture Polymerase Chain Reaction for detection of virus infection directly from crude sap was also standardised.

3. Evaluation of Resistance Inducing Substances for Management of Bittergourd mosaic- KSCSTE Project, Completed

- Field experiments were conducted to evaluate the effect of dilutions of mosaic infected bitter gourd plant extract, ash extract of mosaic infected bitter gourd plant, Plumbago and salicylic acid against bittergourd mosaic. Among these, dilutions of ash extract and salicylic acid (10^{-6}) were found to be better in reducing disease severity.

4. Establishment of fungal culture collection centre – Plan Project, Continued

- Thirty fungal plant pathogens isolated from diseased specimens of various crop plants and maintained pure cultures of these organisms.
- Documentation of plant disease specimens and plant pathogens were carried out.
- Displayed the photograph of plant disease specimens and plant pathogens in the plant disease museum

5. Induction of multiple fungicide tolerant strains of *Trichoderma* spp. for soil borne disease management- Plan Project, continued

- Ten potential *Trichoderma* isolates antagonistic to *Ralstonia solanacearum*, *Phytophthora capsici*, *P. meadii* and *Pythium* spp. were screened for tolerance to copper oxychloride fungicide.

All isolates showed good mycelial growth and sporulation upto one per cent concentration which indicated that all ten potential Trichoderma isolates are tolerant to the recommended doses of (0.2% - 0.5%) of copperoxy chloride. Among the ten, six isolates showed sporulation at 2% concentration, 5 isolates at 5 % concentration of COC.

6. Epidemiology and management of black rot of cauliflower in plains of Kerala-MScProject, continued

- The causal agent of black rot of cauliflower is identified as *Xanthomonas campestris* pv. *campestris*
- *In vitro* evaluation and field trials on disease management showed that, Garlic 5%, turmeric 10%, Tetracycline 200ppm and Kocide 0.2% are effective against black rot of cauliflower.

7. Studies on transmission, host range and management of ash gourd mosaic disease- MSc Project, continued

- During the survey conducted in vegetable growing areas of Thrissur district, four types of mosaic symptoms were noticed.
- In sap transmission, maximum infection of 73 per cent was observed with an incubation period of 23-28 days. Aphid transmission (*Aphis gossypii*) gave 69 per cent infection with an incubation period of nine days.
- Host range studies of the virus showed that, snake gourd, bottle gourd, coccinia, tomato, chilli and cluster bean are the hosts of this virus.
- Ekalevyan- a local variety of Ashgourd (farmer Joy, Puthenchira) showed resistance to mosaic disease.

8. Phenotypic and pathogenic variability of *Sclerotium rolfsii* Sacc. infecting fruit crops and ornamentals- MSc Project, continued

- Isolated *Sclerotium rolfsii* from infected fruit crops and ornamentals viz., banana, mango, chrysanthemum and marigold
- Symptomatology study revealed variation in the symptom developed by the pathogen on these crops
- Cross inoculation study revealed that isolates obtained from these crops could infect each other.
- The estimation of IAA and phenolic compounds revealed that all isolates recorded maximum IAA content in sclerotia whereas all isolates except the isolate from mango showed maximum phenolic compounds in sclerotia.

9. Bio efficacy of endophytic actinomycetes on plant growth promotion and management of bacterial wilt in tomato- MSc. Project, continued

- Isolated endophytic actinomycetes from tomato plants collected from Vellanikkara, Cherumkuzhy, Elanad, Ozhalapathy & Eruthiampathy
- *In vitro* evaluation of antagonistic effect of endophytic actinomycetes against *Ralstonia solanacearum* was studied and maximum effect was showed by Vellanikkara isolate.
- Maximum IAA production was showed by Ozhalapathy isolate. Siderophore, ammonia and non volatile metabolite production were positive and HCN production were negative for all isolates.
- Pot culture experiment to evaluate the effect of promising endophytic actinomycetes showed that Ozhalapathy isolate (*Streptomyces griseolus*) is effective against bacterial wilt of tomato.

Other Research Activities

Effect of coconut water for increasing the concentration of *Pseudomonas fluorescens* suspension

- Addition of one per cent fresh coconut water found to increase the strength of *Pseudomonas fluorescens* suspension and thereby reduced the dose of formulation.

Combined effect of cowdung and *Pseudomonas fluorescens* on *Xanthomonas*

- Combined application of 2 % cowdung slurry supernatant and 2 % *P fluorescens* suspension was found to be effective against Bacterial blight of Rice.

Physiology

1. The physiological analysis on yield decline in rice due to climate change in kole lands were made. The data on the observations in relation to yield decline in rice in kole lands was used as a supporting data to prepare report on the "Paddy crop loss in Kolelands of Thrissur during second crop season 2009-2010" by the technical committee appointed by Hon Minister for Agriculture. Based on this report crop loss compensation was given to affected farmers.
2. Evaluation on production physiology, including photosynthetic efficiency, of rice under rice-duck model cultivation in karuthani kole land was made.
3. Variation in UV -B absorbing pigments in vegetables and rice varieties observed.

Processing Technology

1. KSCSTE Project - Process standardization for developing novel product based on select tropical fruits
 1. Extracted pectin from jack fruit rind and concentrated in vacuum concentrator. Time, temperature and duration of concentration was standardized. Pectin concentrate was found to be an excellent additive in jam for getting good consistency.
 2. Pineapple pulp vacuum was concentrated. Time, temperature and duration of concentration standardized. The products prepared using concentrated pulp viz., jam, toffee and fruit bar were of excellent quality.
 3. Standardized the procedure for preparing fruit toffees, chunks, fruit bars, candy, jujube.
2. EMAK Project- Food Safety through Crop Management- Developing a Management Plan
Fruits, vegetable and spices samples were collected from farmers belonging to Palakkad, Emakulam, Kannur, Wayanad and Idukki districts. The total number of farmers surveyed were 279. Samples for pesticide residue analysis were collected from the following crops-mango, pineapple, banana, cashew, pepper, bittergourd, pea, chilli, amaranthus. The collected samples were send for residue analysis to College of Agriculture, Vellayani and CFTRI Mysore.
3. NABARD Project - Rural Women empowerment through agro processing and value addition
 1. Preliminary survey of four districts of Thrissur, Palakkad, Emakulam and Malappuram to identify potential beneficiaries was completed. The beneficiaries selected were Kudumbasree women engaged in processing activities.
 2. Six training programmes were conducted, which included 120 beneficiaries from rural areas of Thrissur, Palakkad, Malappuram, and Emakulam
 3. Fruits and vegetable processing units were established in rural areas of Thrissur (4), Palakkad (2), Malappuram (1), Emakulam (6) districts.
4. RKVY project vegetables – sub project Employment and income generation in ethnic fruits and vegetables of Kerala through value addition and product development.
 - 14 training programmes were conducted benefitting 345 farmers belonging to districts of Thrissur, Palakkad, Malappuram, Kozhikode and Kannur. Technology for production of different products from underexploited fruits and vegetables were developed. These include pickles (20 types), dehydrated products (40 types) jams (3 types), Osmo- dehydrated products (3 types), squashes (10 types) and wine (10 types)
 - 85 processed products prepared from under exploited fruits and vegetables were exhibited in the Agri Food Fest held at LULU Convention Centre, Thrissur.
 - Survey and documentation of traditional processed products from fruits and vegetables were collected from the districts of Thrissur, Malappuram, Palakkad and Wayanad districts
5. Process standardization for value addition of mango (*Mangifera indica* L) seed kernel
The protocol for the presentation of mango seed kernel flour (MSKF) was developed which includes extraction of mango stone from mango, drying of stone, removal of kernels, slicing, soaking in sulphited water (1000ppm) for 72 hours, blanching in hot water (80-90°) for 30 minutes, drying, milling and sieving to yield flour.

Value addition studies were conducted with composite flour of MSKF and cereal flour. Sensory evaluation of products indicated that MSKF could be used as a substitute up to 50% for refined flour in biscuit, 70% for cocoa powder in cake, 50% for corn flour in pudding and 30 % for rice flour in *puttu*.

6. Extraction, preservation and utilization of natural colour from marigold(*Tagetes erecta* L)

Method for extraction of natural colour from marigold was developed. Solvent extraction of cured marigold flower flour using acetone: hexane in the ratio 3:7 was found to be the best method. The extracted oleoresin was purified by saponifying with KOH and further ethanol wash gave pure crystalline lutein powder.

7. Evaluation of postharvest quality attributes of cabbage and cauliflower grown in plains and higher altitude. (PG Project)

The postharvest quality attributes and shelf life of cabbage and cauliflower grown in plains and higher altitude is being compared.

Soil Science

Formulated STCR targeted yield equations for pumpkin. Conducted test verification experiments on Mundakan rice at different locations of Palakkad. Started STCR experiments (Verification trials) on sweet potato & ground nut at palakkad. Conducted complex experiments on water melon & tomato at COH Vellanikkara. Completed soil sample collection for 3 districts (Kannur, Thrissur & Malappuram) and 80% of the analytical work is being undertaken. Soil sample collections for the other districts are in progress.

Entomology

- Coconut root (wilt)/ leaf rot syndrome and perianth mite was managed by SRF technology in farmer's fields at Porathussery and Kuttikad, Chalakudi.
- Studied the diversity of phytophagous mites in imp. Crops of Kerala
- Analyzed and assessed the quality parameters of stored rice/ wheat samples from different godowns of Food Corporation of India
- Development and distribution of MAT blocks for the effective management of mango and cucurbit fruit flies
- Evaluated methods for the management of bird problems in different crops
- Studied and screened synthetic and biopesticides for the management of papaya mealy bug
- Brought out adhoc recommendation practices for papaya mealy bug
- Released parasitoids of papaya mealy bugs in infested areas
- Population density of birds of agriculturally important birds was recorded on crops viz., rice (both kole land and other irrigated rice crops), vegetables, cashew, fruit crops and organic agricultural fields.

Home Science

Research Title:

Standardisation and quality evaluation of banana based probiotic fermented food mixtures.

PI: Sharon C.L. (2004-24-02)

Research Highlights:

- *L. acidophilus* MTCC 447 was studied for probiotic activity like acid and bile tolerance and antimicrobial activity and it was found to be positive.
- Foods selected for developing the probiotically fermented food mixtures were banana (Nendran), defatted soya flour, green gram flour, ripe mango, papaya and tomato.
- For treatments, variables of fermentation were optimized as 25gm of food mixture, pH 4.5, inoculums 300µl (119×10^6 cfu/ml), temperature of incubation 37°C and time of incubation 24 hours.
- Based on maximum shelf life qualities and viable counts of probiotic organisms, three fermented food mixtures namely T₁ (70% banana flour, 20% per cent defatted soy flour and 10% mango), T₂ (60% banana flour, 20% defatted soy flour and 10% tomato pulp) and T₃ (60% banana flour, 20% defatted soy flour, 10% mango and 10% tomato pulp) were selected.

- Substrate composition was modified by adding sucrose, sorbitol, wheat bran and skimmed milk powder to the three treatments and was subjected to quality evaluation and shelf life study.
- Food mixture T₃SK (with added skim milk powder at 5% level) showed high acceptability and an increase in nutrients and viable count of *L. acidophilus* after storage.

M.Sc.

Research Title:

Bio-availability of minerals from pulses. PI: Ambili Appukuttan A. (2005-16-106).

Research Highlights:

- Three legumes namely bengal gram, green gram and horse gram were selected and subjected to different processing and cooking methods to evaluate its effect on the *in vitro* availability of calcium, iron, phosphorus, potassium and zinc.
- Soaking, dehulling, milling and germination and two cooking methods namely ordinary cooking and pressure cooking were the selected methods.
- Germination for 36 hours and 5 minutes of pressure cooking was the best method in bengal gram, green gram and horse gram for improving extractability of calcium (67.63%, 29.78% and 52.35% respectively) and phosphorus (55.08%, 56.66% and 52.13% respectively) while germination for 36hrs and 30 minutes ordinary cooking increased iron extractability in green gram (70.19%) and in horse gram iron (70.23%). Germination for 24 hours and 30 minutes ordinary cooking showed maximum zinc (76.01%) extractability in green gram.
- Milled and pressure cooked sample showed maximum potassium extractability in bengal gram (48.23%) and green gram (50.69%) which also reduced phytic acid to a minimum.
- Germination for 36 hour and 5 minutes pressure cooking reduced tannin content in bengal gram (73%), green gram (35%) and horse gram (90%).
- All the processing and cooking methods improved the extractability of minerals, maximum improvement was brought about by germination (24 and 36 hours) followed by pressure cooking and ordinary cooking after milling.

I. Research Title:

Comparative evaluation of fresh fruit juices sold by street vendors versus restaurants.

PI: T. Bindhya Dhanesh (2007-16-101)

Research Highlights:

- Seven street vending sites and three restaurants from randomly selected five divisions of Thrissur Corporation were selected to conduct survey among street vendors and restaurant worker to elicit general information of vendors and workers and their knowledge and practices as well as among consumers to study the consumption pattern of fruit beverages.
- Positive responses were obtained from restaurant workers when compared to street vendors with respect to knowledge, cleaning and hygienic practices.
- From the trend observed in fruit beverage consumption obtained from the survey conducted among consumers, three fresh fruit juices namely pineapple, grape and lime juice were selected for quality evaluation (chemical constituents and microbial count).
- Much differences were not observed in the analysis of chemical constituents between the three fruit juices collected from street vending sites and restaurants.
- High counts of bacteria, yeast, fungi and pathogenic microorganisms like *E.coli* and *salmonella* were observed in the juices collected from street vending sites while the juices collected from restaurants had low counts of bacteria, yeast and fungi and no harmful bacteria was observed.
- Fruit juices sold in the street vending sites were unsafe in terms of microbial quality though they possess almost similar nutritional qualities to juices collected from restaurants.

II. Research Title:

Quality evaluation and value addition of edible bamboo shoots.PI: Mittu Mathew (2007-16-107)

Research Highlights:

- Four species of edible bamboo shoots namely *Bambusa bambos*, *Bambusa tulda*, *Dendrocalamus hamiltonii* and *Dendrocalamus strictus* were selected to evaluate the biochemical constituents in fresh as well as processed shoots.

- Among the four species, fresh shoots of *Bambusa tulda* was observed to have the highest content of crude fiber, soluble fiber, reducing sugar, iron, sodium and total free amino acid and among processed shoots, *Bambusa bamboos* had the highest content of fiber, protein, calcium, potassium, sodium and nitrates.
- Significant decrease in biochemical constituents as well as anti nutritional factors was observed in all the four species of bamboo shoots on processing except for moisture and total carbohydrate.
- Based on the nutritional quality and availability of processed bamboo shoots, *Bambusa bamboos* was selected for the development of two products namely pickle and vattal and quality attributes were studied for a period of three months.
- An increase in the peroxide value in pickle and an increase in the microbial count of bacteria and fungi in both pickle and vattals was observed after storage.
- Fresh bamboo shoots were found to be a better source of nutrients but processing of shoots significantly reduced the nutritional as well as the antinutritional factors in them.

III. Research Title:

Quality evaluation of bamboo seed and its products.

PI: Shabna Kunhimon (2008-16-101)

Research Highlights:

- Bamboo seeds were evaluated for cooking, biochemical, nutritional and organoleptic qualities. Physical, organoleptic and keeping qualities of bamboo seed flour were also assessed after three months.
- The physical qualities of bamboo seed evaluated were cooking time (70 minutes), water uptake (6.9ml/g), volume expansion (2.16), grain elongation ratio (0.89), amylose content (34.40%) and gel consistency (48.20mm). A high gelatinisation temperature index was also observed.
- The chemical constituents of dried and milled bamboo seeds analysed were moisture (6.70%), protein (13.78%), fat (1%), starch (62.56%), reducing sugar (0.41%), total sugar (0.99%), fiber (0.92%) and minerals like calcium (30.60mg), iron (5.94mg) and phosphorus (158.60mg). *Invitro* starch digestibility (50.16%) and *invitro* availability of calcium, iron and phosphorus (20.20%, 10.72% and 20.72% respectively) were also analysed.
- Three products namely cooked rice, *kanji* and *payasam* were prepared to evaluate the organoleptic qualities of bamboo seed and among these products *payasam* was the most acceptable one.
- Roasted and unroasted flour prepared using bamboo seeds were evaluated for physical qualities like bulk density, water absorption index, water solubility index and starch content which decreased for both flours on storage. Retrogradation property of bamboo seed showed an increase in syneresis percentage but the flours showed a decrease initially and after storage.
- For organoleptic evaluation of roasted and unroasted flours, products like *puttu*, *idiyappam* and *ada* were prepared using roasted flour, out of which *puttu* was the most acceptable product while the products prepared using unroasted flour were *appam*, *unniyappam* and *murukku*, out of which *unniyappam* was the most acceptable one.
- Total microbial count showed a gradual increase in the flours on storage.

Meteorology

- A sound database is maintained on onset of monsoon and rainfall of Kerala for a period of 141 years (1870-2010)
- If the onset of monsoon is early, that is on or before 25th May, the total monsoon rainfall over Kerala is likely to be below normal or normal. Such trend is not seen if the monsoon is late, that is on or after 8th June.
- Warming Kerala is real. It was significant since 1980s. 1981-90 was the warmest and driest decade in Kerala. 1987 was the warmest year. The State of Kerala was moving from wetness to dryness within the humid type (from B4 to B3).
- The mean annual maximum temperature over the State has increased by 0.72°C, mean minimum by 0.22°C and annual mean by 0.48°C during the period from 1956 to 2009. The rate of increase in maximum temperature across the high ranges of Kerala is more (1.46°C) when compared to that of coastal (1.09°C) and midlands (0.25°C) of the State during the study period from 1956 to 2009.

- The rate of increase in temperature across the high ranges is obvious because of deforestation while the increase in sea surface temperature may be the factor along the coastal belt for increase in rate of atmospheric temperature. The marginal increase in temperature across the midlands may be due to the predominant occupation of plantations like rubber, coconut and cashew. It indicates that the high ranges and coastal belts in Kerala are more vulnerable in terms of the rate of increase in temperature.
- Rice yields in Kerala are unlikely to decline directly due to long term climate change such as increase in temperature, but bound to decline to some extent indirectly through the abrupt short term changes in temperature, such as unusual summer showers and extended rains during the monsoon period as noticed in 2008, 2009 and 2010. Similar was the trend in the case of majority of plantation crops. The frequency of occurrence of such weather abnormalities is likely to increase in the ensuing years under the projected climate change scenario. Therefore, there is a need for pro-active measures against weather abnormalities for sustenance of agriculture as a part of climate change adaptation. A crop mix of back pepper and coffee may be a better choice under the projected climate change scenario since the crop output of one crop declines another one picks up in the same weather conditions.
- High maximum temperature during summer with heavy rainfall during rainy season is likely to affect the annual cocoa yield adversely. The crop is sensitive to both extremes of summer temperature and heavy rainfall during rainy season.
- The regression models developed in the case of coconut, cashew and the tea mosquito bug incidence in cashew can be tested and revalidated for operational purposes.
- The duration of dry spell and wet spell during four critical phases of coconut decides the final female flowers production in addition to variety and better management practices under rainfed conditions.
- The annual coconut production depends up on the weather factors three - and - half - years ahead. However, the decline in coconut production due to severe summer droughts could be seen in the following year under rainfed conditions.. Similarly, good summer showers with less duration of dry spell are likely to influence the coconut yield favorably in the following year to a considerable extent. This could be explained due to the sensitiveness of various critical crop growth stages to soil moisture stress, finally deciding the nut yield in coconut. Unlike in other plantation crops, the effect of long term climate change on coconut productivity is seen marginally decreasing.

BCCP

A. RICE

Preliminary evaluation/ screening of Entomopathogenic Nematodes against Yellow Stem Borer and Leaf Folder in rice. (Pot culture)

Leaf folder incidence was significantly low in chemical control and it was superior to EPN treatments and control. All the EPN treatments were on par in the case of leaf folder incidence. There was no significant difference in stem borer incidence in EPN treated and control plants. Significantly low stem borer incidence was recorded in chemical control.

1. Enabling large scale adoption of proven Biocontrol technologies in rice.

There was no significant difference in dead heart and white ear head incidences. The population of natural enemies like spiders and coccinellids were significantly high in BIPM plots when compared to conventional farming. The grain yield was on par.

B. VEGETABLES

1. Biological Control of Cowpea aphid

The aphid count/plant and percentage infested plants/plot were significantly low in *Cheilomenes sexmaculata* released plot and chemical control plot when compared to control. High incidence of natural predators like coccinellids and syrphids was observed in control plot through out the cropping period and so pest reduction was observed in control plot also. Pod yield was significantly high in treatment plots.

C. POLYHOUSE

1. Evaluation of anthocorid predator *Blaptostethus pallescens* against spider mites

The mite population reduced significantly in *Blaptostethus pallescens* released plants when compared to control plants. Maximum reduction in mite count was obtained in chemical control.

D. WEEDS

Biocontrol of *Chromolaena odorata* utilizing *Cecidochara connexa* by inoculative releases

Cecidochara connexa produces galls in *Chromolaena* plants. In plants with galls there was significant decrease in plant height and number of branches when compared to control plants.

E. COCONUT

Surveillance and need-based control of coconut leaf caterpillar, *Opisina arenosella*

The population of *O. arenosella* significantly reduced after release of the natural enemies *Cardiastethus exiguus* and *Goniozus nephantidis*.

F. FRUITS

Survey on the papaya mealybug *Paracoccus marginatus* and release of the parasitoid -*Acerophagus papayae*

Randomly selected five villages from Thrissur district. The survey showed that 60 per cent of papaya plants was found affected and the intensity of damage was medium. The parasitoid *Acerophagus papayae* was released @ 10 to 25 nos. / homestead during November, 2010. Three months after release only 5 per cent papaya plants were found affected and the intensity was very low.

In addition to Thrissur district releases were made in Malappuram, Emakulam and Palakkad districts. Information collected from the farmers of the released areas revealed that there is significant reduction in the population of papaya mealy bug. In some areas papaya mealy bug was found but the parasitoid was also found along with the mealy bug.

Conducted State level release programme of the parasitoid of papaya mealy bug on 09-12-2010 by the Minister of Agriculture, Kerala.

Engineering

Designed and constructed a check dam at Nellikandam puzha, in Meenangadi Panchayat, Wayand for water harvesting at community level, for meeting the fourth objective namely "Conservation and Management of Soil and Water Resources to mitigate drought and other natural calamities" of the NAIP project "Multi-enterprise farming models to address the agrarian crisis of Wayanad". Also one abandoned well was renovated for ground water recharge through roof top water harvest.

Pomology & Floriculture

- Established a Model Floriculture unit for protected cultivation of commercial flowers with the financial assistance of State Horticultural Mission.
- Collected and evaluated high value ornamentals like *Euphorbia*, *Adenium*; palms, shrubs and foliage plants under different growing systems.
- Collected and evaluated new varieties of *Vanda*, *Mokara* and *Phalaenopsis*.
- Evaluated the performance of exotic varieties of *Anthurium* in open ventilated poly-house.
- Evaluated indigenous plant species for use as dry flowers

PG PROJECTS

- Spike pruning in *Phalaenopsis* has revealed its significant influence on production of new spikes/keikis
- Evaluated ten species and varieties of *Curcuma* for use as tropical landscape plants and cut flowers.
- Evaluated air pollution tolerance indices (APTI) of selected indoor foliage plants for maintaining indoor air quality.
- Standardized the post harvest handling technology of selected varieties of *Heliconia*.
- Studied reproductive biology of mango varieties such as Neelum, Alphonso, Priyur, Banganapalli, Muvandan and Vellaikolumban.
- Studied quality improvement in mangosteen fruits with special emphasis in reduction of gamboge and translucent flesh disorders (TFD).

- Seedling growth of mangosteen in the nursery could be improved in the medium containing vermicompost. GA200ppm+BA100ppm followed by GA 100ppm+BA100ppm and GA100ppm were the superior treatments for enhancing growth of mangosteen grafts in the main field. Application of 'Paclbutrazol 2.0 g a.i./tree could improve yield and yield attributes in mangosteen.

AICRP on Floriculture Improvement

- Orchid germplasm including 192 species of sympodial and monopodials are maintained and evaluated.
- Performance evaluation of 41 *Dendrobium* varieties was done. Eight varieties were added to the existing collection.
- Performance evaluation of 40 monopodial orchids belonging to monogeneric, bigeneric and trigeneric origin was done. They were grouped under tall climbing, intermediate and short stemmed epiphytes according to their nature of growth.
- Among the tall climbing orchids, *Aranthera* Anne Black, *Aranthera* Lily Brook Red, *Aranthera* Deborah, *Aeridachnis* Apple Blossom and *Arachnis* Maggie Oei Red Ribbon, together with intermediate climbing types, *Mokara* Chark Kuan Pink, *Mokara* Walter Oumae White and *Mokara* Calypso Pink showed immense potential for use as cut flower.
- Short stemmed *Phalaenopsis* hybrids and intermediate climbing epiphytes like *Ascocenda* varieties were found to be excellent pot plant varieties.
- Germplasm collection of 63 species/varieties of anthurium is maintained and evaluated. Ten new varieties were added to the existing collection.
- In the collection of under-exploited ornamentals, 11 species/varieties of *Heliconia* and 4 *Alpinia*, *curcumas* and gingers were collected and evaluated.
- Among the cut foliage different species of *Asparagus*, *Philodendron* *Nephrolepis* and the filler, *Solidago* were collected and evaluated.
- Dry flower production technology in selected tropical flowers and foliage.

PLAN PROJECTS

Additional support for landscaping

Established a garden in the premises of the College of Horticulture, landscaped the central circle maintained the lawn in front of administrative block and in the main gate by regular weeding, watering, mowing, application of fertilizers and plant protection chemicals. A water garden and rock garden was established near the college. Gap filling and planting of ornamental plants are being undertaken. Avenue trees, other ornamental trees/ shrubs/ palms and hedge plants are also maintained.

Technologies for tropical fruit crops

Hybridization works were undertaken in papaya. Flowering and fruit characters and post harvest studies were recorded in papaya and sapota. Treatments to enhance seed viability and germination were carried out in papaya. Biometrical observations of the accessions maintained in the germplasm of fruit crops like papaya, pummelo, annona and sapota hybrids were recorded.

Introduction and evaluation of new ornamentals

Germplasm collections of one hundred species/ varieties of shrubs, ornamental bananas, bromeliads, exotic varieties of high value ornamentals were maintained. A new project for identification and evaluation of shrubs for butterfly garden, fragrant garden, moon garden, terrace garden, sunken garden and roof garden was initiated.

Forty two aquatic plants were collected and evaluated based on the growth habit these plants were classified. Twenty two aquatic plants suitable for water gardening at a different level were identified. Ornamental species and varieties of *Curcuma* were evaluated for tropical landscapes.

Suitability of indigenous ornamentals like *Pandanus* *Spathodea*, *Hibiscus* for oil and pigment extraction is being studied.

Development and Maintenance of Demonstration units of Floriculture

Demonstration units of anthurium, gerbera, orchids and foliage plants are maintained by periodical changing of cladding material, establishing different types of irrigation systems and proper care of crops. High value ornamentals like gingers and costus were introduced and evaluated.

Strengthening research on floriculture

The commercial flowers and plants already collected were maintained. New rare and high value ornamental plant species including orchids and anthurium were added to the existing collection. New cut foliage varieties were introduced

Strengthening research on fruits

Germplasm on various minor fruits is being maintained. Studied the effect of various growth regulators on induction of flowering and fruit set in mangosteen.

Standardised the media and growth regulators for accelerating growth of nursery stock of mangosteen.

Carried out repair and maintenance of irrigation lines and general upkeeping of the orchard and newly planted area.

Establishment of Mango Research Centre

Germplasm of mango with 160 varieties is being maintained. Biometric and yield observations are being recorded. The hybrids Ratna & H.151 and varieties Prior & Muvandan recorded higher yields. Hybrids in the newly planted block in the College orchard are being maintained and gap filling was taken up. Application of cultar was found to be beneficial for induction of flowering in mango varieties, Prior and Alphonso. General up keeping of the orchard using weedicides and bush cutter.

Organic production of ornamental plants of therapeutic value

Collected ornamental plants having therapeutic value is being undertaken. Performances of selected plants were evaluated in the medium containing different organic manures.

Rapid cloning of pineapple hybrid 'Amritha' for large scale multiplication

Production and distribution of tissue culture plants of the hybrid variety Amritha is being continued. 10000 plantlets are under various stages of multiplication. Field performance of tissue culture plantlets were evaluated.

Testing organic farming and value addition concepts in ornamental gardens

Collected high value ornamentals and multiplied them. The effect of organic stimulants on the rooting and establishment of different species of shrubs was studied.

Collected shrubs for fragrant garden and aquatic plants for water gardening.

Effect of organic manures on the growth of ornamentals was evaluated.

Project on Hybridization of Mango Varieties of Kerala

Survey of selected homesteads in Cherpu, Vallachira Panchayaths were undertaken during January 2010 and few plus trees located floral biology and crossability behaviour of Moovandan, Priyur etc. were studied in the College orchard.

EXTERNALLY AIDED PROJECTS

Entrepreneurship development and sustainable livelihoods for Scheduled Caste/Tribe women through Floriculture (DBT)

Training on Plant Tissue Culture was started at the Centre for Plant Biotechnology and Molecular Biology of College of Horticulture, Vellanikkara on October 1st, 2010 for 10 beneficiaries of Panancherry Panchayat. As envisaged in the project construction of a Plant Tissue Culture Laboratory is in progress at Kannara

Regulation of Cropping in Mango (KSCSTE)

Data on flowering parameters and yield were recorded which indicate positive response to growth regulator application, especially to paclobutrazol. The treatments Paclobutrazol @ 5.0 g/tree, Paclobutrazol @ 5.0 g/tree + NAA 30ppm, Paclobutrazol @ 5.0 g/tree + KNO₃ (3%) after 90 days were found to be beneficial for inducing flowering and to improve yield in mango in all the three varieties, Alphonso, Prior and Neelum. In old unproductive trees flowering and fruiting could be induced by

pruning and paclobutrazol application in turn resulting in increase yield. Cauliflorous flowering could be noticed in Bangalore variety following the treatment which indicates the possibilities of rejuvenation of trees by these methods.

Establishment of a Gene sanctuary and

The mango germplasm was strengthened by adding 12 varieties which are not available in the collection. Planted a close spaced model orchard in the vacant area with different commercial and popular varieties such as Prior, Ratna, Muvandan, Mallika, Chandrakaran and Vellaikolumbu. A rain water harvesting pond of 3.00 lakh litre capacity with geomembrane lining has been constructed in the orchard. Fencing in the most vulnerable area of the orchard to prevent trespasses and cattle entry was completed. Protection is being given to a total length of 230 meters. Description of the varieties as per the NBPGR Description is being carried out. Preparation of the data is in progress.

Bioinformatic Centre

The Centre is actively involved in a wide range of research work on plant responses to biotic and abiotic stresses, plant metabolomics using systems biology approaches, plant-pathogen interaction studies, sequence analysis, protein structure prediction, molecular docking, metabolic pathways analysis, study of active compounds of medicinal plants, data mining and genetic analysis using molecular marker data. In addition to this, the Centre offers a credit course in Bioinformatics to post graduate Plant Biotechnology students, conducts training programmes in Bioinformatics and the centre has developed and maintains various databases such as database on Medicinal Plants "MEDBASE", database on Indian Spices, database on Rice, database on Improved Crop varieties at KAU, Farmers Portal, and database on Spices and Herbs for Wellness. The centre provides E-mail & internet services and CD-ROM literature services on biotechnology to the scientists, students and other staff of KAU. The centre is publishing a quarterly e-news letter named 'Biobits'.

The Centre is actively engaged in plant based research on sequence analysis, protein structure prediction, molecular docking and metabolic pathways analysis. The main objectives of the Centre include creation and maintenance of databases in the field of agriculture, provide educational and training facilities in different areas of Bioinformatics, promote R& D using Bioinformatics, provide E-mail & internet services and CD-ROM literature services on biotechnology to the scientists, students and other staff of KAU. Centre has developed and is updating a Database on Indian Spices, Database on Rice, Database on Improved Crop varieties at KAU, Farmers Portal, and Database on Spices and Herbs for Wellness.

CCRP

Germplasm collection: During the year 2010-'11, one consignment of bud wood of cocoa consisting of 43 clones resistant to *Phytophthora* pod rot and Vascular streak die-back disease (VSD) of cocoa were imported from the International Cocoa Quarantine Centre, University of Reading UK in Oct 2010. Out of these 36 clones survived. The details of clones imported are provided in Table 1.

Testing of compatibility in newly flowered accessions

Selfing was attempted in 113 flowers comprising of 13 accessions. Three accessions were found to be self incompatible.

Study of pod and bean characters of different accessions:

Observations on pod and bean characters were recorded from 13 newly fruited accessions viz PINA, BORNE 7.B.2, KER 2 E, SC 20, R(10)(MEX), IMC 16, R2, C40, MAR 9, BORNE 7.B.4, UF 677, PA 67, GS 13 and UF 677.

Selection of parents from germplasm and hand pollination:

Ten black pod resistant parents viz PINA, KER 2, R(10)(MEX), IMC 16, BORNE 7.B.4, CLM 90, C 15-61, SC 20, B 184, IMC 6 were crossed with nine male parents (VSD resistant high yielding hybrids VSD I 31.8, VSD I 33.9, VSD I 38.9 and released varieties CCRP 1-6). 549 flowers were pollinated during the year.

Assessment of general combining ability in high yielding VSD resistant hybrids:

Twenty two high yielding VSD resistant hybrids were selfed to assess compatibility status. The results showed that 9 were self incompatible. Crossing with better combiner parent CCRP 3 has been

taken up to assess the combining ability. Better combiners will be multiplied clonally and laid out in a new clonal garden.

Observations on vegetative characters:

Observations on biometric and yield characters were recorded from all trials during the period. The data are being compiled.

Multiplication of mother plants for establishment of clonal gardens:

Root stocks for multiplication of selected mother plants were supplied by M/s Cadbury India Ltd. Seven mother plants have been multiplied and supplied to Tamil Nadu Agricultural University for establishment of clonal gardens in three locations.

Establishment of clonal garden at KAU:

During the year, one clonal garden with 400 plants comprising of seven clones was established.

Multiplication of clones liable to be cut by Power Grid Corporation of India

2500 six month old hybrid seedlings supplied from M/s Cadbury India Ltd were utilized for budding 68 clones in germplasm which are liable to be cut by Power Grid.

Salt Tolerance Studies in cocoa nursery

Investigations on the salt tolerance behaviour of cocoa seedlings were conducted by using 1% solutions of different salts viz. $MgCl_2$, $MgSO_4$, $CaCl_2$ and $NaCl$ along with drinking water (control) for irrigating the nursery as pot culture study. The pH of the solution ranged from 8.1 to 8.32 and the EC 6.6 to 23.5 mmhos/cm, whereas in the control the values were pH 7.17 and EC 0.088. The results showed no satisfactory germination in any of the treatments applied. Cocoa seeds failed to germinate when $NaCl$ was used for irrigation. Eventhough 65% germination could be obtained in $MgCl_2$ solution, the seedlings failed to develop leaves. Apparently all growth and development of the seedlings were hindered by the presence of salts. The results revealed that there is little scope of using sea water as a source of irrigation in the coastal belt of India where availability of good quality irrigation water is scarce.

Extension

1. Technology Dissemination and Capacity building through Medicinal Plants Production and marketing for women SHG Empowerment – SHM project

The project aimed at educating the rural women SHGS on the production and use of medicinal plants. Through a district wide selection process seven training groups were included under the scheme and selected women SHGS were given training in the College of Horticulture. Then technical guidance was given to them for establishing a production unit in their respective areas. The trainings instilled the spirit of entrepreneurship in them.

PG Project

Accomplishing food security through community based initiatives in Thrissur: A participatory analysis – M.Sc thesis. N.Mridula. Guide- Dr. Jiju P. Alex

The study has revealed several issues with important policy implication regarding community food security programmes undertaken by local self government institutions and other development agencies. The study attempted to assess the role of community based organizations (CBOs) in achieving food security and characterize the profile of these organizations. The awareness of the four groups of stakeholders, viz. rice farmers, extension agents, CBO members and people's representatives on the four different dimensions of the food security concerns of communities was also analyzed. The observations showed considerable differences among the stakeholders which throws light on their concern about these dimensions. The study could develop a participatory methodology for quick assessment of food requirement based on the consumption pattern of the households utilizing wealth ranking and memory recall method which could be used elsewhere.

Plant Breeding

- **Characterization and Systematic Evaluation of Genetic Resources Of Vigna:** - One fifty cowpea accessions available at NBPGR regional station Vellanikkara were subjected to morphological, biochemical and molecular characterization. Based on this, these accessions were reclassified into

22 taxa and a dichotomous key was developed to identify different taxa. The proposed key is different from the existing one which is based on fruit and floral characters alone.

- **NAIP Project "Multienterprise Farming Models To Address the Agrarian Crisis of Wayanad District of Kerala:** - Wayanad Jeerakasala and Wayanad Gandhikasala were registered as Geographical Indications under GI Act.
- **Morphological and Biochemical Characterization of Aromatic Rice Cultivars of Wayanad District of Kerala:**-Completed the morphological and biochemical characterization of aromatic rices of Wayanad.
- **IPR Cell K.A.U.:**- Completed the GI Registration of Central Travancore Jaggery.
- **Strengthening Of Food Security via Farmer/Student Participatory Seed Production Programme in Rice.**
- **Development of Male Sterile lines in Sesame through Mutation and Interspecific Hybridisation:** Interspecific hybridization was carried out between released varieties and *Sesamum malabaricum*.
- **Thilak, Co1, SVPRI and Kayamkulam1** were treated with different doses of EMS and the M1 is being raised for observation.
- **Development of black gram varieties suitable for central zone of Kerala.** 18 hybrids were produced and F2 population is under evaluation.

Screening Rice Varieties for Climatic Changes under RKVY Project:-Varieties were evaluated at monthly interval and data is being processed.

In the Study characterization and systematic evaluation of genetics resources of genus vigna 150 accessions were subjected morphological biochemical and molecular charecterisation cluster analysis based these characters was c

Details of research projects

Pomology

AICRP on Floriculture Improvement Projects

Germplasm conservation and crop improvement

ORCHIDS

Enrichment and assessment of orchids germplasm

Genetic improvements in orchids - breeding in *Dendrobium* and *Phalaenopsis*

ANTHURIUM

Enrichment of anthurium germplasm for genetic enhancement

Breeding and testing of new varieties of anthurium

SPECIALITY FLOWERS

Collection evaluation and improvement of under exploited ornamentals(Heliconias, Ginger Lilly)

FOLIAGE PLANTS

Collection evaluation and improvement of cut foliage and fillers

(Asparagus, Gypsophylla, Ferns, Phyllodendron, Golden rod)

Survey, collection and evaluation of native ornamentals for commercial exploitation

Plant protection

ANTHURIUM

Control of bacterial blight *Xanthomonas campestris* pv. *dieffenbachiae* and *Phytophthora* rot of anthurium

Postharvest technology and value addition

ORCHIDS

Standardization of post harvest technology in orchid

ANTHURIUM

Standardization of post harvest technology for anthurium

VALUE ADDITION

Collection and evaluation of ornamental species and plant parts for dry flower production

PG projects

1. Stimulation of growth and induction of variability in mangosteen (*Garcinia mangostana* L.)
2. Introduction and evaluation of new ornamentals for commercial exploitation
3. Chemical regulation of cropping in mango
4. Reproductive biology of selected traditional and popular mango varieties of Kerala
5. Improving quality and shelf life of mangosteen (*Garcinia mangostana* L.)
6. Carbon partitioning in banana intercropped in coconut gardens
7. Regulations of flowering in *Phalaenopsis* orchids
8. Evaluation of foliage plants for interior plantscaping
9. Flowering and post harvest dynamics of heliconias (*Heliconia spp.*)
10. Evaluation of ornamental flowering shrubs for tropical landscapes
11. Growth and physiological response of *Dendrobium* cv. Earsakul in different growing conditions
12. Standardisation of agro techniques in *Phalaenopsis* orchids
13. Morpho-molecular characterization of selected mango (*Mangifera indica* L.) varieties of central Kerala.

Extension programmes

Highlights of extension activities

Training under XI plan scheme: Scaling up of water productivity in Agriculture for livelihood through teaching cum demonstration, training of trainers and Farmers conducted at Agronomic Research station, Chalakudy

RTL

- Soil Testing and Plant analysis and quality of irrigation water and fertility evaluation are being done on payment basis to farmers and site specific fertilizer recommendations are being given to farmers.
- An amount of Rs. 7.5 lakhs was generated as income to the University based on the above service.
- The service on soil test based recommendation received attention by farmers across the state and there many success stories of saving the crops and improving the yield in rice, vegetables, banana, and nutmeg.

Economics

a) Membership in Committees by GoK.

Dr. P. Indira Devi

1. Member, Consultative Meeting on Environmental Management and Compliance-Strategies for Kerala. GoK, 5-08-10
2. Member, Committee on pesticide use in Agriculture. GoK, 3..11..2010
3. Member, Committee on the incident of Dumping Stockpile of pesticides into Rayirom River, Kannur Dst. 7..10..2010

Olericulture

Scientists of the Department actively participated in the LSG Linkage Programme "Comprehensive Vegetable Production Improvement Programme at Pattikad Panchayath". Dr. T.E. George, Dr. Salikutty Joseph and Dr. Baby Lissy Markose served as cluster leaders. The scientists conducted regular field visits to different vegetable farms in the different parts of the Panchayat and farmer contact programmes in this connection.

The staff members of this Department associated with the village stay programme of Rawe students and all other activities connected with that programme.

Okra field day –Dr. KV Suresh Babu, Dr. P.G.Sadhankumar, Dr. P Indira and the MSc. Students of the department participated in the Okra field day programme conducted at NBPGR, Vellanikkara on 1st Chingam 1186.

Dr. T.E. George, Dr. K. Krishnakumary and Dr. T. Pradeepkumar took part in a series of brain storming and work shop sessions at Vellanikkara, Thrissur, Ayyanthole and Malappuram in connection with the formulation of Comprehensive Kole Land Development Project to be submitted to the Central Government.

Pathology

1. Visited rice fields Elamutha and Manalur Thazham kole lands during second crop and gave recommendations for disease problems.
2. Participated in the Integrated Vegetable Development Programme implemented by University at Pananchery Panchayat.
3. Thirty seven batches of visitors (farmers, students and college teachers) came to the Department to gain knowledge about mushroom cultivation and to see plant disease museum.
4. 342 numbers of farm advisory services were conducted.

Processing Technology

The faculty of the department handled classes as resource person in training programmes, seminars etc. The department participated in the Agri Food Fest held at LULU Convention Centre, Thrissur (24th to 27th February 2011) and exhibited 85 processed products prepared from under exploited fruits and vegetables.

Entomology

- Papaya Mealy bug awareness programmes
- Farmers scientist interphase programmes
- KVK Technology week programmes
- IPM dissemination programmes of the state Agri.Dept.
- KAU paddy mission programmes
- Diagnostic field visits for farmers field problems
- IPM training progs to farmers, State dept. Officials , SHM and other stakeholders
- Facilitators for state dept. officials in conducting IPM FFS in rice, vegetables and other crops
- Resource persons for VFPCCK zonal workshops
- Release of parasitoids for coconut caterpilaas
- Awareness programmes regarding harmful effects of chemical insecticides

Other important activities:

Dr.Sosamma Jacob, HoD, is the Chairperson of the Womens Complaint Committee of the Vellanikkara campus of the K.A.U. carried out sitting to settle complaint cases of women employees of the university. Dr.Sosamma Jacob, HoD, has also carried out various duties as the Staff Council Secretary of the College.

Home Science

Actively participated in Kerla Agri Food Technology Meet 2011 from 24-27 Feb. 2011 at Lulu International Convention Centre, Thrissur with an exhibition stall on processed foods.

Meteorology

- a. Dissemination of AAS bulletin to selected farmers of four nearby panchyaths
Under the Integrated Agromet Advisory Services (IAAS) of the IMD, weekly agromet advisory services are being prepared and disseminated to the farming community. These bulletins are delivered directly to the selected farmers of nearby panchayath namely Pananchery, Ollukkara, Madakathara and Puthur. These bulletins also appear in the "Mathrubhoomi and Deshabhimani Dailies".

BCCP

Supplied biocontrol agents to farmers. Visited farmer's fields and suggested remedial measures for weed and pest problems. Conducted Front Line demonstrations on biological control of rice pests in Koorkkenchery panchayath. Arranged seminars on biocontrol of crop pests and weeds for the farmers of different panchayaths.

Pomology

1. Dr. P.K. Rajeevan attended the launching ceremony of Susthira Samrudhi Project on 03-04-2010 at Mannanchery Grama Panchayat.
2. Dr. P.K. Rajeevan and Dr. K. Lila Mathew participated in the programme 'Karshakan Sasarganodoppam' on 7th and 8th April 2010 in connection with the above event.
3. Dr. P.K. Rajeevan handled class on the Production Technology of Orchids at VFPCCK, Cochin on 18-06-2010.
4. Dr. P.K. Rajeevan took classes on Protected Cultivation of Orchids and Anthurium at PAJANCOA and RI, Karikkal on 29-09-2010.
5. Dr. P.K. Sudhadevi, Dr. Sarah T. George and Dr. K. Ajithkumar in the village stay programme and exhibition organised by the 2006 batch students in Coimbatore with the RAWE programme at Kizhakkumchery Grama Panchayat, Palghat District on 26th and 27th November, 2010.

CCRP

- ❖ During the year two day training programme on "Advances in Cocoa Production Technology" was taken up from 13-14 May 2010 was conducted to 9 outside state Technical Officers/ Managers/ General Managers of M/s Cadbury India Ltd working in Tamil Nadu
- ❖ One day training programme on Cocoa Production Technology was conducted on 07-07-2010 to 150 farmers/ entrepreneurs at Rajakumari, Idukki. The programme was funded by DCCD, Kochi
- ❖ One day training programme on "Advances in Production & processing technology in cocoa" was organized by Dr. S. Prasannakumari Amma at Chittur, Palakkad which was attended by 40 Technical/ Field Officers of Cadbury India Ltd and AOs/ ADAs Dept. of Agri. , Government of Kerala on 21-07-2010
- ❖ One day training on Cocoa Production Technology was conducted on 14-08-2010 to 150 farmers/ entrepreneurs at Chittur, Palakkad with financial assistance from M/s DCCD, Kochi
- ❖ One day training on cocoa production technology was organised for the ten Technical/ Officers of Cadbury India Ltd from TN & AP on 08-10-2010 at Vellanikkara in which Dr. S. Prasannakumari Amma, Dr. E. K. Lalitha Bai and Dr. Minimol J.S. handled classes
- ❖ Dr. E. K. Lalitha Bai and Dr. Minimol J.S. handled classes to 50 farmers as part of the one day (18-12-2010) cocoa farmers training at Mankulam organized by M/s KADS, Thodupuzha.
- ❖ Dr. S. Prasannakumari Amma, Dr. E. K. Lalitha Bai and Dr. Minimol J.S. handled classes in many training programmes organised by the State Department of Agriculture , M/s Cadbury India Ltd and M/s Kerala Agricultural Development Society (KADS) in various parts of the state viz. Idukki, Kottayam ,Pathanamthitta, Palakkad and Malappuram districts.
- ❖ Dr. S. Prasannakumari Amma handled classes on all aspects of cocoa including primary and secondary processing and value addition in cocoa in the one day cocoa farmers training organized by MASS & DCCD, Kochi at Murikkassery, Idukki on 30-10-2010.
- ❖ The cocoa farm, the cocoa nursery as well as the chocolate unit was able to attract many farmers and entrepreneurs not only from India but also from other countries including Switzerland, France, USA and others. A batch of foreigners comprising of 40 members from France visited the nursery as well as the chocolate unit.
- ❖ A total of more than 5000 people have visited the unit. More than 3500 telephone calls were received for clearing doubts/ seeking availability of seed pods /consultancy purposes.
- ❖ Published a revised leaflet on cocoa production technology in English.

Extension

The Department spearheads all the Extension activities of the college. As part of the RAWE program for the 2007 adm B.Sc (Ag) students, many agricultural seminars, training programs, farmer competitions and a mega agri. exhibition was conducted in Kizhakkanchery Panchayat, Palakkad dist., during November 2010.

Library

a) **Reading Week Celebrated:** Reading Week has been celebrated in the College of Horticulture during the period June 19-25, 2010 with various programmes such as Book Exhibition, Literary Competitions, Book Review Competition, etc.

b) **Agricultural Book Fair:** An Agricultural Book Fair has been conducted in the College of Horticulture during 28-29 October, 2011. Several national and international publishers dealing with agricultural and bioscience books displayed their books in the exhibition. Students, teachers and libraries were able to evaluate the books directly and purchase at discounted rates.

Radio talks/TV programmes/Audio-Video cassettes

Topic	Date	Name of Scientist	Venue
<u>Agronomy</u>			
Radio talk on "Rice cultivation"	03.07.2010	Dr. P.S John	AIR, Thrissur
<u>AICRP on Weed Control</u>			
Weed control in first crop rice	10-04-2010	Dr. C. T. Abraham	AIR, Thrissur
<u>Economics</u>			
Food Security and management –	8.01.11	Dr. P. Indira devi	Interview AIR Thrissur
World Water Day	Talk in Haritham	Dr. P. Indira devi	AIR Thrissur
<u>Olericulture</u>			
Homestead vegetable cultivation	10-01-11	Dr. P. Indira	AIR, Thrissur
"Diseases of Mango"	February 2011	Dr. Rahmath Niza	National Channel, TV Programme

<u>Processing</u>			
Mechanization for fruit and vegetable processing	16.07.2010	Dr. P.B Pushpalatha	All India Radio
Products from fruits and vegetable	06.10.2010	Dr. P.B Pushpalatha	All India Radio
<u>Entomology</u>			
Economics of honey production TV programme – Papaya mealybug - 12-1-2011	16-8-2010	Mani Chellappan	Thrissur
<u>BCCP</u>			
Programme on biocontrol of papaya mealy bug	4-2-2011		Dooradarshnan
<u>Engineering</u>			
<i>Yanthravalkrutha kalaniyanthranam</i>	7.5.2010	Er. Suma Nair	AIR, Thrissur
<i>Sthreesouhruda yanthravalkaranam</i>	4.6.2010	Er. Suma Nair	AIR, Thrissur
Question – answer session on Farm Mechanisation as a part of the series " <i>Krishi cheyyanum yanthrakkaikkal</i> "	16.6.2010	Er. Suma Nair	AIR, Thrissur

List of publications

Scientific papers	Technical Bulletins	Popular Articles	Books
135	11	60	17

Scientific papers

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Processing Technology

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Soil Science

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CCRP

1. Prasannakumari Amma, S., Mallika V. K. and Lalitha Bai, E. K. 2008. Cocoa. In Peter K.V. (2008) *Biodiversity in Horticultural Crops* Vol.2 Daya Publishing House, New Delhi 320p

Important visitors

Name of the visitor	Designation / address	Date of visit
Dr. Jay G Varshney	Director, Directorate of Weed Science Research, Jabalpur	20-24 Dec. 2010
Dr. T.V.Ramachandra Prasad	Professor (Agron) & P.I AICRP WC, UAS, Bangalore	17-18 March, 2011
Dr. Nimal Chandrasena,	Principal Ecologist, ALS Water Sciences Group, ALS Australia	19- 2-2011
Dr. Amiya Kumar Sahu,	President, National Solid waste Association of India, Mumbai	
Dr.Ranjan Samantaray	Senior Natural Resource Management Specialist, World Bank, New Delhi	24-5-2010
T.K. Sunil Kumar	Senior Editor, Karshakasree	16-11-2010
Dr.N. Ajjan, Director, CARDS & PI, TNAU, Coimbatore	Director, CARDS & PI, TNAU,	22-12-2010
Dr Kadambot Siddique	Director, School Biological Sciences, University of Western Australia Perth	8.9.2010
Dr.P.V.Joseph	Professor, Emiretus	9.9.2010.
Dr B.V.Ramana Rao	Former Project Co-ordmator, Ag.Met, CRIDA, Hyderabad	27.9.2010
Dr.A.K.Bargava	IMD, New Delhi	8.10.2010
Dr. M.R.Ramesh Kumar,	Scientist 'G' NIO, Goa	26.10.2010
Dr E.N.Rajagopal	Scientist 'G' NCMRWF, Noida,	26.10.10

Dr.B Manikiam	Hony Professor, Tunkur University, Karnataka State	15.11.10
Dr.Kadambot Siddique	Director, School Biological Sciences, University of Western Australia, Perth, Australia	3.1.2011
Dr.PSN Sastry	Rtd.Professor (Ag.Met), IARI New Delhi	17.3.2011
Prof(Dr)Lyn Abbot	Professor and vice Dean , UWA, Perth, Australia	17.3.2011
Dr. R.J. Rabindra	Project Director, PDBC, Bangalore	19-10-10
Dr. A.N. shylesha	Principal Scientist, NBAIL, Bangalore	9 th of Dec., 2010.
Dr. K.P. Singh	Director, Directorate of Floricultural Research, IARI, New Delhi	15 th and 16 th June 2010
Dr. Manoj Srivastava	Registrar, Protection of Plant Varieties and Farmer's Right Authority, NASC Complex, DPS Marg, New Delhi; L.C. De, NRC Orchids, Sikkim	
A.N. Rao	State Forest Research Institute, Itanagar	22-10-2010
Dr. Ramesh Kumar	Director, Directorate of Floricultural Research, IARI, New Delhi	26-11-2010
Dr.D.Barman & Dr. Rampal	MRC Orchids, Sikkim	07.08.2010
Christine Kawi	Kenya bureau of standards, Nairobi, Kenya	25.01.2011
Sujatha Pallithium	D.C.S. (planning sabaragamuwa provincial council, Sri-Lanka)	28.01.2011
Dr. Madhumita Das Gupta	Scientist E, IFGTB, Coimbatore	28.02.2011
Dr. A. Mohan Rao	Associate Professor, UAS, Bangalore	05.03.2011
Dr. S. Ramesh	Associate Professor, UAS, Bangalore	05.03.2011
Mr Francis Boucher along with 27 members	President, Confederation of National Chocolate Manufacturers, Paris	23.04.2010
Jean - Pierre Richard	Cocoa Expert, France	23.04.2010
Prof. Kadambot Siddique	University of Western Australia, Australia	29.06.2010
Mr.K.P.Magudapathy	Associate Vice President, Cadbury India Ltd.	13.09.10, 14.10.10 and 21.02.2011
Mr. Urs Tuor	Pal & Partner, Switzerland	22.09.2010
Ms. Anna Swaite	Cadbury Schweppes, UK	14.10.2010
David Preece	Head, Cadbury International, UK	14.10.2010
Mr. Christoph Inanen	Chocolats Halba, Switzerland	20.12.2010
Dr. Gangadhar, R.	Univ. of Horticultural Sciences, Bagalkot, Karnataka	19.02.2011
Mr.R.Rajesh	General Manager, Cadbury India Ltd, TN	13.09.10, 14.10.10 and 21.02.2011
Mr. C.Vijayakumar	General Manager, Cadbury India Ltd, Kerala	13.09.10, 14.10.10 and 21.02.2011

Infrastructure developed

Agri. Statistics

Purchased one computer and 4 chairs for the central computer lab attached to the department.

Microbiology

Purchased equipments - Refrigerated centrifuge, Fraction collector, pH meter and Electronic weighing balance

Processing Technology

Constructed a separate building for hands on learning and agro-processing under ICAR & RKVY projects. Equipments and accessories for cold storage was purchased.

BCCP

Constructed upstairs for the BCCP building and a Polyhouse for 10 lakhs.

Constructed a biocontrol laboratory of worth 30 lakhs funded by SHM

Pomology

Established a Model Floriculture Units at the College of Horticulture, Vellanikkara protected cultivation of commercial flowers with the financial assistance of State Horticultural Mission.

Under the Principal Investigatorship of the Professor and Head, Department of Pomology and Floriculture. It consisted of

Economics

Dr.K. Satheesh Babu is acting as the Research Coordinator, Agro Economic Studies, KAU

Dr.P. Indira Devi is acting as the Coordinator, KAU-LSG Linkage programme (Pananchery panchayat)

Dr.P. Indira Devi is acting as the Chairperson, Women's Complaint Committee, KAU

Olericulture

Exhibition	Date	Scientists
Agricultural Exhibition at Mannanchery, Alappuzha	3-4-2010 to 9-4-2010	Dr. T.E. George, Dr. K.V. Suresh Babu Dr. K. Krishnakumari
Thrissur Pooram Exhibition: KAU Pavilion	April-May 2010	Dr. T.E. George Dr. K. Krishnakumari

Dr. George TE served as Member, Board of Studies, TNAU, Coimbatore

Dr. George TE served as Co-ordinator, PG Entrance Examinations 2010

Dr. Baby Lissy Markose served as P.G. Academic Officer, CoH, Vellanikkara.

Dr. T. Pradeepkumar served as Member, General Council of KAU

Engineering

- Accompanied the 2009 Admission B. Sc. (Ag.) students for the South India Study tour as Tour Member (Suma Nair from 21.2.2011 to 13.3.2011)
- Accompanied the 2008 Admission B. Sc. (Ag.) students for the North India Study tour as Tour Member (Dr. P. K. Sureshkumar from 1.3.2011 to 23.1.2011)
- Teaching Engg 2201 "Farm Power and Equipment" for the 2009 Admission students of College of Co-operation, Banking and Management, Vellanikkara (Dr. P. K. Sureshkumar & Er. Suma Nair)
- Teaching the course Elfm 0008 (2+1) "Tractor Design and Testing" for the UG Students of KCAET, Tavanur (Dr. P. K. Sureshkumar)
- Major Advisor of one PG student of Farm Machinery Department at KCAET , Tavanur (Dr.V.R. Ramachandran)
- Project Co-ordinator (SWE) of the Faculty of Agricultural Engineering (Dr. K.P.Visalakshi)

Apart from the teaching, research and extension activities, the department is actively involved in the following works.

The head of department is the convenor of the General Repair and Maintenance Committee of the College.

The head of department is acting as a member of construction committee for scrutiny and supervision of various petty constructions in all the departments and EAPs of the College.

The department is maintaining three vehicles of the College – two jeeps and one mini bus

The Agro engineering service centre under ABARD programme of the University is being maintained by the staff of the Department.

CCRP

Dr. S. Prasannakumari Amma attended meeting organized by M/s Cadbury Cocoa Partnership

U.K. and M/s Cadbury India Ltd. on 10.11.10 at Kochi.

Dr. S. Prasannakumari Amma was part of the expert team of the DCCD, Kochi for the evaluation and selection of projects on cashew and cocoa submitted by NGOs to be funded by the DCCD, Kochi in its meeting held on 18.03.10 at Kochi.

Plant Breeding

Dr. C.R. Elsy:- IPR Cell, Convener.

Dr. Rose Mary Francies:- PI of DBT Project and RKVY Project

Dr. Dije Bastian:- PG Academic Cell Activities.

Dr. Jiji Joseph:- Co P.I; RKVY-paddy Mission Project.

Finance

Head	Expenditure (Rs.)	Receipts (Rs.)
Non-plan	7,83,96,131	40,64,360
Plan	1,05,31,925	
ICAR (Specify)	31,92,385	
Other EAPs (Specify)	35,14,115	

COLLEGE OF AGRICULTURE, PADANNAKKAD

Academic Programmes

Intake of students

Intake capacity & No. of students enrolled during 2010-11			Out turn of students during 2010-11		
	Male	Female		Male	Female
UG	9	47	UG	5	15
PG	-	-	PG	-	-
Ph.D	-	-	Ph.D	-	-

* Intake capacity: From 2010-11 onwards increased to 56

ICAR Junior Research Fellowship (ICAR-JRF) 2010-11

Six students secured fellowships and four got placements in various universities

Sl.No.	Name	Batch	Subject	Rank No.
Fellowships				
1.	Sameer. V.M	2006	Social Science	36
2.	Prabha Susan Philip	2006	Soil Science	33
3.	Vineeth P. V	2005	Biotechnology	10
4.	Vinu .V	2005	Plant Science	4
5.	Manju Mary Paul	2005	Agricultural Statistics	5
Placements				
1.	Dahliyamol	2006	Plant Science	260
2.	Nivedhitha.M.S	2006	Plant Science	79
3.	Remya Rajan	2005	Agronomy	
4.	Sajeesh.P.K	2004	Plant Science	65

Study tours

- South India Study Tour of the 2008 Batch with 28 students was conducted from 5th April to 19th April 2010
- North India Study Tour of the 2007 Batch with 20 students was conducted from 9th February to 1st March 2011

- c. North India Study Tour of the 2008 Batch with 28 students was conducted from 2nd to 24th March 2011
- d. Study tour of the 2009 batch students to RARS Ambalavayal from 11th to 15th December 2011 as part of the horticulture course, Landscaping and Ornamental Horticulture
- e. Study tour was conducted as part of the course, Cropping Pattern and Farming systems to College of Agriculture, Vellayani; CSRC, Karamana; CRS, Balaramapuram; CTCRI, Sreekaryam; TBGRI, Palode and Mitraniketan, Vellanad for the 2008 batch

Other activities

Students Union activities

- Student's union 09-10 assumed office on 9th of January 2010
- **Bt Brinjal , Boon or Bane:** A debate on bt brinjal, with the active participation of students teachers and non-teaching staff was conducted by the Planning Forum on 25th February 2010
- Yoga class was conducted for the students from 25th to 30th February 2010
- A Seminar on Climate change and the aftereffects on farming was conducted on 5th March 2010
- The World Women's Day was celebrated with a variety of programmes on 8th March 2010
- **Union & Arts club Inauguration:** The Students Union was inaugurated on 29th April 2010, by Sri.P.Jayarajan, the former Controller of Examination ,Kannur University and the Arts Club was inaugurated by the famous poet Sri . Kureepuzha Sreekumar. The occasion was made memorable by a Ganamela.
- Earth hour was observed on 12th May 2010
- **The Malabar mangofest and Kisanmela** was organized jointly by the Students Union and the College on 21st and 22nd may 2010. The function was inaugurated by Sri K.P Rajendran, the Honourable Minister for Revenue. As part of the Mangofest, exhibition of mango varieties, sale of planting materials, grafts and mango was also organized.
- **Environmental day Celebration:** On June 5th, 2010 World Environmental day was observed by Nature club and the NSS Unit of the College. Planting of 100 asokha seedlings in the campus was main attraction of the Programme. Interclass quiz competition was also conducted.
- A blood donation camp was conducted by the Social Service League on 10th May ,2010.
- **Yaadein:** Sendoff function for the 2006 batch on 10th June, 2010 was a unforgettable moment for all.
- **Haritham:** Vegetable Club of the college was inaugurated on 12th July 2010
- **Onam** was celebrated with fun and fervour on 18th August 2010 with Pookkalam, Payasamatsram, tug of war and delicious onam feast.
- A discussion on endosulphan and related issues was conducted on 20th September, 2010
- During the holy month of Ramzan, Ifthar eve was observed with messages, feast and film show on 11th September 2010
- **"Just beat it"** - The interclass Arts competition was conducted on 23rd and 24th September 2010.
- **Resepsi Ramah Tamh:** the Fresher's Day to welcome the 2010 Batch was celebrated on 26th October 2010.
- A career guidance programme by the alumni was conducted on 15th November 2010.
- A seminar on endosulfan was conducted on 8th December 2010
- The students from the college actively participated and won several prizes in the Intercollegiate Arts fest "Dyuthi'10" held from 11th to 13th December 2010 at Vellanikara
- **Decembris:** Christmas was celebrated on 27th December 2010.
- **Waka Waka:** The New Year was welcomed and celebrated on 31st December 2010
- **The athletic meet - Impulse2010:** The Annual Sports and Games meet was conducted from 2nd to 6th January 2010, as a thrilling battle between two college teams named, Knight Riders and Dare Devils
- **Ozone...a little bit green thoughts:** A seminar on forest conservation was on 29th January, 2011 and a documentary entitled "Save Tigers" was also screened.

- Republic day was celebrated on 26th January 2011. After flag hoisting, cleaning of the college and hostel premises was undertaken by the students

a. NSS activities

- Campus cleaning programme was conducted on 30th April 2010
- Blood donation camp was organized on 10th May 2010
- World Environment day was celebrated on 5th June 2010
- Class on Anti-ragging was arranged on 3rd July 2010
- Career guidance and motivation programme for the students were conducted on 17th July 2010
- Campus cleaning was done on 25th July 2010
- 22nd September 2010 was observed as the Car Free Day
- NSS day celebrations were conducted on 24th September 2010
- Gandhi Jayanthi Celebrations and Campus cleaning 2-10-2010
- Took part in the Harithayoram Programme implemented by the Government of Kerala and planted vegetables and tuber crops in front of the college on the side of NH 17. The college was adjudged as the best educational institution in kasaragode district for the exemplary implementation of this programme.
- The college was awarded first prize and 3 star status for the Malinya Muktha Keralam campaign by the District Sanitation Samithi, Kasaragode
- NSS Special Camp was conducted at Thaikadappuram, Nileshwaram from 22nd to 28th March 2011.

Sports and games

Details of Participation of College team in various sports events:

- Akhil Dev and Raghil Raj.P.R played in the District league Championship for Cricket at Kasargode on 29th April 2010
- The college team participated in the Inter-collegiate Volley ball championship held from 6th to 8th May 2010 at the College of Veterinary and Animal Sciences, Mannuthy, Thrissur
- Annual Athletic Meet was conducted on 6th February 2011

Research Programmes

Major Research achievements

1. **Project on "Women empowerment through organic cultivation of vegetables":** Field experiments were conducted to screen the local vegetable types suitable for north Kerala and field trials were laid out for demonstration of technology. Survey, soil testing and microbiological analysis were also done. As part of the project, inputs required for organic farming of vegetables are produced and supplied and training programmes were also conducted. Participatory seed production programme was conducted in the farm and vegetable seeds production of Amaranthus and cowpea was done by some self help group. Total of 250 Kg seeds were produced which costing total of Rs. 4,000/-. Mushroom spawn production by self help group women. Total 600 No. of packets of spawn were sold through instructional farm. Training to college students on organic cultivation of vegetables
2. **Competitiveness and Trade Security in Indian Pepper – A Policy Analysis Matrix (PAM)**
Approach: The findings of the secondary data analysis is published as the Discussion Paper No.7 entitled "Trade performance and Transmission of Price Volatility: The case of Indian pepper" as part of the National Research Programme on Plantation at Centre for Development Studies, Thiruvananthapuram and the findings are submitted to Government of India for further action. Analysis of the primary data collected by survey in Waynad and Idukki districts, preparation of PAM and project report are in progress.
2. **Hariyali Watershed Development Project:** Consultancy services for the preparation of project plan and monitoring of the Hariyali Watershed Development Project was done by the scientists of the College.
3. **"Sugandhi" Integrated Pepper Research and Development Project for Wayanad District:** The project involves research and development activities for rejuvenating the pepper crop in Wayanad district in four selected grama panchayaths namely, Pulpally, Poothady, Mullankolly and Thirunelli. Field visits were made by the scientists in the selected Grama Panchayaths and problems were listed.

A workshop was conducted to discuss these issues on 7.10.10 at PRS Panniyur. Pepper samithies were rejuvenated and apex samithies were constituted. Soil samples were collected through these samithies. from all the selected grama panchayaths.

4. Evolution of high yielding rice varieties suited to Pokkali rice tracts of North Kerala through farmers participatory breeding approach:

- i. **Development of varieties for saline prone Kaipad tracts:** Various experiment trials (CYT with and without lime at low saline and high saline Kaipad) in saline Kaipad tracts of Ezhome utilizing the already developed promising rice cultures and multi- locational trials /farm trials at Vytilla research station and in Kaipad tracts of Kozhikode, Kannur, Kasaragode and Alapuzha districts were carried out.
- ii. **Testing the suitability of newly released Kaipad varieties in non- saline wetland:** Comparative yield trial at the wetland of RARS, Pilicode and Farm trials in wetlands of different districts of Kerala viz., Thiruvananthapuram, Kottayam, Thrissur, Kozhikode, Kannur and Kasaragod were carried out. Multi- locational trilas were carried out at RARS Pattambi, ARS Mannuthy, RARS Moncompu, and RARS Kayamkulam
- iii. **Development of submergence tolerant cultures suited for non-saline flood prone areas:** Initial Evaluation trial in flood prone areas in Padanna Panchyath of Kasaragod district
- iv. **Development of varieties for non-saline wetland for organic farming:** Experiment trial was conducted in the wetland of RARS, Pilicode. MLT was carried out at RARS Pattambi; ARS, Mannuthy; RARS, Moncompu and RARS, Kayamkulam. Farm trials were conducted in wetlands of different districts of Kerala viz., Thiruvananthapuram, Kottayam, Thrissur, Kozhikode, Kannur and Kasaragod
- v. **Evaluation of already developed varieties and cultures from this project for shaded and non shade uplands:** Experiment trials (CYTs) were conducted in the shaded and non-shade upland of RARS, Pilicode. MLT was carried out at College of Agriculture, Padannakkad and farm trials were condcuted in uplands of different districts viz., Kozhikode, Kannur and Kasaragode as shaded and non-shaded intercrop of various perennial crops like coconut, cashew Arecanut and rubber

Salient Outcome: One Kaipad rice culture and one wetland rice culture are ready for commercial release

5. Comprehensive development of Kaipad rice tract through farmers' participatory approach to enhance organic rice production of North Kerala

- i. **Malabar Kaipad farmers' society was formed and registered in June 2010:** In order to take up food security activities, a farmers' society – 'Malabar Kaipad farmers' society" having area of jurisdiction in three districts – Kannur, Kozhikode and Kasaragode – was formed.
- ii. The area of Jurisdiction of the society is Kannur, Kozhikode and Kasaragode districts where Kaipad rice cultivation exists.
- iii. **Awareness seminars on importance of Kaipad rice tracts in food security, and on necessity of Food Security Army:** Eight awareness seminars at the rate of two each in four traditional Kaipad Panchayaths namely Ezhome, Pattuvam, Cherukunnu and Kannapuram were conducted to aware the people on food security and necessity of Food Security Army. Six numbers of awareness classes on necessity of mechanization and food security army in agriculture were conducted. Five classes were for food security army members of four Panchayaths, and one class for presidents of 88 Panchayaths of Kannur district.
- iv. **Food Security Armies were formed in four Kaipad Panchayaths:** Four Food Security armies comprising 20 member each were formed in the four Kaipad Panchayaths - Ezhome, Pattuvam, Cherukunnu and Kannapuram of Kannur district, and trained for 58 days on different programmes like Total agricultural mechanization, Honey bee rearing, Planting material production, Vegetable seed production, Different types of composting, Banana fiber production, Mushroom cultivation including spawn production, Coconut and fruit processing, Rearing layer chicken, Kaipad training and Computer awareness.

- v. **Purchase of farm machineries** : Farm machineries like transplanter, tractor and ridger for Kaipad, Reaper, Thresher cum winnower, coconut climbers, paddy mat nursery trays, Paddy seeder, cono weeder etc costing about 13 lakhs were purchased.
- vi. **Geographical Indication tag for Kaipad rice**: Formalities of applying for getting Geographical Indication tag for Kaipad rice was completed and the application was submitted to the University
- vii. **Documentary on Kaipad rice tract, "Kayal Kandom"** highlighting the importance of the unique Kaipad organic rice tract in food security, nutritional security, water security, environmental protection, biodiversity preservation and livelihood security, was made
- viii. **A website was designed for Malabar Kaipad farmers' society**
- ix. **Organic seed production of Kaipad rice varieties**: 4300 kg of organic seeds of Kaipad rice varieties were produced for raising seed villages of Kaipad varieties in four Kaipad Panchayaths through Food security armies under the management of Malabar Kaipad farmers' society during 2011- 2012.
- x. **Publications**: Published one booklet and leaflet and publication of two more booklets are in the pipeline.
- xi. **PTD trials**: Conducted PTD trials of Kaipad varieties and pre-release cultures in 36 plots of Kaipad / wetland / upland in all over Kerala in various districts like Thiruvananthapuram, Kottayam, Alapuzha, Thrissur, Kozhikode, Kannur and Kasaragode.
- xii. **Passing out pated function of Food Security Army**: On 4th March 2010, passing out pated and certificate distribution of food security army was conducted at Kannapuram panchayath of Kannur district.

6. **National Project on Management of Soil Health and Fertility**

Under the scheme, facilities are available for the analysis of soil samples of farmers

7. **Soil test based Nutrient Management plan for Agro ecosystem of Kerala**

As part of the Agronomy component of the project, estimation of the crop production potential and constraint analysis at the farm and AEZ levels were done by selecting plots managed by best farmers. In the Soil Science component, soil samples (around 11,000) were collected from all Panchayats of kasargode district and analytical work of the soil parameters and nutrient status are in progress.

8. **Iron toxicity management in Kaipad lands and midland paddy fields of Kannur / Kasaragod districts using non-conventional sources of calcium**

Iron toxicity and soil acidity of Kaipad lands were studied. Demonstration trials were conducted at Kannur/ Kasaragod districts with non conventional sources of Calcium.

9. **Establishment of model mango nursery at College of Agriculture, Padannakkad**

50,000 mango grafts were produced

10. **Establishment of small nursery of minor horticultural crops under public sector at College of Agriculture, Padannakkad**

Planting materials of minor horticultural crops (1500 numbers) were produced

11. **Evaluation of Zinc, Boron & Copper nutrition of soil in midland fields of Kasaragod District**

Micronutrient status of paddy soils of Kasaragod district were analysed.

12. **Establishment of small nursery unit for Medicinal Plants**

Nucleus planting materials were planted in the crop museum and the herbal garden. Thirty thousand propagules of 59 medicinal plants were produced so far. Medicinal plants produced in the nursery unit were transferred to the instructional farm of the college and till now, about 2500 numbers were sold, realizing an income of Rs.10,000/-

13. **Strengthening of Tissue Culture Lab for Micro Propagation of Banana**

TC banana plants were produced and provided to the local farmers. TC banana plants were also provided through KrishiBhavan under various schemes operated by CPCRI, Kasaragod, Coconut Development Board, RKVY Project. Unemployed women were trained and they formed SHG group named 'Harithasree' to produce TC banana plants. More than 5000 school students visited

TC lab facility as a part of their study. In the year 2010-11, a total of 72,000 TC banana plants were sold through the instructional farm.

Extension Programmes

Highlights of Extension Activities

- Regular presentations by scientists about the training undergone at the summer/ winter schools/ other trainings /workshops attended in the department/institution level for the effective dissemination and sharing of the acquired knowledge.
- Farmer's doubts on the cultivation of fruits, vegetables and medicinal plants were cleared as and when they visited.
- Mushroom spawn, Trichoderma and Pseudomonas were produced and distributed to farmers.
- Unemployed women (10 numbers) who received hands on training on production of Tissue Culture banana, subsequently registered as a Self Help Group and are producing Tissue Culture banana as per the terms and conditions of Kerala Agricultural University.
- Mangofest Kissan Mela was conducted on 21st and 22nd May 2010 by the student's union. Mango varieties were exhibited mango products were prepared and sold.
- Regular Conduct of Krishi Darshan Programmes for the benefit of school students was organized in more than 1200 school/VHSC students visited the College.
- Scientists of the College participated in the district level research extension interface conducted at Kasragod and Kannur districts.
- Regularly provides Resource Persons for guest lectures ,Seminars, Symposia, Workshops, Research-- Extension Interface Programme ,Hariyali project , Functional Linkage programme etc organized by Department of Agriculture ,Government of Kerala, other Development departments and agencies of Northern Kerala and local self government functionaries.
- Conducts field visits to problem areas as a Multi- Disciplinary Diagnostic Team for the Department of Agriculture.
- Regular conduct of Trainings to a large number of Agricultural Officers and farmers, mainly in association with the state department of agriculture and other agencies .A large number of expertise trainings and classes were conducted on various topics like coconut product diversification, medicinal plants cultivation, mushroom cultivation ,sustainable agriculture ,vegetative plant propagation techniques, general aspects on crop cultivations ,ITK in Agriculture, Pest and disease management in pepper,watershed management,seed village programme, integrated IPM in rice etc. Need based training programmes are also organized.
- As a part of Paddy mission, sufficient number of Agri-clinics was organized in Kannur and Kasaragod Districts. Apart from this large number of field visits were conducted to solve the specific problems of the area concerned .
- Under RKVY, project on women empowerment through organic cultivation of vegetables is being implemented.
- Seed production programmes under different projects are also being implemented.
- Quality vegetable seeds ,Tissue culture banana plants ,other planting materials ,Seedlings of Coconut hybrids and West Coast Tall are being produced and distributed to the farmers.
- A mushroom production unit is also functioning in the college. The unit caters the needs of mushroom growers of Kasaragod and nearl by districts by supplying quality mushroom spawn.
- Pseudomonas, Trichoderma,earth worms etc are also produced,multiplied and distributed to farmers.
- A SHG group was formed and trained on mushroom production
- Participatory seed production programme was conducted in the farm and vegetable seeds production of Amaranthus and cowpea was done by some self help group. Total of 250 Kg seeds were produced which is having value total of Rs. 4,000/-. Mushroom spawn production by self help group women and 600 No. of packets of spawn were sold through instructional farm.
- Eight awareness seminars were conducted at traditional Kaipad Panchayaths namely Ezhome,Pattuvam, Cherukunnu and Kannapuram of Kannur district to aware the people on food security and necessity of Food Security Army.

- Six awareness classes on necessity of mechanization and food security army in agriculture were conducted at Ezhome, Pattuvam, Cherukunnu and Kannapuram of Kannur district. Five classes were for food security army members of four Panchayaths, and one class for presidents of 88 Panchayaths of Kannur district.
- On 4th March 2010, passing out parade and certificate distribution of food security army was conducted at Kannapuram panchayath of Kannur district. Other functions like Agriculture seminar and exhibition, release of documentary, booklet and leaflet on Kaipad, inauguration of website of Malabar Kaipad Farmers' Society, and honoring of farmers who did PTD trials were also conducted on the same day.
- On 4th March 2010 along with passing out parade function of Food Security Army an Agriculture exhibition on old age farm implements, modern farm machinery, and different varieties of rice was conducted.

Farm Advisory Services

In Person	Over Telephone	Through Letters
300	150	50

Radio talks (AIR, Kannur)

Sl.No	Topic	Date	Name of the Scientist
1	Mango cultivation	15 th June 2010	Dr. A. Rajagopalan
2	Medicinal plants	5 th August 2010	Dr. M.P. Giridharan
3	Efficient use of nitrogenous fertilizers	October 2010	Dr. P.R. Suresh
4	Biofertilisers	October 2010	Dr. Biju Joseph
5	Plant Diseases of Rainy Season and their control	13 th September 2010	Dr. K.P. Mammotty
6	Discussion on Food Security Army formed in Kannur district	4 th and 5 th April 2011	Dr. Vanaja. T

T V Programmes

Sl.No	Topic	Date	Name of Channel	Name of the Scientist
1	On total agricultural mechanization training programme for Food security Armies formed in Kannur district	January 2011	Zeal Channel, Kannur	Dr. T. Vanaja Assistant Professor Plant Breeding and Genetics
2	Group action of Food security armies at Keezhara Padasekharam of Kannapuram Panchayath	February 2011	Kannur vision, Payyanur Net work & Manorama News channels	
3	Passing out parade function of Food security army	4 th March 2011	Zeal, Kannur and Payyanur Net work channels	
4	Food Security Army formed in Kannur district	8 th March 2011	'Kandathum kettathum' programme of Asianet channel	

List of Publications

Scientific papers

1. Jose Joseph. 2010, "Intellectual Property Rights of Plant Varieties in India" (Eds) Aravind Kumar and Govind Das, Biodiversity, Biotechnology and Traditional Knowledge, Narosa Publishing House, New Delhi, pp 66-82.

2. Jose Joseph. 2010, "Intellectual Property Rights and Access to Plant Genetic Resources" in (Eds) Aravind Kumar and Govind Das, **Biodiversity, Biotechnology and Traditional Knowledge**, Narosa Publishing House, New Delhi, pp 83-98.
3. Jose Joseph. 2010, "Transfer of technology and Commercialization of Intellectual Property Rights" in (Eds) Aravind Kumar and Govind Das, **Biodiversity, Biotechnology and Traditional Knowledge**, Narosa Publishing House, New Delhi, pp 161-174.
4. Jose Joseph. 2011, "Development of Agricultural Research and Education" in in (Eds) S. Shankar, **100 Years of Agricultural Department** (Malayalam), Farm Information Bureau, Thiruvananthapuram , pp 155-186.
5. Saranya, S., Ushakumari, R., Jacob, S., and Philip, B. M. 2010, " Efficacy of different entomopathogenic fungi aganist cow pea aphid", *Aphis craccivora*. *J. Biopesticides* Special issue-3, 138-142.
6. Saranya, S., Ushakumari, R. 2011, "Evaluation of pure cultures and formulation of entomopathogenic fungi aganist cowpea aphid":, *Aphis craccivora*. *Annals of Plant Protection Science* (Sent for publication- Acceptance no. TJ.1328).
7. Sreekumar, K.M, Vasavan.N, Madhu.s, Sijila.J. Sreedharan.M.P, Sreelekha.S. 2010, "Managing tea mosquito bug in cashew by augumenting red ants Journal of Plantation crops", 2011, 39(1)119-122
8. Latha Bastine.C, Anil Kuruvila and Sandini. K. P, 2010, " Trade performance and Transmission of Price Volatility: The case of Indian pepper", Discussion Paper No.7, National Research Programme on Plantation (NRPPD), Centre for Development Studies, Thoruvananthapuram

Popular Articles

1. Jose Joseph (2010), "Budget – Poimugavum pazhvakkum", **Karshakasree**, April
2. Jose Joseph (2010), "Naikurenayil joyyude success plus" **Kerala Market**, April
3. Jose Joseph (2010), "Vishamadikatha Krishikku Andhra mathreka", **Karshakan**, April
4. Jose Joseph (2010), "Rasavalangalkku eni mulyathishditha subsidy, **Karshakan**, May
5. Jose Joseph (2010), "Padannakayalile kallummakkai viplavam", **Kerala Market**, May
6. Jose Joseph (2010), "Jeevananu bhaviyanu jaiva vyvidhyam", **Karshakan**, June
7. Jose Joseph (2010), "Avacado–arogyadahiniyaya phalavriksham" **Kerala Market**, June
8. Jose Joseph (2010), "Varavayi jaivakeralam" **Karshakasree**, July
9. Jose Joseph (2010), "Swapnam kandal mathiyo" **Karshakasree**, July
10. Jose Joseph (2010), "Jalasurekshaykku Deshiya jalamission **Karshakan**, July
11. Jose Joseph (2010), "Karshika gaveshanathinte gathi athogathi" **Karshakan**, August
12. Jose Joseph (2010), "Vazhapazhathil ninnum mulya vardhitha ulpannangal" **Kerala Market**, August
13. Jose Joseph (2010), "Krishiyum kachavadavumayi vidhesha coporatugal" **Karshakan**, September
14. Jose Joseph (2010), "Muttathe Mullayilum panam kayikkum", **Kerala Market**, September
15. Jose Joseph (2010), "Parayoo annam evide?", **Karshakasree**, October
16. Jose Joseph (2010), "Monsantoyude rahasya lokam" , **Karshakan**, October
17. Jose Joseph (2010), "Vivathangalude Vithu Vithaykkan veedum oru vithubille", **Karshakan** , November
18. Jose Joseph (2010), "Palekharinte chelavilla krishi keralathilum" **Kerala Market**, November
19. Jose Joseph (2010), "Jaivachoranum oru thudarkatha", **Karshakan**, December
20. Jose Joseph (2010), "Jaivakrishi valarunna vipani valrunna padhathi", **Krishiyankanam**, September-October
21. Jose Joseph (2011), "Bhakshanam vishamayam akan janithika vilakal", **Madhyamam**, 6 January
22. Jose Joseph (2011), "Plavukalkkidayil Jayante Jeevitham", **Kerala Market**, January
23. Jose Joseph (2011), "India-European Swathandra Vyapara Karar", **Karshakan**, January
24. Jose Joseph (2011), "Jose Joseph (2011), "Maicheenide vipanierunnu", **Kerala Market**, February
25. Jose Joseph (2011), "2011 Antharashtra Vanavarsham vanangal janangalkku vendi", **Karshakan**, February

26. Jose Joseph (2011), "Indiayude mannu marikkunnu", Karshakan, March
 27. Jose Joseph (2011), "Karshakan parthikku purathannu", Karshakasree, March

No. of visitors to the Institution

Farmers from Kanjangad, Nileswaram, Cheruvathur and other Panchayaths of Kasaragode districts, and from Mayyil, Ezhome, Kannapuram, Cherukunnu and Pattuvam Panchayaths etc Kannur districts regularly visit the college. About 2500 farmers and 20 groups of students visited the college

Important visitors :

(i) Shri. K.P.Rajendran, Minister of Revenue, Government of Kerala, inaugurated Malabar Mangofest on 21st May 2010

(ii) Shri.P.Karunakaran, MP attended the Malabar Mangofest on 21st May 2010

(iii) Shri Mullakkara Retnakaran, Minister for Agriculture, inaugurated the Harithayoram Programme implemented by the Government of Kerala where the students of College of Agriculture planted vegetables and tuber crops in front of the college on the side of NH 17.

Finance

Head	Expenditure(Lakh Rs)	Receipts (Lakh Rs)
Non-Plan	-	-
Plan	273.26	17.33
ICAR (DG)	34.79	-
Other EAPs	45.77	-
Revolving Fund	22.13	15.13

COLLEGE OF FORESTRY, VELLANIKKARA

Academic Programmes

Intake capacity & No. of students enrolled during 2010-11			Outturn of students during 2010-11		
	Male	Female		Male	Female
UG	18	12	UG	16	4
PG					
Forest Mgt & utilization	2	0	PG	2	2
Tree physiology & breeding	2	0			
Silviculture & agroforestry	1	1			
Wood Science	0	2			
Wildlife sciences	1	-			
Ph D					
Wildlife sciences	0	1	Ph D	-	-

Study tours

RAWE batch to Chimmony WLS from 7 to 10 Oct. 2010 - Dr. P.O. Nameer

RAWE batch to Periyar Tiger Reserve from 12 to 15 Oct. 2010 - Dr. P.O. Nameer

RAWE batch to Munnar from 18 to 22 Oct. 2010 - Dr. P.O. Nameer

Chettuva Mangroves with 2009 batches B.Sc Forestry students on January 2011
 Dr.K.Vidyasagaran.

Visit Parambikulam Tiger Reserve with M.Sc. and Ph.D. students as part of reconnaissance visit on
 18.11.2010-Dr.P.O.Nameer.

Study tour to Neyyar WLS, 2010 batch 24 to 27 Dec. 2010 - Dr.P.O.Nameer.

Study tour to Malayattoor Forest Division, 2009 batch 11 to 14 Feb.2011 - Dr.P.O.Nameer.

All India study tour for 2007 and 2008 batch from 23/3/11 to 17/4/11- Dr.Kunhamu & Dr.A.V.Santhoshkumar.

Meppady forest range, Wayanad Forest Division as a part of the course "Dendrology"- Sri.S.Gopakumar.

Students Union activities

As part of the Wildlife Week Celebration from Oct 2nd to 8th 2010, several district level competitions were held at the St. Thomas College High School on Oct 2nd and 3rd conducted by the Kerala Forest Department. Students from the College of Forestry actively participated in the competitions and the following were the winners at the district level.

Essay writing – first prize – Jiss K. Varkey M. Sc. 2010 Batch

Elocution – second prize – Muhammed Iqbal B.Sc. 2007 Batch

Quiz – third prize – Lakshmy A. B.Sc. 2008 Batch. And Nijin, B. S. 2008 Batch

Freshers' Day was conducted on 19-10-2010 to welcome the 2010 batch B. Sc. Forestry students.

Inter-Class Arts Festival 2010 was conducted on 1st and 2nd November, 2010. Dr. P. V. Balachandran, Director of Extension Education inaugurated the festival.

Extra –Curricular activities

1. Dr.P.O. Nameer acted as the Convenor of Shuttle Badminton tournament during the All Indian Inter-Agri Sports Meet – 2010 hosted by KAU from 16-20 Feb. 2011

c. Sports and Games

1. COF team participated in the inter-collegiate of Athletics, Basket Ball and Volley Ball tournaments.

Research Programmes

- a. Major research achievements (Summary and highlights, Department/discipline wise):

Screened provenances of four species of Acacias viz., *Acacia auriculiformis*, *A.mangium*, *A. aulacocarpa* and *A. crassicarpa* based on growth performance and wood quality.

Developed an anatomical key for the identification of important timbers of Kerala.

Developed an online (web enabled & CD) manual of timbers of Kerala that provides accurate and up to date information using a click and query system. Emphasis is on timber identification, utilization & criteria based selection

Rapid biodiversity assessment of Peechi- Vazhani wildlife sanctuary revealed that 48 species of mammals in 21 families have been recorded from Peechi-Vazhani Wildlife sanctuary. Chiroptera (bats) reported the maximum number of species (18). The second most abundant mammal group was rodents (rats, mice and squirrels). 218 species of birds in 51 families were reported from the Peechi-Vazhani Wildlife sanctuary

Rapid biodiversity assessment of Chimmony wildlife sanctuary revealed that 53 species in 24 families have been recorded. 181 species of birds in 46 families were reported during the present study. Seven out of the 16 endemic birds of Western Ghats and 22 species of reptiles in nine families were also reported from the Chimmony Wildlife sanctuary.

Rapid biodiversity assessment of Silent valley National park indicated 40 species of mammals in 22 families, 193 species of birds in 41 families, 34 species of reptiles in nine families, 5 species of lizards and 2 species of geckos.

Pre- sowing treatment of four species of calamus ie. *Calamus thwaitesii*, *C. metzianus*, *C. hookerianus*, and *C. travancoricus* indicated that the treatment with GA₃ and cold water gave a relatively higher germination percentage in all the species except *C. travancoricus*.

CO₂ enrichment technique can be used as an economically viable nursery technology for production of more healthy and vigorous planting stock to meet the increasing demand for social forestry /agro forestry programme.

Wood quality studies indicated that *Pinus caribaea* has wood properties within the accepted range and is suitable for pulping and paper making. *P. patula* and *P. oocarpa* are also suitable for pulping and papermaking with better derived fiber ratios.

Ecology of lesser mammals in Chimmony wildlife sanctuary revealed that a total of 22 species belonging to 10 families occur in this sanctuary. This is inclusive of six species of small carnivores, eight species of rodents, and eight species of bats.

Extension activities

Dr.K. Vidyasagan attended a review meeting KAU-NOVOD Board project o 29/5/2010 at New Delhi

Dr.K. Vidyasagan presented a paper on mangroves and its importance during May 2010 at Ennamavu, Manalur Panchayath, Thrissur.

Dr.K. Vidyasagan presented a paper on biodiversity conservation during June 2010 at Mala Karmel College as part of NSS camp.

Dr.K. Vidyasagan took a leadership in organizing a planting programme at Thrissur Medical College, Viyoor Central Jail as part of National People's Science Congress organized by Kerala Sastra Sahithya Parishath.

Dr.K. Vidyasagan attended as a member in the meeting on 15/1/2011 for the selection of Vana Mitra Award organized by Kerala Forest Department.

All faculty members participated in the Participatory rural appraisal report presentation, One House - One Tree Programme, Seminar and Mini Exhibition conducted by College of Forestry as part of the Silver Jubilee Celebration -2007 batch B.Sc. Forestry students and Pudukkad Grama Panchayat in Chengalloor Govt. L.P. School on 14-8-2010.

Dr.P.O. Nameer conducted a Quiz on Biodiversity at Sacred Heart College, Chalakudy on 5.10.2010

Dr.P.O. Nameer conducted a Quiz on Wildlife conservation at Horticulture College, Vellanikkara on 25.11.2010

Dr.P.O. Nameer acted as a resource person for the Sri Lankan delegates who visited KAU for a fortnight long training at KAU. Accompanied them with the field in Vazhachal forests on 29.1.2011.

Dr.P.O. Nameer acted as a technical advisor on wildlife law under the Wildlife (Protection) Act, 1972 during the "State pet and animal exhibition" held at Talikulam, Thrissur from 2 to 7th Feb. 2011.

Dr.P.O. Nameer did a survey of birds of Mangalavanam Bird sanctuary on 26-27 Feb 2011

Dr.P.O.Nameer reviewed meeting at FHQ, Vazhutacaud, Trivandrum on the "Biodiversity Conservation Plan" on Kole Wetlands and Goodrikkal Reserved Forests on 7.3.2011.

Dr.P.O. Nameer visited Koremala in Pariyaram Forest Range, Chalakudy forest division to address a King Cobra-human conflict issue and resolved the issue on 30 March 2011.

Dr.P.O. Nameer addressed a public gathering and at Vellikulangara, on the King Cobra-human conflict on 31 March 2011.

Farm advisory services

In person	Over telephone	through letters
1. Animal/ parts of dead materials for identification	Planting methods of various tree species availability of seedlings their purchase	Planting material availability
2. Site visits for preparation of planting design, identification of plants		
3. Wood sample identification		

List of Publication

Research papers

MOHAN KUMAR, B. 2011. Self sustaining models in India: Biofuels, eco-cities, eco-villages, and urban agriculture for a low carbon future. In: Designing Our Future from Local and Regional Perspectives - Bioproduction, Ecosystems, and Humanity. Osaki, M., Braimoh, A., and Nakagami, K. (eds). United Nations University. Tokyo, Japan (invited), pp 207-218.

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- MOHAN KUMAR, B. 2011. Species richness and aboveground carbon stocks in the homegardens of central Kerala, India. AGRICULTURE, ECOSYSTEMS AND ENVIRONMENT, 140: 430–440, Elsevier Science, The Netherlands, DOI 10.1016/j.agee.2011.01.006.
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Popular Articles

- Parvathy Venugopal, S. Gopakumar and B N Nagaraj. 2010. *Sugandham parathunna Chandana Mahathmyam* (in Malayalam). Aranyam, Vol. 24. Kerala Forest Department 22-23p.

Book/Journals

- Journal of Tropical Agriculture: Volume 48 (2010) [website: www.jtropag.in].
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Santhoshkumar, A.V. and Ichikawa, K. 2010. Homegardens: Sustainable land use systems in Wayanad, Kerala, India. In : Sustainable use of biological diversity in socio-ecological production landscapes. Background to the 'Satoyama Initiative for the benefit of biodiversity and human well-being.' (ed: Bélair C., Ichikawa K., Wong B.Y. L., and Mulongoy K.J.) Secretariat of the Convention on Biological Diversity, Montreal. Technical Series no. 52, 125-128.

Other activities

- Dr. B. Mohan Kumar continued as editor, Journal of Tropical Agriculture, an open access scholarly journal (www.jtropag.in) published by the Kerala Agricultural University.
Dr. B. Mohan Kumar continued as Associate Editor, Agroforestry Systems, an international journal published by Springer Science, The Netherlands [Editorial Board Member from 2003].

Finance

Head	Expenditure	Receipts
Non plan	1,25,66,642	5,47,636
Plan	45,02,903	0
ICAR	1742129	17,35,000
ICFRE	1918687	20,68,037
Other EAPs	14,33,888	15,50,000
Revolving Fund- Nursery	764880	901418
Forensic unit	579871	648000
Wood science	53237	58217

COLLEGE OF CO-OPERATION, BANKING AND MANAGEMENT VELLANIKKARA

Introduction:

The Kerala Agricultural University Act (Section 5 of Act 33 of 1997) provides for imparting education in Co-operation along with different branches of study. Accordingly the proposal for starting a new four year degree programme in Co-operation and Banking was presented at the 21st meeting of the General Council held on 20-21 November, 1980. The programme was approved by the 22nd meeting of the General Council held on 30.1.1981 under the Faculty of Agriculture. The Government sanction for the programme was received in the year 1982

Mandate of the Institution:

- To assist in meeting the rapidly growing needs of managerial manpower for formal and informal co-operatives, financial institutions, agri-business enterprises and other rural development organizations.
- To under mistake research on organizational, managerial and operational problems of co-operatives, financial institutions, at agri-business enterprises and other rural development organizations.
- To foster the entrepreneurial ability and to extend management and organizational skills to the rural commodity.
- To offer training for policy makers and administrators in the development departments, enterprises, organizations and institutions.

Lead functions:

- To provide trained personnel for the management of departments, institutions and organizations providing support services to agricultural development such as co-operative department, co-operative organizations, micro-finance institutions, non-governmental organizations, rural banks etc.
- To undertake research in functional, managerial and organizational issues relating to institutions providing support services to agriculture.

Auxiliary functions:

- To offer extension support to the departments, institutions and organizations mentioned above. This comprises of organizing training programmes in areas such as Co-operative Management, Project Management, Agri-business Management, Marketing Management, Farm Financial Management, Human Resource Development, Micro – finance and related areas.
- To enable the co-operatives to revitalize their operations through appropriate changes in their managerial skills capabilities and other forms of managerial interventions.

Intake capacity and No. of students enrolled during 2010-11				Out turn of students during 2010-11		
	Intake capacity	Male	Female		Male	Female
UG	40	6	34	UG	7	14
PG (discipline-wise) MBA	a) RMM b) R OFM - 4 35	1 1	0 2	PG (discipline-wise) MBA (30)		
PhD (Discipline-wise)	nil	-	nil	PhD (Discipline-wise)	-	-

Students Union Activities

- 2009-10 Election was 23.1.10
- The students union conducted a Seminar on Environmental protection included in Energy conservation society on 04-06-10.
- The students union conducted a discussion and a Debate competition on Athirapilly water project.
- The interclass arts festival of the college. Mirth 2010 was conducted from 17th to 19th of June, 2010. The offstage items were conducted on 17, 18 and 19 and on stage items on 21, 22, 23, and 2010.
- Celebrated Onam on 18-8-2010.
- Celebrated Freshers day on 18-2010

Extra curricular activities.

All students of the college were able to participate in a one day cleaning campaign for plastic free campaign

Sports and games: Inter collegiate sports competitions.

Students actively participated in the Inter class and Intercollegiate arts festival programme

Other details if any:

Income From fees : 50,23,469/-
Miscel. receipts : 32,418/-
Total : 5055857

Finance

Head	Expenditure	Receipts (Rs.)
Non-Plan	14203187	859923
Plan ICAR	2134763	
Revolving Fund	1912953	4195964

FACULTY OF VETERINARY AND ANIMAL SCIENCES

COLLEGE OF VETERINARY AND ANIMAL SCIENCES, MANNUTHY

MAJOR ACADEMIC ACTIVITIES

Students Strength as on March 2011

UNDER GRADUATE			
	BOYS	GIRLS	TOTAL
BVSc & AH	31	44	75
I Year 2010 Admn.	29	47	76
II Year 2009 Admn.	26	51	77
III Year 2008 Admn.	2	1	3
Ist Year 2008 Adm Old syllabus	4	4	8
IInd Year 2008 Adm Old syllabus	38	37	75
IV Year 2007 Admn.	34	31	65
V Year 2006 Admn.	164	215	379
TOTAL			
POST GRADUATE			
	BOYS	GIRLS	TOTAL
MVSc			
2010 Admn.	17	24	41
2009 Admn.	7	31	38
2008 Admn.		1	1
2006 Admn.	1		1
TOTAL	25	56	81
	BOYS	GIRLS	TOTAL
PhD			
2010 Admn.	9	6	15
2009 Admn.	1	4	5
2008 Admn.		3	3
2007 Admn.		2	2
TOTAL	10	15	25
GRAND TOTAL	199	286	485

Admission & Pass out details of students during the year

	BVSc. & AH	MVSc	Ph.D
Admitted	75	41	15
Pass out	65 students	40 students	3 students

Examinations conducted during the period

- UG Examinations – Seven Annual Board Examinations and internal examination of all UG Courses
- All India ICAR Entrance Examination-2010
- KAU Entrance Examination (MVSc & Ph.D)-2010
- Final Viva-voce Examinations of MVSc & Ph.D – 40 = 3 = 43
- Preparation of Academic calendar and scheduling of various semesters for UG & PG
- Undertook Anti-ragging activities in the campus & prepared weekly reports to the VC
- Issued various bonafide certificates to the students
- Undertook the course registration formalities of UG, PG and Ph.D students
- Collected and compiled the marks of various UG and PG examinations

MAJOR RESEARCH ACTIVITIES

Ongoing Research Projects

Sl. No	Name of the Project
1	ICAR-Outreach Programme on Ethnoveterinary Medicine
2	AICRP on "Improvement of feed resources and nutrient utilization in raising animal production
3	Network project on Buffalo improvement
4	All India Co-ordinated Research Project on Pigs
5	AINP on " Haemorrhagic Septicaemia"
6	AICRP on Poultry, Mannuthy
7	Field progeny testing scheme
8	ICAR Outreach programme on Zoonotic diseases
9	AICRP on Goat Improvement (Malabari Field Unit)
10	Study of herbal acaricides as means to overcome the development of resistance in ticks to conventional acaricides (NAIP)
11	Effect of supplementation of energy and UDP on milk production in crossbred dairy cattle
12	Establishment of Elite Germplasm centre for Malabari Goats and training centre for goat breeders
13	Genetic analysis and marker assisted selection in malabari goats using micro satellite markers
14	Toxicological effects of Agrochemicals and antibiotic residues in Cattle of Northern Kerala
15	Design fabrication and testing of low cost fluid milk processing system
16	Improving awareness in Rural livestock Farming Community Utilizing Modern Communication tools
17	Grassland development and establishment of Fodder Nursery for fodder security of Wayanad
18	Introduction of Emu to Wayanad as an alternate poultry for egg and meat
19	Livestock based production system for rural livelihood security
20	Development of one step Reverse Transcriptase – polymerase chain reaction to detect Duck Hepatitis Virus Type-I in Kerala
21	Development of a PCR assay for rapid detection of New Duck disease in Kerala
22	Development of improved field level diagnostics for Intestinal Schistosomosis
23	Model Veterinary emergency and critical care unit for field adoption
24	Histomorphological comparison of skin in different breeds of rabbits" funded by AHD
25	Coupling outer membrane protein based latex agglutination test and IgM dot ELISA as a tool for the rapid and confirmatory field diagnosis of canine leptospirosis
26	Evaluation of Ethno-Botanicals for the control of ectoparasites in domestic animals

27	TRDM Project Techno economic feasibility of Dairying and Allied activities among the beneficiaries of land distribution project to landless tribals of Kerla with special emphasis to Wayanad district
28	Field Evaluation of three cowside tests for the detection of subclinical mastitis and therapeutic management of mastitis
29	Genetic analysis of Rabbits in Kerala
30	Dry Cow Therapy for Control of Mastitis Among Cows of Three Panchayaths in Thrissur district
31	Ovsynch Programme and its Modifications on the Reproductive Performance of Anoestrus and Repeat Breeding Cattle
32	Research and Development Support for Goat Production
33	Studies on Pododermatitis in cattle
34	Clinical Evaluation of Acrylic Splints for the Treatment of Fractures in Domestic and Wild Animals"
35	Detection of Anthelmintic Resistance in Gastrointestinal helminths of Goats
36	Exploration, identification and Characterization of various livestock rearing systems and agriculture linkages in district wise agro ecological zones of kerala
37	Improving livelihood security of WSHGs involved engaged in Livestock rearing through capacity building in Gender awareness
38	Effective use of information technology in animal husbandry sector for optimisation of livestock productivity and marketing system
39	Livestock based tribal resettlement project at Aralam
40	ATMA Project-Study on Infectious Enteritis in Cross Bred Cattle of Wayanad District
41	Establishment of Commercial Broiler Hatchery
42	Evaluation of milk based ELISA for the detection of Brucellosis in Dairy cattle
43	Installation of Touch screen Information Kiosks at Various Panchayath, Assembly/Parliament Constituencies of Kerala (Kallooppara Assembly Constituency)

EXTENSION ACTIVITIES

1. A training Programme on "Production and marketing of farm fresh milk" was conducted for self help group members.
2. Conducted a visit to Kuttanad to investigate the duck mortality and was found that it was due to Raimarella infection.
3. An investigation on duck mortality in Kannadi and Malampuzha was conducted in May 2010.
4. Disease investigation at Adimali on outbreak of diseases in Boer goats was conducted in October 2010.
5. Farmers and small scale feed manufacturers were given free technical advice with respect to scientific feeding of animals and preparation of balanced feed mixtures.
6. Classes were given to students from various medical colleges regarding scientific feeding and management of different laboratory animals.
7. Treatment and surgery of clinical cases was conducted in both the veterinary hospitals and in farmer's premises during emergency.
8. Artificial Insemination services were provided to farmers in both the veterinary hospitals.
9. Production, processing and marketing of meat, milk and value added products

10. Collection and preparation of specimens and demonstration of the mounted specimens to visitors.
11. Set up an animal husbandry stall showcasing various exhibits including improved breeds of livestock and poultry as part of the Thrissur Pooram-2010 exhibition
12. Conducted the exhibition as part of the National Livestock Show and Food Festival in June 2010.
13. Set up an animal husbandry stall showcasing various exhibits including improved breeds of livestock and poultry as part of the Kerala Agri Food Technology meet at Lulu International Convention Centre in February 2011.
14. Training classes were conducted on scientific poultry production to farmers.
15. Statistical consultations and analysis of data obtained in various research projects

FINANCE

Head	Expenditure	Receipts
Non Plan	76142197	4337791
Plan	4433864	
ICAR	1095323	
EAP	740069	
Revolving Fund (ICAR)	161385	

COLLEGE OF VETERINARY & ANIMAL SCIENCES, POOKOT

Academic programme

In take capacity & No. of Students enrolled during 2010-11				Out turn of students during 2010-11			
	Total	Male	Female		Total	Male	Female
UG (42)	41	18	23	UG	36	18	18
PG (discipline-wise)	2	0	2	PG	-	-	-
Ph. D (discipline-wise)	-	-	-	Ph. D	-	-	-

Study tours

Conducted study tour of final year BVSc & AH students to KLDB Farm and Frozen semen Lab, Mattupetty for out station study purpose

Fourth B.V. Sc & A.H. students were taken to Centre of excellence in Meat Technology, COVAS, Mannuthy as a study tour.

Third B.V. Sc & A.H. students were taken to MILMA Dairy Plant, Kalpetta as a study tour.

All India and South India study tours conducted as per curriculum for 2006 and 2007 batch respectively

Other activities:

Student Union Activities

- Inauguration of University Students Union 2010-2011 by Hon'ble Minister of Health, Govt. of Kerala Smt. P.K. Sreemathi
- Farewell to Students Union 2009-2010, COVAS Pookot
- Inauguration of Students Union 2010-2011, COVAS Pookot

- Inter Class Arts Festival 2010-2011
- Students actively participated in the Inter collegiate Arts Fest at Central Auditorium Vellanikkara bagged third price (Over All)
- Celebration of World Environmental Day
- Independence Day was celebrated in grand manner on 15th August 2010
- Organized the Onam celebrations with a grand feast, athapookalam and other competitions involving students, teaching and non teaching staffs
- Fresher's day was conducted to welcome the 1st year students(2010 batch)
- Film festivals, literary competitions , planting of trees
- A feast was arranged in connection with the Christmas
- New Year day celebration and Campus Night on 31st Dec 2010
- Send off function was conducted for the outgoing students (2005 and earlier admission)
- Republic Day was celebrated in grand manner on 26th January 2010. The day was celebrated as National Integration Day.
- Produced and released a short feature film "Smruthy"

Nature Club

- Nature photography exhibition
- Poster competitions
- Class on Vulture conservation for students and faculty
- Planting of rare endangered threatened plants
- Actively participated in elephant census
- Inauguration of Bhumitra club

Staff club

- Official constitution of Staff club
- Commencement of college canteen
- Development of infrastructure facilities
- Inauguration of staff club
- Family get together of staff club members

Placement

- 2005 and earlier batch students attended Campus interview by KLDB for selection to the post of Asst. Manager at COVAS, Mannuthy.
- 5 students of 2005 and earlier batch were selected in the interview conducted by Allianz Corn Hill, Thiruvanthapuram

D. NSS activities

- Preparation of fodder beds by first year students
- Campus cleaning programme (October 2010)
- Wild life camp held from 18.3.2011 to 23.03.2011 participated by 35 volunteers.

Research programmes

Major research achievements

1. Maintenance of disease free colonies of *Boophilus annulatus* and *Haemaphysalis bispinosa* species of ticks in the laboratory.
2. Control studies for *Boophilus annulatus* and *Haemaphysalis bispinosa* were successfully carried out.

3. Baseline data on cypermethrin, diazinon, coumaphos, deltamethrin, amitraz, fipronil, for *Boophilus annulatus* and deltamethrin, fipronil *Haemaphysalis bispinosa* ticks generated
4. Studies on representative tick samples from field for resistance and susceptibility have shown resistance for synthetic pyrethroid deltamethrin.
5. Acaricidal activity of fractions of ethanolic extracts

CVP-04 butanol fraction	92% adult mortality
Hexane fraction	83.33% adult mortality
CVP-05 Chloroform fraction	91.67%
CVP-08 hexane fraction	100%

Extension programmes

1. Participated in Exhibition during Wayanad Flower Show-2011 Feb 4th- Feb 25th at Kalpetta and adjudged “ Best educational pavillion”
2. Bramhagiri Society - district level exhibition, Wayanad 25th February to 6th March 2011- **Participated**
3. Participated in State level Technical Seminar, Govt. Engineering College, Mananthavadi
4. Participation in Technology Week organized by KVK, Ambalawayal 23rd and 24th February.
5. Services provided
6. Postmortem of 431 (animals and birds), clinical pathology- 85 and histopathology-9 cases-performed by department of Pathology
7. Screening of clinical samples (3278) under Seromonitoring of samples for foot and mouth disease under the Animal Disease Control Project-Department of Microbiology
8. Bacteriological and chemical analysis of well water and tap water samples (173) by Department of Veterinary Public Health
9. Vaccination camps for animals and birds in various parts of Wayanad district, outbreak investigations in and around Wayand
10. Infertility camps in various panchayaths in association with AHD institutions and NAIP projects.
11. Classes to farmers, veterinarians and para- veterinary staff of AHD

CLASSES

1. Class on Management of Infertility in Cattle at Kaappuvayal, Thariyode Panchayath, Wayanad 07.07.2010.
2. Class on Scientific Management Practices in Cattle rearing at CoVAS, Pookot on 15.09.2010 and 16.09.2010
3. Class on Infectious Diseases of Goats and its prevention at CoVAS, on 23.09 .2010
4. Advances in Reproductive Management of Dairy Cattle at CoVAS, Pookot, 24.09.2010
5. Short term trainings for Veterinary officers of AHD organized by Dept of Pharmacology and Toxicology
6. 6 Infertility cum Animal Health Camp at Choothupara, Meenangadi Panchayath, Wayanad 26.11.10
7. Class on Infertility and Corrective measures at Vellamunda Panchayath, on 27.11.2010
8. 8 Class on Management of Infertility in Dairy Cattle at Thariyode Panchayath, Wayanad on 3.12.2010
9. Infertility cum Animal Health Camp at Nellimalam, Meenangadi Panchayath, Wayanad 8.12.2010

10. Infertility cum Animal Health Camp at Pallikunnu, Kaniyambetta Panchayath, Wayanad 17.12.2010
11. Infertility cum Animal Health Camp at Arimula, Kaniyambetta Panchayath, Wayanad 22.12.2010
12. Infertility cum Animal Health Camp at Puthussery, Thondarnadu Panchayath, Wayanad 22.02.2011
13. Infertility cum Animal Health Camp at Cheengavallam, Ambalavayal Panchayath, Wayanad 11.03.2011
14. Infertility cum Animal Health Camp at Panamaram Panchayath, Wayanad on 19.03.2011
15. Infertility cum Animal Health Camp at Madakkimala, Kaniyambetta Panchayath, Wayanad. 20-03-11.
16. Familiarisation of Modern Technology Tools in Animal Reproduction, Kozhikode 23.03.2011
17. Infertility cum Animal Health Camp at Koliyadi, Nenmeni Panchayath, Wayanad on 27.03.2011
18. Class on Reproductive Management for Commercial Dairy Farming, Kissan Gosthi, ATMA, Kalpetta. 30.03.2011

Other activities

CVE Programme conducted

- Regenerative Medicine for Veterinarians on 19.1.2011
- Expert – Dr. T V Anil Kumar, Scientist E Division of Experimental Pathology, SCTIMST, Poojapura TVM
- Refinement of the Attributes of the New Generation Veterinary Professionals on 20.1.2011
- Expert – Dr. A Rajan Dean (Rtd.) CoVAS, Mannuthy
- HISSsssss.....Snake on 11.02.2011
- Expert – Dr. C Sreekumar Associate Professor Department of Veterinary Parasitology TANUVAS
- Acute Ovine Fasciolosis-The Science of the Disease Investigation on 11.02.2011
- Expert – Dr. C Sreekumar Associate Professor Department of Veterinary Parasitology TANUVAS

Farm Advisory services

Department	In person	Over telephone	Through letters
Livestock Production & management	50	45	5
Animal Nutrition	30	30	-
Dept of OG	40	250	5
Microbiology	2	2	0
Preventive Medicine	50	75	-
Animal Genetics	6	10	4
Clinical Medicine	45	24	Nil

List of publications

1. Sunil A R, Amithamol K K, Ajithkumar K G, Nair S N, Juliet S, Ravindran R, Rawat A K S, Ghosh S. Effect of three plant ethanolic extract on cattle tick *Rhipicephalus annulatus* in integrated management of arthropod pests of livestock and poultry in the aftermath of global warming and climate change at Veterinary College and Research Institute, Namakkal on 21-22nd April 2010.

2. Ravindran R, Ajithkumar K G, Sunil A R, Amithamol K K, Nair S N, Juliet S, Devada K, Rawat A K S and Ghosh S. Comparison of acaricidal effect of commercial preparations of amitraz against *Rhipicephalus annulatus* in integrated management of arthropod pests of livestock and poultry in the aftermath of global warming and climate change at Veterinary College and Research Institute, Namakkal on 21-22nd April 2010
3. Ravindran R, Sunil A R, Amithamol K K, Ajithkumar K G, Aparna M, Nair S N, Juliet S, Rawat A K S and Ghosh S. Comparison of acaricidal effect of anathakara (*Cassia alata*), Jetropha (*Jetropha curcas*) Ungu (*Pongamia pinnata*) leaves in integrated management of arthropod pests of livestock and poultry in the aftermath of global warming and climate change at Veterinary College and Research Institute, Namakkal on 21-22nd April 2010
4. Saju G, Sameer K, Bhagyalakshmi C P, Deepthi V, Nair S N, Sujith S, Sujarani S, Juliet S. Wound healing property of *Gmelina arborea* in mice in Kerala Veterinary Science Congress 2010, Palakkad On 28th September 2010
5. Meera S N, Divek V T, Nair S N, Sujith S, Suja Rani S and Juliet S. Dermal toxicity and in vitro antibacterial property of *Lantana camera* in Kerala Veterinary Science Congress 2010, Palakkad On 28th September 2010
6. Bhagyalakshmi C P, Deepthi V, Sameer K, Saju G, Nair S N, Sujith S, Sujarani S, Juliet S. Anti inflammatory property of *Chromolaena odorata* in mice in Kerala Veterinary Science Congress 2010, Palakkad On 28th September 2010
7. Kumar Arun N S, Sini M, Praseena P, Divya T M, Sujith S, Nair S N, Suja Rani S, Ravindran R, and Juliet S. Evaluation of anti nociceptive and antipyretic properties *Chromolaena odorata* in mice in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.
8. Divya T M, Sini M, Praseena P, Kumar Arun N S, Sujith S, Nair S N, Suja Rani S, Ravindran R, and Juliet S. Ethnoveterinary practices for treatment of skin diseases among the tribes of Wayanad district in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.
9. Sreelekha K P, Nair S N, Sujith S, Nisha A R, and Juliet S. Anti inflammatory property of aqueous extract of *Coccinia grandis* in mice in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.
10. Divya T M, Sini M, Praseena P, Kumar Arun N S, Sujith S, Nair S N, Suja Rani S, Ravindran R, and Juliet S. Central nervous system activity of alcoholic extract of *Chromolaena odorata* in mice in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.
11. Kumar Arun N S, Divya T M, Sini M, Praseena P, Sujith S, Nair S N, Suja Rani S, Ravindran R, and Juliet S. Ethnoveterinary practices among kurichiar tribes in Wayanad district in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.
12. Praseena P, Kumar Arun N S, Divya T M, Sini M, , Sujith S, Nair S N, Suja Rani S, Ravindran R, and Juliet S. Ethnoveterinary practices among mullu kuruma tribes in Wayanad district in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and

X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.

13. Praseena P Kumar Arun N S Divya T M, Sini M, , Sujith S, Nair S N, Suja Rani S, Ravindran R, and Juliet S. Effect of alcoholic extract of *Chromolaena odorata* in carbon tetrachloride induced hepatotoxicity in mice in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.
14. Sini M, Divya T M, Praseena P Kumar Arun N S, Amithmol K, Sujith S, Nair S N, Suja Rani S, Ravindran R and Juliet S. In vitro antimicrobial activity of alcoholic extract of *Chromolaena odorata* in Recent trends in ethnopharmacology and monitoring of environmental and food toxicants and X annual conference and national symposium of ISVPT at College of Veterinary Sciences and Animal Husbandry, Jabalpur, Madhyapradesh on 2-4th December 2010.
15. Nair S N, Sameer K, Bhagyalakshmi C P, Deepthi V, Saju G, Sujith S, Suja Rani S and Juliet S. Wound healing property of *Eupatorium glandulosum* in mice in 4th World Ayurveda Congress and Arogya Expo, Bengaluru, 9- 13 December 2010.

Finance

Head	Expenditure (Rs) (Gross)	Receipts(Net)(Rs)
Non plan	NIL	
Plan (Including EAPs an)	4,20,79,923	3,94,24,481
ICAR	3,00,000	3,00,000

COLLEGE OF DAIRY SCIENCE & TECHNOLOGY MANNUTHY, THRISSUR

Study tours:

1. South India Study tour for 2008 Batch was conducted during the period from 9.2.11 to 20.2.2011.
2. All India Study tour B. Tech 2007 Batch during the period from 25.2.11 to 20.3.2011.
3. KLDB Farm Mattupetti, Munnar – B. Tech 2009 Batch on 16-18th July, 2010.
4. KLDB Farm Mattupetti, Munnar – B. Tech 2007 Batch on 10- 11th July, 2010.

Extra-Curricular Activities

The students are encouraged to participate in various extension, programmes of the university. Our exhibition stalls were analysed during Thrissur Pooram Exhibition, Thrissur flower show and Agro Food Technology Meet 2011. Exhibition on participation of milk products and value addition of milk were arranged.

NSS Activities

The N.S.S. unit of the College taking all efforts to achieve the objectives laid out under this scheme. Dr. EK Kurien, Associate Professor is serving as the Programme Officer. Various programmes taken up under this scheme are aimed to improve the social commitment of students and their personality development. The volunteers took earnest steps to educate common people on the need of energy conservation, masking campuses plastic free and keeping the surroundings clean. The volunteers spent a day with the orphans of the institution "Friends of the birds of air" Peechi.

Sports and Games

The College do not have a teacher of Physical Education. The students are given encouragement in various sports and games. College team participated in Inter collegiate Sports and Games Meet. Mr. Paul James was two silver medals in 100m and 200m race during the Inter Agricultural University Sports Meet 2010 held at our University.

Research Programmes

A study was conducted to assess the detergent potential of a spoilage protease enzyme obtained from the microflora of dairy plant environment. An attempt was also made to study the impact of selected enzyme producers on the shelf life of curd (dahi) and sterilized skim milk. A total of 71 bacterial isolates obtained from dairy environment were screened for their ability to produce spoilage enzymes like proteases lipases and lecithinases. In general, proteolysis of milk was found to have an adverse effect on the quality of products. The possibility of exploiting an alkaline protease from spoilage organism in Dairy Plant sanitation was also looked into. Environmental conditions for the production of alkaline protease by a psychrotrophic strain of *Bacillus cereus* (S4) was optimized in whey based medium. Enhancement of protease activity in the presence of surfactants and stability in the presence of H₂O₂ signified its potential to be used as detergent additive. Qualitative assessment of cleaning efficiency of inbuilt formulation substantiated the superiority of enzyme based formulations. Ammonium sulphate fractionation, dialysis and gel filtration using seralose 4B and Seralose 6B were effective in purifying the protease preparation by 141.31 fold. The purified protease was found to be a homogenous preparation of molecular weight of 50.5 kDa as determined by SDS PAGE. Submitted the final technical report of KSCSTE scheme on 'Utilization of microbial enzymes for quality assurance in Dairy industry'

Extension Programmes

Acute shortage of scientists/teachers prevent the college from taking up extension activities. However by utilizing the services of final year students and the students union. Various extension programmes are taken up. These include demonstration of participation of various dairy products and exhibition of dairy products and dairy machinery during Thrissur Pooram exhibition, Thrissur flower show and Thrissur District Cattle show

List of publications

Scientific Papers:

1. R Rajendrakumar, P. Sudheer Babu and SN Rajakumar Energy Conservation opportunities – A survey of Principles followed in the milk processing plants in Kerala – National Energy Convention, Thrissur – 6th March, 2011.
2. R. Rajendrakumar (2011)- Maximising Return through efficient Dairy Processing Science conducted by NABARD and Kerala Veterinary and Sciences University, Thiruvananthapuram – 6th January, 2011.
3. R Rajendrakumar (2011) Equipment and Machinery for Hygenes Processing of Dairy Food Products – National workshop on Emerging Career and Business Opportunities in Food Processig – Ist March 2011.
4. Kurien E.K. and Senthilvel.S. Soil erosion and Runoff model for a well defined Soil Science of Tamil Nadu. *Echo-chronide Vet.* 4(3).

Finance

Head	Expenditure	Receipts
Non-plan	--	--
Plan	82,51,925.00	--
ICAR	7,49,612.00	2,76,479.00
Other EAPs	94,333.00	--
Revolving Fund	--	--

FACULTY OF FISHERIES, PANANGAD

COLLEGE OF FISHERIES, PANANGAD

Academic Programmes:

Intake capacity & No. of students enrolled during 2010-11	Out turn of students during 2010-11				
	Male	Female		Male	Female
UG	18	30	UG	-	-
PG(Disciplinewise) M.F.Sc	2	2	PG	-	-
Ph.D. (Discipline wise)		1	Ph.D	-	-

Study tours:

South India tour 2008 batch during 4.10.2010 to 11.10.2010 – visited :

- (1) Avalanche Trout Farm, Ooty
- (2) CFTRI, Ooty
- (3) UAS – Fisheries Unit, Bangalore
- (4) Fisheries College, Mangalore
- (5) Boat repair yards, Kannur
- (6) Fish landing Centre, Calicut

Other activities (Brief outline only)

1. Inauguration of Students Union was held on 22nd April 2010 By Sri. A.M. Arief, M.L.A Aroor.
2. Students union conducted a talk on HACCP on 24th June, 2010
3. Students union organized a Celebrity Quiz programme on 21th July, 2010
4. Onam celebration was conducted on 13th August, 2010
5. The students of this college conducted visit Old age home at Maradu on 26.01.2011
6. Sent off to 2006 batch of B.F.Sc students, Sri. George Mathew HoD, Dept. of Fishery Engg., Dr. T.M. Jose, Professor, Dept. Fishery Biology.

Extra curricular activities:

The College arts festival Drishya 2010 was conducted from 17th to 19th June 2010. The best among them were selected to represent the college in the University Arts Festival. The students of this college participated in the University Arts Festival

- a) N.S.S. activities: Celebrated Anti terrorism day on 21st May. A seminar was conducted on "No tobacco day on College of Fisheries Panangad. Talk of Dr. Alexander John, Prof. Department of Community Medicine was major allocation of the day. 2 days Nature study camp was conducted at Munnar on March 2011.
- b) Other activities:
 - i) Tree planting on World Environmental day.
 - ii) Campus cleaning programme on Gandhi Jayanthi

Sports and games:

As usual the regular courses are conducted in Physical education and swimming in addition there is regular supervision and management of sports activities during the evening hours.

Inter class competition were held in few numbers of sports and games. The college team has participated in almost all intercollegiate competitions and was fared well in this competitions. A few numbers of students have participated in interuniversity Foot ball tournament and ICAR sports and games held at Vellanikkara.

The college is registered member of Ernakulam District Cricket Association and regularly participated in the League tournaments.

Extension programme:

Farm Advisory Services:

In person	Over telephone	Through letters
200	75	—

List of publications:

Scientific papers:

1. Sumi T.S. , Sharrel Rebello, Jisha M.S. and Sherief P.M – 2010. Toxic effects of sodium dodecyl sulphate on grass carp *Ctenopheryngodon idella*. Fishery Technology 47(2):145-150.
2. Gomathi P; Nair J.R and Sherief P.M. 2010. Antibacterial activity in the accessory nidemental gland extracts of the Indian squid, *holigo duvauali* orbiny. Indian Journal of Marin Sciences 39: 100-104
3. Divya V.H; Devika P, Manoj Kumar B; Nair C.M and Sherief P.M. 2010. Optimisation of reverse transcription loop-mediated isothermal amplification energy . *M. rosenbergii* J. of virological methods 167: 61.67

No. of visitors to the institution (farmer group/students): 31 visitors from Ministry of Sri Lanka

Important visitors: S. Sharma, Fisheries Minister, Govt. of Kerala.

Finance

Head	Expenditure	Receipts
Non-plan	3,19,41,114	2,46,40,000
Plan	94,61,676	86,52,000
ICAR	1,31,859	---
Other EAPS	32,38,816	39,55,000
Development Grant	13,15,126	12,46,696
Total	4,60,88,591	12,46,696

FACULTY OF AGRICULTURAL ENGINEERING AND TECHNOLOGY

KELAPPAJI COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY, TAVANUR

Academic Programmes

Intake capacity & No. of students enrolled during 2010-2011			Out turn of students during 2010-2011		
				Male	Female
UG - 46	13	30	UG	10	16
PG (discipline-wise) - 15	2	9	PG	-	-
Ph.D. (Discipline-wise)	-	-	Ph.D	-	-

Study Tours Conducted:

- 19-05-2010 - Dairy Plant, Mannuthy - 2006 Batch
- 08-07-2010 - KAMCO, Athani - 2008 Batch
- 09-07-2010 - Pavizham Rice Mill, Kalady - 2008 Batch
- 06-10-2010 - AHADS, Attappady - 2006 Batch
- 21-12-2010 - Tata Tea Factory, Munnar - 2008 Batch
- 20-09-2010 to 05-10-2010- South India Study Tour - 2007 Batch

RAWE - Students of 2006 Batch B.Tech. (Agri. Engg.) under in - plant training at various institutions in September, 2010 under RAWE programme. Students of 2008 Batch undergone implant training at SRFMTTI, Govt. of India, Ananthapur from 2-8-2010 to 27-8-2010.

Other activities

a. Students' Union Activities:

Students' Union 2009-10 was inaugurated by Dr. Srivalasan, J. Menon on 5-6-2010. College Arts Festival "Alcheringa - 2010" was celebrated on 15th to 17th July, 2010 in a colourful atmosphere. A farewell to outgoing 2006 Batch was given on 3-12-2010. In connection with International Women's Day, an Essay Writing competition was conducted. College Magazine "Vaikhari" was published on 30-07-2010. Quiz Club of Students' Union conducted "Rajiv Gandhi Inter Collegiate Quiz Competition Camp at Tirunelli from 24-03-2011 to 26-03-2011. 38 students participated in the Camp.

b. Extra Curricular Activities:

"Vanitha Jagratha Samithi" for girl students were constituted with Dean as Chairman and Sri. Basheer, C., Sub Inspector of Kuttipuram as Convenor.

"Techno Wizard" 2010 was celebrated on 3-6-2010 in connection with National Technology Day Celebrations 2010, supported by KSCSTE. The programme included Technical Sessions, Quiz Competitions for school students, Poster making & Seminars, Competitions to students etc.

Training & Placement Cell:

Training and Placement Cell under the charge of Academic Officer, arranges the conduct of training to be imparted to the UG & PG students, in the Industries and/or Training Centres, within or outside Kerala. Few recruiting agencies come and hold interviews in the Campus. Placement Cell also

arranges to forward the applications of students for recruitment in various banks and other institutions
A career counseling session on "Agriculture and Food Management" was conducted by Agriculture and Food Management Institute, Mysore on 27-4-2010

Silver Jubilee Celebration:

The faculty of Agricultural Engineering & Technology, Tavanur came into existence on 2-10-1985 and classes for B.Tech. (Agrl. Engg.) was started on 23-1-1986 at KCAET, Tavanur. The Silver Jubilee of the College, "Haritham" was celebrated on 23-12-2010 in a befitting manner. Sri. E. T. Muhammed Basheer, Hon'ble Member of Parliament, was the Chief Guest of the celebration. Former Deans were honoured in the function. A Technical seminar on "Role of Agricultural Engineering in Sustainable Development of Kerala" was also conducted. Students, Staff & family, Alumni and retired staff actively participated in the function.

c. NSS activities:

National Service Scheme (NSS) aimed at developing student's personality through community service. The overall objective of National Service is education. This objective is attained through service to the community.

Environment day was celebrated in our campus from June 4-5, 2010. After cleaning, bins were placed at different locations in the campus. 350 tree saplings, procured from Assistant Conservation of Forest, Malappuram were planted on June 5th at various locations in the campus. All NSS volunteers actively participated in the tree planting programme. A lecture on 'Plastic Pollution-What we have to do?' was delivered on the same day at 5 pm by Dr. Habeebu Rahman, Programme Coordinator, KVK Malappuram.

In connection with the World Car Free Day, a Cycle Rally was organized from Calicut to Thiruvananthapuram by Calicut University in association with Energy Conservation Society. A warm reception was given to Cycle rally at KCAET Tavanur by the KCAET NSS unit on 18th September, 2010. Rally captain Sri. Soman advised the NSS volunteers to promote the use of eco-friendly cycle to make Kerala State a less polluted State. Dean presided over the meeting.

World Car Free Day was observed in campus on 22nd September, 2010. Car Free Day pledge was taken by the NSS volunteers at the College Seminar hall at 10 AM. Four wheelers were not allowed to enter the campus on that day.

In connection with the Environmental Conservation Day, a lecture talk on 'Pollution' was conducted at the College Seminar hall on 26th November 2010. Er. Nitya, Research Associate, DIFM scheme delivered the lecture.

In connection with the World AIDS day, AIDS awareness programme was organised at the College Seminar hall on December 1st 2010. Mr. Gopinathan, Health Inspector, PHC Tavanur and a team of Tavanur Public Health Centre workers delivered the lecture. A quiz competition was also conducted and prizes were distributed to the winners.

Five NSS volunteers of this college were participated at the NSS State level Camp organised by the Directorate of VHSS on 'Environment Awareness' at AIHARDS, Attappady from 25th to 29th November 2010. Four NSS volunteers of this unit were participated at the NSS State level Camp on 'Adolescence Health Issues' at Mannar organized by MG university at D B Pampa college, Parumala, Mannar from December 10-14, 2010. Two NSS volunteers of this college were attended to attend the State level NSS Camp on 'Social Investigation' at University Students Centre, PMG Junction, Thiruvananthapuram from 12th to 16th January 2011.

NSS KCAET unit organized 7 days special camp from 5th January to 11th January, 2011 at Govt. VHSS, Neriya Mangalam. The theme of this special camping programme was "Youth for Sustainable Development with special focus on Watershed Management and Wasteland Development. The camp was inaugurated at 5.00 PM by Mr. Regi Parayil, Block Panchayat Member, Neriya Mangalam Panchayat. Mr.

Madhavan Namboodhiri, Principal, VHSS, Neryamangalam was the chief guest of the function. In the inaugural address, Mr. Regi Parayil pointed out that these special camps would provide unique opportunities to the students for collective experience sharing and constant interaction with community. District Collector, Ernakulam has asked the NSS KCAET Unit, through the NSS state coordinator, to prepare a development plan for the Harithaparvam plot in Neryamangalam Block of Ernakulam Dt. Harithaparvam plot is about 8 ha and at present, major part of this area is barren and with wild vegetation. There is a thought process to develop this area through scientific agriculture and allied activities for the socio economic development of that area. Eventually this task has been taken by KCAET NSS unit.

Topographic survey of the entire area was carried out using tacheometric survey. A topographic map for the area was prepared. Soil sampling and its analysis was also done along with this. Closing ceremony of the Special camp was organized on 11th January, 2011 at 5 PM. Dr. M. Sivaswami, Dean (Ag.Engg.) presided the function.

d. Sports and Games

The College teams have participated in KAU Inter Collegiate Tournaments and Malappuram District Championships in various items and won the following places:

1. In Inter Collegiate Volleyball Men 2nd place
2. In Inter Collegiate Badminton women. 2nd place
3. In Inter Collegiate Table Tennis women 2nd place

Ms. Neethu Rani won the Individual Championship in the KAU Inter Collegiate Athletics meet

The following students have represented the KAU :

1. Mr. Rohit Murali in South Zone Inter University Cricket Tournament
2. Mr. Sumit Kumar Jha in South Zone Inter University Cricket Tournament
3. Mr. Basith. K in South Zone Inter University Cricket Tournament
4. Mr. Aftab Saeed. P.P in South Zone Inter University Football Tournament
5. Mr. Rohit Murali in All India Inter Agricultural University Sports and Games meet
6. Mr. Sreerag. P.M in All India Inter Agricultural University Sports and Games meet
7. Mr. Neethish Varghese in All India Inter Agricultural University Sports and Games meet
8. Ms. Neeraja H Nair in All India Inter Agricultural University Sports and Games meet
9. Ms. Neethu Rani in All India Inter Agricultural University Sports and Games meet
10. Ms. Pritty S Babu in All India Inter Agricultural University Sports and Games meet
11. Ms. Neethu Varghese in All India Inter Agricultural University Sports and Games meet

Ms. Neethu Rani won the Individual Championship in the KAU Athletics Meet held at Mannuthy.

Ms. Neethu Rani won Gold Medal in Javelin Throw in All India Inter Agricultural University Sports and Games meet.

The Annual Sports "ASPERA 2010" was conducted in a befitting manner on 22nd and 23rd May 2010.

e. Library and Information Centre:

KCAET - LIC acts as the central hub of the information needs of the Kelappaji College of Agri. Engg. & Technology, Tavanur community. It consists of about 24,000 books, 500 bound journals of both Indian and foreign journals and more than 200 project reports. For the last few years library obtaining on-line journals through CERA Consortium by ICAR and Science Direct. The Library portal of KCAETLIC is available through Infranet in the Campus facilities online access of the project reports, theses and e books INFLIBNET.

Research Programmes:

a. Major research achievements (highlights)

I. Precision Farming Development Centre

1. Fertigation experiment in coconut

- * To find out the optimum quantity of fertilizer needed under fertigation

- * The biometric observations taken earlier showed that the treatment with 80% of the recommended dose of fertilizer showed better performance.
 - * Some of the palms started yielding, but it has not been stabilized yet and hence result not concluded
2. Development of precision farming techniques for cultivation of cut flowers under naturally ventilated green houses
 - * To find out the suitable irrigation method for gerbera and to determine the fertilizer dose needed.
 - * With the results obtained so far, it can be inferred that there is no comparable difference in performance between the treatments with in line and on line irrigation.
 - * The trial is continued with inline drip irrigation system to evaluate the effect of various levels of fertigation.
 3. Standardization of irrigation requirement of salad cucumber inside poly house
 - * To standardize the irrigation requirement of salad cucumber
 - * Drip irrigation with two litre per day per plant gave best performance
 - * Trial being repeated during one more season
 4. Performance evaluation of cool season vegetables in naturally ventilated Green house
 - * To evaluate the performance of cool season vegetables in low cost naturally ventilated green house
 - * Performance of cabbage and cauliflower inside greenhouse was better than outside
 - * Seventy five percent and 200% increase in the yield was observed in the case of cabbage and cauliflower
 - * Crop inside the greenhouse yielded one month early
 5. Evaluation of precision farming package for bhindi
 - * To standardize the fertigation requirement for bhindi grown under drip and mulching
 - * From trials conducted plastic mulching with drip irrigation was found to be effective for cultivation of bhindi
 - * Around 80% to 100% increase in the yield was noticed in treatment with drip irrigation and mulching as compared to control plots
 6. Production of quality vegetable seedlings under humid tropic condition
 - * low tunnel structures made of MS rod and MS flats with 100 micron UV stabilized polythene sheet as cladding material can be used for seedling production.
 - * A shade level of 50% is to be given in summer.

AICRP on Post Harvest Technology

1. The centre has initiated steps to establish a model APC with Coconut Extraction Plant at KCAET, Tavanur. Machineries like Copra Cutter, Oil expeller and a Filter Press were purchased.
2. A survey was conducted at various R&D institutions and some firms to collect the details of the post harvest technologies developed. Accordingly, details related to the following machineries were submitted to the PC unit.
 - a. Cardamom polisher
 - b. Pine apple peeler corer cum slicer
 - c. Pepper thresher
 - d. Keramitra
 - e. Ashgourd seed extractor
 - f. White pepper processing machine
 - g. Pepper thresher KAU model
 - h. Tender coconut punching machine

2. A survey was conducted to the District Industrial Centres of Malappuram, Thrissur, Palakkad, Ernakulam and Idukki. Food based Agro Processing Industries registered in each district is given below.

3. Percentage of Food Based Agro Processing Industries in selected districts of Kerala

District	Industries Registered	Food Based Industries	% of Food Based Industries
Malappuram	2351	368	16
Thrissur	2388	428	18
Palakkad	2499	39	2
Ernakulam	2896	234	8
Idukki	4974	628	13

The details of the selected agro processing industries in these five districts were submitted to the PC unit.

4. As a part of the project " Impact assessment of technologies developed under AICRP on PHT" the centre has assessed the details of various technologies like:

a. *Standardization of curing of vanilla:* The centre has developed an improved method for curing the vanilla beans. The developed method is faster, less energy intensive and produces quality output in terms of vanillin content. By this, vanilla beans are killed using hot water at 63°C for three minutes. Instead of sun drying they are subjected to mechanical drying at 55°C for 90 minutes/day for nearly 12 days so that initial weight of vanilla beans is reduced to half. It is then slow dried at 70% relative humidity for nearly 7 days to reduce the initial weight to one third. At this time, the moisture and vanillin content of vanilla beans are 25% and 1.99% (estimated at Spices Board, Cochin). The slow dried beans are kept for conditioning for three months in suitable packaging material.

b. *Development of Black Pepper Decorticator:* The developed black pepper decorticator decorticates the presoaked berries by the combined effect of churning and centrifugal action. Water is jetted inside the decorticating drum to enhance the removal of the outer pericarp of the berries. The developed decorticator has the following parts: feed hopper, decorticating drum, main shaft, water supply system, collecting tray and outlet arrangement. The main functional part of the machine is the decorticating drum which houses the main shaft. In order to facilitate the efficient decortication, sixteen spikes are fixed in staggered arrangement on the shaft. The shaft rotates at a speed of 142rpm. This horizontal shaft is connected to a reduction gear unit having a gear ratio of 5:1 through a flanged coupling. The gear unit is coupled with 0.5 hp single phase motor of 1440 rpm through a V-belt and pulley system.

- The centre has developed a new packaging technology for the storage of cured vanilla. Cured vanilla beans packed in LDPE tubes were found to store safely for a period of one year.
- The centre has developed a Black Pepper Decorticator which decorticates the presoaked berries by the combined effect of churning and centrifugal action. the machine recorded an efficiency of 91.8% at 142 rpm.
- A detailed worksheet is prepared to identify the CCP's and for the development of new protocol for the preparation of black pepper and value added products from pepper viz. dehydrated green small and medium scale industries by modifying the process lines and human interventions, for maintaining quality of final products.
- The centre has developed and tested a Vanilla oleoresin extraction plant with a capacity of 3kg cured vanilla beans.
- The centre has developed a prototype percolation type vanilla extractor for extracting the vanilla beans using ethanol as solvent. The extractor extracts the cured vanilla beans at a combination of

concentration 60%, 30% and 15% ethanol; each percolated at the rate of 2 hours per day for 5 days. The vanilla extractor recorded an efficiency of 60% and an evaporative loss of 12.9%

- After the modification of the first and second model, in view of enhancing the efficiency the final model was developed and tested. It consists of a feeding section, peeling section and a product outlet. This model was provided with three peeling blades of varying diameter for peeling different grades of banana. The capacity, material loss and peeling efficiency of the peeler was found as 35kg/hr, 9% and 88% respectively.

Development of Innovative Farm Mechanization Package on Kerala

1. Development of Pokkali Harvester

The wheels of the Pokkali Harvester have been fabricated. The traction wheels are ready for testing the tractive force in the pokkali field.

2. Development and Testing of bed former

Bed former suitable for Pokkali area was developed with float unit as an attachment to KAMCO harbieri mini tiller. The testing of bed former was done in a private field on 09-06-2010. The areal extent of the field was about 2 acres. Two models of bed former (with and without float) were tested. The testing was done in the presence of expert scientists of Rice Research Station, Vytilla. Some minor modifications suggested have been incorporated in the design and is ready for testing again in the field.

3. Development of power operated coconut dehusker

The development of rotary coconut dehusker is in the final stage with a 2 HP electric motor.

4. Development of Pepper harvester

Motorized pepper harvester was developed for solving the tedious harvesting work of pepper. It consists of a cutting blade, conveying mechanism and a collection bag. The blade is fixed just behind the conveyor which conveys the pepper stalk towards the blade and cutting will be done with blade. The harvested pepper stalk will be conveyed through the conveyor and directed to the collection bag made of nylon net. The power source was a 12 V, 4.5A lead acid battery connected by wires.

5. Development of Ginger harvester/ Coleus harvester

The ginger harvester was attached to the IC engine of 3 HP for developing the new model of ginger harvester. As manual harvesting of ginger is tedious, a mechanized harvesting mechanism is needed to ease the operation. The implement consists of an engine with soil loosening tynes. The tynes penetrate into the soil during the operation and excavate the rhizomes by loosening the soil. The harvester ensured the quality of tubers while in operation by reducing the damage and breakage to the rhizomes. The implement was tested in the prepared field of laterite soil at KCAET, Tavanur. Some modifications in the engine power and tynes spacing have been suggested after testing and these modifications are in progress. A self propelled harvester was developed to alleviate the drudgery of farmers associated with harvesting ginger. The harvester consists of a frame made of GI pipes for mounting the bajaj chettak scooter engine of 7.5 hp. The harvesting unit is attached to the main frame by an extension of MS angle, which can be removed if needed. The power transmission from engine shaft to drive shaft is through chain and sprocket. The harvester was tested in a field of 40 m² with three different types of tynes. Its effective field capacity is highest for angular tynes at 0.01245 ha h⁻¹. The highest harvesting efficiency was found to be 64% for angular tynes. The cost of operation of harvester is Rs.77.25 per hour and its total cost is Rs. 20,000/-.

6. Development of Coleus Peeler

A coleus peeler was developed to reduce the drudgery while peeling the coleus. The peeler consisted of peeling unit and the prime over. The prime mover for driving the peeling unit is a 0.5 HP electric motor with a rated speed of 1440 rpm. Maximum capacity of the peeler is 3.0 kg in a single run. Average time for peeling 1 kg of coleus is around two minutes.

KSCSTE: Evaluation and Standardization of a Microsprinkler Developed by Shri. Avaran

A micro sprinkler developed by Shri. Avaran from a 3mm dia LDPE microtube was used for making the micro-sprinkler. The study consist of three parts i) Evaluation of the micro-sprinkler developed by Avaran ii) Standardization of the dimension of width of cut of the sprinkler, iii) Evolve a technology to manufacture the micro-sprinkler in large scale.

The evaluation and standardization completed and four different dimensions were standardized for its pressure and discharge relationship. Other parameters like uniformity coefficient, coefficient of variation, water distribution characteristics, wetted radius and application depth were also analyzed. The technology to manufacture these standardized products are ongoing.

Extension programmes:

1. Precision Farming Development Centre:

a. Highlights of Extension Activities(Attach Photographs of important activities)

PFDC conducted

- * Six trainings for farmers of various districts of Kerala
- * One training each for the Agricultural Officers and Agricultural Assistants of Dept. of Agriculture
- * One training for the scientists working in various KVK's in Kerala
- * PFDC participated in various exhibitions conducted in KERALA, viz. Haritholsavam, Brinjal fest, , Food technology meet, exhibitions conducted in connection with technology week of varios KVKs etc.

AICRP on Post Harvest Technology

The AICRP on PHT has actively participated in various exhibitions conducted in the state.

1. "Tharisu Rahitha Nelvayal Samrakshanam" organized by Govt. of Kerala at Mannachry, Alappuzha from 3rd to 9th April 2010
 2. Agricultural Technology Exhibition and Kissan Mela 2011 held at IISR, Calicut from 27th to 29th January 2011. The machines like Banana Peeler, Black Pepper Decorticator and Pineapple peeler corer cum slicer were exhibited.
 3. Kerala Agri Food Technology Meet 2011 held at Lulu International Convention centre, Thrissur 24th to 27th February 2011. The machines like Banana Peeler, Black Pepper Decorticator, Arecanut dehusker, Ashgourd seed extractor and Pineapple peeler corer cum slicer were exhibited.
- **Kaippad Field Demonstration:** Farm machinery demonstration on tillage implements at Karuvad Padashekaram, Ezhome, Kannur on 28-30 April 2010.
 - **Mannanchery Exhibition:** A mega exhibition on "Farm Mechanization" was held at Mannanchery from 3rd-8th of April 2010
 - **Karshaka dinam 2010:** Karshaka Dinam 2010 was celebrated on 17-08-2010. A discussion on paddy cultivation was led by Mr. Habeebu Rahman, Prof. & Head, KVK, Thavanur.
 - **Exhibition at MES, Ponnani** from 18-12-10 to 26-12-10 on agricultural implements.

AICRP on Farm Implement & Machinery

a) Highlights of extension activities:

Training	-	1
Field level Demonstrations	-	15
Exhibitions	-	5

Department of LWRCE

1. Handled classes on "Micro Irrigation" for farmers and Agricultural Officers on 22-2-2011 at Perambra, 23-2-2011 at Kalpetta, 10-3-2011 at Koduvally, 11-3-2011 at

Angadipuram and 24-3-2011 at Mulamthuruthy.

2. Handed a class "Selection and Maintenance of Pump sets" for farmers at RARS, Pattambi on 12-1-2011.
3. Handled a class on "Water for Agriculture" on 17-4-2010 in the Seminar organized by Institution of Engineers, Trichur chapter.

Radio talks/TV Programmes/Audio/Video Cassettes

Topic	Date	Name of Scientist	Channel
Irrigation pumps	18-05-2010	Asha Joseph	AIR, Thrissur

Farm Advisory Services

In Person	Over Telephone	Through Letters
5	4	-

Radio talks/TV Programmes/Audio-Video Cassettes

Topic	Date	Name of Scientist	Channel
Reapers and Threshers	01-06-2010	Er. Sindhu Bhaskar	AIR, Thrissur

Department of LWRCE

Radio talks/TV Programmes/Audio-Video Cassettes

Topic	Date	Name of Scientist	Channel
Precision Farming	21-05-2010	Er. Vishnu B	AIR, Thrissur

Radio talks/TV Programmes/Audio-Video Cassettes

Topic	Date	Name of Scientist	Channel
Micro Irrigation	24-05-2010	Dr. Abdul Hakkim, V.M.	AIR

Department of SAC (Veterinary)

Farm Advisory Services

In Person	Over Telephone	Through Letters
10	45	--

Field visit

No. of visits	Problem identified	Recommendations
189	Nutritional deficiency of animals	In feed supplements

List of publications:

I. Precision Farming Development Centre:

Popular Articles:

One popular article on Precision farming centre in 'KERALA KARSHAKAN' in May 2010 edition. Authors - Dr. E.K Mathew and Er. Anu Varughese.

DIFM Package on Kerala

Scientific Papers

Overview of farming practices in the water-logged areas of Kerala, India by Dr. Jayan P R., and Nithya Sathyanathan (International Journal for Agricultural and Biological Engineering, December, 2010, Vol 3., No. 4)

Technical Bulletins

"Aadhunika Karshika Yanthranghal" by Dr. Jayan P R, Associate Professor & Project Director (DIFM)

DIFM Brochure released on 23-01-11

Department of .SAC (Veterinary)

- Scientific Papers 4
- Popular Articles: 9

No of visitors to the Institution (farmer groups/ students): 1396

Important visitors:

AICRP on Post Harvest Technology

Dr. M. S. Sajeev, Senior Scientist, CTCRI, Trivandrum.

AICRP on Farm Implement & Machinery

Dr. Surendra Singh, Project Co-ordinator, AICRP on FIM, CIAE, Bhopal.

Visited the centre and evaluated the progress. He also witnessed the field problem & evaluation of machinery.

Finance

Head	Expenditure	Receipts
Non Plan	2,64,81,344	2,14,80,000
Plan	31,48,910	20,47,000
ICAR	48,80,969	48,33,000
Other EAPs	17,86,965	17,12,000
Revolving Fund	2,62,889	2,86,433

KAU HIGH SCHOOL, VELLANIKKARA

Academic Programme

Strength of students 2010-2011 : 965 (Pre-Primary, LP, UP & HS)

SSLC Examination March 2009

Total candidates : 106

Candidates eligible for higher education : 105

(1 candidate appeared for SAY Examination and secured eligibility for Higher studies)

Top Scorers

Dr. Kaleeswaran Memorial Endowment for the year 2010 awarded to 7 students who won full A+ (Anusree.P.S, Sunandh. O.S, Athira Mohan, Jayalakshmi. R, Lisha S. Kumar, Dhanu Unnikrishnan, Gokul. A. S). *Mrs. Lalitha Kaleeswaran Award* for the best performing student of Class X of 2010 awarded to Kum. Jayalakshmi. R

USS Scholarship awardees : Heera Soman, Anju shaju

KAU school Scout team won first prize in district scout camporee

Consumer club- Teacher in charge : T.J.Magy

Our consumer club won second place in the district

Sports:- 100 m, 200 m, 400 m , running 1st – Vijay. T (participated in Revenue District Sports), Aswin. A. B sub junior High Jump 2nd

Sub District Youth Festival

L.P. Section :- Akash P.Christy (Mappila Pattu A Grade), Aiswarya S.Menon & Party (Group song, National Anthem A Grade)

U.P. Section :- Afsal .A.S (Katha rachana A grade, 3rd), Ashik Krishna (Kavitha rachana A grade), Parvathy Babu (Folk Dance Agrade), Atul Govind (English Speech 3rd Place)

H.S. Section :- Sanjay.S.Nair (Mono Act 2nd), Haritha.K.K (Oil painting 2nd), Aravind .P.R (Pencil Drawing A Grade, 2nd), Ajay.S (Recitation A Grade) , Asif .A.S (Kavitha rachana A Grade), Akhil.K.P(Mimicry 2nd)Anila Grace Prakash (Violin Western A grade, 1st),Nikhil.S (Hindi speech A grade, 1st)

Literary club Malayalam

Thaliru scholarship examination 1st place 500 /- cash prize –Sony Mohan

Vidyarangam Club: Kavitha Rachana 3rd place – Asif A.S, Ashik Krishna

Upanyasa Rachana – Reshma. Katha Rachana- Bhavya

School Reading Competition – 1st place Stella Shaju

Science Club :- Sub District Science Fair –Hareesh.K.L,Akhila.M.S (Still Model A Grade , 1st) , Jofin.K.J,Greeshma Krishnan.K.U (Improvised experiment A grade,1st), Relesh Balu ,Sarath.M.B (Research Type Project HS A Grade , 2nd)Riya.P.M,Midhun Krishna.K.M(Research Type Project UP A Grade,2nd)

Maths Club

State Maths Congress: Ajay. S 3rd place, State Maths Fair : Ajay.S (Project A Grade) KAU School Maths Magazine 'Mathematical Rhythm' won 3rd place in Revenue District . Ajay.S(Single Project 2nd prize) & Prabin Nandakumar (Number chart 3rd) in the Revenue District Maths Fair

Finance

Head	Expenditure	Receipts
Non Plan 104-20-0005	63,24,112	8,99,351

CHAPTER III
RESEARCH
FACULTY OF AGRICULTURE
NARP (SOUTHERN ZONE), VELLAYANI

Research Programmes

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON HONEYBEES

a) Selective breeding in *A. mellifera* and *A. cerana* for stock improvement

- The brood area, pollen and honey storage of both the species varied over the months. The brood area ranged from 2007.50 to 4980.00 cm² for *A. mellifera* while for *A. cerana indica* it ranged from 348.00 to 960.50 cm². *A. mellifera* had a pollen storage which ranged from 103.00 to 982.00 cm² and for *A. cerana indica* ranged from 64.50 to 156.00 cm². Maximum brood and pollen storage was observed during November whereas the honey storage during March and May for *A. mellifera* and *A. cerana indica* respectively. The honey storage ranged from 945.50 to 4430.00 cm² for *A. mellifera* and 512.00 to 1256.00 cm² for *A. cerana indica*. These colonies will be utilized for multiplication by following mass queen rearing techniques. Continuous untimely rainfall due to climate change during September-October reduced the pollen storage in hives of both the species.
- The pests recorded from the Indian bee hives were ants and earwigs but they were not much harmful. The bee eater (*Merops orientalis*) predated upon a number of Italian bees in swarms resulted in the drastic reduction of worker bee population in the hives. Hence these colonies could not be prepared for ensuing honey flow by providing honey chamber.

b) Diversity and abundance of different insect visitors on winged beans *Psophocarpus tetragonolobus* and assessment of their role in pollination

- Among these different types of insects, maximum numbers were recorded from the family Xylocopidae. The activities of carpenter bees were maximum during the morning hours from 8 AM to 10 AM. The cleistogamous flowers of the winged bean were forcefully opened by the carpenter bees using their strong mandibles, thus plays an important role in the pollination.
- The foraging rate (number of flowers visited for 5 min. per m²) of *Xylocopa* is three flowers per five minutes and one bee spends on an average one minute on a single flower. Fully caged plots provided with stingless bees (T₃) recorded maximum average yield (1453 g) followed by T₂ and T₄. Lowest yield (747 g) was recorded from the fully caged plots without insects. Thus the data revealed that the carpenter bees, stingless bees as well as the Indian bees had an immense role in the yield enhancement of winged beans.

c) Survey of bee diseases and enemies in different beekeeping pockets of Kerala

- The incidence of Thaisac brood virus on *Apis cerana indica* in different districts of Kerala ranged from 2.52 to 9.32 per cent; the pest infestation was also less than ten per cent. The mean infestation of *Vespa cincta* (04.28%), ants (04.65%) and wax moth, *Galleria melonella* (02.30%) was recorded from the different districts of Kerala.
- The climate change with untimely continuous rainfall during September to November has affected the honey bee population. During the brood rearing season, the bees require sufficient quantity of pollen for better brood development. As the bees could not forage due to continuous heavy rain, the pollen stock in the hive reduced and hence a decline in brood rearing was noticed. This affected the normal division of colonies during the season. The bee keepers/bee breeders also could not divide their colonies properly during this period. In apiaries where pollen storage was insufficient the cells were seen uncapped. The bee keepers suspected this as incidence of Thai sac brood virus. The scientists from the centre

visited such apiaries and advised the bee keepers to provide pollen substitute to the hives which helped them to recover from the symptom.

d) **Diversity and abundance of different insect visitors on Coconut *Cocos nucifera* and assessment of their role in pollination**

- As a part of the preliminary studies, the morphology of pollen from the pollen basket of honey bees and the coconut inflorescence was studied in order to ensure that the pollen from the pollen basket contain the coconut pollen. For this, the pollen pellet from the pollen basket (corbicula) of Italian bee (*Apis mellifera*) kept at Coconut Research Station; Balaramapuram was collected randomly from different hives. Temporary mounts of pollen were prepared and observed under microscope. The pollen were suspended in alcohol (70%), washed in water and mounted in a drop of glycerine (50 %) for one minute. The spores become swollen and it was observed under the Leica microscope. The thickness of the spores was measured using the microscope. Similarly the pollen from coconut inflorescence was collected and the thickness was measured. Two types of pollen were observed one with cream colour and the other yellow coloured. The cream coloured spores have the same thickness as that of the spores of cocenut inflorescence (0.043 mm), thus it is confirmed from the observations recorded, that the pollen pellet from the pollen basket of *A. mellifera* accounts maximum coconut spores.

e) **Studies on *Varroa destructor* and its management**

- The incidence of pest infestation is being recorded along with the survey of TSBV infection in different bee keeping pockets of the State. The *Varroa* infestation is not recorded from the apiaries during the period under report.

f) **Standardization of management strategies against absconding and swarming behaviour of *A. cerana indica***

- The mean value of brood, honey and pollen of *Apis cerana* maintained under three conditions during the period from November 2009 to October 2010 were recorded . The bee strength of the hives maintained in three types was almost similar with a mean number of six frames per hive. Maximum brood area (910.88 cm²) and pollen storage (107.76 cm²) was observed in those hives with new egg laying queen subjected to management practices where as the maximum honey storage (289.52 cm²) was recorded from hives with no selection background. The hives of *Apis cerana* with no selection background possessed poor brood area (573.22 cm²) and pollen storage (57.76 cm²). The disease incidence and pest infestation recorded was very low, absconding and swarming was not observed. A number of insects were recorded from the hives, only a few numbers of pests viz., ants, spiders and wax moths were present which accounts to 25 per cent.

g) **Management of TSBV disease with indigenous methods**

- The incidence of TSBV still exists in a mild form. The percentage of infestation varies from 2.52 to 9.32 per cent. The observations revealed that the symptoms of infection were recorded in the weak colonies especially with poor pollen storage. The affected brood colonies remain uncapped even after they reached the pupal stage. Keep the colonies with sufficient supply of pollen and nectar. The colonies fed with sugar solution along with curcuma 2 per cent during the lean season keep the brood free from infection.

h) **Diversity and species characteristics of stingless bees in Kerala**

- It was reported that all the samples were of the same *Trigona iridipennis*. Efforts are being made to collect the stingless bees from different parts of the State. One stingless bee having difference in size, behavior and habitat was found from Kannur district. The hive entrance, brooding pattern, honey storage etc. are different from that of *T. iridipennis*. The bees were sent to Dr. Roubik and waiting for his reply.
- A species of stingless bee has been collected from Nagaland during September, 2010. Different types of stingless bees including one from underground were observed. The samples have to be identified from Panama for confirmation. Among these, two species

indicates specific difference in brood pattern, bee colour and size. The morphometry of the same has been done in the laboratory

Domestication and management of stingless bees

a. Management of stingless bees for honey extraction

- While handling the stingless bee colonies during honey extraction and division, the worker bees used to bite the bee keeper as well as the bees themselves resulting in the death and loss of worker bees in the colony.
- A technique has been standardized for honey extraction without disturbing the stingless bee colony. This technique is found to be very economic to farmers as an empty plastic bottle is only needed for the honey extraction. The plastic bottle is provided with minute holes and the mouth of the bottle is kept at the entrance of the hive. Then the top of the wooden hive is slightly tapped with a small log. Once the bees have entered, the bottle is closed and will be kept safe. After honey extraction, the mouth of the bottle is opened and kept near the entrance of the hive so that the bees will enter back into the hive. This method is advantageous:
 - i) Honey can be extracted at any time in a day.
 - ii) This also prevents the death of bees due to fighting.

b. Artificial feeding of stingless bees

The lean season management practices for stingless bee colonies are not available. To standardize a technology for feeding the stingless bee artificially with honey/sugar syrup, different methods are being tried. Rectangular (ventilated) plastic trays which were used for storing fruits were used for this method. A layer of cotton was placed at the bottom of the tray. The honey drops/sugar solution was poured on the cotton using a wash bottle. Two or three trays were kept on one layer one above the other. The topmost tray was covered with a cover. The stingless bees entered the tray through the aeration holes provided on the sides of the tray. This method has got many added advantages.

- i) The aeration holes being small, other bees could not enter the tray.
- ii) Because of the mass feeding, the bees will not bite each other.
- iii) This method enhanced the colony strength of stingless bees during lean season.
- iv) The artificially fed colonies during dearth season exhibits good strength and hence produce more queen cells (2-18 Nos.) during the ensuing brood rearing season.

c. Predators of Stingless bees

Identified a predatory spider of stingless bee is *Thomisus lobosus* coming in the family Thomisidae. It is an Yellow coloured spider with wide thorax, the anterior margin bears pointed horns. The dorsal side of the abdomen is flat; the anterior side is obliquely truncated and posterior side of pentagonal shape. Legs are smooth, the first and second pairs much robust than the third and fourth.

Brief report of achievements made :

The colonies which were found efficient in brood area, pollen and honey storage after the selective breeding in *A. mellifera* and *A. cerana* for stock improvement were prepared for ensuing honey flow by providing honey chamber. Studies on the diversity and abundance of different insect visitors on winged beans *Psophocarpus tetragonolobus* and assessment of their role in pollination data revealed that of winged beans. The incidence of TSBV still exists in a mild form. The percentage of infestation varies from 2.52 to 9.32 per cent. Recommended to keep the colonies with sufficient supply of pollen and nectar. The colonies fed with sugar solution along with curcuma 2 per cent during the lean season keep the brood free from infection. The disease incidence and pest infestation recorded was very low, absconding and swarming was not observed. A number of insects were recorded from the hives, only a few numbers of pests viz., ants, spiders and wax moths were present which accounts to 25 per cent. The morphometry of the two species from Nagaland which indicated specific difference in brood pattern, bee colour and size from *Trigona irridipennis* has been done in the laboratory. Technique has also been standardized for artificial feeding of stingless bees as well as the honey extraction without disturbing the stingless bee colony. This technique is found to be very economic to farmers.

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON PARASITIC NEMATODES WITH INTEGRATED APPROACH FOR THEIR CONTROL, VELLAYANI CENTRE

Hot spot areas of cyst and root-knot nematode were identified in paddy. When compared to cyst nematode, *Heterodera oryzae*, *Meloidogyne graminicola* was distributed in small pockets and in ten locations it became a major problem in paddy. The impact analysis in yield due to major nematode was worked out in paddy, vegetable and banana. In paddy, there was 30% loss due to *M. graminicola*. In vegetables the loss was estimated as 10% due to *M. incognita* infestation. In banana the crop loss was estimated as 12 % due to *R. similis* and in pepper the loss was 20% due to *M. incognita*. Screening of chilli varieties against root-knot nematode revealed that Jwala, Jwalasakhi, Jwalamukhi and Ujwala were moderately resistant with a root-knot count ranging from 23 to 29 per root system with a gall index of 3. Management of root-knot nematode infesting cucurbits through use of organic amendments showed that neem, castor and jatropha cakes were equally effective. Evaluation of IHR bio-pesticide for the management of root-knot nematode in okra that *Trichoderma harzianum* and *Paecilomyces lilacinus* were revealed equally effective. Management of major nematodes on banana using bioinoculants revealed that *T. viride*, *Bacillus macerans* and *Pseudomonas fluorescens* were effective.

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON FORAGE CROPS

KAU PROJECTS:

1. Development of hybrid derivatives in fodder cowpea

Farm trials were conducted at 10 locations in Thiruvananthapuram, Kollam and Pathanamthitta districts using two advanced cowpea cultures. Culture 1 recorded the maximum green fodder yield (300q/ha) followed by Culture 2 (275q/ha)

2. Identification of fodder rice bean for southern region

Farm trials were conducted using two selections with high yield and adaptability under partial shade and in rice fallows. Selection 1 recorded the maximum green fodder yield (337q/ha) followed by Selection 2 (292q/ha) in partial shade. In rice fallows also Sel.1 recorded the maximum green fodder yield (383q/ha) followed by Sel.2 (337q/ha).

3. Germplasm collection, maintenance and evaluation of guinea grass

Two guinea grass selections developed by clonal selection are found to be promising with high green fodder yield, quality and adaptability. Clonal multiplication of these clones is being done.

4. Multiplication of Planting Material

Multiplication of planting material of released fodder varieties, Suguna, Supriya and Harithasree is being done

5. National Breeding Programmes

Special Programme For Varietal Improvement in Fodder Rice bean

6. Collection and evaluation of germplasm

Two selected accessions of ricebean were tested against Bidhan -1 during rabi 2010

7. Intervarietal hybridisation

Using the 10 selected germplasm lines received on exchange basis from 5 AICRP centres, intervarietal hybridisation was attempted. But hybridisation could not be completed in all the 10 lines simultaneously because of very low flowering in 6 lines. Hybridisation will be repeated.

8. Mutation Breeding

Mutation breeding using the mutagen Ethyl Methane Sulphonate was attempted in the variety Bidhan-1.

9. Evaluation of bajra-napier hybrids and development of hybrid varieties suited to Kerala

Fifty one bajra-napier hybrids developed at the Department of Forage Crops, Tamilnadu Agricultural University during kharif 2009 were evaluated. Only few crosses germinated and they are being multiplied

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON MUSHROOMS

Maintained cultures of *Pleurotus florida*, *Pleurotus sajor caju*, *Pleurotus opuntia*, *Pleurotus eous* and *Pleurotus cystidiosus*. Cultures of *Ganoderma lucidum*, *Lentinus edodes*, *Agaricus bisporus*, *Agaricus bitorquis*, *Auricularia polytricha* and local collections of *Calocybe indica*, *Tricholoma* sp., *Auricularia* sp and *Ganoderma* were maintained. Developed a low cost technology for the cultivation of medicinal mushroom, Reishi, *Ganoderma lucidum*. Log method of cultivation for its cultivation was also tried.

Suitability of different substrates for the cultivation of Oyster mushroom *Pleurotus florida* and *Calocybe indica* was attended. Rubber sawdust followed by banana paddy straw and banana pseudostem was found to be the best substrates for Oyster mushroom while paddy straw followed by rubber sawdust and sugarcane bagasse was found to be the best for *Calocybe indica*.

Plan project : Development of high yielding leaf curl virus resistant varieties in chilli from segregating generations of inter-specific crosses.

The trial comprising plants from fourteen selected F_6 plants in the above experiment (F_7 generation) for further advancement of generation (F_7 generation) is in progress in the field. The plants are in good stand. Individual plants are being evaluated for selection & forwarding to CYT.

Plan project : Collection, evaluation and utilization of native types and develop high yielding leaf curl complex resistant, drought tolerant varieties in chilli through inter-specific hybridization.

The project proposal (under Plan Schemes of Kerala Agricultural 2010-11) submitted to Kerala Agricultural University through the Associate Director, NARP (SR) was approved. AS & TS was obtained from Director of Research, KAU. Request was sent to the Comptroller, KAU, for allotment of Head of Account and placement of funds.

Plan project : Biocontrol of vegetable pests

Standardised the methodology for improving the storage life of Talc based formulation of *B. Bassina*. Five farm trials were conducted in vegetables for the management of vegetable pests and proved their efficacy in managing vegetable pest. The efficacy of adjuvants also was standardized.

As assistant nematologist in AICRP Nematodes conducted field experiments, farm trial in farmers field, trainings, farm advisory service, estimation of nematodes from roots and soil in all the experimental field as well as from field samples suspected for nematode infestation and suggested remedy for their management. Conducted field trial in farmers field at Chengal and Kalliyoor, Peringamala state farm.

Plan Project : Developing an Integrated Farming System Model at Vellayani

B.Sc(Ag) students, students from outside institutions, farmers and others visit the IFS demonstration model unit and get familiarized with the principles and practices of Integrated Farming System.

The programme is a teaching cum demonstration model. Data on economic yield from the various crops, daily feed consumed by the ducks, egg production, growth of fish, turnout from azolla and vermicompost unit etc., are documented.

As a research component the nutrient content of the pond silt was analysed and its potential for enhancing crop productivity was evaluated.

Plan project : Development of mutant varieties in Neelayamari from segregating generations

In the experiment I, eleven mutants were raised for evaluation in M_3 generation. Based on the superior performance ten mutants were selected and these mutants were raised for evaluation in M_4 generation and these plants are in flowering and fruit development stage. Observations related to this experiment are being recorded and the experiment is in progress.

Plan project : Strengthening research on biofertilizers and biocontrol agents

Efficient strains developed under various projects are being maintained as pure culture and supplied to various production centres in the state as and when required. The mother culture and

production technology have been transferred to the 35 production centres in Kerala and technical help is being given to these centres as part of the project.

KAU Project : Evaluation of yard long bean germplasm for yield and mosaic resistance

Nine yard long bean accessions were evaluated in CYT for two seasons for yield and mosaic resistance during the period. The data of the second CYT is being tabulated for statistical analysis

KAU Project : Development of high yielding anthracnose resistant chilli varieties from among the segregating generations of three way cross hybrids

Selection of superior progenies from among the segregating generations of three way cross hybrids for yield and anthracnose resistance is in progress.

DBT Project : Exploring western ghats biodiversity for antifungal metabolite for plant disease control

Efficient biocontrol organisms – *Pseudomonas*, *Trichoderma* and *Bacillus* capable of suppressing *Phytophthora capsici* and *Rhizoctonia solani* have been isolated and identified through dual culture technique.

RKVY Project : Integrated fruit fly management

Integrated fruit fly management has been implemented in farmers field through farmers participatory approach for which demonstration plots are maintained in three districts, viz. Thiruvananthapuram, Kollam and Alappuzha.. Training classes on Integrated Management of fruit flies in mango and vegetables were being conducted in groups of farmers, convened at different locations in three districts. The training programmes are conducted with the support of Agrl. Officers and local Panchayath officials. In training programmes, farmers were given pheromone traps and biocontrol agents, free of cost, both developed under the project for fruit fly management. In order to speed up the dissemination of technology, leaflet, CD and posters were prepared. The technology is being refined under the project also. Improvement of container of the pheromone trap, standardization of dosage of bran based formulation as well as talc based formulation of the bio control agent *Beauveria bassiana* and *Paecilomyces lilacinus* for field application was done. Dosage for both soil application and spraying were standardized.

Salient achievements

Trained 188 mango growers and 304 vegetable growers (10 trainings) as against the target of training 200 mango and vegetable growers on IPM of fruit flies. . 279 Cue lure traps and 181 methyl eugenol traps 322 ktis of biocontrol agents (*B.bassiana*) were distributed to the trainees free of cost.

Maintained 15 vegetable demonstration plots and 15 mango demonstration plots in three southern districts Thiruvannathapuram, Kollam and Alappuzha

Distributed leaflets, on IPM of fruit fliesStandardised the shelf life of talc based formulation of *Beauveria bassiana* and *P.lilacinus* for fruit fly management

Standardised effective area of coverage of pheromone trap.

Standardised the effective height of pandal for reducing pest incidence

RKVY project : Augmentation of vegetable production through technological intervention.

Maintenance breeding of two okra varieties and one vegetable cowpea variety are being undertaken as the breeder of the above varieties under RKVY project "Augmentation of vegetable production through technological intervention". The crops are in the field and the trial is in progress

RKVY Project : Karshaka Santhwanam

As per the mandate of the RKVY Project 'Karshaka Santhwanam' the multidisciplinary diagnostic team under the leadership of the P.L. Dr. Sam T. Kurumthottical (Professor) has been making visits to the farmers' fields as and when requests are received from them in person, over phone or through electronic media regarding any soil or crop problem. Although only the southern districts of Thiruvananthapuram, Kollam and Pathanamthitta were originally envisaged in the program, the service of the team has been now extended to Idukki and Alappuzha as well. After detailed field physical investigation and if required, chemical analysis of soil and plant specimen suitable recommendation are being provided to the farmers for redressing their problems.

RKVY Project : Establishment of the Centre for Organic Farming of Kerala Agricultural University at Vellayani

Under the RKVY Project "Establishment of the Centre for Organic Farming of Kerala Agricultural University at Vellayani" two model organic farms were established with scope certificate issued by the authentic certifying agency 'INDOCERT' 12 Nos. of demonstration plots and 18 Nos. of vermi composting units were established in farmer's fields in Trivandrum and Kollam districts. At 10 locations training classes were organized to impart scientific skills to farmer in organic farming, which benefited more than 1500 farmers. Field experiments are being undertaken at College of Agriculture, Vellayani to standardise organic POP recommendations for all the important crops of Kerala.

RKVY Project : Centre for development of microbial inoculant technology for organic farming system

The construction work of the laboratory has been completed. Equipments have been purchased. Organisms suitable for organic waste decomposition has been isolated from Kerala soils and highly efficient organisms for lignin and cellulose degradation has been obtained. These isolates would be highly useful for organic waste decomposition and manure production. Isolation and screening of native biofertilizer and biocontrol organisms is in progress.

RKVY Project : Adoption of microbial inoculant technology for major crops cultivated in Thiruvananthapuram district

As per the programme, microbial inoculants such as biofertilizer consortium, *Pseudomonas* and insect biocontrol agents are to be distributed to selected farmers of Trivandrum district. For the purpose, microbial inoculants were procured from the Dept. of Agrl. Microbiology. 2.5 tonnes each of *Pseudomonas* and NPK consortium have been distributed to 2000 farmers. Along with the distribution, 9 training programmes were conducted to create awareness among the farmers on the benefits of microbial inoculants. Native *Bradyrhizobium* sp and AMF were isolated from cowpea growing areas using appropriate media and efficiency testing is in progress.

SHM Project : Establishment of biocontrol & biofertilizer production unit

Mass production of biocontrol agents - *Pseudomonas* & *Trichoderma* and Biofertilizers - *Azospirillum*, *Azotobacter*, *P. solubilizers* and AMF are being undertaken. Facilities have been established for quality analysis of microbial inoculants and samples submitted by Dept. of Agriculture, farmers, entrepreneurs are being analyzed. A formulation technology with emphasis to sustain virulence and higher shelf life of microbial inoculants including insect biocontrol agents - *Beauveria*, *Metarrhizium* and *Verticillium* have been developed. All equipments have been purchased and installed in the available space. The construction of biocontrol lab sanctioned under SHM, has been completed.

Dept. of Agriculture & Co-operation, GOI Project : National Project on Management of Soil Health Management and fertility - Stationary Soil Testing Laboratory

The stationary soil testing laboratory established under the 'National Project on Management of Soil Health Management and fertility' offers facilities to farmers research students and R & D institutions to have their soil, water, plant and manure samples chemically analysed at rates fixed separately for each group.

Dept. of Agriculture & Co-operation, GOI Project : National Project on Management of Soil Health Management and fertility - Mobile Soil Testing Laboratory

Setting up of Mobile Soil Testing Laboratory (MSTL) is under progress and analytical and advisory service is provided to farmers on payment using the available facilities of MSTL.

State Planning Board Project : Soil based plant nutrients management plan for Agro eco systems of Kerala

Under this project, training was imparted to members of Nehru Yuvak Kendra on scientific Soil sampling. Training on Analytical techniques was given to soil testing staff of the Soil Testing Lab of Department of Agriculture. Analysis of soil samples collected from farmers fields is progressing.

IMD project : Integrated Agromet Advisory Services

101 Agromet Advisory Bulletins were prepared in English and 50 were prepared in local languages and disseminated to farmers. The bulletins were prepared by analysis of medium range weather forecast received from India Meteorological Department in relation to crop stages. Messages based on the bulletins were broadcasted through mass media and were published in dailies.

Validation of the medium range weather forecasts was done as per the standard methods. The weather forecast received from IMD and the actual (observed) weather data of College of Agriculture, Vellayani, were compared to assess the validity of weather forecasting. The results showed that the forecast on rainfall was 100 per cent 'correct' during the month of February and March followed by January (91.3 per cent). It was observed that in June, July and August which is the period of the South West monsoon in Kerala, none of the forecasts were correct. The total rainfall recorded during June 2009 was only 174 mm as compared to the normal rainfall of 270.10 mm at Vellayani. It is seen that the 'correct' forecasts were more during the drier months of the year.

WGDP : Irrigation and Shading Techniques for Vanilla Cultivation in the Western Ghats

For the field experiment on vanilla with irrigation and shade, the vegetative growth (number of leaves and vine length) recorded significantly higher values in 50% shade, followed by 25% shade and the least growth in the case of open condition.

1. The yield values of vanilla were significantly higher on 25% shade (97 flowers / plant and 62 beans / plant) than 50% shade and open condition.
2. Mist irrigation recorded higher yield in vanilla compared to micro sprinkler and drip irrigation.

Extension Programmes

All India Co-ordinated Research Project on Mushrooms

Five off campus trainings and nine campus training programmes on mushroom cultivation and spawn production were undertaken. Training were given to educated unemployed youths, school students, mushroom growers of VFPC, Kakkanad, RATT, Kazhakoottam, VHSC and school students, KVK's, Farmers club etc.

All India Co-ordinated Research Project on Forage Crops

Production and distribution of planting material of improved varieties of guinea grass B-N hybrids, signal grass and congosignal grass to dairy farmers, NGOs, Department of Agriculture, Krishi Vigyan Kendras, Animal Husbandry Department, Dairy Development Department and Kerala Livestock Development Board.

Transfer of Forage Technology

Forage Technology Demonstrations using improved fodder varieties and production technologies were conducted during Kharif 2010-2011 at 15 locations using Suguna Harithasree, KBC-2 and Bidhan-2 in Thiruvananthapuram, Kollam and Palakkad districts of Kerala

Ten Forage Technology Demonstrations were conducted during Rabi 2010 -2011 in Thiruvananthapuram and Kollam districts using Suguna, Harithasree and Bidhan-1 with improved technology.

All India Co-ordinated Research Project on Honeybees and Pollinators

1. Participated in the Agricultural Exhibition at Mannancheri Grama Panchayat, Alappuzha from 3-9 April 2010 conducted by Kerala Agricultural University. The innovations and technologies developed by the Centre has been Exhibited in the stall of KAU pavilion which attracted the viewers of the district
2. Participated in the International Horti Expo 2010 conducted by State Horticulture Mission from 02-12-10 to 06-12-10 at Chandrasekharan Stadium, Thiruvananthapuram.

All India Co-ordinated Research Project on Plant Parasitic Nematodes with Integrated Approach For Their Control

1. Demonstrated nematode management practices in banana (paring and hot water treatment) to the members of the farmers club of Naruvamoodu, Thiruvananthapuram District.

2. Two CD 's were prepared about the extension activities and research highlights of AICRP, in the name of 'About nematodes and 'Nimavirakale ariyan' (malayalam). They were released by Sri K.R. Viswambaran IAS, Vice Chancellor, Kerala Agricultural University on 11.05.2010 on the occasion of the inauguration of Biocontrol Laboratory. Shri. Mullakkara Ratnakaran, the Minister for Agriculture and Dr. Sashi Tharoor M.P were also present on the occasion.
3. Conducted class on nematode management in Mavelikkara (16-11-10).
4. Routine farm advisory services for nematode management were conducted.
5. Three samples received from Pepper Research station, Panniyur, Kannur District were processed for nematodes. Two samples were heavily infested with burrowing nematode. Recommendations were given for the management especially with neem cake and *Bacillus macerans*.
6. Soil solarisation and potting mixture denematization techniques were demonstrated to a team of Agricultural officers working in Dist farm, Seed farm and Biotechnology centre Govt of Kerala

Farm Advisory Services

In Person	Over Telephone	Through Letters
Dr. K. Vasanthakumar	2	-
Dr. T. Jiji		
1500		
Dr.M.S. Hajilal		
25	10	Nil
Dr. Sam T. Kurumthottical, Dr. C. R. Sudharmai Devi, Dr. Usha Mathew		
50	>70	e-mail - 2 Nos.
Ajith. K		
12	70	
Dr. S. Devenesan, Dr. K. S. Premila, Dr. Amritha V. S.		
More than 150	More than 1500	More than 20

Radio talks / TV programmes / Audio-Video Cassettes

Topic	Date	Name of Scientist	Channel
Radio talks			
Apiculture, honey production, consumption-present status in Kerala	20-08-10	Dr. S. Devanesan	
Documentary about AICRP on HB&P	07-09-10	Dr. S. Devanesan	
Honey as food and medicine- a comparison with foreign countries	02-11-10	Dr. S. Devanesan	
Question answer section - reply to doubts of bee keepers	14-09-10	Dr. K. S. Premila	
Question answer section - reply to doubts of bee keepers	12-10-10	Dr. Amritha V. S.	
TV programmes			
Soil testing	11-03-11	Dr.Usha Mathew	Doordarshan Kendra
Monsoon management of honey bees	16-07-10	Dr. S. Devanesan	Doordarshan Kendra
Live phone in programme on apiculture	18-02-11	Dr. S. Devanesan	Doordarshan Kendra
Video cassettes			
One video cassette was prepared on IPM of fruit flies in fruits and vegetables		Dr. Jiji. T	

Scientific Papers

Subarban, M. Geetha.D. and Hajilal, M.S.2010. Oyster mushroom cultivation - An agri based enterprise

for women in Kerala. Book of abstracts of the first Kerala Women's Science Congress held from 10-12, August 2010 at Emakulam.

- Muthuswamy, A and Khader, K. M. A. 2010. Genetic variability for yield and leaf curl virus resistance in varieties of chilli (*Capsicum annum* L.). *Int. J. Mendel.* 27 (1-2): pp. 5-6
- Devanesan S., Shailaja K. K. and Premila K. S. 2010 Meliponiculture for yield enhancement and food safety in Kerala *Advances in Pollen Spore Research XXVIII*: 57-62
- Devanesan S., Shailaja K. K. and Premila K. S. 2010 Potential of Meliponiculture in Rural homesteads of Kerala *Bee world* 5th issue April-June 2010 p33-35
- Jiji, T., Nisha, V.G., Sarika Mohan and Abraham Verghese. 2010. Food bait preference of melon fly *Bactrocera cucurbitae* and oriental fruit fly *B. dorsalis*. *Insect Environment*.vol 15(4):p147
- T. Jiji, Abraham Verghese, G. Suja, A. Naseema, V. G. Nisha, Sarika Mohan and John D. Mumford 2010. Impact of the project Integrated Management of Fruit Flies in India (IMFFI) on fruit and vegetable cultivation in Southern Kerala. 8th International Symposium on fruit flies of economic importance, Valencia, Spain Sept. 2010.
- Sheela.M.S., Nisha, M.S. and Jiji.T. 2010 Bioefficiency of *Bacillus macerans* for the management of root knot nematode *Meloidogyne incognita* in vegetables - Paper presented the International Conference, Bangalore India Bio 2010 held on 2nd to 4th June 2010 Abstract p 12 -13.
- J.V. Siji., C.A.Prakas., M.S.Sheela and C. Mohandas. Efficacy of *Cleome viscosa* L. against *Meloidogyne incognita* infestation in okra (*Abelmoschus esculentus* L.), *Thai Journal of Agricultural Science*, 2010, 43 (3): 151- 156.

Finance

Head	Expenditure	Receipts
Non-Plan	Rs. 17032437.00	
Plan	Rs. 809554.00	Rs. 5064.00
ICAR	Rs. 13136236.00	Rs. 2460.00
Other EAPs	Rs. 19850977.00	Rs. 276624.00
Revolving Fund	Rs. 13935.00	Rs. 502570.00

TRAINING SERVICE SCHEME COLLEGE OF AGRICULTURE, VELLAYANI

Extension Programmes

1. TSS, Vellayani is identified as the nodal centre by MANAGE for AC & ABC. Using the funds from State Horticultural Mission, training hall with modern facilities for multimedia projection, AC, PA system and other facilities were developed furniture.
2. Using plan fund equipments like handcam, laptop, LCD projector and other accessories worth Rs. 1.9 lakhs were purchased.

Farm Advisory Services

In Person	Over Telephone	Through Letters
10	3	Nil

Field visit:-

No. of Visits	Problem identified	Recommendations
20	Fusarium wilt of cowpea- Aphids	Copper Oxy chloride, Nimbecidin 3ml + 20 gm garlic/litre Roger 2ml/litre

Flower thrips	Malathion-2ml/litre + garlic
Leaf webber and leaf spot disease of Amaranthus	8 gm sodium bicarbonate+32 gm turmeric powder+40 gm asafetida in 10 litre water
Leaf rot in coconut	3 ml calyxin in 300 ml/palm-drenching, 5 kg Neem Cake-soil application
Boron deficiency in banana	Micro food
Problem of over nutrition	Reduce dose of fertilizers

List of Publication

Scientific Papers

- Dr. Anilkumar.A.S. and Dr.A.K.Sherief (2011). Sustainable Farming practice for intercropping Medicinal plants used for the preparation of 'Neelibringadhi oil' in Coconut Garden' in Shweta and V.K.Singh (ed.).
- Proceedings of National Conference on conquering impact of climate change on Agriculture through organic farming – A global perspective, D.S. College, Aligarh 2011: 61-67.

Finance

Head	Expenditure	Receipts
Non-Plan	Rs. 44,87,919/-	Rs. 1,68,469/-
Plan	Rs. 3,85,965/-	

CROPPING SYSTEMS RESEARCH CENTRE, KARAMANA

Research Programmes

Major Research Activities

The mandate of the station is on reprioritization of the thrust areas of research with lead function of maximizing the productivity levels of rice and rice based cropping system. The verification functions are the multi-locational trials and integrated production trials, bio-energy conversion and organic recycling and water requirement of crops. The on-farm research component involves verification and testing of developed technologies to conduct simple fertilizer trials in the farmers' field in a phased manner.

- ❖ This is the only research centre in the region to provide quality seeds to the rice farmers.
- ❖ Situated in the heart of Thiruvananthapuram city and CRC is the onerice cultivation area.
- ❖ The centre provides rice panicle during "Nirayum Puthari" for the temples in the region.
- ❖ This institute has a potential to develop as a resource centre for urban agriculture.

Main activities

The experiments conducted under the AICRP on Cropping Systems during the period

1. Performance of different cropping systems in rice based cropping system (1a)
2. Permanent plot experiment on integrated nutrient supply system in a cereal based crop sequence (2a).
3. Long range effect of continuous cropping and manuring in a rice based cropping system (2b).
4. Development of organic farming package for the system based high value crops.
5. Evaluation of IFS model.

EXTERNALLY AIDED PROJECTS

- (1) Classification and characterization of farming systems in district wise agroecological zones of Kerala.

Funding agency- Kerala State Planning Board

- (2) Development of Ground Water Information System for the assessment and Management of Ground Water resources with ready reference to paddy cultivation in Palakkad, Wayanad and Alleppey districts of Kerala. Collaborative project with NGRI, Hyderabad, KAU-CSRC, Karamana and CWRDM, Calicut.

Funding agency EMAK- Trivandrum.

Major achievements

Out come of individual experiments

- *Long range effect of continuous cropping and manuring on soil fertility and crop productivity:* Skipping phosphorus continuously for years significantly reduced crop growth and yield in rice, delayed flowering and prolonged maturity by about two weeks.
- *Permanent plot experiment on integrated nutrient supply system for cereal based sequence:* The experiment started during 1985-86 is being continued and the results clearly revealed that substitution of either 25 percent or 50 percent recommended dose of fertilizer as organics during kharif season is beneficial for sequential cropping of rice.
- *Multiple use of cowpea and nutrient balance in a rice based cropping system:* Raising green manure crop of sunhemp or cowpea significantly enhance the yield of subsequent crop of rice. Growing grain or vegetable cowpea also resulted in a similar increase in rice yield.
- *Integrated weed management in rice based cropping systems:* A summer crop of bhindi or green manure crop of daincha enhanced the subsequent rice crop. Depending on the length of growing period a short duration cassava can also be taken as summer crop without any reduction in the yield of subsequent rice crop. After three year cropping cycle a significant decline in major weed species *Echinochloa crusgalli* was observed.
- *Development of organic package for system based high value crops:* The experiment aims to evaluate organic farming vis-à-vis farming with integrated nutrient management with respect to growth, yield, quality and pest management in high value cropping sequence of rice-vegetable-vegetable. The experiment was initiated from kharif season 2003 with rice-cucumber-bhindi sequence.

ECF Experiments

- *Response of nutrients in cropping systems on farmers field:* In the farmers field N,NP,NK,NPK treatments exerted significant impact on grain yield as compared to the control. The response of NPK was 8.04, 9.09 and 15.11 and 7.28, 11.59 and 17.67 kg/kg nutrient applied in kharif and rabi seasons respectively.
- *Agronomic management practices for increased production of cropping systems:* The results of study revealed that lack of plant population is the major constraints and its correction increased rice yield in farmer's field. The recommended package of practices recorded positive and significant influence in the farmer's field.
- *Front line demonstration on oilseeds;* The front line demonstration of rice-rice-sesamum cropping systems gave better response and yield in FLD field with cv. Thilarani with recommended nutrient application. Though the cost of cultivation was higher it gave higher net income and B:C ratios in all the locations.
- *Research Accomplishments over past years*

Over come the constrains in cropping systems

- Use of Machette, Stam F-34 and 2,4-D sodium salt for weed control in rice
- Studies on integrated weed management in a rice based cropping system shows that in continuously cropped rice fields where weed infestation especially that of 'Kavada' (*Echinochloa crusgalli*) is high, raising a summer crop of daincha, bhindi etc. significantly reduced it's infestation.

Alternate cropping systems (diversification)

- Inclusion of Short duration variety of tapioca after two short duration crops of rice
- Inclusion of bhindi after two medium duration rice crops in wetlands.

Nutrient management

- Fertilizer dose for high yielding short duration variety (HYSDV) of rice as 70:35:35 Kg NPK/ha and high yielding short duration variety (HYMDV) as 90:45:45 kg NPK/ha
- Fertilizer dose for local varieties of rice
- Nitrogen must be applied in rice in splits as basal, at tillering and panicle initiation stage
- Fertilizer dose for black gram as 20 : 30 : 30 kg NPK/ha
- Fertilizer dose for sesamum as 30:15:30 kg NPK/ha
- Foliar application of urea in rice
- Application of biofertilizer Azospirillum @ 2.5 kg/ha (mixed with sand or compost in the ratio 1:25) helps in reducing the rate of fertilizer nitrogen application by about 25%
- Sodium as common salt can substitute potassium as Muriate of potash to the extent of 25% for rice in well drained wetland soils.
- Studies on integrated nutrient supply system in a cereal based crop sequence has shown that the rate of chemical fertilizer application can be reduced to half by applying green manures, farm yard manure, green leaf manure etc.
- The results of a study on long range effect of continuous cropping and manuring in a rice based cropping sequence revealed that continuous skipping of phosphorus fertilizers result in a significant reduction in grain yield of rice, results in stunted growth, reduced tillering and delays flowering by about two weeks, resulting in a increase in crop duration and delayed harvest.

Crop establishment

- Spacing for short duration and medium duration varieties of rice raised during Virippu and Mundakan season.

Human Resource development

All the scientists of the centre already possessing doctoral degree in the respective field of specialization, pursue resource development regularly attending useful summer institutions of SAUs and ICAR institutions.

Linkages with other institutions

The scheme, with the patronage of the respective Regional Agricultural Research Station has stronger linkage with the State Department of Agriculture, State Planning Board, Kerala State Department of Science & Technology, Soil Survey Department, Ground Water Department and ICAR Institute viz CTCRI, Sreekariam, teaching campuses of the Kerala Agricultural University for collaborating research work and extension activities.

A few school students accompanied by their teachers visited the Station for collecting information on the preparation and uses of biopesticides/biofertilizers for presentation in the State Level Exhibition for school students.

Several farmers visited the Station during the specified period mainly with the purpose of purchasing rice seeds and banana suckers.

Extension programmes

Scientific aspects of Rice Farming at various Krishi Bhavan's of Trivandrum

Farm Advisory Service :

In person	Over Telephone	Through Letter
100	250	10

List of Publications :

Scientific papers:

Jacob, J., Shirmila J., Sarada, S., Anu, S. and Roy, S. (2010). Assessment of allelopathic compatibility of trees and guinea grass in Integrated Homestead Farming Systems. In: *Proceedings National Seminar on Sustainable Agriculture-Emerging Trends* pp.112

- Jacob, J., Sarada S., Geetha V., Anu, S. and Saneesh C.G. (2010). Multipurpose Trees: A Potential Source of Nutrients in Integrated Homestead Farms of Wayanad, Kerala. *Proceedings National Seminar on Sustainable Agriculture-Emerging Trends* pp.27-29
- Krishnakumar, K., Rageena, S., Jacob, J., Geetha, K. and Reddy, D.V.S.. (2010). An assessment of floral diversity in the homestead farms of Kerala, India. In: *Abstracts International Conference on Coconut Biodiversity for Prosperity*, pp.40, CPCRI, Kasaragod.
- Jacob, J., Joy, M., Geetha, V. and Sheeba, U. (2010). A Holistic Systems Approach To Identify Sustainable Perennial Crop Based Systems-A Case Study. In: *Abstracts International Conference on Coconut Biodiversity for Prosperity*, pp.79, CPCRI, Kasaragod.
- Jacob, J., Shirmila, J., Sarada, S. and Anu, S (2010). Role of allelopathy in vegetables crops production. *Allelopathy Journal* 25 (2): 275-312
- Jacob, J., Shirmila, J., Roy, S. (2010). Investigations on the allelopathic compatibility of pepper with multipurpose trees for use as standard in homesteads. In: *Abstracts 19th Biennial Symposium on Plantation Crops PLACROSYM XLX* pp.113-115, Rubber Research Institute of India, Kottayam.
- Jacob, J., Joy M., Sarada, S., Sinoby, V. and Saritha, N.S. (2010). Seasonal and system wise variation in disease and insect pest incidence in plantation crops of Wayanad district. In: *Abstracts 19th Biennial Symposium on Plantation Crops PLACROSYM XIX* pp.169, Rubber Research Institute of India, Kottayam.
- Varughese, K., Abraham, S., John, J. and Rani, B. (2010). Adaptability of scented rice cultivars suitable for Kerala. In: *Abstracts, 1st Indian Biodiversity Congress, Thiruvananthapuram. IBC2010.* pp 181.

Books :

- Narwal, S.S., Pavlovic, P. and Jacob, J. (2011). *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. Studium Press LLC, Houston, Texas. ISBN: 1-933699-66-3)
- Jacob, J. (2010). *Allelopathic effect of trees in the homesteads of Kerala, India*. Lambert Academic Publishing, Saarbrücken, Germany. ISBN: 978-3-8383-8988-2
- Gangwar, B., Varughese, K., Jacob, J., Rani, B., Vijayan, M. and Mathew, T. (2010). *Manual on Integrated Farming Systems*. Kerala Agricultural University and Project Directorate for Farming Systems Research.

BOOK CHAPTER

- Jacob, J. and Narwal, S.S. (2011). Laboratory bioassay with agroforestry tree parts and rhizosphere soil. In: *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. Studium Press LLC, Houston
- Jacob, J. and Joy, M. (2011). Pot Culture Studies in Agroforestry Systems. In: *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. Studium Press LLC, Houston
- Jacob, J., Patil, R.H. and Narwal, S.S. (2011). Multistorey Agroforestry Systems Field Studies. In: *Research Methods in Plant Sciences, Volume 2: Forestry and Agroforestry*. Studium Press LLC, Houston

Finance

Head	Expenditure
Non-Plan	4647124/-
Plan	72031/-
ICAR	4864517/-
Other EAPs	1207141/-
Revolving Fund	64052/-

FARMING SYSTEMS RESEARCH STATION SADANANDAPURAM

Dr Bini Sam : Coordinator Paddy Mission

Under the paddy mission project, 15 numbers of candidates have been selected with qualifications of ITI / ITC/ VHSC in Automobile/ Diesel Mechanic. These selected candidates were given comprehensive trainings in different aspects of agro machinery like their operation, repair, service and maintenance by using the facility of ARS, Mannuthy centre for 15 continuous days from 20-11-2010 to 04-12-2010 at FSRS, Sadanandapuram for creating master trainers for functioning of the proposed Agro machinery testing, training and service centre. The training programme was inaugurated by Adv. Aiysha Potti, Hon MLA of Kottarakkara and the function was presided over by Sri. K. Dinesh Babu, Executive Committee member of KAU. The machine transplanting (8 row Yanji Sakthi Mechanical Transplanter) was inaugurated by Hon Minister for Agriculture Sri. Mullakkara Rethnakaran. Smt. Aiysha Potti, Hon MLA, Sri. Dinesh Babu, Executive Committee Member, Dr. Leenakumari, Executive Committee Member and ADR (Paddy Mission), Dr. Sivaprasad, ADR, NARP (SR), Dr. U Jayakumaran, Professor & Head, ARS, Mannuthy and Adv. Gopalakrishna Pillai, Kollam Jilla Panchayth president attended the valedictory function of the of the training programme.

Research Programmes:

KAU Plan Scheme Projects

1. *Title of the Project: Development of homesteads through scientific planning and interventions in technology and management. – An action research and analysis*

Objectives:

1. To improve the resource use efficiency and thereby increase the sustainability and profitability of the selected farms through scientific planning, intervention in technology and management.
2. To understand the crop dynamics in the selected farms, farmers management practices and constraints to homestead farming

Major research highlights:

Homestead farming is a highly complex and dynamic system of agriculture, which utilizes optimally the limited land, water and energy resources for obtaining maximum production and benefit from unit area by integrating different enterprises. A model is developed at FSRS including components such as crop, animal, poultry, apiary and ornamental fish unit.

2. *Title of the project: Collection, conservation, cataloguing and biochemical characterization of medicinal plants in homesteads of Southern Regions of Kerala Code No: AMP /02-00-16/99/KTR (10)KAU AS & TS:*

Objectives:

To conduct a detailed study of medicinal plants in homesteads of Southern Region of Kerala, to identify and catalogue them and to maintain a germplasm collection of these plants at the station

Major research highlights: A medicinal plant garden with 70 accessions was established for demonstration and multiplication. Maintenance of these plants is being done. All medicinal plants have been identified and catalogued. New medicinal plants are being collected, identified, catalogued and maintained in the farm. Planting materials in preference to the farmers have been produced.

3. *Title of the project: Impact of soil and water conservation measures on the growth and yield of banana cv. Nendran*

Objectives: To assess the impact of soil and water conservation measures on the growth and yield of banana and to assess the changes in soil structure by these measures if any.

Major Research highlights: Soil and water conservation measures have a positive impact on the growth and yield of Nendran plants. Vetiver planted plot (T4) shows higher yield followed by bunding (T1), mulching (T3) and silt pits (T2). Lowest yield in control plot (T5). Early bearing of fruits was also noticed in Treatment T4.

4. *Title of the project: Organic recycling for vegetable production in Homesteads Presented in the FRC on March, 2010. Code No Awaited.*

Objectives:

- a. To study the effect of enriched vermicompost and enriched compost as an alternate source of Farm Yard Manure and the conjugal effect of enriched vermicompost and enriched compost with chemical fertilizers.
- b. To assess the time taken for composting from the raw materials in ordinary compost and the multiplication rate of worms in enriched vermicompost.
- c. To assess the impact of enriched vermicompost and enriched compost on the soil nutrient status and the occurrence of pests and diseases.

Major Research Highlights: Treatment involving the application of enriched compost (Trichoderma) T₃ was found to record highest yield than other treatments. The treatment T₃ recorded a 57 % yield increment over treatment T₁ (Absolute control). Substitution of chemical nutrients with vermicompost enriched with Trichoderma to an extent of 75 % and 50 % recorded significantly higher values than other treatments. From the study it is observed that enriching compost with Trichoderma is found to be fruitful with respect to yield, shelf life and organoleptic aspects. This is followed by treatments involving the enrichment using PSB, Azospirillum and Neem cake.

5. *Title of the project: Evaluation of banana –vegetable cropping system under homestead situation in Kollam district*

Objectives:

1. To evaluate the performance of banana- vegetable cropping system under the partially shaded condition of homesteads in the midland farming situation
2. To study the effect of substituting chemical nitrogen with vermicompost in vegetables

Major Research Highlights: The performance of banana vegetable cropping system under the partially shaded condition of homesteads in the midland (laterite) farming situation of Kottarakkara and the effect of substituting chemical nitrogen with vermicompost in vegetables was evaluated. Third year experiment is ongoing. Banana & inter crops have been planted and the treatments are being imposed. The experiment is well maintained. The experiment was laid out with Cowpea, Bhindi, Sweet potato and Cucumber as inter crops. The suitable intercrop for banana was found to be Cowpea (Bush) with a yield of 8 t /ha, followed by Bhindi, Sweet potato. It is inferred that the performance of sweet potato was affected due to partial shade. The performance of vermicompost as a source of N is better and plots with the application of vermicompost for nitrogen recorded a better yield than the plots treated with chemical fertilizers though the former is required in large quantities.

6. *Title of the project Management of Amaranthus leaf blight under homestead situation Presented in the FRC on December, 2010.*
7. *Title of the project: Effect of irrigation and fertilizer application on the growth and yield of pepper*

Objectives:

To assess the effect of irrigation on the growth, flowering pattern and yield of pepper under different fertilizers levels with emphasis on the incidence of soil borne pathogens like phytophthora

Major Research Highlights: Of various treatments imposed the treatment I₂ F₁ with the combination of irrigation on the basis of IW/CPE ratio of 0.25 and a dose of 100:100:300 kg per ha was found to be superior with a yield of 1750 kg/ha.

External Aided Projects

1. *Title of the project: " Augmenting planting material production through farmer participation and establishment of seed bank in Kollam Dt. "*

Objectives:

1. Ensuring availability of good quality seeds and planting materials in the district through farmer participation
2. Developing manpower in the district in vegetable seed production as well as in vegetative propagation techniques

3. Popularizing KAU improved and high yielding varieties of major vegetable among the farmers.

4. Establishment of Bio control lab at FSRS, Sadanandapuram

Major Research Highlights: About twenty trainings benefitting more than 1000 farmers were conducted in different aspects of vegetable seed production viz. vegetable cultivation techniques, organic recycling and vermicomposting, cultivation aspects of cool season vegetables, Mushroom cultivation and spawn production etc. to the farmers of the locality. Seed production of various crops such as bittergourd, Snakegourd, Bhindi, cowpea and Amaranthus is being carried out in the farmers' field. Production of enriched vermicompost and biofungicides such as *Pseudomonas* is being carried out in a successful manner. Steps are being taken to renovate the existing lab in to a full fledged biofungicide lab. Produced and sold items worth Rs. 80000/- during the current financial year.

2. *Title of the project: An investigation on ergonomic evaluation and improvement of selected rice farming implements for women*

Objectives:

- i) To measure the pertinent anthropometric dimensions of women labourers with reference to the dimensions and positions of the functional components of implements/ tools used in rice cultivation
- ii) To measure the energy expended by women labourers while performing mechanized and hand operation in sowing, weeding, harvesting and threshing
- iii) To measure the subjective response in terms of rating scales for selected operations
- iv) To evaluate the acceptable workload and limit of continuous performance of women labourers for selected operations
- v) To incorporate modifications in the design features of the tools /equipment for enhanced comfort with less fatigue of the human labourer.

Major Research Highlights: An anthropometric data base for the women agricultural workers is generated. Nine subjects were calibrated in the laboratory to determine the relationship between heart rate and oxygen uptake, after giving training on the use of Benedict Roth Recording Spirometer and Bicycle ergometer. All the subjects were given equal training on the operation of Direct Paddy Seeder, Rotary Weeder, KAMCO Reaper and Mini Thresher until they get acquainted with the operations. The experiment is laid out in farmer's field. The trials were conducted while performing the operations such as sowing the seeds in lines by hand, sowing with direct paddy seeder, weeding by hand, weeding with rotary weeder, harvesting with sickle, harvesting with KAMCO reaper, threshing by hand and threshing with mini thresher. Heart rate, overall discomfort and body part discomfort score of all the subjects were measured during each trial. The energy cost of operation, acceptable workload and limit of continuous performance of each selected operations is being analyzed. Based on the analysis of data necessary modifications have been done in the equipments. The third year experiment is in progress.

3. *Title of the project: Bioresource recycling for sustainable livelihood in rural areas*

Major Research Highlights: This is a development project which focuses on creation of income and livelihood security through empowering women. Three vermicompost tanks are to be constructed in three locations to be profitably operated by the women groups under scientific supervision. Groups have been selected and trained in vermicompost preparation. Vermicompost tanks are being constructed in Pathanapuram, Pallickal and Vettikkavala villages. Five training programmes covering nearly 500 persons have been conducted under the project.

4. *Title of the project: Impact of Agricultural research on productivity – A case study of Research in Vegetables*

Major Research Highlights: . Survey work for data collection from scientists on research investments and output and from farmers on research output adaptation are being collected.

5. *Title of the project: Farmers participatory approach to assess the impact of Integrated Plant Nutrient System on soil health and crop yield in a typical laterite soil of Western ghats*

6. *Title of the project: Establishment of Agro Machinery Testing, Training and Service Centre for South Zone of Kerala*

Objectives:

1. To build a repository of agricultural implements and machinery for rice cultivation
2. To conduct training on operation, maintenance and servicing of agro machinery and implements in order to create adequate skilled manpower resource base in the South Zone of Kerala
3. To provide a facility for refinement of Agri machineries/implements suited to the locality and conditions prevailing in the South Zone of Kerala
4. To popularize gender friendly equipments for women farmers to reduce the workload/drudgery of women labourers in rice farming operations and enhancing their opportunities for remunerative employment and income

Major Research Highlights: At present Farming Systems Research Station, Sadanandapuram has no skilled/trained man power to work as master trainer for the training centre. For that 15 numbers of candidates have been selected with qualifications of ITI / ITC/ VHSC in Mechanical Engg/ Automobile/ Diesel Mechanic. Agricultural Research Station, Mannuthy, has to its credit a full fledged Agro Machinery Testing and Training Centre which is currently being used for training purposes as well as being leased out to farmers to meet their mechanisation demands. These selected candidates were given comprehensive trainings in different aspects of agro machinery like their operation, repair, service and maintenance by using the facility of this centre for 15 days from 20-11-2010 to 04-12-2010 at FSRS, Sadanandapuram. Machineries includes power tiller , cage wheels, mini tiller, self propelled rice transplanter, direct paddy seeder, cono weeder, rotary weeder, power sprayer , self propelled harvester, thresher , brush cutter, coconut climbers etc.. The successful trainers will be given an up gradation training for further development of skill for 20 days at ARS, Mannuthy from 24-1-2011 onwards. The successful master trainers will be used for the functioning of the proposed Agro Machinery Centre. Their services can also be utilized in South Zone comprising of Thiruvananthapuram, Kollam, and Pathanamthitta Districts to meet the man power trained in Agricultural mechanization.

Farm Advisory Service:

	In person	Over telephone	Through letters
Technical advice	115	600	12
Soil Testing			20 nos.

List of publications**Scientific papers**

1. B.Aparna and S.Regeena. (2010).Evaluation of banana- vegetable cropping system under homestead situation in Kollam dt. Proceedings of Biodiversity congress,held at Trivandrum Dec 28-30,2010
2. Susha S.Thara,Bhavani Devi.S and Suharban.M. Influence of soil on the occurrence and distribution of Agaricus sp. in Kerala. Proceedings of Biodiversity congress,held at Trivandrum Dec 28-30,201
3. Binisam. 2011.The effect of terrain conditions on the vibration of power tillers. International Journal of Agricultural Engineering. Vol 3 (2). Page No. 343-347
4. Binisam and S.Regeena. Anthropometry of Kerala Female agricultural workers for Agri. Machinery. - Kerala Womens Science congress, Kochi.
5. B.Aparna and S.Regeena. (2010) Effect of enriched compost on the growth and yield of Okra- Kerala Womens Science congress, Kochi
6. Susha.S.Thara Bhavani.Devi M. and M. Suharban(2010) . Effect of temperature and pH on the mycelia growth of Tropical Agaricus sp. Kerala Womens Science congress, Kochi
7. Susha S.Thara .S. Bhavani Devi.M. Suharban.(2011). The effect of climate on the occurrence of Agaricus sp. in Kerala National seminar on climate Change and food security In Proceedings of 20 -22 Jan,2011at CTCRI, Trivandrum

8. BiniSam.(2011) Energy expenditure of female workers during operation of a self propelled paddy harvester. National seminar on climate Change and food security In Proceedings of 20 - 22 Jan, 2011 at CTCRI, Trivandrum
9. B.Aparna and S.Regeena (2011).A farmer participatory approach to assess the impact of enriched vermicompost on the growth and yield of Okra..National seminar on climate Change and food security In Proceedings of 20 -22 Jan,2011 at CTCRI, Trivandrum
10. BiniSam (2011). Physiological cost of female workers during operation of a paddy drum seeder. Proceedings of the Kerala Science Congress
11. Aparna.B. (2011). Effect of agro chemicals on soil biological health- a case study . Proceedings on national seminar for enhancing productivity.17-18 March,2011
12. Aparna.B. (2011) .Quantification of enzyme activities under rice crop in a permanent manorial experiment in the coastal sandy tract of Onattukkara of Kerala.An Asian Journal of soil science 5 (2):347-351.

Finance

Head	Expenditure (Rs)	Receipts (Rs)
Non-Plan	6821751	5523000
Plan	8261401	8383000
ICAR	-	-
Other EAPs	2622000	2849000
Revolving Fund	198991	556704

SOIL CONSERVATION RESEARCH STATION, KONNI

Other actives

WGDP Planning Board, Govt. of Kerala funded research project "Impact assessment of land use practices and studies on sustainable development in Western Ghats of Kerala" has been completed.

The farm has been taken over by Revenue department.

Research programmes

Western Ghat is the major orographic feature of the Indian Peninsula, fringing the West coast from Tapti estuary to Capecomerin. Forty percent of the area of Kerala lies within this Western Ghats which is blessed with numerous rivers and streams. The South-West monsoon (June to September) mainly regulates the water balance in this region followed by North- East monsoon (October November). The 3000 mm rainfall on this tropical belt is no exception but that the steep slopes of Western Ghats drain down major portion of the precipitation along the narrow width of the state and very shallow coastal plains to the Arabian Sea. Now water scarcity in summer months is a major problem faced by the Western Ghat region as the wells on the hillslopes dry up by February. When we consider Pampa and Achenkovil rivers in Pathanamthitta District, though about half of these river basins are covered by forest, it is not able to provide sufficient water for the District during summer months. It may be noted that one third of Hydroelectric Project is situated in the Pamba basin. Kakkad Electricity project is also functions in this District. The Kallada and Pamba Irrigation Projects are also functioning in the District.

Variation in the components of hydrologic cycle especially reduction in base flow compared to the past is observed in rivers of Kerala during summer months. No studies were available to assess the reasons for the same and quantify its effects. However the impacts of human activities on environment are well reflected in different aspect of hydrologic cycle, supply demand mechanisms, inabilities in adjusting to mild climatic extremities, and altered status of nutrient/particulate loadings.

In this context Western ghat cell, Planning and economic affairs (WGC) Department sanctioned a research project at Soil conservation research station, Kerala Agricultural University to study these aspects in detail with respect to Western Ghat portion of Achenkovil and Pampa river basins in Pathanamthitta District

Under this project the river flow details pertaining to Achenkovil River for the period 1978 to 2006 at the river gauging station Thumpamon were collected. As there is no major flow regulation structures in this river the discharge is mainly dependant upon the rainfall pattern. The annual river discharge from June to May and cumulative rainfall for the corresponding months were analyzed. It was found that the flow was minimum in the year 2002-2003 which was corresponding to the lowest rainfall of the decade. The flow was only 551M m³ corresponding to an annual rainfall of 1822.4mm (June 2002-May 2003). The next lowest flow was observed in 1982-83 and it was 622.5 M m³. The highest discharge during the period 95 to 2006 was observed in 1998-99 (1528Mm³) corresponding to a rainfall of 4000mm.

In 2000-2001 the rain in the months Nov 2000 to Mar 2001 was equally distributed. The lean flow Jan- April was highest during that year ie71Mm³. In the year 2001-2002 during the months Dec, Jan and Feb the rainfall was comparatively less ie below 50mm. Though there were normal rain in March and April, the lean flow was only 11.59 Mm³. In the year 2002-2003 lean flow was 10.55Mm³. During that period there were normal rain in February, March and April and no rain in the month December and January.

The water balance study shows that From December onwards the rainfall is not sufficient to meet the potential evapotranspiration and therefore the moisture is drawn from the moisture reserves in the soil or ground water aquifer. In addition to that the domestic water requirement is also met from the ground water reserve. The summer rains are not sufficient to recharge ground water reserves. These factors show that the lean flow in river Achenkovil is decided by the volume of ground water exploited in the midland and highland portion of the catchments.

An amount of 0.5 Mm³ water is being pumped from this river per month under different water supply schemes. When we consider the months Jan to April like the year 2004-2005 the total discharge was 6.04 Mm³ and the pumping requirement was 2Mm³. That is 33% of the total flow was pumped for different water supply schemes.

Different aspects of recharge as influenced by cultivation practices, vegetation, consumption of stored ground water, release to river system during summer months, pattern of river flow, effect of conservation measures taken up, soil moisture status , all are analysed in detail. The remedial measures to improve the hydrological behaviour of the Western Ghat region of Pathanamthitta District are suggested.

Finance

Head	Expenditure	Receipts
Non- Plan	-	-
Plan	2348449.00	
ICAR		
Other EAPs	1000.00	
Revolving Fund	-	-

CENTRAL ZONE

REGIONAL AGRICULTURAL RESEARCH STATION, PATTAMBI

Dr.P.Raji-

- I. Advisory committee member of Yamini Varma, PhD Scholar (Plant Pathology), College of Agriculture, Vellayam
- II. Guided 5 Students of MSc. Microbiology, from Department of Biosciences, Indira Gandhi College of Arts and Science, MG University (Two months project) in the following topics
 - Effect of plant oils and botanicals on *Xanthomonas oryzae* pv. *oryzae*, bacterial blight pathogen of rice
 - Effect of botanicals and biocontrol agents on *Rhizoctonia solani*, causal agent of sheath blight of rice
 - Effect of plant oils and botanicals on *Pyricularia grisea* blast pathogen of rice
 - Evaluation of coconut water as a medium for mass production of *Trichoderma viride*
 - Evaluation of coconut water as a medium for mass production of *Pseudomonas fluorescens*

Other activities

Dr. R. Ilangoan, Assoc. Professor (Agron): Handled Research Methodology Course for M.Tech Students of K.C.A.E.T., Tavanur

Research programmes

Plant Breeding

- Fifty nine Pattambi rice varieties along with 28 accessions of short, medium and long duration group which have been maintained *in situ* are being characterized and catalogued during Kharif and Rabi 2010. These are to be deposited in Medium Term Storage at NBPGR, Thrissur.
- Sixteen local cultivars from various part of Wyanad district were collected and insitu multiplication and characterization is going on.
- The F₄ generations from crosses made between photoperiod sensitive second crop varieties and popular photoperiod insensitive varieties during *rabi*, 2006-2007 have been raised during *rabi*, 2010 for further evaluation. About 50-60 panicles were collected from promising six cross combinations for raising next generation.
- The F₄ generations from crosses made between photoperiod sensitive second crop varieties and popular photoperiod insensitive varieties during *rabi*, 2006-2007 have been raised during *rabi*, 2010 for further evaluation. About 50-60 panicles were collected from promising five cross combinations for raising next generation.
- Promising cultures identified to exhibit relatively high pest and disease tolerance during *kharif*, 2007 and also multiple resistant under AICRIP National testing programme in 2007 were evaluated along with varieties Kanchana and Aiswarya during *kharif*, 2009 as replicated station trial. Replicated station trial continued during *kharif* 2010.
- The promising Cultures 9401-2, 9409-12, 9409-6 were multiplied and evaluated under mechanized planting during *kharif*, 2010 Seed multiplication of these three cultures were also carried out.

AICRIP Trials

Promising rice cultures produced at various co-operating centers of AICRIP were subjected to study the comparative performance of various duration groups of elite cultures and hybrids viz., very early, early, mid early, medium. These were evaluated under IVT as well as AVT. Observations on plant height, tiller number, flowering duration, grain yield and reaction to pests and diseases will be recorded.

In Advanced Variety Trial, Very Early (AVT-VE), eight entries were tested, entry 701 and 703 were the top ranking entries with per ha yield of 6239 kg. Among early group, AVT-2-E and AVT-1-E

were taken with 9 and 10 entries each. In AVT 2 E, entry 908 recorded maximum yield of 6837 kg/ha. and in AVT 1 E, entries 1004 and 1006 along with Matta triveni (local Check) recorded maximum yield 6666 kg/ ha. Irrigated Mid-Early (AVT-1-IME), out of the 31 entries tested, entry 1202 was found to be superior with per ha yields of 9074 kg. Under Irrigated Medium, AVT-2-IM and AVT-1-IM, 22 and 20 entries were tested. In AVT 2 IM, Local check, Uma out yielded all the AICRIP entries. In AVT 1 IM, entries 1502 and 1515 recorded maximum yield of 8205 kg/ha.

In Initial Variety Trial, Early (IVT-1-E), out of the 45 entries tested, entry 1145 was found to be superior for the yield character. Irrigated Mid-Early (IVT-IME), out of the 64 entries tested, 1346 was found to be superior. Irrigated Medium (IVT-IM), out of the 64 entries tested, 1645 was found to be superior. Irrigated Late (IVT-IL), out of the 53 entries tested, 1918 was found to be superior. Rainfed Shallow Lowland (IVT-RSL), out of the 45 entries tested, 4125 was found to be superior.

AICRP on NSP (crops)

National Seed Project - Breeder Seed Production and Seed Technology Research

- Under Breeder Seed Production Programme, 78.03 quintals of breeder seeds of 24 rice varieties were produced and sold during 2009-10. The price of the breeder seed was raised from Rs. 28/- to Rs. 34/- for coarse and Rs. 36/- for fine varieties. In 2010-11 indents for breeder seed is 67.05 quintals. A total of 93 quintals of rice breeder seeds are expected from 6.25 hectares. The varieties include Jyothi, Harsha, Aathira, Matta Triveni, Aiswarya, Kanchana, Aswathy, Swarnaprabha, Uma, Annapoorna, Vaishakh, Samyuktha, Swetha, Neeraja, Karuna, Makaram, Anaswara, Red Mahsuri, K K Varna, Varsha, Jeerakasala, Jaya and Mahsuri.
- Under Breeder Seed Production Programme, maintenance breeding was carried out. Nucleus seeds of twenty one popular rice varieties were multiplied. The observations on each row of nucleus seed were taken at harvest. Non variable rows were selected in order to maintain the genetic purity of these varieties. Summer crop of Breeder seed is progressing. A total production of 200 Kg of nucleus seed is expected after harvest of rabi crop.
- Relationship of ODVs identified in STL samples with genetic impurity in GOT was assessed. Eight ODV samples of paddy varieties obtained from seed testing laboratory were subjected to workout the relationship of ODVs with that of offtypes in GOT. It was observed that more than 90% ODVs were offtypes. This confirms the utility of ODV in identifying the genetic purity of varieties.
- Under Seed Physiology, Storage and Testing The experiment on standardization of seed vigour tests and vigour standards for field crops using accelerated ageing test were carried out. Under this experiment seed quality standard of different seedlots of rice in relation to seed vigour was identified. The highest vigour index was exhibited by the newly released upland variety Vaisakh. The experiment is continued during 2011 also.

ICAR MEGA SEED PROJECT

- In participatory seed production programme at farmer's field farmers of Malappuram and Palakkad districts were participated. The results are encouraging. The farmers are highly co-operative and very much interested in quality seed production. Roguing activities were carried out by trained personnel of this station. Regular field inspections were undertaken by both scientists and technical staffs of the station. The rate of seed procurement was enhanced from Rs.15/kg to Rs.19/Kg in 2010. There is a tremendous increase in the seed production by participatory mode compared to last few years. A total of 1566.4 Quintals of Truthfully labelled seeds were produced from 141 acres of farmer's field involving 24 farmers during 2009-10. In 2010-11 Kharif, a total of 645 Quintals of Truthfully labelled seeds were produced from 54 acres of farmer's field involving 14 farmers and seed procurement of rabi and summer crops of 2010-11 are still continuing under the seed project.

SEED TESTING LABORATORY

- The seed quality of 727 samples of Rice, Vegetables, pulse and oilseeds submitted by the Dept. of Agriculture and Seed production centres of the University were analysed during 2010-11.

Plant Physiology

AICRIP Trials

- Studies on photothermic indexing was done with 20 entries planted at 15 days interval. Higher yields were recorded by advancing the sowing dates. Among the early planting group, the entry IET 20556 recorded maximum yield. In the late group, the entry IET 20945 recorded relatively high yield.
- Radiation use efficiency based on weather and crop parameters such as phenology and TDM were tested for 20 improved rice cultures of medium and long duration was used to conduct the experiment with Jyothi, Aathira, Vaishakh and Samyuktha as local check. RUE was measured at tillering, panicle initiation, flowering and grain filling stage. RUE was highest at panicle initiation stage and lowest at flowering stage. IET 21478 performed well among other varieties.
- **Boron use efficiency:** Seven entries, which had poor spikelet fertility were tested. Boron was applied as foliar spray at anthesis stage @ 0.2, 0.4, 0.6 and 0.8 ppm and data were recorded for spikelet fertility panicle topology high density grain and other yield attributes. The result show that application of Boron has resulted in increase in grain number and reduced the number of unfilled spikelet suggesting that boron application improved the fertility of the spikelet.
- **Evaluation of Rice Genotypes for terminal Heat Tolerance suitable for future climate change** to investigate the differences in the terminal heat stress tolerance in the 25 elite rice genotypes. Seventeen popular varieties of our germplasm was also tested in the trial. High temp during anthesis prevent anther dehiscence, pollination, pollen germination and result in blank hulls with no grain inside and smaller and lighter kernels. Low quality grains due to high night temp during grain filling stage. Vaishakh recorded highest plant height of 114 cm under stress condition against the overall mean of 82.83 cm. In case of specific leaf area, the entry IET 20894 recorded the highest value of 458.67cm²/g under stress conditions. Among our varieties, Swetha was better performer for SLA. Number of productive tillers ranged from 3-7 with highest value for our variety, Kanchana under stress condition. Uma recorded maximum grain weight per plant under stress condition. TDM values ranged from 100 to 352.01g under stress condition and 123.48 to 453.21 g under control condition.
- **Evaluation of Rice Genotypes for Drought tolerance** to investigate the differences in the tolerance to drought under rainfed conditions in the elite rice genotypes. IET 21605 exhibited comparatively good performance. IET 21119, IET 21291, IET 21613, Bhadra and Vaishakh were also performed well.

Division of Agronomy

AICRIP - NITROGEN VARIETY TRIALS (AVT)

Optimum and appropriate use of nitrogen enhances the rice productivity through the best N use efficiency. In order to find out the production potential of different elite cultures of AVT – 2 at various levels of N were experimented in rice fields of R.A.R.S, Pattambi during the Kharif seasons. Agronomy division was actively involved and collected the data and supporting the breeders for differentiating N responsive genes in rice

Cultural management practices for enhancing yield of rainfed upland rice

Bispyribac-sodium, another new herbicide molecule was evaluated in transplanted rice. Result of the experiment proved that there was no crop toxicity at any doses 25 g to 50 g a.i/ha of Bispyribac-sodium applied at 8 – 15 days after transplanting. Effective weed control was observed in all the plots treated with herbicides

Glyphosate applied before the land preparation followed by pre-emergence herbicides either butachlor or Bensulfuron + pretilachlor are effective with respect to weed count and dry matter. Cono weeding is also effective. This trial is conducted in long term basis to identify the weed dynamics over a period of time with respect to the different weed control program.

Developing an effective agronomic package is very important for increasing the yield of rainfed upland rice. The trail was conducted with 5 different weed control treatments viz., pre-emergent herbicide Pendimethalein @ 0.75 Kg a.i/ha with green manures and mechanical weeding and unweeded control.

Micronutrient fertilization on rice was started as long-term assessment in collaboration with Soil Science department. We were obtained very positive response for micronutrient fertilization. It was just beginning the Rabi crop still in the field. Encouraging results were expected on long term basis.

AGRI. METEOROLOGY OBSERVATORY AND CLIMATE DATA MANAGEMENT

Climate change and global warming is getting more importance during the past one decade. Our division is maintaining Ag.Met observatory and extending support to IMD to get the data on evapotranspiration from lysimeter erected in R.A.R.S facility. Climate data were taken two times a day and used the data for our research purposes as well supplied to the News and Media groups.

Plant Pathology

All India Coordinated Rice Improvement Programme

Monitoring virulence of *Xanthomonas oryzae* pv. *oryzae*

- Virulence analysis of bacterial blight pathogen of rice *Xanthomonas oryzae* pv. *oryzae* has been carried out with 22 near isogenic lines (IRBB background) with different bacterial blight resistance genes and their combinations. None of the gene combinations tested offered satisfactory resistance reaction to the native isolate of bacterial blight pathogen. This suggests the need for further search for resistance to bacterial blight pathogen of rice

Monitoring virulence of *Pyricularia grisea*

- Virulence analysis of blast pathogen of rice *Pyricularia grisea* showed that some of the tested differentials containing resistance offered resistance to the local isolate of blast pathogen. Eg. Tetep and Tadukan showed resistance reaction

Screening for Leaf blast resistance

- In National Screening Nursery 1 (NSNI), 171 entries were screened for leaf blast resistance. Only one four entries showed resistance reaction to leaf blast. The National Screening Nursery II consisted of 580 entries of which 21 entries showed resistance reaction. Out of the 94 entries tested in National Hybrid Screening Nursery, 14 entries showed resistance reaction. Out of the 106 entries tested in Donor Screening Nursery, 8 entries showed resistance reaction to blast

Screening for sheath blight resistance

- In National Screening Nursery 1 (NSNI), 171 entries were screened for sheath blight resistance. 28 entries showed resistance reaction to sheath blight. The National Screening Nursery II consisted of 580 entries of which 55 entries showed resistance reaction. Out of the 94 entries tested in National Hybrid Screening Nursery, 7 entries showed resistance reaction. In DSN, out of 106 entries tested, 18 entries showed resistance reaction.

Screening for bacterial blight resistance

- In National Screening Nursery 1 (NSNI), 171 entries were screened for sheath blight resistance. Only one entry showed resistance reaction to bacterial blight. The National Screening Nursery II consisted of 580 entries of which 2 entries showed resistance reaction. Out of the 94 entries tested in National Hybrid Screening Nursery, 4 entries showed moderate resistance reaction. Out of the 106 entries tested in Donor Screening Nursery, 2 entries showed resistance reaction to bacterial blight

Evaluation of fungicides against brown spot

- As part of search for new molecules for management of diseases, two new molecules, hexaconazole 75 WG and Kresoxy methyl 40%+ hexaconazole 8% WG were tested and found effective against brown spot of rice

Pesticide Compatibility trial

- For the combined infestation of sheath blight and leaf folder combination product of fungicide and insecticide (fubendiamide 3.5% +hexaconazole 5%WG) was tested against sheath blight and leaf folder in comparison with the hexaconazole and flubendiamide individually. Further testing is required for confirmatory results

PLAN Scheme

Development of eco friendly strategies for the management of major diseases and pests of rice.

- Among the different treatments, the plant oils lemon grass oil and cinnamon oil, the biocontrol agents *T. viride* and *P. fluorescens* were found to be effective in reducing the sheath blight severity

Bioinoculants production Unit (Revolving Fund -ICAR)

In the unit the biocontrol agents, *Pseudomonas fluorescens*, Trichoderma, Trichogramma, vermicompost and enriched vermicompost and earthworms are available to the farmers.

Agricultural Entomology

a.) Screening experiments

1.) National Screening Nursery -1

- Screening trials revealed 40 entries showed moderate resistance with less than 10 % leaf damage while entries IET 21687, 20863, 21119 and 21540 showed resistance to gall midge. 46 entries showed moderate resistance reaction to whorlmaggot.

2. Gallmidge screening trial

- JGL 17644 and 17786 showed resistance to gall midge among 35 entries screened during the period.

3. Gallmidge monitoring population trial

- Net house studies with four entries for resistance to gall midge showed purple variety showed moderate resistance to the pest.

4. Gallmidge Biotype studies

- Gallmidge biotype studies with screening of 17 entries under four sets of differential showed a R-S-S-S-S pattern showing deviation from normal reaction confirming the presence of other biotype other than biotype 5.

5. Insecticides Evaluation trial

- Rabi'09-10 : Studies on screening of new insecticide molecules under insecticides evaluation studies showed that combination insecticides, Flubendiamide + Buprofezin @875 ml/ha was found effective against stem borer and whorlmaggot with highest grain yield among all other tested insecticides during rabi season.

Khari'10 : During the period three new insecticides with New combination product (Buprofezin + Acephate) in three different doses compared with Buprofezin nad acephate in two formulation 75% SP and granular formulation 95% SG were tested with monocrotophos as check insecticides. The results showed all tested formulation were effective at earlier stages of gall midge attack but at later stage none were effective. For white ear damage caused by stem borer none of the formulations were effective. For whorlmaggot, caseworm and blue beetle all the tested formulations were effective and was on par with efficacy with the check insecticides. There was no significance difference in the grain yield among the treatments.

6. Pesticides compatibility trial

- Rabi'09-10 : Pesticides and fungicides compatibility tests with two new insecticides, Flubendiamide (0.25g/lit), spinosad (0.25 ml/lit) and fungicides, Isoprothiolane (1.50 ml/lit) and Tricylazloe (0.60 g/lit) alone in combination were tested. The results showed that insecticides alone or in combination with fungicides were effective against stem borer and leaf folder. Highest grain yield was obtained from Flubendiamide (0.25 g/lit) + Isoprothiolane (1.50 ml/lit) treated plots.

Khari'10 : During the period, two insecticides, a new combination product ethiprole + imidacloprid and rynaxypyr were tested with fungicides hexaconazole and tricylazole against rice pests and sheath blight. For stem borer and gallmidge all the insecticides treatment alone as well as in combination of fungicides were effective. For blue beetle and whorlmaggot, rynaxypyr in combination with fungicides hexaconazole and tricylazole were effective. The highest grain yield was obtained in rynaxypyr in combination with fungicides hexaconazole treated plots.

7. Integrated pest management (Special screening trial)

- Field studies under taken on Integrated pest management in an area of one acre in comparison to farmers practice (1 acre) with variety Uma. IPM treatments comprised installation of egg cards against stem borer and leaffolder and pheromone trap for stem borer with need based application of neem formulation 3% showed that IPM treatment recorded 3952 kg/ha while FP recorded a low yield of 2504 kg/ha.

8. Light trap data collection

- The studies with insect collection with light trap showed highest population of stem borer (128 no's/day) during 2nd week of January, gall midge (32 no's/day) during 3rd week of September, green leafhoppers *N. nigropictus* (720/day), *N. virescens* (640/day) during last week of January, brown planthopper (172/day) during 2nd week of May, caseworm (29/day) during last week of August and rice bug (85/day) during 3rd week of March respectively were recorded.

9. RKVY project

- Under RKVY project on 'Validation of SRI for higher productivity in Palakkad region' there was increase in area in second year under SRI by 45 ha compared to first year which was only 4.60 ha in the mundakan season.

Division of soil science

Projects in operation

Permanent manurian trial (Tall Indica)-since 1961

Permanent manurian trial (Tall Indica)-since 1961

AICRP on Long Term Fertilizer Experiment-since 1997

Permanent manurian trial (Tall Indica)-since 1961

PMT (T) has completed 48 years and PMT (D) has completed 36 years of experimentation. In permanent manurian trial, during last year, irrespective of the season, maximum grain and strew yield were obtained for the integrated use of fertilizers and cattle manure (T 5). Continuous application of nitrogenous fertilizer alone or inorganic fertilizers alone were found to have detrimental effect on the growth and yield of rice. Lowest yield was obtained for Ammonium sulphate alone (N alone) treatment.

AICRP on Long Term Fertilizer Experiment-(variety Aiswarya)

This experiment has completed 12 years. The effect of treatment on yield and soil fertility parameters is as given below

Effect on yield

In LTFE, as in the previous years, in both the seasons, highest grain and straw yield were recorded by the treatment T8 which received 100%NPK (as per POP of KAU) along with FYM @5t/ha. However this was on par with T10 (100@ NPK +in situ growing of *Sesbania aculeate* green manure crop.) Lowest yield was recorded by T12 (absolute control)

Effect on nutrient uptake

The effect on nutrient uptake followed the same trend as in yield. The uptake of N,P,Ca & Mg was higher for T8 A which received 100%NPK (as per POP of KAU) along with FYM @5t/h.

Effect on soil fertility

With respect to the soil pH, no significant variation was made by the treatments after kharif. In the treatment where continuous addition of inorganic fertilizers alone as done, a slight decline in organic carbon content compared to other treatments were observed. Generally the soil organic carbon content is in the high range. The high organic matter content may be due to the degeneration of roots and incorporation of stubbles after each harvest. The status of P and K after kharif season was almost in the medium and low range respectively.

Division of Social Science

Farmer Participatory Action Research Programme

- The average cost of cultivation was Rs. 21,424 and Rs. 19,060 per hectare for the conventional and SRI cultivation respectively showing 11% reduction in the cost with SRI. The net return was Rs. 11,149 and Rs. 23,868 per hectare for conventional and SRI respectively.
- In the adoption of technologies like Micro Irrigation and Mulching water and labour saving to the tune of 50 per cent is seen.

RKVY project on Conduct of workshop on Attaining Potential yield of rice in Palakkad district of Kerala

Conducted a Mega workshop and ascertained the problems faced by the farmer in Rice production with the help of a structured interview schedule and focused group discussion. The problems expressed by the farmers are given below:

- Schedule of water release not known
- Soil testing results not accurate
- Zinc deficiency in certain areas
- Timely availability of fertilizer
- Adequate fertilizer availability
- TN varieties are only suitable for their areas expressed in Eastern Palakkad region
- Organic inputs given as subsidy are inferior quality
- Daincha seeds given in Krishi Bhavan are mixture of inferior and superior varieties
- Germination problem in Krishi Bhavan distributed seeds
- Seeds stored in polythene bag have low germination
- Fertilizer application not done scientifically
- Delay in payment of paddy procured
- Procurement of Tamil Nadu varieties not being done
- Private procurement agencies procure at lower cost Rs. 9.80 but ready Cash is given
- High cost of labour
- Lack of labourers
- Lack of young labourers
- Lack of skilful labourers in rice farming
- Most of Labourers are old aged affecting the efficiency
- Tractor not available in right time
- Difficulty in operation of tractor in fragmented holdings
- Tractor ploughing not done properly
- Seeds procured from Combine harvester shows poor germination
- New weed emergence (Kuthiravalli) from Karnataka

Horticulture

1. Nutrient management trial in coleus: Trials conducted for three seasons were concluded. Results indicated that application of fertilisers in more than two splits does not have advantage.
2. Germplasm maintenance and breeder seed production in coleus and ash gourd are being done.
3. Data collected on vegetable cultivation in river beds and river banks along the different rivers of the state.
4. 19 trials laid out in 4 plots each in farmers' fields in Palakkad district to test various technologies developed in vegetables including varieties and management

AICRP on Arid Legumes

A. PLANT BREEDING TRIALS

1. AVT + IVT on cowpea

Seventeen entries were evaluated for yield and yield related parameters during Rabi 2010. The entry CP-203 recorded the highest yield of 1507 Kg/ha followed by CP-214 (1089 Kg/ha). The entries were free from major pests and diseases.

2. IVT on horse gram

Ten entries were evaluated for yield and yield related parameters during Rabi 2010. The entry HG-405 recorded the highest yield of 812 Kg/ha followed by HG-406 (722 Kg/ha). The entries were comparatively free from major pests and diseases.

3. AVT-I on horse gram

Eight entries were evaluated for yield and yield related parameters during Rabi 2010. The entry HG-38 recorded the highest yield of 973 Kg/ha followed by HG-35 (712 Kg/ha). The entries were comparatively free from major pests and diseases with HG-38 recorded 3.92 per cent collar rot.

4. AVT-II on horse gram

Nine entries were evaluated for yield and yield related parameters during Rabi 2010. The entry HG-22 recorded the highest yield of 1223 Kg/ha followed by HG-26 (1085 Kg/ha). The entries were comparatively free from major pests and diseases.

5. FLD on horse gram

The horse gram variety CRIDA 18R released from CRIDA, Hyderabad was given to ten farmers for conducting the FLDs. The variety performed well under both pure crop and intercrop situations.

6. Evaluation of horse gram germplasm

106 entries of horse gram from NBPGR were evaluated for their yield and yield related parameters. The data processing is going on.

7. Hybridization and selection in cowpea

Major objective is to evolve a high yielding, short stature dual purpose cowpea variety with longer pods and medium sized grains. The variety should be resistant to major biotic as well as abiotic stresses. We have advanced 122 entries from F2 generation to F3 generation.

8. Corrective breeding in Krishnamony/Ptb-2

Krishnamony /PTB-2 is a variety well suited to summer rice fallows as it is of short duration and bushy with synchronised flowering. But the black grain colour of the variety makes it less acceptable by the farmers. Hence to improve the grain colour we have adopted single plant selection from a large population to identify and isolate three distinct colored lines namely off white, light brown and reddish brown retaining all the desirable characters. The experiment is advanced to fourth generation.

B. AGRONOMY TRIALS

1. Assessment of arid legume based intercropping systems

The experiment started during 2009 to identify a suitable arid legume based intercropping system for the state. The experiment was conducted with cowpea and horse gram as main crops and Bhindi and Amaranthus as intercrops. Intercropping significantly reduced the seed yield of cowpea when it is intercropped with Bhindi and with Amaranthus the yield was on par for all the combinations tried. Horse gram intercropping system yielded on par with sole crop.

2. Studies on weed management in cowpea

The experiment started during 2009 to identify a suitable technology for weed management in leguminous crops, particularly in cowpea. The study conducted during rabi 2010 showed that pre emergence application of Pretilachlor @0.75 Kg per Ha + one hoeing at 20 days after sowing (DAS) and two hoeing one at 20 DAS and 40 DAS were more effective in bringing down the weed count per m² as well as weed dry matter per m² and increase the seed yield of cowpea.

3. Survey and status report on arid legumes based farming situation and production constraints in different agro-climatic zones

As a part of the AICRP on arid legumes a survey was conducted with an objective of gathering information on important pulse crops grown under different farming situations and identifying constraints in their cultivation and strategies for increasing production. It was done during 2010-11 in the selected villages of Malappuram district and the following observations were made.

- In Malappuram 80 per cent cultivation is practiced in summer rice fallows following the second crop of rice.

- The major arid legumes grown in the region are horse gram and cowpea. Apart from cowpea, green gram, black gram and red gram are also cultivated.
- It was observed that in Palakkad district 20% farmers followed seed treatment with biofertilizers whereas 8.50 per cent farmers followed seed treatment each with water soaking, fungicide and insecticide.
- The arid legumes are mainly sown by broadcast method in the district (90%).
- Only 7.50% farmers use chemical fertilizer in the district. Organic manures are used by 12.50% farmers in Malappuram district.
- In Malappuram district the 79 % of arid legumes are grown rain fed condition
- 92.50% farmers adopt no weed management practices in the district.

C. PLANT PROTECTION TRIALS

1. Evaluation of Cowpea and Horse gram in IVT and AVT entries for important diseases

Evaluated 18 entries of cowpea for collar rot during 2010 -11. CP-201 showed resistant reaction to the disease. In horse gram 17 entries were evaluated for collar rot during 2010-11. HG 27, HG 28, HG-32 and HG-34 showed resistant reaction to the disease.

2. Management of Yellow Mosaic Disease

The disease incidence over three years showed that all the treatments were found effective in reducing the yellow mosaic incidence in horse gram than the control. The mean yield data showed that significantly higher yield was recorded in neem oil 3%, neem oil 5%, Azadiractin 1.5 ml/litre and Dimethoate 2 ml/litre treated plots than the control

3. Isolation of PGPR and testing antagonistic activity against cowpea diseases

Three hundred soil samples were collected from the Palakkad district. On isolation by serial dilution method 74 *Pseudomonas fluorescens* and sixty five *Bacillus* sp were obtained on the specific media. All the cultures isolated were showed green fluorescence. These cultures were tested for their antagonistic activity for the pathogens causing cowpea diseases. Antagonistic activity studied with the cowpea collar rot pathogen (*Rhizoctonia solani*), dry root rot pathogen (*Macrophomina phaseolina*) and Anthracnose pathogen (*Colletotrichum lindemuthianum*) in a dual culture assay. The study showed that six cultures found effective in controlling the pathogens under *invitro* condition.

4. Survey, Surveillance and Monitoring of Arid Legumes diseases in arid legume growing areas of Palakkad and Malappuram districts

The survey conducted at Palakkad and Malappuram districts during the period from September 2010 to March 2011. The survey showed that the incidence of collar rot caused by *Rhizoctonia solani*, dry root rot caused by *Macrophomina phaseolina*, cowpea mosaic caused by cowpea mosaic virus and anthracnose caused by *Colletotrichum lindemuthianum* were noticed in the cowpea growing areas

5. Screening of cowpea entries against rust disease

Rust disease in cowpea is one of the severe problem in cowpea. The Infected leaf shows a burnt appearance in the advanced stage of the infection. In order to identify resistant source to the disease, twelve entries of cowpea viz., CP-1, CP-2, CP-3, CP-4, CP-5, CP-6, CP-7, CP-8, CP-9, CP-10, CP-11 and CP-12 received from UAS, Bangalore as a part of identifying the resistant source to rust disease were evaluated by bombarding the rust spores on the pin pricked area of the young cowpea leaf during August to October 2010. It was found that CP-3, CP-4, CP-11 and CP-12 showed resistant reaction to the rust disease in cowpea.

6. Evaluation of horse gram accessions for important diseases

150 accessions of horse gram germ plasm received from NBPGR, Thrissur during 2010 -11 were evaluated during rabi 2010 for yield and disease incidence. It was found that entries 1, 28, 49, 57, 66 and 100 showed less incidence of 20 – 25% to yellow mosaic disease.

7. Management of cowpea aphid

Nine treatments with insecticides and neem based formulations were tested for the management of cowpea aphid. It was found that All the treatments were found effective in reducing the aphid infestation in cowpea crop than the control.

8. Farm trial on pod borer management

The chemical profenophos was found effective in reducing pod borer incidence in cowpea. Farm trials conducted at seven farmers fields.

9. SHM projecton Establishment of Plant Health clinic on horticultural crops at RARS, Pattambi

Established plant health clinic on horticultural crops at RARS, Pattambi. The recommendations to the problems of horticultural crops are being given to the farmers.

RKVY –Paddy mission project

Rice knowledge bank and museum at RARS, Pattambi PI-Dr.P.Raji

Under - RKVY- enhancing rice production in Kerala and attaining partial self sufficiency a project Rice knowledge bank and museum at RARS, Pattambi was in operation to establish a rice museum. As part of this project , collection of exhibits such as tools and implements, for processing , storage structures, measuring tools was done.

Rice mobile clinic – Central zone – coordinator -Dr.P.Raji

Rice mobile clinic with all facilities for preliminary identification of field problems in rice has been functioning at RARS,Pattambi under RKVY paddy mission. This facility is for identification and solving field level problems by the scientists of various disciplines as and when required.

Dr. R Ilangovan

- ✓ Imparted the latest technologies inn water management practices adapted in World wide and how best followed it in Kerala
- ✓ Highlighted the importance of water and nutrient management in seed crop vegetables
- ✓ SRI and Weed management in Rice is highlighted in most of the classes

Resource person in district level seminars/ Interfaces

Dr.P.Raji

Rice seminar organized by KVK,Ambalavayal (19.5.10)

Research Extension Interface of Wayanad district (19.11.10)

Research Extension interface of Malappuram district (22.12.10)

Division of Social Science

Outreach

- Handled a class on 'Issues in Current Agricultural economy' in connection with the Inauguration of Economics Association at Sree Neelakanta Govt. Sanskrit College,Pattambi,Palakkad on 11.02.2011.

Exhibitions

- Participated in the Exhibition conducted at Mannancherry on 03.04.10
- Participated in the Exhibition conducted at Lullu Convention centre from 24-27,feb 2011 on the theme Kerala Agricultural Food Technology .
- Participated in the exhibition organized by State Department of Agriculture conducted at RARS,Pattambi on the theme "Nattukuttan"
- A three day Exhibition was conducted as part of Farm Day celebration at RARS,Pattambi from 8.03.11 to 11.03.11
- Participated in 3 Agricultural Technology Management Agency(ATMA) meetings conducted by State Department of Agriculture.
- Participated in 2 District level technical advisory committee meeting held in Palakkad district organized by District Planning office.
- Participated in 1 District Development committee and 1 Backward region Grant fund meeting convened by the Collector

Examinerships Offered

Paper setter and Valuator B.Sc.course on Extension Education and Rural development for University of Agricultural Sciences, Dharwad

Farm Advisory Services

In person	Over Telephone	Through letters
140	267	Nil

Radio talks/TV programmes/Audio-video cassettes

Topic	Date	Name of scientist
Field day -New variety released for -Upland cultivation (PCV News)	27-09-10	Smt Faseela K.V.

List of Publications

Scientific papers

- Veena V and Johnkutty I. 2010. Rice genetic resources of Kerala. National Seminar on Indian Biodiversity Congress from 28-30 December, 2010.
- Beena R., Sheshshayee M.S. and UdayakumarM., Bambara groundnut-An under utilized drought hardy crop. National Seminar on Indian Biodiversity Congress from 28-30 December, 2010.
- Ambili, S. N., Musthafa, K. and Purushothaman, S. M. 2010. Exploitation of bio diversity in pulse crops of Kerala. National Seminar on Indian Biodiversity Congress from 28-30 December, 2010. P.240
- Ambili, S. N. and Radhakrishnan, V.V. 2011. Two line rice hybrids innovative approach to enhance the productivity. National Seed Congress from 29-31st January 2011. P.170
- Karthikeyan, K Sosamma Jacob and Purushothaman. S.M. 2010. Incidence of insect pests and natural enemies under SRI method of rice cultivation *Oryza* 47 (2): 154-157.
- Karthikeyan, K and Sosamma Jacob. 2010. *Pseudomonas flourescens* and *Heterorhabditis indica* Poinar for the management of major pests of rice. *J. Biopesticides* 3 (1): 96-99
- Karthikeyan, K., Sosamma Jacob., Pathummalbeevee and Purushothaman. S.M. 2010. Evaluation of different IPM Modules for the management of major pests of rice (*Oryza sativa*) *Indian J. Agric. Sci.* 80 (1): 59-62
- Karthikeyan, K and Sosamma Jacob. 2010. Biological efficacy of *Beauveria bassiana* against Rice blue beetle, *Leptispa pygmaea* Baly (Coleoptera: Chrysomelidae. *International Research Journal of Plant sciences.* 1 (1) 30-32
- Shanmugasundaram,B. and Ponnusamy,K.A. 2010.Post Tsunami Technical and Social Interventions in the affected rice tracts of Tamil Nadu and Puducherry. *Indian Res.J.Ext. Edu.*10(3):84-90.
- M. L. Jyothi and M.C. Narayanan kutty 2010 Variability in ash gourd. *Book of abstracts. First Indian Biodiversity Congress – 28-30 Dec., 2010* :. 180
- M.L Jyothi and M.C. Narayanan kutty. 2011. Seed viability in cowpea in relation to storage conditions. *Souvenir and Abstracts of National Seed Congress – Jan. 29-31, 2011*:272
- Thulasi V, TJ Purakayastha, Deo Pal. 2010. Does elevated CO2 affects decomposition of rice and wheat residues

Finance

Head	Expenditure	Receipts
Non-plan	219.01	10.65
Plan		
ICAR	148.27	
Other EAPs	39.05	1.44
Revolving Fund	64.27(Includes amount spent for infra structure)	41.30

AGRICULTURAL RESEARCH STATION, ANAKKAYAM

Research Programmes:

a. Major Research achievements (highlights) -

1) *Breeding improved varieties of cashew by hybridization* (CC-01-00-06-63)

Objectives: Cashew improvement through developing breeding strategies including hybridization and advanced research tools

Achievements:

An experiment was laid out in June 2004 in RBD with 35 selected progenies from 8 combinations (treatments) in 3 replications in block 4 and 6. Observations on height, girth and spread were recorded during November 2010. Analysis of variance showed that there was no significant difference among treatments for the characters studied. About 50% of the hybrid combinations have started yielding and the yield per tree in some of them has reached up to one kg or above.

The growth of the trees is satisfactory. We have to wait for one more year to get comparative data on yield attributes.

2). *Commercial seed production of major vegetable crops* under protected conditions (Project code number and AS & TS are awaited)

The project has been approved vide Minutes of the 67th FRC meeting held on 6.3.2009. Since technical sanction has not been accorded so far we are continuing with preliminary trials on seed production under protected conditions (poly houses) of bitter melon (Preethi) and tomato (Anagha).

3). *RKVY project- Establishing of a polyclonal progeny orchard of cashew* at CRS, Anakkayam (R6/66055(xxiii) DATED 19/03/08 - 311-31-8487)

Objectives:

1. To establish a multi-clonal garden for providing elite planting material to cashew growers
2. Identification, characterization and selection of promising polyclonal progeny combinations for pest and disease resistance and hardiness.

Achievements:

Thirty two high yielding/hybrid varieties of cashew released from various research stations of India have been planted at CRS, Anakkayam to establish the clonal garden during June 2009. Performance of the clones is satisfactory and recording observations will be started during June 2011.

4. *Establishment of a network centre* for production and distribution of T.C. plants (R1/66142/08 Dated 23/01/09 - 311-31-8551)

Objectives: To undertake tissue culture production of elite varieties of anthurium and gerbera

Achievements:

We have started Tissue culture of anthurium, gerbera and banana (Nendran and Grandnaine) from December 2010 onwards. Initial cultures of these crops/varieties have been established and further work is in progress.

5. *Laying out a Pepper Small Nursery* at CRS, Anakkayam (311-31-8584)

The project is funded by the State Horticulture Mission

Objectives: To establish a permanent propagation unit for production and distribution of rooted cuttings of Panniyur -I variety of pepper

Achievements:

1. A progeny garden for rapid multiplication of pepper has been established and the project is nearing completion.

6. *Setting up a hi-tech Polyhouse* at CRS, Anakkayam (R2/60302/06 dated 24/03/09 -311-31-8577)

The project is funded by the State Horticulture Mission.

Objectives: To set up a permanent production unit for protected cultivation of vegetables and nursery plants.

Achievements:

The poly house has been set up and is being utilized for preliminary trials on vegetable seed production cited vide item 2

7. *R & D project entitled "Development of production units for hybrid coconut seedlings and other planting materials in three districts of Kerala" under RKVY 2009-10(R6/60124/2009/XXI dated 19.12-09)*

Objectives: To develop seed production unit in selected Panchayath for the large scale production and distribution of hybrids and elite seedlings of coconut and quality planting materials of major intercrops to the farmers by utilizing the technologies and infrastructure facilities available at various coconut Research stations by seed village concept.

Achievements: The project is in progress. Hybridization work is in progress in selected farmers field for production of Kerasree (WCTXMYD) seed nuts.

8. *ICAR project on cashew-based cropping system:* competition and feasibility studies (R3/69054/04 DATED 3-1-2011) is being conducted at this research station with Dr. Sajan Kurien, ADR as PI and Dr. P. Rajendran, Professor & Head, CRS, Anakkayam as Co-PI.

9. *Vegetable Mission, Kerala.*

CRS, Anakkayam has been selected recently by the Vegetable Mission as one of the implementing centres

Extension Programmes

1. Students from nearby institutions were given demonstration on various aspects of cashew cultivation/meteorological observatory
2. The station is functioning as information centre for farmers of Malappuram, Kozhikkode and Palakkad districts on various aspects of commercial cultivation of major crops of the zone.
3. The station serves as an important source of planting materials/seeds to farmers/Panchayath/Krishibhavans etc.

Training programmes organized

1. - Six month's Stipendiary Training Programme to VHSE passouts which was sanctioned vide order number Trg (1) 392/07 dated 27-9-07 of the Hon. Vice Chancellor, KAU is being conducted at this station from 2008 onwards.
2. The station is frequently conducting sponsored training programmes on various aspects of horticulture, plant propagation, plant tissue culture and biotechnology, hi-tech horticulture, rainwater conservation and commercial crop production for PG students, graduates, agricultural officers, and field staff of the state Department of Agriculture. Training programmes are also imparted to SHGs, VHSE pass-outs, women groups and unemployed youth on varying aspects including commercial propagation, plant tissue culture, water management, hi-tech horticulture etc.
- 3 - A series of On Job Training was imparted to students of VHSE batches of Malappuram district.

Farm Advisory Services

Farmers from various parts of Malappuram, Palakkad and Kozhikkode districts visit the station for technical guidance and advice on various aspects of agricultural production

In Person	Over Telephone	Through Letters/emails
250	More than 2000	100

Other details if any : **Renaming of the CRS, Anakkayam**

1. Recently, the last Research and Extension Review Committee of the KAU Executive Committee has approved the proposal for renaming this research station as Agricultural Research Station.

Anakkayam, allowing diversification of its research activities without discontinuing the existing research programmes in cashew.

It is expected that the redefining mandates and restructuring of the station will become effective soon so that the diversified research and development activities of the station can be continued with better and efficient research and technical support.

- The State Planning Board has approved the proposal for construction of a permanent residential training centre, up-gradation of tissue culture laboratory and nursery at Cashew Research Station, Anakkayam during this year. Once these facilities are instituted it is also possible to run Academic Diploma Programmes like Diploma in Horticulture and Nursery Management, PG Diploma in Hi-tech Horticulture etc. at this Centre. The priority to ensure improved performance of the station would be immediate action to provide the required scientific staff to work at this research station.

Finance

Expenditure details:

Head	Expenditure (Rs)	Receipts (Rs)
Non-Plan & Plan	7332583	436,152
ICAR	-	-
EAP	-	-
Other EAPs	2628,918	-
Revolving Fund (Station)	1835705	3151,258
Revolving Fund (NCRF)	1563585	2009,248

Income generation: Income generated from CRS, Anakkayam during the past six years

Year	Revolving funds	Miscellaneous farm revenue	Total Income generated
2005-06	308076	184230	492306
2006-07	523079	226012	749091
2007-08	864778	308750	1173528
2008-09	2101666	499776	2587956
2009-10	4316891	330831	4647722
2010-11	5160506	436152	5596658

Funds transferred to Comptroller, KAU

Sl.No	Name of scheme	2009-10	2010-11	2011-12* (as on 30-6-2011)
1	Station RF 311-65-6118	16lakhs	8.75lakhs	18lakhs
2	NCRF 311-65-6357	0	4lakhs	7lakhs
3	Misc	2.5lakhs	4.75lakhs	1.7lakh
Total		18.5lakhs	17.5lakhs	26.7lakhs

* 1. This achievement is the result of a team work. This may be appropriately rewarded and appreciated so as to ensure this achievement in coming years to continue.

2. The station may kindly be allocated more funds for strengthening its primary facilities like a training hall with residential facility and quarters for the head of station and supporting staff.

AGRICULTURAL RESEARCH STATION, MANNUTHY

Research programmes

- 1) Three extra short duration rice cultures were developed through re-selection in Hraswa. These were found promising in station trails and were recommended for farm trials in kole lands.
- 2) Rice culture C26T (b) developed by hybridization and selection between Mahsuri X Vytilla³, was recommended for farm trial in kole lands for salinity tolerance.
- 3) Farm trials of promising genotypes of cabbage & cauliflower are in progress. New cultivars (14 varieties of cabbage and 12 varieties of cauliflower) are being tested for suitability in the plains of Kerala. Five genotypes of carrot and radish found suitable for cultivation in the plains are being evaluated. Development of technology for seed production of cool season vegetables like cauliflower and cabbage in the hills of Idukki district is in progress.
- 4) Eighteen F1 Hybrids were developed in Bitter gourd. The hybrids are being evaluated.
- 5) As a part of developing technology for protected cultivation of vegetables, Poly house production of cucumber was undertaken. Fertigation schedule and irrigation requirements are being standardized.
- 6) Under "Seed and Nursery programme" infrastructure facilities, for augmenting planting material production and planting new progeny orchards developed.
- 7) Conceptualization of "Food Security Army" Agro Machinery Operations Service Executives (AMOSE), Agro Machinery Operations Service Centre (AMOSC), Mobile Agro Machinery Training Unit (MAMTU), Mobile Agro Machinery Repair and Service Unit (MAMRSU), Farm Machinery Facilitation Centre (FMFC) and institution of it.
- 8) Productivity of Kole lands with respect to climate change was monitored and analyzed.
- 9) New farm machinery like 'KAU Kera Suraksha Coconut Climber' was designed and developed, Paddy Combine Harvester of different types were tested.
- 10) Kerala Agricultural University model of "Food Security Army" training and PAR for farm mechanisation referred as model for Agricultural Research for Development (AR₄D).
- 11) 'Paddy Straw Baling' service was introduced.

RICE

Six extra short duration rice cultures developed through reselection in rice variety Hraswa were evaluated and three (HS-1, HS-13 & HS-16) were given for farm trial during pancha season in kole land.

Seventeen aromatic rice varieties and eight hybrids collected from different sources were evaluated. Among aromatic varieties PS-2, PS-3, PS-4, Vasumati and Sugandhamati were found promising. Among rice hybrids CORH-3, KRH-2 and Suruchi 5401 were promising under Kerala conditions.

For developing a super rice for organic rich kole lands of Kerala, comparative yield trial of seven cultures from two different cross combinations viz., Jyothi x Swarna prabha and Uma x Mahsuri was conducted. Culture 2-08 from the cross Jyothi x Swarna prabha and culture 23-08 from Uma x Mahsuri were found promising with grain yield of 6315 kg/ha and 6488 kg/ha respectively.

Preliminary yield trial of eight cultures selected from different cross combinations was undertaken for identification and development of rice genotypes suitable for mechanised rice farming. Comparative yield trial will be conducted during next season.

Fifteen high yielding rice varieties were evaluated in kole lands to test their suitability for cultivation in kole lands. Rice varieties with duration above 110 days viz., Jyothi, Uma, Varsha and Cul 7711 were found promising.

In a trial to evolve rice varieties of high grain and straw yield, from interracial crosses of diverse origin, culture C26T (b), a cross between Mahsuri X Vytilla 3 is under evaluation in saline areas of kole lands.

Among fifteen short duration varieties evaluated for 3 seasons for drought resistance / tolerance, three varieties viz. Swarnaprabha, Makom, and Mattathriveni performed well in paddy fields of Mannuthy. These are under evaluation in Kole lands during the pucha season.

Corrective breeding of rice variety Jyothy is going on as a KSCSTE Project to incorporate moderate panicle shattering. Irradiation of Jyothy seeds with 500 Gy Gamma rays and treatment of seeds with EMS (0.06%) was done. The M1 generation was raised and 500 lines forwarded to M2 generation which is presently in the field.

Vegetables

The station has pioneered the cultivation of cool season vegetables in the plains of Kerala. Evaluation of tropical genotypes of cool season vegetables cabbage, cauliflower, carrot, radish and onion is in progress to identify more genotypes suitable for cultivation in the plains. Farm trials of promising varieties already identified are in progress.

Comparative yield trials of 10 promising bitter gourd genotypes identified for summer rice fallows is being carried out with Preethi as a check 18 F1 hybrids of bitter gourd developed are being evaluated for identifying the promising combinations.

Technology for poly house production of capsicum (Var. Indira) is being standardised.

Farm trials of two promising tomato accessions LE 1-2 and LE 66 is in progress at Malappuram, Palghat, Thrissur and Ernakulam Dts.

Thirty two trials for refinement of technological innovations in vegetables were laid out in farmers' fields in various parts of the district under a plan scheme of Govt. of Kerala.

Large scale production of seeds and planting materials are being undertaken through seed and nursery programme of the station. The plant tissue culture laboratory is producing and selling tissue culture plants of banana and pine apple.

Under the Dt. Panchayat Funded project 1.66 lakh seedlings of annual drumstick PKM-1 were produced and supplied to selected 30 krishi Bhavans in the district.

Coconut

Under the RKVY Project on "Development of production units for hybrid coconut seedlings and other planting materials in 3 districts of Kerala", following works were undertaken.

- Conducted training to the farmers and youths on pollination techniques for the production of hybrid coconut seedlings.
- Collected and sown elite coconut seednuts(1100 Nos)
- Planted 450 Nos of banana suckers
- Harvesting of tuber crops completed
- (v)In 240 mother palms pollination work for the production of Hybrid coconut seedlings started.

Pulses

Cowpea accessions collected from NBPGR Vellanikkara and RARS Pattambi were screened with an objective of evolving cowpea varieties resistant to pulse beetle. Three entries viz; EC 367711, EC 390231 and IC 201092 which showed resistance were used as donors for hybridization with high yielding varieties. Five different cross combinations are in the F₃ stage of evaluation.

Rice/Farm Mechanization

'Food security army' Training Programme attained national attention and Govt. of Kerala provided budgetary provision of Rs.28 crores for setting up'Green Army Model'.

'Kera Suraksha Coconut Climber' was designed and released for safety 'Sit and Climb' coconut climbing

'Paddy Straw Bailer' was introduced, tested and demonstrated before farmers. Made technical recommendation to Department of Agriculture and introduced straw baling service through AMOSC

Rice-Duck farming was tested. A new system of rice farming in kole lands with vegetables on main bund, flowers on field bunds, duck in paddy field and fishes in field channels was introduced and tested (OBEK).

Logo was designed for 'Food Security Army'.

Mobile units of farm machinery training (MAMTU) were strengthened and six units were created. One unit of MAMRS was also established.

Extension programmes

Dr. U. Jaikumaran

- Conducted 23 no. of training on Food Security Army training
- Visited Goa (21 to 24.04.2010) and Vijayavada (17.01.2011 to 18.01.2011) for providing advisor service on Mechanical Paddy Transplanting.
- Conducting 15 days training at Erode on "Mechanical Paddy Transplanting" invitation of ICDP, Erode from 22.07.2010 to 10.08.2010
- Large scale testing of Paddy Straw Baler and providing Straw Baling service to farmers.

Conducted 'OBEK' Programme at Karuthani Kole Padavu under Paddy Mission in 250 acres incorporate following components.

1. Integrated Paddy Duck Farming System. Maintain 200 ducklings in Paddy field for 2 months.
2. Mary gold cultivation in paddy field bunds
3. Vegetable cultivation in outer running bund.

Dr.C.Narayanankutty

1. Served as technical adviser to VFPCCK, Kakkanad, Kochi in seed production of cool season vegetables, PTD trials and precision farming projects
2. Course director 30 days Vocational training programme on tissue culture techniques to youths.
3. Conducted 15 experiments in farmers field in Thrissur district under the state plan project "Refinement of technological in Vegetable Production in Farmers fields for attaining Food Security".
4. Resource person in famers seminar organize by VFPCCK, department of Agriculture, Regional Rural Bank etc.

Farm Advisory Services

In person	Over telephone	Through letters
20	25	2

List of publications

a) Scientific papers

C.Narayanankutty, R.R.Rakesh, P.B Pushpalatha and U. Jaikumaran 2010. Genetic variability and propagation studies in Jack (*Artocarpus hetrophyllus lamp*) P-72-75

National workshop on Jack fruit, University of Agricultural Sciences, GKVK, Bangalore

Finance

Head	Expenditure (Rs)	Receipts(Rs)
Non-Plan	83,86,393	
Plan	60,68,683	
ICAR	14,00,000	
Other EAPs	49,32,369	
Revolving Fund	27,23,135	
		43,43,446

CASHEW RESEARCH STATION, MADAKKATHARA

Research programmes

Crop improvement

- A total of 132 accessions, including exotic and indigenous collections, are being maintained and evaluated in the clonal germplasm conservation block.
- There was significant variation among genotypes for annual nut yield during 2009-10 in the MLT II. The highest nut yield was recorded by Hy 303 (10.20 kg/tree/year) followed by Hy 320 (8.90 kg). The highest cumulative yield was recorded by Hy 303 (58.90 kg) followed by Hy 320 (51.37 kg).
- During 1993-2010, 1637 hybrid plants were produced at the station and are being evaluated.

Crop management

- Application of graded levels of N, P or K or their 2-way or 3-way interactions did not significantly influence the growth and yield characters as well as annual and 10- year cumulative nut yield of cashew.
- Data on high density planting during the sixth year of yielding indicated increasing per hectare annual and cumulative yield with increase in tree density, whereas per tree annual yield showed a declining trend with increasing tree densities but no definite trend was observed in respect of per tree cumulative yield. The annual per tree yield and annual and cumulative per hectare yield showed an increasing trend with increasing fertiliser levels, with the maximum yield recorded by 225 : 75 : 75 kg NPK/ha. However the cumulative per tree yield showed an increasing trend only upto 150 : 50 : 50 kg NPK/ha.
- Trees under normal density planting system recorded higher per tree annual and 10- year cumulative nut yield during the thirteenth year of planting. In terms of per hectare nut yield (both annual and 10-year cumulative), high density planting system was significantly superior to normal density system.
- The study on intercropping revealed that the growth and yield of cashew is benefitted by intercropping and that tapioca is the most profitable tuber crop that can be cultivated as intercrop in young cashew plantations. Intercropping tapioca in 6- year old cashew plantation, recorded the highest net returns of Rs. 26466/ha and C: B ratio of 1.72 followed by coleus with a net returns of Rs. 23590/- and C: B ratio of 1.56.

Crop protection

- ❖ Among different spraying schedules, lamda – cyhalothrin was found most effective over applications of chlorpyrifos, triazophos and profenophos.
- ❖ Three new hosts of *Helopeltis theivora* viz, clove bean (vegetable crop), *Ipomea sp* and *Ixorra coccinea* (Ornamental plants) were reported for the first time.

Cashew apple processing

The technology for commercial production of Cashew Apple Soda, Cashew Apple Vinegar and Cashew Apple Chocolate has been developed and employed at the station.

Refined the technologies for enhancing quality of the following cashew apple products

a. *Chocolate*: Preparation of chocolate with milk powder, cashew apple powder, sugar, butter, cashew nut and cardamom powder was found to have overall acceptability with a storage life of six months.

b. *Cashew apple vinegar*: Gelatin as well as sago gave better results in reducing the off colour of cashew apple vinegar.

c. *Blended beverages*: Cashew apple juice with pineapple juice and cashew apple juice with passion fruit juice in the ratio of 50: 50 gave good acceptability for squash as well as RTS.

d. *Fresh juice blended preparations*: Blended fresh juice preparations with cashew apple, gooseberry, carrot, mint leaves, sugar and water and with cashew apple, gooseberry, mint leaves, cardamom powder, ginger and sugar had maximum acceptability.

Standardized the technology for the preparation of jelly and cake from cashew apple.

Floriculture

Standardized the age of mother plants, age of rooted cuttings and the portion from the cutting is to be taken in the propagation of bush jasmine. The flower production in bush jasmine could be enhanced by the application of bioregulators and organic supplements. Flower production could be substantially improved by the application of BA (50ppm & 75ppm), vermiwash (20%), cycocel (500 ppm & 1000ppm), panchagavya (3%) and *Pseudomonas fluorescens* (1%) in bush jasmine.

Extension programmes

(i) *Launching of new cashew apple products*: The station has launched commercially the following three new cashew apple products: -

1. Cashew Apple Soda
2. Cashew Apple Vinegar
3. Cashew Apple Chocolate

The inauguration of the commercial launching and first sale of the newly launched products were undertaken on 15/1/11 during the cashew day celebration.

(ii) Participation in exhibitions

Participated in the following exhibitions to depict the research achievements of the station as well as for the sale and display of cashew apple products and cashew grafts:

1. Agri Expo at Mannancherry, Alappuzha district during April 3-10, 2010
2. Thrissur Pooram Exhibition at Thrissur during 12 April – 24 May 2010
3. Exhibition during the National Symposium on Horticulture Biodiversity at Bangalore during 28-31 May 2010
4. Malabar Agro Fest organized by Plantation Corporation of Kerala Ltd during 25 – 28 November 2011 at Kozhikode.
5. The station organized a Mini Exhibition on 15/1/11 during the cashew day celebration at Madakkathara wherein, apart from the station, four other stations (KVK, Thrissur, Cocoa Project, Medicinal Plant Scheme, Honey bee Project) of KAU participated.
6. The station put up a mini exhibition on 29/1/11 at Pudussery, Palakkad during the district level cashew seminar.
7. The station put up a stall during January 21-27 during flower show organized by Agri Hort Society at Thrissur.
8. The station organized a mini Exhibition during the state level cashew farmers' meet organized by KSACC at Kollam during 24 – 25 February 2011. Apart from several farmers, Sri. P.K. Gurudasan, Honourable Minister for Cashew Industry also visited the exhibition and appreciated the display of technologies and sale of products, particularly cashew apple products.
9. The station put up a stall in the state level Agri Food Technology Meet held at Hotel Lulu International, Thrissur during 24 – 27 February 2011 for display of technologies and sale of products.

Seminars organized

(i) Cashew day 2011 at CRS, Madakkathara

The station celebrated "Cashew day 2011" on 15/1/2011 with funding from DCCD, Kochi and organized a state level farmers' seminar on cashew as part of the celebration. 200 cashew farmers participated in the seminar. The inaugural function of the cashew day celebration was attended by (1) Sri. Rajaji Mathew Thomas, MLA (2) Smt. Sujatha Lakrishnan, Madakkathara Grama Panchayath President (3) Sri. Venkitesh Hubballi, Director, DCCD, Kochi (4) Dr. T. Prathapan, Director, State Horticulture Mission, (5) Dr. K. Aravindhakshan, Dr. S. Leenakumari and Dr. Anilkumar (Executive Committee Members), (6) Dr. T.R. Gopalakrishnan, Director of Research, (7) Dr. P.V. Balachandran, Director of Extension, (8) Smt. S.K. Santha, Principal Agricultural Officer, (9) Sri. E.K. Sudheesh, Madakkathara Grama Panchayath Member and (10) Dr. I. Johnkutty, Associate Director. During the cashew day, three new facilities built up at the station viz., new block of cashew apple processing unit, sales counter and cashew parlour were inaugurated. Commercial launching and first sale of three new cashew apple products viz, cashew apple soda, cashew apple vinegar and cashew apple chocolate were also done during

the function. Five publications from the station on cashew and floriculture were also released during the function. A mini exhibition was also organized during the cashew day where in five station participated.

(ii) District level cashew seminar at Pudussery, Palakkad

The station organized a district level cashew seminar at Pudussery Community Hall, Palakkad district on 29/1/11 with funding from DCCD, Kochi. 200 farmers participated in the seminar. The seminar was inaugurated by Sri. T.N. Kandanathan, President, Palakkad District Panchayath in a function presided over by Smt. K.N. Sreedevi, President, Pudussery Grama Panchayath. Members of the Local Self Government Institutions, Sri. Vanajadelakshan, Assistant Director of Agriculture and Sri. A. Kuppaswamy, President, Kanjikkode Service Co-operative Society felicitated the function. A mini exhibition on cashew cultivation and cashew apple products was arranged during the seminar.

Farm Advisory Services

In person	Over telephone	Through letters
Imparted technical advice on the replanting of cashew of Athirappilly and Kallala Estates of Plantation Corporation of Kerala after an on the spot inspection on 17/12/10	12 farmers Dr. Gavas Ragesh	1- Dr. Gavas Ragesh

Radio talks/ TV programme/ Audio - video cassettes

Topic	Date	Name of scientist
Achievements of Cashew Research Station, Madakkathara - AIR, Calicut	May 2010	Jose Mathew, Gavas Ragesh, Sobhana A and Gregory Zachariah

v. Infrastructure developments, income generation and miscellaneous activities

Infrastructure development

The following three new facilities were started on 15/1/2011 at this station during cashew day for the improvement of research, extension and development facilities of the station.

- (1) New block of cashew apple processing unit (funded by NHM and RKVY)
- (2) Sales Counter funded by SHM
- (3) Cashew Parlour (funded by RKVY)

Constructed vermi compost tanks and installed model biogas unit to initiate programme on utilization of cashew apple and crop residues for vermi compost and biogas production

Renovation of insect net house

Works taken up under MGNREGS

Slashing cashew plantation

A new farm road was made along the border of the farm from "Madakkathara Moola" to Main Gate under NREGS.

Undertook construction of farm road from office building to water tank under NREGS.

Renovation of drainage channel in the cashew block behind KVK has been taken up under the NREGS during the month

Undertook the construction of farm road surrounding the cashew and coconut plantation of Pallikkunnu block Maintenance of farm roads A total of 4170 man- days at a cost of Rs. 6.30 lakhs has been utilized under NREGS at the station

List of publications

Scientific articles

- Jose Mathew, A. Sobhana and Mini, C. 2010. Opportunities for income enhancement from cashew plantations through cashew apple processing. Proc. 2nd International Cashew Conference on "cashew, people and environment" at Kampala, Uganda, 27 - 29 April 10
- Sobhana, A., Jose Mathew and Mini, C. 2010. Utilization of cashew apple in food industry. Proc. 2nd International Cashew Conference on "cashew, people and environment" at Kampala, Uganda, 27 - 29 April 10

- Anitha, S., Jose Mathew and Abraham, C.T. 2010. Dual cropping of rice and green manure crops – a cost effective management alternative for direct seeded semi – dry system of rice cultivation. *Indian J. Agron* 55 (3) : 165 – 170
- Jose Mathew, Sobhana A., Gregory Zachariah and Gavas Ragesh. 2010. Intercropping in cashew for improved resource management". In : Extended summaries, National Symposium on "Resource management approaches towards livelihood security", December 2-4, 2010, Bengaluru, pp 360
- Jose Mathew, Mini, C and Sobhana, A. 2010. Development and dissemination of technologies for cashew apple processing. In : Abstracts, 19th Biennial symposium on Plantation Crops (PLACROSYM XIX), 7 – 10 December 2010, RRII, Kottayam, pp. 198-199
- Anitha, S. and Jose Mathew. 2010. In situ green manuring with daincha – a cost effective management alternative for wet seeded rice. *J. Trop. Agric.* 48 (1-2): 34-39
- Gavas Ragesh, Haseena Bhaskar and Jose Mathew. 2011. First record of Tea Mosquito Bug *Helopeltis theivora* on cashew from Madakkathara, Kerala. Abstracts, 23rd Kerala Science Congress, 29- 31 January 2011, Trivandrum, pp 17
- Anitha, S., Jose Mathew and Abraham C.T. 2009. Dual culture of rice and green manure crops: a low cost and eco- specific technology for weed management in semi – dry rice. *Indian J. Weed Science* 41 (1 & 2) : 55-61
- Sobhana, A., Jose Mathew and Mini, C. 2010. Confectionaries from cashew apple. Abstracts, National Conference on "Horticultural Biodiversity for Livelihood, Economic development and Health care", 29- 31 May 2010, Bangalore
- Sobhana, A. 2010. Effect of rooting harmonies on the rooting of Jasmine in different seasons – National Conference on Horticultural Biodiversity for Livelihood, Economic development and Health care. Abstracts, 29- 31st May 2010, Bangalore
- Anitha, S. and Jose Mathew. 2010. Direct and residual effect of concurrent growing of daincha in wet seeded rice on the productivity of rice – rice cropping system. *Ind. J. Agric. Sci.* 80 (6) : 487 – 492, June 2010
- Jose Mathew, A. Sobhana and Mini, C. 2010. Multiple uses of cashew apple and opportunities for commercial exploitation. *The cashew and Cocoa Journal* 1 (4) : 20-30 (October – December 2009)
- Anonymous. 2010. Report on cashew field day celebrations at Kelakam, Kannur on 16/12/09 by Cashew Research Station, Madakkathara. *The Cashew and Cocoa J.* 2 (3) : 17
- Anonymous 2010. State level farmers' training programme on cashew production technology at Cashew Research Station, Madakkathara. *The Cashew and Cocoa J.* 2 (3) : 20

Books/ Book chapters/ Technical Bulletin/ Leaflets

Books

- A. Sobhana. 2010. Potential ornamental crops of Kerala. Director of Extension, Kerala Agricultural University, Mannuthy, 135 p
- A. Sobhana. 2010. Kuttimulla (in Malayalam). Director of Extension, Kerala Agricultural University, Mannuthy, 26 p

Book chapters

- Gopalakrishnan, T.R., Balakrishnan P.C., Prasannakumari Amma, Jose Mathew and Sujatha, V.S. 2010. Achievements of KAU in plantation crops research, challenges, future prospects and research priorities. Souvenir, 19th Biennial Symposium on Plantation Crops (PLACROSYM XIX), 7 – 10 December 2010, RRII, Kottayam, pp. 50-81
- Jose Mathew. 2011. Cashew cultivation in India – development and importance. In: scientific cashew cultivation for improved productivity (In Malayalam) (Eds: Gavas Ragesh and Jose Mathew) Cashew Research Station, Madakkathara
- Jose Mathew 2011. Suitable soil and climate for cashew cultivation. In: scientific cashew cultivation for improved productivity (In Malayalam) (Eds: Gavas Ragesh and Jose Mathew) Cashew Research Station, Madakkathara pp. 10-14

Jose Mathew 2011. Scientific management practices for cashew cultivation. In: scientific cashew cultivation for improved productivity (In Malayalam) (Eds: Gavas Ragesh and Jose Mathew) Cashew Research Station, Madakkathara pp. 15-24

A. Sobhana. 2011. Vegetative propagation in cashew. In: scientific cashew cultivation for improved productivity (In Malayalam) (Eds: Gavas Ragesh and Jose Mathew) Cashew Research Station, Madakkathara pp. 60-69

A. Sobhana. 2011. Harvesting and processing of cashew nut and its products. In: scientific cashew cultivation for improved productivity (In Malayalam) (Eds: Gavas Ragesh and Jose Mathew) Cashew Research Station, Madakkathara pp. 98-105

A. Sobhana. 2011. Preliminary processing and products of cashew apple. In: scientific cashew cultivation for improved productivity (In Malayalam) (Eds: Gavas Ragesh and Jose Mathew) Cashew Research Station, Madakkathara pp. 106-114

Jose Mathew, Gregory Zachariah, Gavas Ragesh & Sobhana, A. 2010. Annual Report 2009-10. AICRP on Cashew, Madakkathara Centre, CRS, Madakkathara, 84 p

Popular articles

1. Anonymous 2010. An SOS from cashew industry which faces an unprecedented crisis. City Journal (Thrissur), Nov 19, 2010, pp.5
2. Anonymous 2010. Book introduction on "Cashew and mango" (Book reviewed: Cashew and other fruits, processing and enterprises (Eds: Mini, C and Jose Mathew), Cashew Research Station, Kerala Agricultural University, Madakkathara, 115 p.) Karshakan 18 (4) : 65
3. Jose Mathew 2010. Best Management makes cashew a cash crop (In Malayalam). Karshakan (April 10) : 18 (4) : 9-11
4. Sobhana. A. 2010. Kasumangayil ninnum jamum vainum, biskattum (In Malayalam). Karshakan (April 2010) 18 (4): 15-16
5. Sri. Gregory Zachariah. 2010. Athulppadanaseshiyulla kashumavinangngal (In Malayalam). Karshakan (April 2010) 18 (4): 12-13
6. Sobhana, A. and Jose Mathew 2011. Don't waste cashew apple (In Malayalam). Kerala Karshakan 56 (10) p. 54-57
7. Anonymous 2011. Preserve cashew apple – for syrup and jam. Mathrubhoomi Daily dt. 7/3/11

Finance

Head	Expenditure	Receipts
Non- plan	1831932	1414322
Plan	906041	
ICAR	4009744	
Other EAPs	1728690	
Revolving fund	1072370	1413981
Total	9548777	2828303

AICRP ON MEDICINAL, AROMATIC PLANTS & BETELVINE, COLLEGE OF HORTICULTURE, VELLANIKKARA

Research Programmes

Following research projects were carried out under AICRP ON MAP & B

I. CROP IMPROVEMENT

1. CHITRAK - *Plumbago rosea*

Title of Experiment: Assessment and Induction of variability in *Plumbago* species for high Plumbigin content.

Experimental Results: 26 Accessions of *Plumbago* species were collected from different parts of Kerala and Tamil Nadu and evaluated for genetic variability with respect to its biometrical traits and quality. The causes of seedset in *Plumbago rosea* were studied. Based on morphological and quality traits they were grouped into 7 clusters. Path coefficient analysis indicated that large sized leaves and increased dry root weight countable to maximum plumbagin content. *In vitro* regeneration in *plumbago rosea* was standardized. *In vitro* mutagenesis of selected accessions of *Plumbago rosea* resulted in the development of *in vitro* mutants having more than double the Plumbagin content compared to the parental ones.

3. ASOKA (*Saraca asoca*)

Title of Experiment: Survey, collection and evaluation of germplasm

Experimental Results: 42 accessions of Asoka in the germplasm maintained in this centre recorded a lot of variability with respect to its morphological traits and the tannin content imparting the medicinal property. Accession TCRSA485 and TCRSA497 have showed maximum bark yield (1251.69 cc and 1012.45 cc) with appreciable amount of tannin content (3.3% and 3.7%) respectively.

Since Asoka is a cross pollinated plant true two type progeny is seldom received through seed propagation. Vegetative propagation for mass multiplication of Asoka is a successful method to obtain true two type progenies. Coir pith compost root media for air layering is found to be highly successful.

II. AGRONOMY

Experiment I .Effect of organic manures and biofertilisers on yield and quality of *Bacopa monnieri*

From the data it is clear that there was variation in growth characters due to application of organic manures alone and in combination with biofertilizers. Among the different organic manures tried, farmyard manure (FYM) had profound influence on the vine length of brahmi followed by vermicompost compared to coirpith compost. This trend was noticed in both the years. In combination with biofertilizers also, FYM had the highest vine length. The pooled analysis of biomass production showed that the biomass production was the highest for the combined application of coirpith compost with Azospirillum and PSB which was 236 % increase over control. Among the different organic manures applied alone, FYM had significantly higher biomass production compared to vermicompost and coirpith compost. The dry matter production also showed the same trend as that of biomass production with highest dry matter production for combined application of vermicompost with Azospirillum and PSB and it was comparable with combination of coirpith compost, Azospirillum and PSB.

Experiment II Influence of organic manures and biofertilisers on yield and quality of *Sida cordifolia*

The growth characters showed variation when organic manures were applied alone and in combination. The coirpith compost application produced the tallest plants followed by vermicompost. In combination with biofertilizers also coirpith compost recorded the maximum height which was comparable with vermicompost with Azospirillum and PSB. The maximum number of branches was recorded by vermicompost followed by coirpith compost among the different organic manures when applied alone. The combined application of vermicompost with Azospirillum and PSB had the highest number of branches followed by coirpith compost with biofertilizers. Rootlength did not show consistent variation. The fresh root yield per plant was the highest with vermicompost application which was comparable with FYM when applied alone. The vermicompost also recorded the highest fresh root yield of 15.57 g/pl when applied with Azospirillum and PSB followed by coirpith compost with Azospirillum and PSB. The FYM application recorded the highest biomass production when applied alone compared to vermicompost and coirpith compost. But in combination with Azospirillum and PSB, vermicompost recorded the highest biomass production among all the treatments

Experiment III . Effect of organic manures and biofertilisers on yield and quality of *Plumbago rosea*

The combined application of FYM@10t/ha along with bio fertilizers produced the tallest plants. FYM @5t/ha and vermicompost @5t/ha with Azospirillum produced plants with comparable height. The number of leaves produced was also maximum for FYM@10t/ha along with bio fertilizers. Vermicompost applied plants showed poor performance compared to plants applied with FYM in terms of height and number of leaves. With respect to number of branches also the same trend was noticed with maximum for combined applicatiob of FYM@10t/ha along with biofertilisers. FYM application gave

better results with respect to biomass production and dry matter production compared to vermicompost application. Among the different doses of FYM, FYM@10t/ha along with bio fertilizers gave maximum biomass production and dry matter production than FYM@5t/ha. But in the case of vermicompost @ equivalent to 5t/ha of FYM along with bio fertilizers showed higher biomass and dry matter production.

Developed the technology for the production of Kesasuthi Herbal Shampoo

III. PHYTOCHEMISTRY

Title of Experiments : Quality assessment of raw drug of Asoka

Experimental results: Developed an easy TLC method for quick detection of adulteration in the raw drug market samples of asoka bark. Petroleum ether extracts of the stem bark of asoka and polyalthia samples (authenticated by botanists) gave specifically differentiating chromatographic profiles. These chemical fingerprints will help in differentiating the genuine asoka bark from market adulterants. This technique was applied for assessing the quality of 22 asoka bark market samples collected from various markets of Kerala state and the results revealed that out of 22 market samples analysed only 15 samples were genuine asoka but 7 samples were adulterants. This proved that this TLC technique can be effectively utilised for authentication of the asoka bark. No costly equipments and chemicals are necessary and hence it is comparatively a cheaper and economic method. HPLC method developed by the centre also proved effective for detection of adulteration but it is of course costly compared to TLC method

Extension Programmes

Farm Advisory Services:

In person	Over Telephone	Through Letter
200	220	10

Field Visits

No. of Visits	Problem identified	Recommendation
30	8	8

List of publications

Scientific papers:

- C. Beena. 2009. A rapid method for detection of Adulteration in the market samples of *Saraca asoca* bark. Proceedings of 19th Swadeshi Science Congress at COVAS, Mannuthy Page 64.
- C. Beena and V.V. Radhakrishnan 2010. Haemagglutination as a rapid tool to differentiate *Saraca asoca* bark from the adulterant *Polyalthia longifolia*. Journal of Progressive Agriculture Vol. I, October 2010.
- C. Beena and V.V. Radhakrishnan. 2010. "Phytochemical investigations in the endangered medicinal plant "*Nervilia aragoana* ". Proceedings of First Indian Biodiversity Congress 2010 held at Thiruvananthapuram, CN stadium conference hall.
- K.S Gopal , S. Praveen & C. Beena 2010 "Ethanol production from mango waste using indigenous bacteria and yeast "Proceedings of National symposium on waste management 2011 January ,at KAU.
- Latha, A. and Radhakrishnan, V.V. 2010 Yield and plumbagin content as influenced by irrigation regimes in *Plumbago rosea* as intercrop in coconut garden. Proceedings of 19th Plantation Crops Symposium (PLACROSYM XIX) RRII, Kottayam from 7-10 December, 2010

Other details if any

Other activities

- The planting materials of important medicinal plants are being produced and distributed from this scheme earning annual revenue of >Rs. 3.67 lakhs
- Germplasm collection of important medicinal plants of Kerala is enriched by collecting the plants all over Kerala. Rare and endangered medicinal plants are also collected from all over Kerala.
- Large scale cultivation of important medicinal plants of Kerala is done as part of the Revolving fund scheme earning net profit of Rs. 1.5 lakh.
- Attempts are also being taken for the popularisation of herbal home gardens as a means of germplasm conservation.

- Value added products like Naruneendi Syrup, Dandhappala Oil, Vasica Choornam, Rasnadi Choornam, Kesasudhi Herbal Shampoo and Kesa Raksha Herbal Oil produced and distributed with above 4 lakhs

Finance

Head	Expenditure (in lakhs)	Receipts (in lakhs)
Non - plan	-	-
Plan	523006	-
ICAR	4763455	-
KSCSTE	138346	-
Net work Programme on Production and Distribution of elite seeds and planting materials	150000	-
Revolving Fund	417444	977446

AICRP ON BIOLOGICAL CONTROL OF CROP PESTS & WEEDS COLLEGE OF HORTICULTURE, VELLANIKKARA

Research Programmes

A. RICE

- Preliminary evaluation/ screening of Entomopathogenic Nematodes against Yellow Stem Borer and Leaf Folder in rice. (Pot culture)

Leaf folder incidence was significantly low in chemical control and it was superior to EPN treatments and control. All the EPN treatments were on par in the case of leaf folder incidence. There was no significant difference in stem borer incidence in EPN treated and control plants. Significantly low stem borer incidence was recorded in chemical control.

- Enabling large scale adoption of proven Biocontrol technologies in rice.

There was no significant difference in dead heart and white ear head incidences. The population of natural enemies like spiders and coccinellids were significantly high in BIPM plots when compared to conventional farming. The grain yield was on par.

B. VEGETABLES

- Biological Control of Cowpea aphid

The aphid count/plant and percentage infested plants/plot were significantly low in *Cheilomenes sexmaculata* released plot and chemical control plot when compared to control. High incidence of natural predators like coccinellids and syrphids was observed in control plot through out the cropping period and so pest reduction was observed in control plot also. Pod yield was significantly high in treatment plots.

C. POLYHOUSE

- Evaluation of anthocorid predator *Blaptostethus pallescens* against spider mites

The mite population reduced significantly in *Blaptostethus pallescens* released plants when compared to control plants. Maximum reduction in mite count was obtained in chemical control.

D. WEEDS

Biocontrol of *Chromolaena odorata* utilizing *Cecidochares connexa* by inoculative releases. *Cecidochares connexa* produces galls in *Chromolaena* plants. In plants with galls there was significant decrease in plant height and number of branches when compared to control plants.

E. COCONUT

Surveillance and need-based control of coconut leaf caterpillar, *Opisina arenosella*

The population of *O. arenosella* significantly reduced after release of the natural enemies *Cardiastethus exiguus* and *Goniozus nephantidis*.

F. FRUITS

Survey on the papaya mealybug *Paracoccus marginatus* and release of the parasitoid - *Acerophagus papayae*

Randomly selected five villages from Thrissur district. The survey showed that 60 per cent of papaya plants was found affected and the intensity of damage was medium. The parasitoid *Acerophagus papayae* was released @ 10 to 25 nos. / homestead during November, 2010. Three months after release only 5 per cent papaya plants were found affected and the intensity was very low.

In addition to Thrissur district releases were made in Malappuram, Ernakulam and Palakkad districts. Information collected from the farmers of the released areas revealed that there is significant reduction in the population of papaya mealy bug. In the areas, where papaya mealy bug was found presence of parasitoids was also noted.

- AICRP on Biological control of crop pests & weeds (ICAR) .P.I.- Dr.K.R.Lyla Outlay- Rs. 2927000
- SHM project on 'Establishment of Biocontrol Laboratory' (State Horticulture Mission-Kerala). P.I - Dr.K.R.Lyla . Outlay of Rs. 50 lakhs
- Revolving fund- KAU . P.I.- Dr.K.R.Lyla

Extension programmes

- Highlights of extension activities

Supplied biocontrol agents to farmers. Visited farmer's fields and suggested remedial measures for weed and pest problems. Conducted Front Line demonstrations on biological control of rice pests in Koorkkenchery panchayath. Arranged seminars on biocontrol of crop pests and weeds for the farmers of different panchayaths.

TV programmes:

Programme on biocontrol of papaya mealy bug on 4-2-20011 from Dooradarshnan

List & Number of publications:

Research Papers

- Lyla, K.R., Beevi, S.P., Philip, B. M., and Jalali, S.K. 2010. Biological control of rice pests in 'kole' lands of Kerala. *J.Biol.Control* 24(3): 268-270
- Lyla, K.R. and Philip, B.M. 2010 Incidence of papaya mealy bug *Paracoccus marginatus* Williams and Granara de Willink (Hemiptera: Pseudococcidae) in Kerala. *Insect Environment* 15 (4) 2010 p. 156.
- Lyla, K. R., Philip, B.M., and Sinish, M.S., 2011. Field release and establishment of *Cecidochara connexa* (Macquart) (Diptera : Tephritidae) on *Chromolaena odorata* (L.) King and Robinson in Kerala. *J Biol.Control* 25(1)

Popular article

Lyla K.R. and Manichellappan. 2011. Mealy moothakkethire mithrakedangal Kerala Karshakan January 2011. p.38-39. Published by Farm Information Beureau, Kerala

Technical Bulletin

Lyla K.R. – AICRP on Biological Control of Crop Pests and Weeds, Vellanikkara, Kerala

Extension Bulletin

Lyla K.R. Jaiveeka Roga – Keeda Niyanthrana upadhikalum upayogikkenda reethikalum (Malayalam)

Lyla K.R. and Manichellappan. Papaya mealy moothayude Jaiveekaniyanthranam (Malayalam)

Finance

Allotment	Expenditure
ICAR - 2927000	2443661
SHM- 200000	1950010

AGRONOMIC RESEARCH STATION, CHALAKUDY

Academic programmes

- Smt. E.B. Gilsha Bai offered the course "Forest survey and Engineering (Fmau 3109)" for the 3rd year students of College of Forestry from July to December
- Smt. E.B. Gilsha Bai was the external examiner for B-Tech Engineering course "soil and water conservation engineering".
- Dr. Mini Abraham was the external examiner for the course programme "Weed management", BSc. Hons(Ag)

RESEARCH PROGRAMMES

A. MAJOR RESEARCH ACHIEVEMENTS (HIGHLIGHTS)

I. AICRP Projects

1. **Comparative study of drip method of irrigation on soil water status, growth and yield of coconut.**

Different levels of irrigation using drips and basin irrigation were compared. Statistical analysis of data on yield showed that drip irrigation at 75% and 100% of pan evaporation and basin irrigation has significant influence on nut yield. In drip irrigation, the nut yield for irrigation at 75% PE was significantly superior to 50% PE and 100% PE. Maximum yield was obtained for basin irrigation and lowest yield was obtained for rain fed crops.

2. **Optimization of plant and lateral geometry for economising micro irrigation (Drip)**

In the present study, keeping the plant population in a unit land constant, lateral spacing was varied to determine the optimal design for micro irrigation system. When the distance between the laterals was increased, the spacing of the plants along the row and total length of laterals got reduced. Results of the study indicated that treatment having a lateral spacing of 2.4m & plant spacing of 30 x 30 cm gave higher benefit cost ratio and treatment with 1.2 m lateral spacing and 30 x 60 cm plant spacing gave lesser benefit cost ratio.

3. **In situ rainwater harvesting through micro catchments and its effect on coconut yield.**

Statistical analysis of data on yield showed that in-situ rainwater harvesting through micro catchments has significant influence on the number of nuts produced. The yield of coconut plants provided with in-situ rainwater harvesting and drip irrigation at 75% PE was significantly superior to the yield of rain fed plant. Maximum yield was obtained for drip irrigation at 75% PE and lowest yield was obtained for rain fed crops. There was no significant difference between the yield of first two treatments

4. **Effect of irrigation and mulching on growth and yield of coconut.**

The objective of the experiment is to study the influence of different levels of irrigation and mulching on growth and yield of coconut. Planting of the coconut seedlings was done during 1992-93 and the irrigation as per the technical programme was scheduled from January 94 onwards. The mulches and irrigation levels were not found to significantly influence nut yield in coconut in the earlier years. However, a positive effect of sub surface mulching in rainfed palms was observed. Mulches were freshly incorporated during 2005 and the results during 2006 revealed that mulching significantly increased nut yield. This positive effect was not visible during last two years.

All levels of irrigation showed significant effect on nut yield over rain fed control, but between different levels, there was no significant difference.

5. **Effect of irrigation on growth and yield of cashew (*Anacardium occidentale*)**

The objective of the experiment is to study the influence of irrigation on growth and yield of cashew and to evolve an optimum irrigation schedule for the crop. The experiment was started during June 1996. Results of the experiment indicate that yield is significantly influenced by

irrigation. All the three levels of irrigation were on par indicating that low level of irrigation is sufficient to get higher yields from cashew.

6. Water Management practices for coconut based cropping systems.

The experiment started during summer 2002. Planting of nutmeg, arecanut and pepper was done in existing coconut plantation and irrigation treatments were started in 2004. Due to irrigation coconut yield is found to increase, but the different levels did not show any significant influence. Current years yield data on nut yield of coconut showed that in a coconut based cropping system where coconut, arecanut and nutmeg are grown together, arecanut and nutmeg required only 75 % of the recommended irrigation when coconut is given 75% irrigation. The nut yield of arecanut showed that if arecanut and nutmeg are given 100 % irrigation coconut requires only 50% of the recommended irrigation though the yield was not statistically significant.

7. Optimisation of field water requirement for efficient operation of wet seeder and cono weeder for rice.

Statistical analysis of yield data reveals that weeding using cono weeder has significant influence both on the straw weight and grain weight. All the treatments using cono weeder both with and without standing water, gave significantly higher grain weight than that with hand weeding. Weeding at 20 DAS & 40 DAS using cono weeder and without standing water gave maximum grain and straw yield. Treatment with standing water and hand weeding gave minimum grain yield. All the treatments without standing water gave higher yield compared to the treatments with standing water. Among the treatments with and without standing water, weeding at 20 and 40 DAS was superior to other treatments.

8. Designing low cost organic fertigation system for homestead vegetable production

The objective of the experiment is to design a low cost semi-automatic system for organic fertigation of vegetables in homesteads of Kerala. Mud pots having holes for coir wicks were used for filtering the organic fertilizers like cow dung solutions and ground nut solution. Filtrate, mixed with water in a proportion 1: 10, was passed through different micro irrigation equipments such as drip, micro sprinkler, mist and fogger. One irrigation system with four laterals was installed for this. One wire mesh filter was also incorporated in the system. There is also provision for water fertilizer solution to enter the system without passing through the wire mesh filter. The experiment was going on

9. Micromising irrigation and fertigation through inline drippers

The objective of the experiment is to study the soil moisture distribution pattern and to study the effect of mulch in conserving soil moisture. Salad cucumber was planted in the field by the mid of December 2010. Different treatments were laid out in the field. Observations like soil pH, soil moisture etc are being taken at weekly interval.

10. Productivity enhancement through Intercropping and efficient water Management techniques in ginger

The experiment started during September, 2010. Planting of rhizomes was carried out in October and irrigation treatments were started according to the technical programme.

Amaranth as intercrop was sown in furrows in between ginger beds. The harvest of one amaranth crop is over. A second crop of amaranth is already seeded and the crop is coming up. The ginger crop is in its 4th month of growth. Periodic sprayings against pests and diseases are being carried out, fertilizers and manures are applied and observations are being recorded.

11. System Intensification for better water productivity in banana

Objective of the study is to develop a water saving production system for banana variety Nendran under modified high density planting.

Planting has been done with one, two and three suckers per pit as three treatments. After cessation of rains, irrigation was given on alternate days at three different levels viz. 20 l, 30 l and 40 l per plant. 40 liters per plant was taken as the control and basin irrigation was the method followed. In the other two levels, irrigation was done using drip.

Different levels of irrigation did not have any significant effect on yield. Irrigating the plant @40l/plant was on par with giving irrigation @20l & 30l/plant through drip method. First year results on yield showed that banana needs 10l/Plant/day for optimum yield. The results showed that water can be saved by 25 to 50% when drip irrigation was practiced instead of traditional basin irrigation.

II. Plan projects

Management technology for productivity and sustainability of rice in wetlands

To study the effect of organic sources in combination with different levels of inorganic fertilisers on productivity and sustainability of rice based cropping systems

Analysis of data revealed that yield and yield attributes were not significantly influenced by source of manure. With regard to fertilizer levels, plots with organics alone showed significantly lower yield compared to fertilizer applied treatments.

Evaluation of different levels of organic and inorganic nutrients under bubbler irrigation system (BIS) for cucurbits

The experiment is aimed at studying the influence of different sources of organics and levels of inorganics on growth and yield of bitter gourd at different moisture regimes under BIS

Analysis of data on yield and yield attributes revealed that levels of irrigation had significant effect on yield but not the levels of fertilizer. Fruit yield was significantly influenced by irrigating the crop through KAU micro sprinkler and was superior to farmer's practice of pot irrigation (5mm daily). Levels of fertilizer had no significant influence on growth and yield.

Water Management studies in Horticultural Crops

a) Technology development for enhanced water and nutrient use efficiency in coconut plantations.

Mulching of the field with coconut leaves, summer ploughing, cover cropping with cowpea and keeping the field undisturbed were done according to the technical programme. Soil moisture content is being recorded at fortnightly intervals.

Farmer participatory trials on adaptability of KAU micro sprinkler in horticultural crops

The project aims at standardizing the details of irrigation requirement in various horticultural crops using KAU micro sprinkler and to popularize the technology by conducting demonstration in farmer's field.

Experiment on fertigation in banana using KAU micro sprinkler under triangular method of planting was done with two levels of irrigation and three levels of fertilizer application. Observations on different biometric and yield characters are being taken.

Performance Evaluation of ground water recharging system of the farm

Cleaning and strengthening of farm pond was carried out. Soil erosion and water balance study in the percolation pond is being conducted.

Micronutrient fertilization in Horticultural crops

The project aims to determine the micronutrient requirement of fruit crops such as banana and pineapple and important vegetable crops such as bhindi, cowpea and cucurbits to improve the productivity and quality and also to demonstrate the correct usage of micronutrients in these crops by laying out trials in farmers field.

The treatment consists of application of Zn, B and Cu individually and in combination of all these treatments and control with no micronutrients. Experiment was done to determine the micronutrient requirement of bhindi, cowpea, banana and pineapple. Initial studies showed positive response to application of micronutrients such as zinc, boron and copper. Experiment is being continued

Farmer participatory research extension and seed production programme

Demonstration on Influence of pheromone trap in cucurbits for fruit fly was done in farmers' field. Reduction in incidence of fruitfly attack was noticed.

Evaluation of selected vegetables under protected cultivation

The performance of cabbage, cauliflower, tomato and capsicum in the green house were studied and compared with open condition. The experiment is in progress.

SPB project on nutrient management

Objective of the project is to assess the nutrient requirement of crops based on soil test values and crop nutrient status. Selection of farmers having crops with high yield potential in Trichur districts for the crops namely paddy, coconut, banana, pepper and vegetables were completed. Soil samples were collected and yield of crops were recorded and analysis of samples is in progress.

III. Externally aided Projects

1. Scaling up of Water Productivity in Agriculture for livelihoods through Teaching Cum Demonstration, Training of Trainers and Farmers

Training programmes organized

Fifteen farmer's training and trainer's training were organized during 2010-11. Total number of trainers trained is 58 and total number of farmers trained is 958, covering different districts of Kerala. The programme was implemented in co-operation with different KVKs and research and teaching institutions of KAU.

1. Diagnosis and recommendation of micronutrient fertilization in Banana- KSCSTE funded project.

Soils from different locations under banana cultivation in Thrissur district are being analysed for major and micronutrient status. Deficiencies of potassium, zinc, boron and copper were observed in some locations. Work is in progress

2. SHM project on "Establishment of small Mangostein nursery"

It is a one year project sanctioned for Rs.3 lakhs. The project was started during April 2011. Under this project germinated Mangostein seeds were collected from selected trees with high yielding and good quality Mangostein fruits in farmer's field. The seedlings were raised and sold to farmers. Production and distribution of seedlings is being continued

3. SHM project on "Establishment of small Nutmeg nursery"

Under this one year project germinated nutmeg seeds and budded nutmeg plants were collected from high yielding and good quality nutmeg fruits in farmer's field. The seedlings were raised and sold to farmers. Production and distribution of seedlings is being continued

4. SHM project on "Establishment of Hardening unit for gerbera and orchids"

Constructed green house for raising gerbera and orchid plantlets. Under this project hybrid gerbera plants and different types of orchids (mother plants) were collected. Flowered gerbera plants were sold.

5. SHM Project on "Vermi Compost Production Unit "

In this project a vermicompost production unit was established. The production of vermicompost, worms and sale of worms is going on

Details of research projects

1. Completed projects during 2010-2011: 6 Nos (AICRP projects)

1. Optimization of plant and lateral geometry for economising micro irrigation (Drip)

In the present study, keeping the plant population in a unit land constant, lateral spacing was varied to determine the optimal design for micro irrigation system. When the distance between the laterals was increased, the spacing of the plants along the row and total length of laterals got reduced. Results of the study indicated that treatment having a lateral spacing of 2.4m & plant spacing of 30 x 30 cm gave higher benefit cost ratio and treatment with 1.2 m lateral spacing and 30 x 60 cm plant spacing gave lesser benefit cost ratio.

2. In situ rainwater harvesting through micro catchments and its effect on coconut yield

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significantly superior to the yield of rain fed plant. Maximum yield was obtained for drip irrigation at 75% PE and lowest yield was obtained for rain fed crops. There was no significant difference between the yield of first two treatments

3. *Effect of irrigation and mulching on growth and yield of coconut*

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The objective of the experiment is to study the influence of irrigation on growth and yield of cashew and to evolve an optimum irrigation schedule for the crop. The experiment was started during June 1996. Results of the experiment indicate that yield is significantly influenced by irrigation. All the three levels of irrigation were on par indicating that low level of irrigation is sufficient to get higher yields from cashew.

5. *Water Management practices for coconut based cropping systems.*

The experiment started during summer 2002. Planting of nutmeg, arecanut and pepper was done in existing coconut plantation and irrigation treatments were started in 2004. Due to irrigation coconut yield is found to increase, but the different levels did not show any significant influence. Current years yield data on nut yield of coconut showed that in a coconut based cropping system where coconut, arecanut and nutmeg are grown together, arecanut and nutmeg required only 75 % of the recommended irrigation when coconut is given 75% irrigation. The nut yield of arecanut showed that if arecanut and nutmeg are given 100 % irrigation coconut requires only 50% of the recommended irrigation though the yield was not statistically significant.

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Extension programme

Following training programmes were conducted

1. Women empowerment through agriculture and allied programme (6/8/2010 to 12/8/10)
2. Vegetable cultivation and seed production (18/8/2010)
3. Micro irrigation (1/11/2010)
4. Vegetable seed production & Nursery management, budding and grafting (8/11/10)
5. Micro irrigation and Fertigation (9/11/2010)
6. Scaling up of water productivity in Agriculture for livelihoods through Teaching cum

Demonstration, Training of Trainers and Farmers .

Government of India Project "Scaling up of Water Productivity in Agriculture" started under the IXth Plan is in operation since 2007. ARS Chalakudy is the nodal office of the training.

The main objective of the project is training farmers and trainers about different aspects of aspects of water conservation and water resource management. Training programmes were carried out by the Agronomic Research Station, Chalakudy through different KVKs, Central Govt. Institutions, Research Stations and Colleges under KAU. Inaugural function of the training 2010-2011 was conducted at ARS Chalakudy on 9-7-2010. Honourable member of Parliament, Sri K. P. Dhanapalan inaugurated the function. Honourable Vice Chancellor Sri.K.R. Viswambaran was the chief guest. Dignitaries from Kerala Agricultural University and officials from local bodies attended the function. During the year 2010-11, we have conducted 15 farmers training and 2 officers trainings and trained 958 farmers and 58 officers

Technology demonstrated in the farmers field

Demonstration of "Effect of Fruit fly pheromone trap in controlling fruit flies in cucurbits "

A demonstration trial was successfully conducted under the project "Farmer participatory research extension and seed production programme" in the bitter gourd plot (Sri.K.M.Mani, Kottakkal house, Angamaly) and in the snake gourd plot (Sri. K. M. Bhaskar, Kattooparambil, Choukka, Chalakudy). Observations showed that fruit fly attack was low in snakegourd and bitter gourd plots where pheromone traps were kept. Also it was observed that KAU pheromone trap for fruitfly is better than that of market available one.

Farm advisory service rendered

Scientists of the Station rendered advisory service to the farmers, by visiting the field, by post and through telephone, on various aspects of irrigation and crop production and plant protection of rice, vegetables and banana.

Radio talk/Television Programme

1. Dr. K.P.Prameela. radio talk on protected cultivation at AIR Thrissur on 01/06/10
2. B. Sudha, Asst.Prof has done discussion on " Water conservation" on 1/3/2011 at AIR, Trivandrum

List of Publications

1. Scientific papers

1. Mini Abraham, V. S. Devadas and T.K.Bridgit. 2010. Effect of organic nutrition on disease tolerance in vanilla (*Vanilla Planifolia* Andrews) Indian Journal of Arecanut, spices and medicinal plants 12(1)11-12

Popular Articles

1. T. K. Bridgit, 2010. Importance of Biodiversity in food security. Grama Jyothi (Malayalam) Kottappuram Development Society (KIDS), Kodungallor, Thrissur Oct. 2010, p. 6-9
2. E. B. Gilsha Bai and B. Sudha 2011. Ground water-a precious resource, Spice India (Malayalam) Feb.2011
3. E. B. Gilsha Bai and B. Sudha 2011. Water harvesting – stories from the past. Harithabhumi, (Malayalam) March,2011.

No. of visitors to the station (farmer groups/students)

- 25 school teachers from Thrissur district visited the station in connection with the vacation training programme on 13-05-2010.
- 68 farmers visited the station in connection with the training on "Organic cultivation and kitchen gardening organized by Janasree mission Ernakulam on 17/5/2010
- 25 Farmers from Chavakkad block visited the station in connection with the ATMA training on 19-05-2010
- 25 school teachers from Thrissur district visited the station in connection with the vacation training programme on 20-05-2010.
- 25 Farmers from Adimaly block visited the station in connection with the ATMA training on 20-05-2010
- Students of College of Horticulture, Vellanikkara visited the station on 9/9/2010 as a part of RAWE programme 2010.

- Asst. Director of Agriculture, RATTTC Vyttila visited the station along with 20 Agrl. Officers in connection with the training on Micro irrigation and fertigation on 09/11/2010
- 60 students from Govt H. S Chalakudy visited the station to study the different Agrl. Activities of the station on 10/11/2010
- Students from Govt V H SE Nadavarambu visited the station to study the different Agrl. Activities of the station on 19/1/2011

Total receipts in rupees by sale of seeds and planting materials during
01-04-2010 to 31-03-2011 = Rs 10,18,355/-

Name of the project under which the production was carried out

1. Seed and Nursery programme
2. Revolving fund schemes
3. SHM projects
4. Other plan and EAP projects operating in the station.

Other details if any

Nurseries developed under the SHM projects

1. Mangostein nursery

Under the SHM project on Establishment of small Mangostein nursery" germinated Mangostein seeds were collected from selected trees with high yielding and good quality Mangostein fruits from farmer's field. The seedlings were raised and sold to farmers. Production and distribution of seedlings is being continued

2. Nutmeg nursery

Under the SHM project on Establishment of small Nutmeg nursery" germinated nutmeg seeds and budded nutmeg plants were collected from high yielding and good quality nutmeg fruits in farmer's field. The seedlings were raised and sold to farmers. Production and distribution of seedlings is being continued

3. Gerbera and orchid nursery

Under the SHM project on " Establishment of Hardening unit for gerbera and orchids" Constructed green house for raising gerbera and orchid plantlets. Under this project hybrid gerbera plants and different types of orchids (mother plants) were collected. Flowered gerbera plants were sold. Nursery development work is in progress.

Under the ICAR development grant, farm pond of size 26m x 12m x 6m constructed for maximum water productivity so as to have the facility for increased vegetable cultivation during summer months.

Demonstration Programmes:

A. Technology demonstrated in the station

(i) Precision farming

- a. Greenhouses :Four greenhouses were constructed with fog and mist facilities and vegetable cultivation is in progress . In one green house propogation and mass multiplication of orchids and gerbera are also undertaking
- b. RainshelterTomato: is cultivated in the rainshelter and the performance of the crop is very good especially during rainy season.
- c. Mist Chamber :Mist chamber were constructed for propagation of nursery plants.
- d. Fertigation unit: Fertigation unit with fertilizer injector, screen filter sand filter and ventury and other irrigation accessories

ii). Watershed model

Agronomic and engineering measures for soil and water conservation, check dams, farm ponds and water recycling devices are demonstrated

(iii) **Vermicomposting**

Under the SHM funded projects, constructed a unit for the production of vermicompost. Vermicompost technology which can be use in household are also demonstrated.

IV. **Mushroom production unit**

Unit for the production of milky and oyster mushroom is being started under the revolving fund scheme.

(V) **Rain water harvesting structures**

(VI) **Micro irrigation techniques**

Various microirrigation techniques suitable for different types of crops are demonstrated.

B. Technology demonstrated in the farmers field

Demonstration of "Effect of Fruit fly pheromone trap in controlling fruit flies in cucurbits "

A demonstration trial was successfully conducted under the project "Farmer participatory research extension and seed production programme" in the bitter gourd plot (Sri.K.M.Mani, Kottakkal house, Angamaly) and in the snake gourd plot (Sri. K. M. Bhaskar, Kattooparambil, Choukka, Chalakudy). Observations showed that fruit fly attack was low in snakegourd and bitter gourd plots where pheromone traps were kept. Also it was observed that KAU pheromone trap for fruitfly is better than that of market available one.

Finance

	Expenditure	Receipts
Non Plan	2412265	
NARP	3165680	
Plan	997932	
ICAR	7647607	
EAP	908848	
RF	637387	1168845
Bank Charges	10097	
Fund Transferred to Comptroller	700000	
Station Receipt	769038	331131
Total	1,72,48,854	14,99,976

**AROMATIC AND MEDICINAL PLANTS RESEARCH STATION,
ODAKKLAI, ASAMANNOOR POST, ERNAKULAM DIST.**

Research Projects

1. **Collection and maintenance of germplasm of aromatic and medicinal plants.**

The station serves as a conservation centre for germplasm of important aromatic plants relevant to the state. This year also, collection of 450 accessions of lemongrass, twelve accessions of palmarosa, 235 accessions of cinnamon and 18 accessions of vetiver were maintained. In addition a collection of more than 500 types of medicinal plants were maintained in the herbal garden.

2. **Study of selected Adaptogenic Plants and Ayurvedic Drugs with special reference to Polyphenolic Composition and Antioxidant Activity.**

(KAU-Oushadhi collaborative project financed by National Medicinal Plants Board, Govt. of India, Outlay Rs. 25.00 lakhs for 3 years. PI: Dr. Samuel Mathew, Professor)

Antioxidant capacity of about 125 plants and 60 Ayurveda medicines was assayed in this project,

by a set of *in vitro* methods. The polyphenols contributing to the radical scavenging activity were identified by HPLC. Decline in the antioxidant capacity of important choornams, arishtams and lehyams under storage was estimated. Manufacturer-wise and batch-wise variations in the quality of selected Ayurveda medicines were also studied.

3. Investigations on anti-inflammatory properties of selected underexploited medicinal plants

- Anti-inflammatory activity of all the three plant species included in the study is confirmed by *in vivo* studies.
- Ethanol extractives of *Artanema sesamoides* and *Argyreia speciosa* roots were much superior in anti-inflammatory activity.
- *Artanema sesamoides* root extractives showed highest antioxidant activity and very high total phenolic content compared to other two root extractives.
- High antioxidant activity observed in fractions with anti-inflammatory activity
- Phenolic content was found to be high in fractions showing high anti-inflammatory activity
- Pectin which is generally reported to contribute to anti-inflammatory activity was detected to a level of 3.19% in roots and 5.69 in leaves of *Artanema sesamoides*
- Anti-inflammatory activity was found to concentrate in butanol fraction of root ethanolic extractives of *Artanema sesamoides* on partitioning into ethyl acetate, butanol, methanol and water fractions.
- Ethanolic extractives showed anti-inflammatory activity in chronic inflammation model i.e. in cotton pellet granuloma model.
- Direct aqueous methanolic extractives showed anti-inflammatory activity in chronic inflammation model i.e. in adjuvant arthritis model.
- Antioxidant activity was found to be the highest in butanol fraction i.e. an EC₅₀ value of 54 ppm. The butanol fraction after acid hydrolysis for 3 hrs showed antioxidant activity equivalent to 14 ppm (EC₅₀ value).
- Water decoction of roots showed higher anti-inflammatory activity compared to water infusion of roots and water decoction and water infusion of leaves. contribute to anti-inflammatory activity
- Root and leaf extractives were found to contain pectin which is reported to contribute to anti-inflammatory activity
- No acute toxicity was found up to a dose of 15000 mg / kg of animal in case of ethanolic extractives and up to 5000 mg/kg of animal in case of aqueous methanolic extractives when tested in wistar rats.

4. In the NMPB financed project for development of good agricultural practices and GAP monograph of *Baccopa monnieri*, 60 accessions of brahmi were collected from different agro ecological situations. The accessions AMP 11 and 42 were found to show exceptionally high Bacoside content of 3.878% and 4.711% respectively. Studies on domestication showed that though saturation water level of the soil with is adequate for the best rooting and early growth, for subsequent satisfactory growth, yield and for effective weed control, a shallow standing water level of 2-3 cm is essential. For obtaining more number of harvests and higher total yield per year, planting has to be done with the onset of monsoon i.e. during May. The plant was found to respond well to organic manuring. The ideal harvesting interval was found to be 60 days. The natural habitats were surveyed to gather information on distribution, extent of occurrence and availability of the species and to analyse the peculiar features of the growing situations. A brief survey among the major user industries of the state was also carried out to collect information on quantity, form and period of requirement of brahmi, price offered, source of the material and formulations prepared by them with brahmi as an ingredient.

Details of research projects.

1. Study of selected Adaptogenic Plants and Ayurvedic Drugs with special reference to Polyphenolic Composition and Antioxidant Activity.

(KAU-Oushadhi collaborative project financed by National Medicinal Plants Board, Govt. of India, Outlay Rs. 25.00 lakhs for 3 years. PI: Dr. Samuel Mathew, Professor)

Antioxidant capacity of about 125 plants was assayed in this project, by a set of *in vitro* methods. The individual polyphenols contributing to the radical scavenging activity were identified by HPLC studies. Similarly, about 60 Ayurveda medicines (classical, proprietary as well as patented products) having application in rejuvenative therapy were also studied for their antioxidant power and the composition of polyphenolic compounds in them were elucidated. About thirty plants with very high antioxidant activity and ten Ayurveda medicines excelling in antioxidant power were identified. Decline in the antioxidant capacity of important choornams, arishtams and lehyams under storage was estimated. Manufacturer-wise and batch-wise variations in the quality of selected Ayurveda medicines were also studied.

Very high antioxidant activity was identified in the fruit rind of kadukka, gooseberry, tannikka and pomegranate as well as leaves of common plants like guava, jack, mango, cashew, badam and asokam. Further, clove buds, cinnamon bark, silybum seeds and *Mucuna pruriens* seeds are other rich sources of antioxidant power in addition to heart wood and leaves of karingali and neermaruthu. The results of the study suggests the possibility of developing antioxidant nutraceutical product/s, individually or from mixtures of the above plant materials.

Further, based on the results obtained, the following Ayurvedic medicines can be popularised for their antioxidant properties Triphala choornam, Gomutra harithaky, Pramehaoushadhy, Thriphalaghritam, Draksha lehyam, Kalyana gulam, Shivagulika, Agasthya rasayanam, Vilvadhya lehyam and Chandraprabha.

Areca nut fruit is another rich source of antioxidant polyphenols but the presence of carcinogenic alkaloids precludes its use in medicine. Utilisation of the fruit after removal of the toxic principles is another challenging work of future.

2. Investigations on anti-inflammatory properties of selected underexploited medicinal plants

FRC Code No: AMP-06-00-02-2008/ODL (10)/ KSCSTE-

Anti-inflammatory activity of *Argyrea speciosa*, *Ipomoea mauritiana* and *Artanema sesamoides* for cure of inflammatory conditions in traditional medicine system is scientifically validated. Ethanol extractives of *Artanema sesamoides* and *Argyrea speciosa* roots were much superior in anti-inflammatory activity. *Artanema sesamoides* root extractives showed highest antioxidant activity and very high total phenolic content compared to other two root extractives. It also showed highest anti-inflammatory activity at a lower dosage at 3 hr observation and also at 7th day of consecutive drug administration. Its root decoction and ethanol extract do not possess acute toxicity. Procedure for extraction of anti-inflammatory fraction from *Argyrea speciosa*, *Ipomoea mauritiana* and *Artanema sesamoides* were developed. Procedure for purification of anti-inflammatory compounds from leaves and roots of *Artanema sesamoides* standardized

Anti-inflammatory activity of root ethanol extractives of *Artanema sesamoides* in chronic inflammation model

In chronic model (cotton pellet induced granuloma), oral administration of ethanol extract of *Artanema sesamoides* showed decreased formation of granuloma tissue by 11.66%, 24.00% and 29.46% ($p < 0.05$) respectively on drug administration for seven consecutive days at doses of 100 and 200 mg/kg and standard drug. The root ethanol extract showed high antioxidant activity ($EC_{50} = 62.3$ ppm) when analysed by DPPH method.

Anti-inflammatory activity of subfractions of root ethanol extractives

Different fractions (ethyl acetate, butanol, methanol and water) partitioned from root ethanol extractives of *Artanema sesamoides* were evaluated for anti-inflammatory activity by carrageenan induced rat paw inflammation model and among these fractions, butanol fraction showed highest activity (50% inhibition compared to negative control), TLC profile of active butanol fraction in different solvent system revealed the presence of four major compounds.

Anti-inflammatory activity of root and leaf decoction and infusion in acute and chronic model

Water infusion and water decoction of both root and leaves of *Artanema sesamoides* was evaluated for anti-inflammatory property in rats using carrageenan induced rat paw oedema model and root decoction was found to be most active in curing inflammation but inferior to successive ethanolic extract of root. Traditionally root decoction is used in inflammatory conditions. Root water decoction was

evaluated for anti-inflammatory property in chronic inflammation model i.e. adjuvant arthritis model and was found to inhibit inflammation by 9.78 % at a dose of 200 mg/kg and 14.67 % at a dose of 400 mg/kg. In root decoction, 11 peaks/ compounds with antioxidant activity was observed which contribute to its anti-inflammatory activity.

Acute toxicity studies

Acute toxicity of ethanolic root extract was studied and no death or fatal symptoms had been noticed up to a dosage of 15000mg/ kg of animal. Acute toxicity of root decoction was studied and no death or fatal symptoms had been noticed up to a dosage of 5000mg/ kg of animal.

Chemical characterization

Active fraction has been sent for LCMS profiling at IIT, Mumbai and active compounds purified by preparative HPLC have been sent for H NMR and C NMR, and FTIR.

3. Development of good agricultural practices and GAP monograph of *Bacopa monnieri* – on going

Funded by National Medicinal Plants Board. Sanctioned for implementation at the Aromatic and Medicinal Plants Research Station, Odakkali for a period of three years from 2009 to 2011 with a financial outlay of Rs. 6,00,000. The date of start of the project is 1.1.2009. The objective of the study is to develop good agricultural practices and G.A.P. Monograph of *Bacopa monnieri* for its development and cultivation in the country.

The project was initiated during 2009 and the various programmes of work are progressing as per the programme schedule.

60 accessions of brahmi were collected from different agro ecological situations. From these, 37 accessions were selected and they were subjected to RAPD analysis to examine the extent of similarity among the collections. The collections were found to belong to four clusters and some of them differed widely. Quality evaluation of the selected accessions were carried out by estimation of Bacoside A. The accessions AMP 11 and 42 were found to show exceptionally high Bacoside content of 3.878% and 4.711% respectively. Four accessions viz. AMP 11, 42, 39 and 52 which showed bacoside A values of above 1.5% are promoted for further evaluation for identification of a superior strain for cultivation.

Field experiments on time of planting, depth of standing water required, system of planting, nutrient requirement, harvest interval and storage methods were carried out to develop a suitable package of practices for the quality production of *B. monnieri* and to study the effect of various agronomic practices on the quality of the crude drug. Study on depth of water column and planting method showed that though saturation water level of the soil with is adequate for the best rooting and early growth, for subsequent satisfactory growth, yield and for effective weed control, a shallow standing water level of 2-3 cm is essential. Experiment on influence of time of planting showed that for obtaining more number of harvests and higher total yield per year, planting has to be done with the onset of monsoon i.e. during May. If the planting is delayed beyond August, vine yield is reduced considerably. Also leaf stem ratio decreases drastically, affecting the quality of the economic produce. The plant was found to respond well to organic manuring. The ideal harvesting interval was found to be 60 days. Out of the different storage methods tested, storing in plastic bucket was found to be the best as it showed lowest moisture percentage and fungal infection. The important pests and diseases are being recorded and general control measures are taken and recorded to evaluate their efficiency.

In addition to the above experiments, natural habitats were surveyed to gather information on distribution, extent of occurrence and availability of the species and to analyse the peculiar features of the growing situations. Soil and plant samples were collected from these areas and they are being analyzed for content of toxic and heavy metals as well as bacoside A content to study the influence of growing system on quality of brahmi.

A brief survey among the major user industries of the state was also carried out to collect information on quantity, form and period of requirement of brahmi, price offered, source of the material and formulations prepared by them with brahmi as an ingredient.

B. Development projects.

1) National Horticulture mission Project (Aromatic plants component)

About 316 kg of lemongrass seeds were produced during 2010-11 which is sold to the

cultivators in different parts of the country. Around 16000 vetiver slips of variety ODV- 3 were also distributed to farmers and different institutions during last year. Lemongrass oil (47.0kg) produced under the scheme was sold to public at a cost of Rs.35/30ml. Aromatic oil samples received from farmers and industry were analysed for quality and reports provided, on a regular basis from the Regional Analytical Laboratory funded under the scheme. Consultancy was offered to various drug manufacturing units for development and maintenance of in-house quality control laboratories.

2) National Horticulture mission Project (Spices component)

The following spices planting materials were produced in the station and distributed to farmers and Spices Board.

Item	Production
i. Pepper	100000
ii. Nutmeg	1182
iii. Curry leaf / cinnamon	3100
iv. Turmeric-seed-rhizomes	1000 kg

3) Facilitation Centre for medicinal plants: This project is funded by National Medicinal Plants Board. A total of 4 trainings were organised at different districts during 2010-11 of a state and 249 farmers were trained on cultivation of medicinal plants. In the work shop conducted, at College of Agriculture, Padannakkad, Kasaragodu district during the year under scheme 375 participants from different sectors of Medicinal plants attended.

4) RKVY project "Strengthening of analytical laboratory for quality testing and certification of produce of medicinal plants at AMPRS, Odakkali" (Outlay Rs. 10.00 lakhs)

Essential items of accessories of sophisticated equipment in the analytical laboratory were purchased and installed and the analytical capability of the lab for testing and certification of farmer's produce was strengthened.

5. Establishment of Model Nursery for Medicinal Plants

Funded by National Mission on Medicinal Plants, State Horticulture Mission, Kerala

Following activities were undertaken under the project

- Construction roof rain water water storage pond of 2 lakh litre capacity
- Setting up of steam sterilisation unit
- Construction of green house – 1 No. (400 m²) , mist houses – 2 Nos.,(100 m² each),
- Construction of field germination beds, vermi compost tank, repair of existing nursery sheds
- Development of facility for storage of nursery items
- Development of seed processing and storage facility by air conditioning seed storage room, purchase of seed storage cabinets
- Development of facility for seed germination and moisture testing

6. 'Preparation of Web Based Interactive Packages for Selected Medicinal Crops'

Funded by NABARD (outlay: Rs. 8.9 lakhs)

The project includes development of live demonstration of cultivation practices and capturing and posting the knowledge in web as text, still photographs and video clips for effective and meaningful transfer of technical knowhow to the progressive farmers. In order to facilitate recording of various field operations, these crops are raised in the farm; besides recording is also carried out in farmers fields in different districts. Agro-technology of the following crops will be first documented in high quality Digital Video mode and then web posted. The works are in progress.

7. Augmenting Tissue Culture Facilities for Mass Production Of Quality Planting Materials

Funding Agency : State Horticulture Mission – Kerala. Project outlay: Rs. 15 lakhs

PI: Dr. Ancy Joseph, Associate Professor (Horticulture). The following items were purchased & installed under the project Autoclave , hot air oven & precision water bath, Electronic analytical balance,

Laminar air flow cabinet, Tissue culture racks, Computer, Water purifier, Micro wave oven, pH meter, SMF Batteries & UPS, air conditioners.

8. Refinement of technological innovations in vegetable production through experiments in cultivators fields for attaining food security. Funded by DoA, Govt of Kerala. Financial outlay 2.04 lakhs. Twenty experiments comparing different released varieties of vegetables, different organic amendments, planting methods etc are laid out in farmers field.

Extension programmes

Being one of the pioneer institutions engaged in the research on aromatic and medicinal plants, good liaison is maintained between producers, traders, and the user industry. Dissemination of technology is efficiently carried out through regular farmer contact programmes, correspondence, news papers, audio and visual media. The station functions as a quality testing centre for essential oils and important medicinal plants & crude drugs thereby enabling the farmers to fetch the maximum price for their produce based on quality. Agrilclinic and training programmes are integral part of our extension activities. We have participated in local agricultural fairs and exhibitions. The station meets the demand of planting materials from potential cultivators not only from within the state but also from places everywhere. Two day - District level training programmes were conducted for farmers of Kannur, Alleppey, Pathanamthitta and Kottayam Districts. A state level farmer-industry interphase was conducted on 11-2-2011 at College of Agriculture, Padanakkad.

Radio talks / TV programmes /: Audio-video cassettes Radio talks :			
Topic	Date		Name of Scientist
Cultivation and post harvest management of lemongrass and spices	5 Jan 11	AIR, Devikulam	Dr. Samuel Mathew
Medicinal plants – scope and cultivation	8-10-10	AIR, Kochi	Dr. Gracy Mathew

Technical Bulletins

Technical bulletins on the following medicinal plants were prepared and distributed among farmers 'Palakappayyani', 'Kumizhu', 'Chetthikkoduvely', 'Keezharnelly' and 'Naikkaruna'

Finance

Head	Expenditure (Rs.)	Receipts (Rs.)
Non Plan	7785489	1716413
Plan	631502	
ICAR	0	
OEAPs	8364919	
Revolving fund	1485600	
Total	18267510	

PINEAPPLE RESEARCH STATION VAZHAKULAM

Research programmes

The Pineapple Research Station, Vazhakulam aims at developing pineapple varieties suitable for processing and table purpose, identify a superior clone of pineapple utilizing natural and induced variability. The pineapple hybrids produced in the hybridisation programme breeding for yield and quality of pineapple are being evaluated. Irradiated suckers of pineapple variety Mauritius were evaluated for better fruit quality and the evaluation of the better types is continued. Hybrid seeds of pineapple were irradiated and the seedlings produced were evaluated. The evaluation of the better types found is continued. In vitro cultures of the Mauritius variety were irradiated and the plantlets produced were evaluated. During last year about 2064 hybrids and 98 mutants were evaluated for yield and quality

parameters. Nine hybrid lines produced fruits having weight more than 1.9 kg and TSS more than 19%. Different types found in farmers field were collected and being evaluated. Various types of passion fruit collected from southern states identify a passion fruit variety suitable for low altitude areas in Kerala are being evaluated. Survey on pest and disease in pineapple is continued. Pest and disease problems of 30 farmers were attended during last year. Work on detection of virus disease in pineapple is continued. Production of tissue culture pineapple is continued.

Fresh inoculation of four varieties of pineapple (Mauritius, MD2, Kew and *Ananas nanas*) was done in MS+4BA+1NAA and obtained multiple shoots within a month. All ready established cultures were subcultured in MS+4BA+1NAA for multiplication and MS+1NAA for rooting at regular time interval. The plants with enough roots were treated with 20g/l pseudomonas for 20 minutes and planted in potting mixture (Cowdung + solarised soil) for hardening. Less rooted plants were treated with 1ml NAA/l for half an hour before planting for further rooting. Leaves and nodes of the two varieties (purple and yellow) of passion fruit gave maximum response in 2NAA and 2BA respectively. Nodal explants gave faster response than leaves. Fresh inoculation of five varieties of banana (Red banana, Nendran, Robesta, Poovan and Njalipoovan) was done in MS+5BA. Elongation and bulging of the buds were observed within two weeks.

The company project entitled 'Evaluation of fungicide Samarth (Hexaconazole 2% SC) against collar rot of pineapple' sponsored by M/s. Rallis India Pvt. Ltd., Bangalore was evaluated at the Pineapple Research Station, Vazhakulam for one season during 2010-11 with a financial outlay of Rs. 1,65,450. The objective of the project was to evaluate the bioefficacy of Samarth (Hexaconazole 2% SC) against pineapple collar rot and other diseases. The results show that it is highly effective in controlling the diseases. Hexaconazole 0.5% is more efficient in disease control though it slightly affects plant growth in terms of plant height and leaf length in the early stages with no marked difference thereafter. Hexaconazole 0.4% is safest with good disease control efficiency. A project proposal to identify a high yielding superior quality passion fruit variety for commercial cultivation in Kerala so as to harness the full potentials of the growing situation giving maximum benefit to the growers in terms of more employment, higher incomes and better standard of living at a total cost of Rs.16.00 lakh was submitted to Kerala State Council for Science, Technology and Environment for Grant of Science Research Schemes (SRS).

A project proposal to establish a fruit processing laboratory at PRS for the efficient conversion of leftover fruits to value added products like squash, jam, syrup, etc at a total cost of Rs.19.90 lakh was submitted for approval under RKVY 2011-12.

Pineapple Research Station, Vazhakulam prepared its Vision 2030 wherein it visualizes to be Fruit Crops Research Centre of Excellence (FCRCE) by 2030. The advanced research centre of excellence dreams to be the ultimate authority and provider of excellent quality technology, products and services in fruit crops through concerted research and development efforts sustained by best human resources and infrastructure development.

Extension programmes

a) Highlights of extension activities :

The management problems faced by pineapple farmers are regularly attended by visiting fields, in person, seminars, through telephones, emails etc. Extension activities are mainly done in association with the Pineapple Farmers Association, ever since the inception of the station. This has contributed much to the development of pineapple in Kerala. The website of the station www.kau.edu/prsvkm was updated with more relevant and useful information for the public.

Farm Advisory Services

In person	Over telephone	Through letters/Email
90	60	30

Radio talks/TV Programmes/Audio-video Cassettes

Topic	Station	Date	Name of Scientist
On use of chemicals in pineapple cultivation	FM, Kochi	11/10/2010	Dr. Joy P.P

On use of chemicals in pineapple cultivation	AIR, Trichur.	12/10/2010	Dr. Joy P.P
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List of publications

- Joy P. P. 2010. Pineapple sector in Kerala: Status, opportunities, challenges and stakeholders. Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.
- Joy P. P. 2010. Benefits and uses of pineapple. Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.
- Joy P. P. 2010. Production technology for Vazhakulam pineapple (Mauritius). Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.
- Joy P. P. 2010. Production technology for pineapple variety 'Kew'. Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.
- Joy P. P. 2010. Passion fruit (*Passiflora edulis* Sims) Passifloraceae. Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.
- Joy P. P. 2010. Passion Fruit Production Technology. Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.
- Joy P. P. 2010. Status and prospects of Passion Fruit Cultivation in Kerala. Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.
- Joy P. P. 2011. Pineapple Research Station: Vision 2030. Pineapple Research Station (Kerala Agricultural University), Vazhakulam-686 670, Muvattupuzha, Ernakulam, Kerala, India.

Finance

Head	Expenditure(Rs)	Receipts(Rs)
Non plan	-	-
Plan	196983	48999
ICAR	-	-
OEAPs	140556	-
Revolving fund	-	-

BANANA RESEARCH STATION, KANNARA

Research programmes

Banana:-a.Crop Management

Conservation of germplasm

The germplasm collected from different sources within and outside the country are being conserved in a compact field gene bank. 290 accessions are presently conserved. Characterization of germplasm was continued with IPGRI descriptors and molecular techniques. The hybrid introductions TMB 5295-1 SH-3640 and FHIA-03 are under testing in farm trials in three districts - Thrissur, Palghat and Ernakulam of Central Kerala. TMBx5295-1 is also suited for the preparation of chips.

Popoulu (AAB), a unique introduction with thick blunt fruits, available in the gene bank is useful as a dessert and cooking cultivar. Unripe fruits are suited for chips, while ripe fruits resemble Nendran in taste. *In vitro* multiplication has been taken up to facilitate evaluation.

New additions made from NBPGR, NEW Delhi, NRCB, Trichy during 2009-10 are being field evaluated which include Kluai Namwa Khom(AAB), a semi dwarf cultivar under Pisang Awak(AAB) group. It is shorter in stature than the local clone Karpooravalli, of the same group. An accession with orange yellow fruit pulp and several resistant accessions were also identified.

Another set of 75 ITC accessions supplied by NRCB, Trichy during 2010-11 is in the process of hardening and field establishment. These include, wild *Musa*, diploids(AA,AB) and triploids(AAA,AAB and ABB) including several plantains. Based on preliminary evaluation useful accessions will be retained

Improvement of Nendran

Even though Nendran set seed when pollinated with Calcutta-4 and Pisang Lilin seed germination was difficult and only one hybrid progeny could be evolved earlier. Subsequently seeds obtained during 2010 could be germinated resulting in 5 F1 hybrid progeny. These have been field established along with the first hybrid for evaluation.

b.Crop Production

Highest per hectare yield and B:C ratio was obtained for the spacing 2 x 3 m where three plants were accommodated in a pit and with 100 per cent recommended dose of fertilizers for banana var. Nendran

A new experiment on standardization of organic nutrient schedule in banana var. Nendran was laid out. Another experiment to study the impact of climate change in banana was also initiated

Fibre recovery percentage was highest for machine extraction. Among the retting treatments fibre recovery percentage was maximum for the treatment boiling in NaOH 1.0% for 30 minutes in Nendran and Mysore.

Ag.Entomology

1 Management of Pseudostem borer:-

- Cut and remove the dry leaves and spray chlorpyrifos at 0.05 % at monthly intervals for three times, at 6th, 7th and 8th month after planting is the best treatment.
- Placing 30 cm long, split pseudostem pieces of harvested banana, treated with formulation of *Beauveria bassiana* @ 15 gm/ piece, at weekly intervals starting from 5th month till harvest gave good control of the borer.

2 Management of root mealy bug:-

- Isolated an entomopathogenic fungus, *Paecilomyces lilacinus* for the first time from the root mealy bug, *Geococcus* sp
- Application of recommended dose of lime, i.e., 1 kg/ plant in split doses, regular removal of weed flora in banana gardens (which harbour the mealy bugs), followed by application of entomopathogenic fungus, *Verticillium lecanii*, either alone / or in combination with neem oil (3%) and hostathion in alternate months controlled mealy bug infestation in banana and resulted in higher yield.

Plant Pathology

- The major diseases of banana grown in Kerala are leaf spot diseases, viral diseases like Bunchy Top, Banana Bract Mosaic and Infectious Chlorosis, and Rhizome rot. Panama Wilt was recorded only in Rasthali (AAB), Njalipoovan and Kadali. Fungal diseases were more during rainy period. The pseudostem rotting was recorded on banana var. Kadali. There was no record of any new disease on banana during this period. The fungi causing the diseases were isolated in artificial medium.
- Various isolates of *Fusarium oxysporum f. sp. cubense* was isolated from different samples and compared based on morphological and cultural characters. There was no variation between the isolates.
- Epidemiological studies on sigatoka leaf spot disease showed that the incidence of Sigatoka leaf spot disease was least in June- July planting and maximum during November planting.
- Spraying Propiconazole 0.5 ml/l (0.05%) + Petroleum based mineral oil 1%) showed to be the most effective in controlling sigatoka leaf spot disease and recorded maximum bunch weight.
- The new introductions of the germplasm such as SH-3640, TMB5295-1, FHIA-25, FHIA-21, FHIA03, TMB2x9128-3, TMB 3x15100-6 were found to be resistant to sigatoka leaf spot disease.

- A centre for virus indexing has been established at BR, Kannara utilising the fund received from RKVY. All genotypes in germplasm and all planting material used in banana experiments are being screened for presence of known viruses. Various techniques standardised and validated in this lab are :- 1. BBrMV: RT-PCR and ELISA 2. CMV: RT-PCR and ELISA, 3. BSV: PCR, IC-PCR 4. BBTV: PCR and ELISA

All the TC plants produced from the TC lab of BRS are being indexed. The indexing facility is rendered to other TC lab of the University as well as to private tissue culture labs on payment basis.

- Intensive studies on Banana Streak virus disease was carried out.
- Immunocapture PCR technique was also standardised for indexing BSV

2. JACKFRUIT

- The jackfruit germplasm identified during previous years in farmers field, Pineapple research centre, Vellanikkara and NBPGR, Vellanikkara were characterised using IPGRI descriptors. Promising types suited for fruits, chips and cooking were identified. Vegetative progeny of the identified types are being prepared to establish a clonal block.
- Under Varietal trial, Muttam varikka, Pechiparai -1, Singapore Jack, Palur-1, Burliar-1 and Velipala could be established in the field. Muttom varikka and Pechiparai-1 are vigorous growing than other varieties. Regular flowering and fruiting are observed in Pechiparai-1 and Muttom Varikka. Palur-1 is less vigorous than Pechiparai-1.
- The best method of vegetative propagation in jackfruit has been inarching where the graft take over was 90 per cent with a final success percentage of 50 percentage. Epicotyl and soft wood grafting did not yield satisfactory results.
- Studies on effect of rootstocks on the performance of jackfruit revealed that inarching of jackfruit local variety on jack seedlings and Ainipala seedlings gave 50 percent success.
- The pests of Jack observed were defoliation by grass hopper and leaf caterpillar, Lycaenid caterpillar, a white sphingid caterpillar, green leafhopper and a green katydid. The spittle bug, *Clovio lineaticollis* is a mild but regular pest whenever new shoots are formed. Leaf scraping by a chrysomelid beetle was regularly observed. Fruit fly and a species of red ant was seen colonizing in the ripe fruit in the gumless jack. All the pests were of minor nature only.
- The diseases of Jack recorded are leaf spot, fruit rot, algal rust and pink disease.

3. RAMBUTAN

- Rambutan budded plants procured were planted to study the establishment and performance. Two plants established in the field. Subsequently plants were collected from Chetthalli. They will be field planted with the onset of monsoon.

4. PINEAPPLE

- A total of 34 hybrid lines developed at Pineapple Research Centre, Vellanikkara are being maintained and evaluated. One hybrid 'Amritha' was released from this station which is a cross between Kew x Ripley Queen. Large scale production of planting materials of 'Amritha' is in progress.
- Twenty five varieties collected from different parts of the country are being maintained at PRC, Vellanikkara. This collection is being evaluated for evolving new varieties.
- A total of 21 clones collected from different parts of Kerala are being maintained at PRC Vellanikkara. Multiplication of selected clones are in progress.

II. ANNUAL PLAN PROJECTS – 6 no. – 24 lakhs.

- (i) Intensive vegetable seed production
- (ii) Breeding pineapple for yield and quality
- (iii) Research on Banana & Pineapple based homestead farming
- (iv) Development of ecofriendly management protocol for Kokkan & Bacterial wilt.
- (v) Conservation of germplasm collection under world Bank BIP.
- (vi) Works – DPP

III. Agro climatic Zone Specific Research – 4 projects - 11.35 lakhs

- (i) On farm testing of banana varieties and field demonstration of Tissue culture plants
- (ii) Utilization of bio waste from banana
- (iii) Demonstration of the potential of high yielding varieties of Pineapple and popularization of Tissue culture plants of pineapple.
- (iv) Integrated management of pseudo stem weevil and Root mealy bug of banana

IV. OTHER EAPs

- (i) Production of T.C plants of banana (P.I-Dr. Rema Menon, Professor(Hort.):
Established a centre for the production of TC plants of banana with the funding of SHM/DAC/RKVY and GOK (approximately 70 lakhs). A TC lab with all facilities could be established. During 2010-11 the centre produced 85,000 plantlets of 12 commercial varieties and distributed to the farmers earning an revenue of 12.75 lakhs.
- (ii) Biocontrol lab for the mass production of biocontrol agents (P.I – Dr. Maicykutty P. Mathew & Co PI: Dr. Anita Cherian. K):
Established a Biocontrol lab for the mass production of biocontrol agents with the funding from SHM (70 lakhs). Biocontrol lab at a cost of 50 lakhs with all equipments could be established. During 2010-11 the station produced pseudomonas (473 Kg), Trichoderma (94Kg), Beauveria (253 Kg), Metarhizium (150 Kg), Verticillium (228 Kg), Paceliomycites (40 Kg) and NPV valued at 1.03 lakhs
- (iii) Biology and management of root mealy bug on banana cultivars -
KSCSTE Project (P.I. – Dr. Maicykutty. P Mathew)- 4.605 lakhs (April, 07 to October, 2010)
Two new species of Geococcus identified. Biology and bionomics, population dynamics, field distribution, varietal susceptibility, natural enemies, and management of root mealy bug etc. were studied.
- (iv) Banana fibre extraction and utilization for women empowerment and income generation (P.I. – Dr. Suma, A).
Developed a centre for the banana fibre extraction and utilization with SHM funding (10.35 lakhs). A training hall with provision for display of products could be developed. The centre has already developed a series of products from banana and is giving paid training to SHGs/Farmers etc. on various aspects of banana fibre Extraction and the utilization for the production of handicrafts, utility items & fabrics.
- (v) Virus indexing and Disease diagnostic lab (P.I- Dr. Anita Cherian. K):
Developed facilities with a lab and essential equipments for virus indexing on commercial scale with the funding of R.K.V.Y (18.5 lakhs). Indexing facilities are available on commercial level to institutions on payment basis.
- (vi) Plant Health clinic (P.I- Dr. Anita Cherian. K) :
Developed a plant Health clinic with lab and equipments at the station with the funding of SHM (20 lakhs). The centre is rendering on farm and off farm Agro advisory and diagnostic services on crop production and management of pests and diseases of banana for increasing the productivity.
- (vii) Training programme in banana (P.I- Dr. Rema Menon)
The station is conducting two training programmes of 6 months duration to two batches of twenty five selected farmers sponsored by SHM (15 lakhs). The facilities developed include one seminar hall with furniture and audio visual equipments. The station is also getting a training hall furniture and audio visual equipments under the programme.
- (viii) Model banana Nursery (P.I. Dr. K.C. Aipe) :
The station is producing planting materials of commercial varieties of banana on a large scale with the funding of SHM (18 lakhs). Facilities developed include three ground level tanks of 2.5 lakh litre capacity of water, one store and one green house. Produced 45,000 suckers during 2010-11.

- (ix) Establishment of a Network Centre for production and distribution of planting materials of pineapple (P.I. – Dr. A. K. Babylatha)

The infrastructure facilities developed under this project include construction of an open well, a ground level tank of 50,000 litre capacity and computer facilities. The project is now working on a revolving fund mode. Different types of planting materials of pineapple viz suckers, rooted slips, rooted crowns etc. (11238- numbers – 2010-11) are being produced and supplied to farmers of Kerala. Funded by Govt. of Kerala (7.5 lakhs).

Extension Programmes

1) Training classes taken

Imparting training to farmers/members of Karashaka Samathis /SHGs/Farm clubs/ Unemployed youth on various aspects of Banana cultivation, utilization including post harvest handling and Banana fibre utilization. Also participates in exhibitions/farm day/seminars etc. organized by University/SHM/VFPCK/ Agricultural Departments etc.

Farm Advisory Services :

In Person	Over Telephone	Through Letters
5000	15000	100

Radio talks/ TV Programmes/ Audio/Video Cassettes

Topic	Date	Name of the scientist/s	Channel
On various aspects of banana cultivation and value addition	June, 2010 and re-telecasted many times	Dr.K.C.Aipe Dr.Rema Menon Dr.Maicykutty.P.Mathew Dr.Suma.A Dr.Anita Cherian	Amritha T.V.Channel Repeated broad cast twice
Fibre utilisation		Dr.K.C.Aipe, Dr.Suma.A	"

The Surya T.V also broad casted three short episodes on all aspects of banana cultivation during February, 2011.

List of Publications

Scientific papers

Mathew, M.P. Soumya K.C, Smitha, M.S and Aipe, K.C. 2010. Biology of Root mealy bug, *Geococcus citrinus* Kuwana, a new pest attacking banana in Kerala. Abstracts No.TS6-PA-13.Global Conference on Banana, 10-13 December, 2010, organized by AIPUB, and NRC on banana, pp. 97

Mathew, M.P., Beena, S., Soumya K.C, and Aipe, K.C.2010. Studies on *Paecilomyces lilacinus*, the entomopathogen of root mealy bug of banana Abstracts No.TS6-PA-14.Global Conference on Banana, 10-13 December, 2010, organized by AIPUB, and NRC on banana, pp. 97.

Jacob, S. J., Mathew, M.P. and Girija, D. 2010. *Bacillus thuringiensis* Berliner From India. Lap-Lambert Publishing Company, Germany.

Smitha, M.S and Mathew, M.P. 2011.Management of root mealy bugs, *Geococcus* spp. in banana cv. Nendran. Pest Management in Horticultural ecosystems, 16 (92): 108-119

Smitha, M.S and Mathew, M.P. 2011.Evaluation of banana cultivars against root mealy bugs, *Geococcus* spp. Pest Management in Horticultural ecosystems, 16 (92):174-176

Menon, R.,Cherian,A.,Suma,A and Mathew,M.P .2010. Conservation and Utilization of resistant banana germplasm. In Abstracts National Conference on Horticultural biodiversity for livelihood, economic development and healthcare,27-31 May, Bangalore

Menon, R., Cherian, A., Suma, A and Mathew, M.P. 2010. Strategies for the utilization of Sigatoka leafspot resistant genetic resources in banana. In Abstracts .Global Conference on Banana, 10-13 December, 2010, organized by AIPUB, and NRCB,

Menon, R., Cherian, A and K.C. Aipe 2010. Large scale multiplication and distribution of banana tissue culture plant for higher productivity .In Abstracts .Global Conference on Banana, 10-13 December, 2010, organized by AIPUB, and NRCB.

Popular articles

Mathew, M. P and Aipe, K.C. 2010. *Vazhay Badhikkunna Keedangal* (Malayalam). *Krishiyankanam*, . 15(1):24-25 and 32-33

Menon, R. 2010. *Vazha-oru Antherdesiya Bhakshyavila*. *Krishiankanam* (Malayalam) *Krishiyankanam*, 15(1):12-13

Cherian, A.K and Aipe, K.C. 2009. *Vazhe Badhikkunna Rogangal* (Malayalam). *Krishiyankanam*, . 15(1):26-29

Brochures

Banana Research Station, Kannara, Activities and Achievements

Leaflets

1. Fungal diseases of Banana.
2. Biocontrol agents

Chapters in book

Menon, R. and K.V.Peter. 2011. *Origin, Distribution and Biodiversity in Jackfruit*. In: *The Jackfruit*, Studium Press LLC, Texas, pp19-32

Menon, R. 2011. *Ethnobotany and Genetics of species of Artocarpus*. In: *The Jackfruit*, Studium Press LLC, Texas, pp33-40

Jacob, J.S., Mathew, M.P. and Girija, D. 2010. *Bacillus thuringiensis* Berliner From India. Lap-Lambert Publishing Company, Germany. 129 p.

No of visitors to the station: 10,000

Important Visitors

1. Sri. Mullakkara Ratnakaran, Hon'ble Minister for Agriculture, Govt. of Kerala
2. Sri. K.R. Viswambaran, Hon'ble, Vice Chancellor, KAU
3. Sri. C. K. P. Padmanabhan, M.L.A
4. Ms. Anne Vezina from Bioersity, France on 13.07.2010
5. Dr. D.V. Rajendran, consultant CMD, Trivandrum.
6. Dr. C.P. Rajasekharan, Chief (Agri.), State Planning Board, Trivandrum on 29.09.10
7. Sri. T.R. Prsannakumar & M.S. Cinnappa, forest officers from Karnataka state
8. Sri. R.S. Dawalkar, IFS, Govt. of Maharashtra on 28.10.2010
9. Sri. Sathyanarayana Mishra, Deputy Dir. of Agri with 25 Agri. Officers from Govt. of Orissa
10. K.P. Puneeth and L.P. Madhu, Assistant Horticultural Officers with 45 farmers from Chick Mangalore, Karnadaka .on 28.10.2010
11. Dr. P.V. Balachandran, Director of Extension
12. Dr. M.K. Sheela, Director of Extension i/c

Finance

Head	Expenditure	Revenue
Non-plan	70.40	13.82
Plan	3.68	
ICAR (Specify)	71.79	
Other EAPS (specify)	0	
SHM/ RKVY/ NHM/ KSCSTE	90.09	3.00
Total	235.96	16.82
Revolving fund (SHM/ RKVY/ GoK)	8.55	12.83
Grand Total	244.51	29.65

CADBURY- KAU CO-OPERATIVE COCOA RESEARCH PROJECT (CCRP), COLLEGE OF HORTICULTURE, KAU P.O., VELLANIKKARA

Academic programmes

Dr. S. Prasannakumari Amma, Professor & Head, CCRP, handled the session on cocoa by covering all aspects of cocoa including its cultivation and management, primary processing and value addition to the outgoing B. Sc (Ag.) batch in the Agricultural Seminar organised at Adat, Thrissur on 21-5-2010 as part of the RAWE programme of the IV B.Sc(Ag.) students of the College of Horticulture, Vellanikkara

Dr. J. S. Minimol, Assistant Professor, CCRP, handled the session on cocoa by covering all aspects of cocoa including its cultivation and management, primary processing and value addition to the outgoing B. Sc (For.) students in the Biodiversity Seminar organised at Pudukkad, Thrissur on 14.08.2010 as part of the RAWE programme of the College of Forestry, Vellanikkara

Dr. J. S. Minimol, Assistant Professor, CCRP, handled the session on post harvest handling and value addition in cocoa to 9 students belonging to the 2007 admission batch of the IV B. Sc (Ag.) students on 25.3.2011 as part of their Experiential Learning programme.

Research Programmes:

Major research achievements (highlights):

Germplasm collection: During the year 2010-'11, one consignment of bud wood of cocoa consisting of 43 clones resistant to *Phytophthora* pod rot and Vascular streak die-back disease (VSD) of cocoa were imported from the International Cocoa Quarantine Centre, University of Reading UK in Oct 2010.

Testing of compatibility in newly flowered accessions

Selfing was attempted in 113 flowers comprising of 13 accessions. Three accessions were found to be self incompatible.

Study of pod and bean characters of different accessions:

Observations on pod and bean characters were recorded from 13 newly fruited accessions viz PINA, BORNE 7.B.2, KER 2 E, SC 20, R(10)(MEX), IMC 16, R2, C40, MAR 9, BORNE 7.B.4, UF 677, PA 67, GS 13 and UF 677.

Selection of parents from germplasm and hand pollination:

Ten black pod resistant parents viz PINA, KER 2, R(10)(MEX), IMC 16, BORNE 7.B.4, CLM 90, C 15-61, SC 20, B 184, IMC 6 were crossed with nine male parents (VSD resistant high yielding hybrids VSD I 31.8, VSD I 33.9, VSD I 38.9 and released varieties CCRP 1-6). 549 flowers were pollinated during the year.

Assessment of general combining ability in high yielding VSD resistant hybrids:

Twenty two high yielding VSD resistant hybrids were selfed to assess compatibility status. The results showed that 9 were self incompatible. Crossing with better combiner parent CCRP 3 has been taken up to assess the combining ability. Better combiners will be multiplied clonally and laid out in a new clonal garden.

Observations on vegetative characters:

Observations on biometric and yield characters were recorded from all trials during the period. The data are being compiled.

Multiplication of mother plants for establishment of clonal gardens:

Root stocks for multiplication of selected mother plants were supplied by M/s Cadbury India Ltd. Seven mother plants have been multiplied and supplied to Tamil Nadu Agricultural University for establishment of clonal gardens in three locations.

Establishment of clonal garden at KAU:

During the year, one clonal garden with 400 plants comprising of seven clones was established.

Multiplication of clones liable to be cut by Power Grid Corporation of India

2500 six month old hybrid seedlings supplied from M/s Cadbury India Ltd were utilized for budding 68 clones in germplasm which are liable to be cut by Power Grid.

Salt Tolerance Studies in cocoa nursery

Investigations on the salt tolerance behaviour of cocoa seedlings were conducted by using 1% solutions of different salts viz. MgCl₂, MgSO₄, CaCl₂ and NaCl along with drinking water (control) for irrigating the nursery as pot culture study. The pH of the solution ranged from 8.1 to 8.32 and the EC 6.6 to 23.5 mmhos/cm, whereas in the control the values were pH 7.17 and EC 0.088. The results showed no satisfactory germination in any of the treatments applied. Cocoa seeds failed to germinate when NaCl was used for irrigation. Eventhough 65% germination could be obtained in MgCl₂ solution, the seedlings failed to develop leaves. Apparently all growth and development of the seedlings were hindered by the presence of salts. The results revealed that there is little scope of using sea water as a source of irrigation in the coastal belt of India where availability of good quality irrigation water is scarce.

Extension programmes

- ❖ During the year two day training programme on "Advances in Cocoa Production Technology" was taken up from 13-14 May 2010 was conducted to 9 outside state Technical Officers/ Managers/ General Managers of M/s Cadbury India Ltd working in Tamil Nadu
- ❖ One day training programme on Cocoa Production Technology was conducted on 07-07-2010 to 150 farmers/ entrepreneurs at Rajakumari, Idukki. The programme was funded by DCCD, Kochi
- ❖ One day training programme on "Advances in Production & processing technology in cocoa" was organized by Dr. S. Prasannakumari Amma at Chittur, Palakkad which was attended by 40 Technical/ Field Officers of Cadbury India Ltd and AOs/ ADAs Dept. of Agri. , Government of Kerala on 21-07-2010
- ❖ One day training on Cocoa Production Technology was conducted on 14-08-2010 to 150 farmers/ entrepreneurs at Chittur, Palakkad with financial assistance from M/s DCCD, Kochi
- ❖ One day training on cocoa production technology was organised for the ten Technical/ Officers of Cadbury India Ltd from TN & AP on 08-10-2010 at Vellanikkara in which Dr. S. Prasannakumari Amma, Dr. E. K. Lalitha Bai and Dr. Minimol J.S. handled classes
- ❖ Dr. E. K. Lalitha Bai and Dr. Minimol J.S. handled classes to 50 farmers as part of the one day (18-12-2010) cocoa farmers training at Mankulam organized by M/s KADS, Thodupuzha.
- ❖ Dr. S. Prasannakumari Amma, Dr. E. K. Lalitha Bai and Dr. Minimol J.S. handled classes in many training programmes organised by the State Department of Agriculture , M/s Cadbury India Ltd and M/s Kerala Agricultural Development Society (KADS) in various parts of the state viz. Idukki, Kottayam ,Pathanamthitta, Palakkad and Malappuram districts.
- ❖ Dr. S. Prasannakumari Amma handled classes on all aspects of cocoa including primary and secondary processing and value addition in cocoa in the one day cocoa farmers training organized by MASS & DCCD, Kochi at Murikkassery, Idukki on 30-10-2010.
- ❖ The cocoa farm, the cocoa nursery as well as the chocolate unit was able to attract many farmers and entrepreneurs not only from India but also from other countries including Switzerland, France, USA and others. A batch of foreigners comprising of 40 members from France visited the nursery as well as the chocolate unit.
- ❖ A total of more than 5000 people have visited the unit. More than 3500 telephone calls were received for clearing doubts/ seeking availability of seed pods /consultancy purposes.
- ❖ Published a revised leaflet on cocoa production technology in English.

Farm advisory services:

In person	Over Telephone	Through Letters
5000	3500	15

List of publications:

Scientific papers: 16

1. Prasannakumari Amma, S. 2010. Farm level processing of cocoa. *The cashew* 22(4): pp 9-12
2. Prasannakumari Amma, S. 2010. Cocoa Processing. *The cashew and cocoa journal* I(1): pp 3-5
3. Prasannakumari Amma, S. 2010. Three decades of Cocoa research in Kerala Agricultural University, Thrissur. *The cashew and cocoa journal* II(2): pp 15-19.
4. Prasannakumari Amma, S. 2011. Advances in Post harvest technology and value addition in cocoa. State level two day seminar on "Advances in cocoa cultivation" held at the KVK, APHU, Venkataramannagudem, west Godavari district, AP- 534101 on 7-8 Mar 2011
5. Minimol J. S. and Prasannakumari Amma, S. 2010 CCRP- its impact on sustainability of cocoa cultivation & women empowerment. NABARD sponsored National workshop on PPP for Gender Mainstream in Agri-Entrepreneurship Development, KAU, Vellanikkara 10 Nov 2010
6. Minimol J. S. and Prasannakumari Amma, S. 2010 Collection and utilization of cocoa (*Theobroma cacao*) germplasm in KAU. Book of Abstracts – 1st Indian Biodiversity Congress 3-4 Dec. 2010, Thiruvananthapuram, Kerala p183.
7. Minimol J. S. and Prasannakumari K.T. 2010. Growth pattern, periodicity and seasonality in leaf production of sacred lotus. *Indian J. Hort.* 67 (4): 546-553
8. Namboodiri Raji Vasudevan and Krishnan S. 2010. Schematic identification of chethikoduveli (*Plumbago rosea* L.) ideotype for optimal plumbagin content. Book of Abstracts – 1st Indian Biodiversity Congress 3-4 Dec. 2010, Thiruvananthapuram, Kerala p39
9. Lalitha Bai, E. K., Prasannakumari Amma, S and Minimol J. S. 2011 Three decades of research on crop management of cocoa in the KAU. Proc. Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station Vittal, Karnataka 28-29 Jan 2011
10. Lalitha Bai, E. K. and Prasannakumari Amma, S. 2011. Preliminary investigations on salt tolerance of cocoa. Proc. National Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station, Vittal, Karnataka 28-29 Jan 2011
11. Lalitha Bai, E. K. and Prasannakumari Amma, S. 2011. Effect of weather on cocoa pod yield. Proc. National Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station, Vittal, Karnataka 28-29 Jan 2011
12. Minimol J. S., Prasannakumari Amma, S. and Lalitha Bai, E. K.. 2011 Three decades of research on breeding of cocoa (*Theobroma cacao* L.) in Kerala Agricultural University. Proc. National Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station, Vittal, Karnataka 28-29 Jan 2011
13. Minimol J. S., Prasannakumari Amma, S. and Lalitha Bai, E. K.. 2011. Technology for farm level processing of cocoa – an analysis. Proc. National Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station, Vittal, Karnataka 28-29 Jan 2011
14. Minimol J. S., Prasannakumari Amma, S., Krishnan, S. and Namboodiri Raji Vasudevan 2011. Influence of fruit apex on fruit shape in selected accessions of cocoa. Proc. National Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station, Vittal, Karnataka 28-29 Jan 2011
15. Minimol J. S., Prasannakumari Amma, S., Lalitha Bai, E. K. and Namboodiri Raji Vasudevan. 2011. Field performance of vascular streak die back disease resistant hybrids of cocoa. Proc. National Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station, Vittal, Karnataka 28-29 Jan 2011
16. Namboodiri Raji Vasudevan, Mallika V. K., Prasannakumari Amma, S. and Minimol J. S. 2011. Heterosis in hybrids of cocoa. Proc. National Seminar on "Strategies for enhancing productivity of cocoa" held at CPCRI Regional Station, Vittal, Karnataka 28-29 Jan 2011

Finance

Head	Expenditure (Rs.)	Internal Receipts (Rs.)
a. Non-plan	Nil	Nil
b. Plan – i. Net work project on production of elite planting materials in cocoa	1,99,975/-	Nil
c. Other EAPs		
i. Cadbury- KAU Co-operative Cocoa Research Project	40,49,347/-	15,38,158/-
ii. SHM project on Production of hybrid pods, hybrid seedlings and budded plants of cocoa	17,21,313/-	-
iii. DCCD programme on conducting trainings – 2 nos.	60,000/-	
TOTAL	60,30,635/-	
d. Revolving fund schemes:		
i. Production and distribution of quality Planting materials in cocoa	7,78,037/-	7,41,581/-
ii. Home level production of cocoa Chocolates	3,59,173/-	2,59,173/-

CENTRE FOR GENDER STUDIES IN AGRICULTURE AND FARM ENTREPRENEURSHIP DEVELOPMENT (CGSAFED)

VELLANIKKARA

Research Programmes:

1. DBT Project on Promoting Bio -Resource based Pilgrim needs as a Livelihood Option by Rural Women in Kerala was completed. A women empowerment model with political, economic, technological, social and cultural dimensions was evolved through process documentation research under the project. The scaled up model was validated by institutionalization as 'Kadali Nivedyam Project' in Kodakkara block panchayath which served as a convergence platform for different development agencies through functional involvement viz. Dept of local administration (co-ordination and monitoring), Primary Co operative Banks (credit and procurement), Poverty alleviation mission – Kudumbasree (mobilization and activities of women groups), State Department of Agriculture (field monitoring and inputs supply), Kerala Agricultural University (technology facilitation) and Guruvayoor Devasam (assured market support). A total of 43 trainings were conducted during the project period covering a total of 1621 Women beneficiaries. Altogether 15 demonstration units were established during the project period covering 122 women as direct partners. One food processing unit was also established.

2. Concurrent Evaluation of schemes under Macro management in Agriculture was completed. The various schemes envisaged in the work plan for 2009-10 for the development of agriculture under the MoU-Macro-Management Schemes in Thrissur and Alappuzha Districts of Kerala were evaluated. It was observed that various schemes of agricultural development in the districts were aimed at enhancing the productivity of crops and improving the income of farmers through adoption of appropriate scientific production and post harvest technologies. The share of allotment for various schemes revealed that the major share of allotment is for Rice development and all the schemes recorded achievement percentage around 90 per cent at the state level.

3. DRWA-Network project on Gender Issues of Rice Based Production System and Refinement of Selected Technologies in Women Perspective is in progress. Sample survey of 500 households from the five rice farming zones of Kerala viz. Kuttanad (Alapuzha dist), Kole (Malappuram dist), Onattukara (Alapuzha dist), irrigated rice (Palakkad dist) and high rage (Waynad dist) was completed and analysis of data is in progress. As a part of the refinement of selected technologies, introduction of manual

transplanters among women labourers will be tested with manual transplanters developed by CRRI, Cuttack.

4. DRWA-Net work project on Public Private Partnership for Gender Mainstreaming is in progress. Under the project, status of Public- Private Partnership and institutional arrangements for gender mainstreaming of agricultural development initiatives in the state were collected and analysed. Detailed study has been conducted in selected cases where a definite Public Private Partnership component was involved either in formal or informal way. The identified cases have been broadly categorized, based on the major areas of partnership as (a) PPP in Agricultural Research. (b) PPP for facilitating backward and forward linkages in entrepreneurship development and self employment. (c) PPP in capacity building and skill development. (d) PPP for market support and buy back of agriculture products and (e) PPP category for promotion of organic products. Detailed analysis of the selected models especially on the aspects of risk sharing, sharing of responsibilities, sharing of benefits management of PPP chain etc is underway.

Extension Programmes:

a) Highlights of extension activities

Farm women empowerment and gender mainstreaming in agricultural extension were promoted through various training programmes, workshops and field development programmes.

1. As part of the Dr. K. N. Shayamasundaran Nair Memorial Endowment Lecture held on 13.08.2010, K.P.Kannan, Professor of Development Economics, Centre for Development Studies, Thiruvananthapuram delivered lecture on "Agricultural Development in an Emerging Non-Agrarian Regional Economy: Kerala's Challenges".
2. A National Workshop on Public Private Partnership for Gender Mainstreaming in Agri-entrepreneurship Development was held. The workshop enabled interaction of national level experts and agencies involved in women empowerment in the state.
3. Women Farmers Meet was held as part of the International Women's day on 8th March 2011 at Perinjanam Panchayath. The occasion served as a platform for discussing the farm women's needs and constraints and the proposed farm women empowerment policy of KAU.
4. Together with State Women's Commission, the CGSAFED has organised one day seminar on "Madyamangalkku oru Vanitha Nayam" at Kerala Sahithya Academy, Thrissur on 18.03.2011. The opportunity was used to highlight the need for media's increasing focus on women's developmental issues.

Farm Advisory Services

In Person	Over Telephone	Through Letters
Perinjanam women farms society		
Farm women groups of COSTFORD		

List of Publications

Books

1. Proceedings of National Workshop on Public Private Partnership for Gender Mainstreaming in Agri-entrepreneurship Development- Dr.P.Rajendran, Dr.R.M.Prasad, Dr.Binoo P Bonny
2. Final Report of Concurrent evaluation of schemes under Macro management in agriculture-Dr. Binoo.P.Bonny, Dr.P.Prameela, Dr.T.K.Pradeep kumar, Dr A.Prema

Finance

Head	Expenditure	Receipts (Project fund for the year)
Plan	Rs164770.00	128500.00
i. Promoting Bio - Resource Based Pilgrim Needs as a Livelihood Option by the Rural Women of Kerala'	Rs.15224.00	Rs.15224.00 (DBT funded)
ii. Network project on Gender Issues of Rice		

Based Production System and Refinement of Selected Technologies in Women Perspective	Rs.210539.00	Rs.265000.00 (ICAR funded)
iii. Network Project on 'Public Private Partnership for Gender Mainstreaming in Agriculture'	Rs.234437.00	Rs.240000.00 (ICAR funded)
National Workshop on "Public Private Partnership for Gender Mainstreaming in Agripreneurship Development"	Rs.165000.00	Rs.165000.00(NABARD funded)

ALL INDIA NETWORK PROJECT ON AGRICULTURAL ORNITHOLOGY, COLLEGE OF HORTICULTURE

Research Programme

a. Major research achievements (highlights)

- Population density of agriculturally important birds was recorded on crops viz., rice (both kole land and other irrigated rice crops), vegetables, cashew, fruit crops and organic agricultural fields. On rice the bird damage occurred during seeding, vegetative and maturity stages.
- The main depredatory birds on rice were baya, pigeon, moorhen, parakeets, etc. the damage ranged from 2.2 to 48.0 per cent at different stages of the crop.
- In vegetables mainly cow pea and bhendi were damaged by the parakeets (15%).
- In Kole lands the species richness was 77 with cattle egret being the most dominant bird followed by the teals. There was no significant difference between the organic and the traditional fields as far as the birds are concerned.
- The roosting sites of the birds were located and counted in different locations. Mainly the mixed roosts of birds of aquaculture importance and beneficial birds were located market and railway station limits.
- Metalized reflective ribbons were used against the depredatory birds in the rice and vegetable fields. The scarring effect against the birds was well beyond two weeks.
- Automatic cracker station was fabricated and evaluated for scarring the depredatory birds in Pokhali rice fields.
- Pellet analysis of barn owl showed that the bird survive mainly on rodents and shrews (99%). Artificial nesting sites were provided for the owls and other beneficial cavity nesting birds.
- The house sparrow population studies showed that the birds were mainly confined to the market places mainly and birds could be recorded in the agricultural fields only in the hilly areas.
- Bird mortality in the vicinity of crop fields was very less during the period under report. The tissue samples analysed for the insecticide residue showed below detectable level (BDL) of residues.

Management of Papaya Mealybug (MPMB)

- Papaya mealybug was recorded on 72 host plants.
- Severe infestation (>90 %) was observed on papaya, plumeria, jatropha, hibiscus, brinjal, guava, etc.
- Mealybug was spotted on number of un cultivated plants making a reservoir for the re-infestation on crop plants.
- Non chemical methods viz., soap water spray and chemical insecticides viz., imidachlopid, profenophos, acetamiprid, etc., were used against the mealybug on crops and un cultivated plants. Repeated application was required to control the infestation.
- By the introduction of the mealybug specific parasitoid, the population of the papaya mealybug had come down significantly.

- Papaya mealybug is under control following wide spread distribution of the parasitoid.

Extension programme

Period	Programme Details
3 to 6 th Apr 2010	Mannanchery exhibition
23-4-2010	Pooram exhibition – agro-clinic
20-5-2010	Mitraniketan – Stingless bee
31-5-2010	Pre – ZREAC workshop
22-6-2010	ZREAC workshop
14-08-2010	Forestry RAWE programme
09-12-2010	Papaya mealybug specific parasitoid, <i>Acerophagous papayae</i> release - by Hon'ble Minister for Agriculture, Government of Kerala
14-12-2010	Awareness programme on PMB to DDA, ADA, AO, AAO, Panchayat officials- Palakkad
24 to 28 th Feb. 11	Agri Food Exhibition – LULU, Thrissur
9 to 11 th Mar. 2011	Kissan Mela, RARS, Pattambi

Farm advisory services

In person	Over telephone	Through letters
65	52	2

Radio talks/ TV programmes/ Audio-video cassettes

Topic	Date	Name of scientist	Channel
Economics of honey prodn.	16-8-2010	Dr. Mani Chellappan	All India Radio, Thrissur
Papaya mealybug and its specific parasitoid	06-1-2011	Dr. Mani Chellappan	Asianet – Kissan Krishi Deepam
Papaya mealybug	12-1-2011	Dr. Mani Chellappan	Doordarshan, TVM

List of publications

Scientific papers

Jim Thomas, Mani Chellappan and Haseena Bhaskar. 2010. User friendly rodent management techniques in coconut plantations – A frontline demonstration in Thrissur District, Kerala. In International Conference on Coconut Biodiversity for Prosperity, CPCRI, Kasaragod. Pp. 204

Technical bulletins

K. R. Lyla and Mani Chellappan. 2010. Biocontrol of papaya mealybug. Technical folder. p 6.

Popular articles

K. R. Lyla and Mani Chellappan. 2010. Parasitoids against papaya mealybug. In Kerala Karshakan. Pp 38-39

Finance

Head	Expenditure	Receipts
ICAR	2290353	21675
Plan	375615	-

ECF CENTRE, THIRUVALLA

Research Programmes

- 1) Balanced application of N, P and K in recommended dose is highly required for realizing maximum grain and straw yield in all rice growing tracts
- 2) Mineral nutrition with Phosphorus is found to be relevant than K nutrition in the rice growing tract of Kuttanadu. While K nutrition is becoming more important in the sandy loam tracts of Onattukara as compared to mineral nutrition with P.
- 3) The major constraint in the productivity of rice in Kerala is observed to be the maintenance of optimum plant stand in the field rather than any other factors
- 4) Intensification of rice fallows with vegetable crops gives more net return to the farmers. The cropping system consisting of rice-rice-yard long bean and rice-rice-Amaranthus had recorded the highest economic returns
- 5) A survey carried out on existing coconut based and rice based farming system enabled to identify the technological interventions to be made to increase the total economical returns and sustainability of the farming system.
- 6) Popularization of high yielding varieties of sesamum released from Onattukara Regional Agricultural Research Station through varietal demonstration under FLD on oilseeds

Finance

Head	Expenditure	Receipts
Non Plan	Nil	Nil
Plan	-	-
ICAR - 318-31-6639	3859647	Nil
ICAR - 318-31-7721	10000	Nil
SPB- 318-31-8775	19600	Nil
Revolving Fund	Nil	Nil

NORTHERN ZONE

REGIONAL AGRICULTURAL RESEARCH STATION, PILICODE

Research programmes

1. Utilization of Existing Germplasm and Description of Varieties (CAP-01-00-01/76 PIL 9 KAU)

The project aims to evaluate the exotic and indigenous cultivars of coconut available in the station, to describe the morphological characteristics of each variety and to conduct replicated trials with promising types. The germplasm collection of coconut consists of 40 indigenous and 35 exotic types. The morphological and yield attributes are being recorded.

The varieties Kerasagara as well as Kudat, Philippines Lono and St. Vincent were found superior to other genotypes in terms of nut and copra yield/palm. Seedlings of Kerasagara have been raised for establishing seed garden. The genotypes Kudat, Philippines Lono and St. Vincent were proposed for release.

2. Screening Coconut Cultivars for Tender Nut Purpose [CAP-02-00-01/2000/PIL(2)KAU]

The objectives are to identify superior genotypes suitable for tender nut purpose, to study the seasonal variation in quality parameters of coconut water, and to decide the optimum physiological maturity having maximum quality, quantity and consumer acceptance.

The genotype MGD was found superior in terms of volume of nut water and nuts per palm per year. Total sugars, reducing sugars, TSS, ascorbic acid and protein were found maximum in Malayan Yellow Dwarf followed by Gangabondam and West Coast Tall. The genotype MGD was proposed for release as a variety suitable for tender nut purpose and to multiply the seedlings for distribution.

3. Development of Short Statured High Yielding Coconut Variety with Good Nut Quality (CAP-02-00-01-2006/PIL(9)KAU)

The objective of the project is to identify and evaluate dwarf coconut varieties with good nut quality and their utilization for the production of short statured high yielding coconut hybrids.

Survey was conducted in the farmer's fields to identify desirable palms having good yield and dwarf stature. Some of the palms identified were selected as mother palms for the production of *inter-se* and hybrid seed nuts. The *inter-se* seedlings were field planted for further studies.

4. Trial of Promising Seed Materials [CAP 02-00-02/76-PIL (A) KAU]

The objectives are to compare the performances of promising types with West Coast Tall, to isolate superior types and hybrids of coconut and to study the economics of raising promising types and hybrids in comparison with WCT.

The annual nut production was significantly high in the hybrid Chandrasankara, followed by Kerasankara, Lakshaganga and Keraganga and type PP Tall. The Copra yield/ palm of the hybrids, Philippines ordinary and PP tall were on par. The cumulative nut yield obtained was highest in Keraganga followed by Lakshaganga, Chandrasankara, LO, PP tall and Kerasankara. In general the hybrids were superior to WCT and other varieties in nut yield. The mean annual yields for the last six years were on par in all four hybrids and the types LM and PP Tall. The Copra yield/palm/year was highest in the hybrids indicating the superiority of hybrids over other varieties.

5. Evaluation of Coconut Hybrids (Exploitation of Hybrid Vigour in Coconut) [CAP-02- 00-07/73-PIL-KAU]

The study has the objectives of studying the extent of heterosis in different hybrids involving 10 parental combinations as well as of studying the influence of 'Ayiramkachi' on promising tall and dwarf parents for yield and other characteristics.

The annual nut yield / palm significantly varied between hybrids and the hybrid LM x MYD produced maximum number of nuts followed by AYK x WCT, LM x GB and LO x AYK which were on par in nut yield. The cumulative nut yield was high in AYK x WCT and LM x MYD.

Except in combination with PO and AO, the AYK performed well with other tall and dwarf combinations.

6. Establishment of Model Organic Coconut Farm (343-31-2377)

Objectives of the project is to study the influences of organic cultivation for short and long term performance of coconut and intercrops, to study the soil dynamic in terms of available nutrient in the soil before and after organic cultivation and to act as a model coconut garden in respect of the source and availability of organic manures

An isolated five ha of coconut plantation in the T and T1 blocks of RARS Pilicode is being developed in to a model organic coconut farm. Application of organic manure as per the schedule was started from August 2007 onwards. Soil and water conservation measures, sowing cowpea in the basins and growing banana as intercrops were taken up.

7. Studies on Yellowing of Arecanut in Kannur District

The study aims at Identifying the causative factors for yellowing of Arecanut ,Quantifying the extent of damage by the major causative factors; examining the possibility of managing yellowing of Arecanut through adoption of proper management techniques across a range of production conditions; documentation of farmers' know-how in management of yellowing in Arecanut and exploring the feasibility of crop improvement through extensive survey of genetic stock available in the region for resistance/ tolerance.

Lab analysis of soil samples collected from field is in progress. The summary of NPK analysis reveal that 96% of the samples analyzed had medium values for N, 42 % for P and 44 % for K. Thirty two percentage samples recorded low values for P and 24 % for K. The study has been completed and final report is under preparation.

8. Conservation and Evaluation of Malabari Breed of Goats (Gr-07-01-92/Kau)

The objectives of the study are; conservation and evaluation of Malabari goats and; selective breeding of Malabari goats for meat and milk.

Altogether 106 kiddings were there out of which 45.28% were single births and 56.7% twin births or above. Kidding rate was 1.62. Male to female ratio was 1:0.85. Average kidding interval was 289 ± 20.22 days. Numbers of births were maximum during summer months and mortality was maximum during winter months. Major reason for mortality was respiratory tract infections. Altogether 113 does belonging to farmers were bred with bucks maintained in the unit and 126 goat kids were supplied to needy farmers during the year.

9. Genetic Improvement of Dessert Mangoes of Malabar Region (RKVY Project)

The study aims to generate database on the availability of local dessert type mangoes in Malabar region; to study the diversity of these mangoes in relation to morphological and quality aspects of mangoes; to generate data base on mango processing industries, quality aspects, manpower, marketability and price trend; to standardize the quality aspects of dessert/table type and their suitability for value addition as well as to popularize the superior genotypes of dessert mangoes in Malabar Region.

Eight diverse types suitable for dessert purpose have been identified from Nileshwar block of Kasaragod and Taliparamba of Kannur districts and character described using NBPGR Descriptors for mangoes. Kunhimangalam, Nambiar Mango, Gomanga, Kilichundan, Kappakka manga, Kurukkan, Kuntani, Cherymanga are the types collected. The characters such as bearing habit season of flowering fruit yield and quality were studied. A germplasm of diverse type will be maintained at RARS, Pilicode for further evaluation.

10. Evolving Coconut Hybrids Suitable For Kerala at RARS, Pilicode, (RKVY Project)

Identified mother palms having desirable attributes by survey in farmer's field. Developed inter se & hybrid seed nuts and seedlings are planted in the main field. Further crosses are going on as envisaged. Provided chain link fencing to the new cross combination, purchased coconut pit making device and various items envisaged in the project.

11. Production and distribution Of Coconut seed-Lings and Other plant materials adopting seed Village Concept (RKVY Project)

30 days training was given to the SHG on production of planting materials and management of nursery unit. Started grafting works and production of banana suckers by using the trained SHG. Nursery unit and the sales center have been erected at both the centers. 10000 hybrid seed nuts produced during 2009-10 are sown in the nursery.

12. Development of production unit for hybrid Coconut seedlings and other planting materials in three districts of Kerala (RKVY Project)

The centers in each district were finalized as follows:

ARS, Mannuthy and Central Nursery in Trissur district. Cashew Research Station, Anakkayam and IF, KCAET, Tavanur in Malappuram district. Both units sanctioned in Kannur district will be functioning at PRS, Panniyur with production at two Panchayats. Conducted walk in interview for SA at Central nursery, Vellanikkara, CRS, Anakkayam and PRS Panniyur. Production targets for each unit for various crops were finalized. Preliminary steps were carried out for the construction of nursery units in the five centers

13. Conservation multiplication and distribution of Malabari breeds of goats (RKVY Project)

Construction of permanent goats shed is in progress. Existing goat sheds have been repaired. Equipments such as fencing material, refrigerator laptop, weighing equipments, identification tags, slurry pump, pump-sets, etc., have been purchased. Necessary feed, medicine and other essential materials have also been procured. Goats were procured from Goat farm, KLDB, Doni and added to existing stock. Established new fodder plots using various types of fodders for meeting increase in the demand for fodder. Various types of fodder tree seedlings were collected from different sources and experiments were set up to examine yields and uses of these trees for feeding goats

Evaluation of goats (bucklings and doelings) within the farm for future selection is in progress. 18 numbers of goats were culled and disposed. Sale of goat kids to farmers and breeding of female goats of farmers with bucks maintained in the station is in progress.

14. Participatory management of coconut gardens in Kasaragod District (RKVY Project)

The objectives include assessing the crop loss in coconut due to pest & disease incidence as well as poor management; generation of data base on coconut farming in each Grama Panchayath, and constitution of skilled labour force in each village panchayath for timely & scientific management of coconut palms.

The project has been initiated and survey work is in progress.

External Aided Projects

AICRP on Cashew

1. Germplasm Collection, Conservation, Evaluation, Characterization and Cataloguing in cashew

The study aims to conduct survey in northern districts of Kerala for identifying bold nut and diverse types of cashew, to collect, multiply vegetatively, characterization and conserve them for further breeding programmes and to isolate the superior types.

Of the 87 diverse types identified, PLD -4 was found to be superior to all the other accessions collected. Among the accessions planted during 1998, PLD-4 has put forth more of vegetative growth particularly towards north-south directions. The nut yield was high wherever the trees had more of north-south spread.

Hybridization and selection

The dwarf, TPB -1 (PLD-57) was used for the hybridization with ANK -1 and MDK -1 with the objective of obtaining hybrid progenies having dwarf stature, higher percentage of bisexual flower, nut setting, and nut yield. The hybrid MDK -1 x PLD-57 was found to be close to the dwarf male parent in growth characteristics recorded.

2. Fertilizer Application Trials in High Density Cashew plantations

The objective is to study the level of fertilizers required in different densities cashew plantations. The nut yield per ha was significantly higher under the planting density of 600 plants / ha. Higher nut yield per ha was recorded with the fertilizer dose of, 75 N, 25 P, 25 K₂O Kg/ha.

3. Agro – Meteorological Advisory Services (DST Project)

The objective of the programme is to issue agro-advisory services to the farmers based on medium range forecast issued by NCMRWF (National Centre for Medium Range Weather Forecasting, New Delhi), DST, Govt. of India. Based on the weather forecast received, the agromet advisory members will discuss the impact of weather forecast on various crops grown in the region. The NCMRWF issues biweekly weather forecast, ie, on Tuesday and Friday. The daily weather forecast given by the NCMRWF for 4 days in advance is used for preparing agro advisory bulletins on every Tuesday and Friday.

Extension programmes

Farm Advisory services

In person	Over telephone	Through letters
780	2000	90

Radio talks/ TV programmes/Audio – video cassettes : Nil

Provided answers on the various questions of the farmers on coconut farming through 'Krishi Jaalakam' programme of AIR Kannur on various occasions

List of publications

1. Kasumavu krishi reethigalum Kasumanga samskaranavum - Oru laghu lekha by Dr. B. Jayaprakash Naik, Dr. Madhu Subramanian and Shahanaz, KMP
2. Kashumanga vibhavangal – Dr. B. Jayaprakash Naik, Dr. Madhu Subramanian and Dr. Ajith Kumar B.
3. B. Jayaprakash Naik and PC Balakrishnan (2010) Evaluation of the promising genotypes of coconut and their prepotency at seedling stage. In Proceedings of the International symposium on Coconut Biodiversity diversity for prosperity , CPCRI, Kudlu, Kasragod 25-28th October 2010
4. P.C Balakrishnan and B. Jayaprakash Naik (2010) Evaluation of a semi dwarf type Annur tall and its hybrids. In Proceedings of the International symposium on Coconut Biodiversity diversity for prosperity , CPCRI, Kudlu, Kasragod 25-28th October 2010
5. Vithu grama paddathi (Malayalam) by PC Balakrishnan, ADR (Coconut Mission) and B. Jayaprakash Naik, ADR, RARS, Pilicode
6. Sankara thengin thaigalude pradhanyam (Malayalam) by PC Balakrishnan, ADR (Coconut Mission) and B. Jayaprakash Naik ADR, RARS, Pilicode
7. Sasya Paripalanam Kerakrishiyil – Hand Book by Dr. Madhu Subrahmanian, Dr. B. Jayaprakash Naik and Dr. A.V. Meera Manjusha
8. A.V. Meera Manjusha and B.N. Sathyanarayana, 2010, Studies on acclimatization treatments to improve post acclimatization survival in stevia (*Stevia rebaudiana* Bert). *Acta Horticulturae*, 865: 171-178
9. A.V. Meera Manjusha and B.N. Sathyanarayana, 2010, Acclimatization studies in stevia (*Stevia rebaudiana* Bert). *Acta Horticulturae* 865: 129-133

No. of visitors to the institution (farmer group/students): 750

Important visitors: Agricultural minister Mullakkara Ratnakaran visited the station on 3-12-2010 in connection with the inauguration of 'Harithayoram' Project

Agricultural minister Mullakkara Ratnakaran visited the station on 18-12-2010 and inaugurated the nursery unit and dwarf coconut seed garden.

Sri. K. Kunhiraman, MLA, Trikaripur Legislative constituency, Govt. of Kerala

Sri . Pallipuram Balan MLA, Nileshwar Legislative Constituency, Govt. of Kerala
 Sri. CKP Padmanabhan, MLA, Govt. of Kerala
 Dr. TR Gopala krishnan, Director of Research , KAU, Vellanikkara
 Dr. PV Balachandran, Director of Extension, KAU, Mannuthy

Finance

Head	Expenditure	Receipts
Non-Plan	14795314	1785867
Plan	1470431	
ICAR	3209444	
Other EAPs	3134065	
Revolving fund I	2610817	2903658
Revolving fund II	692529	716843
Revolving fund III	5602	-
Total	25918202	5406368

PEPPER RESEARCH STATION, PANNIYUR

Research Highlights

Crop: Black Pepper

- Among the new germplasm accessions Angamaly , Chalakudy , ICP 48 and Vattamunda were promising with spike yield more than 3 kg/vine .The number of spikes/vine were maximum for Angamaly (1300) followed by Chalakudy (854).
- Among the intervarietal hybrids P6 x P 5 is found to be promising with green berry yield of 5 kg/vine.
- Recommended Package of Practices KAU resulted in a significant green berry yield increase of 21 percent over Organic Package of Practices involving FYM 10kg vine⁻¹, Neem cake 1 kg vine⁻¹ and Vermi Compost 1 kg vine⁻¹.
- Integrated nutrient management utilizing FYM 10 kg vine⁻¹, Phosphobacteria 50g vine⁻¹, Bordeaux mixture 1%, Trichoderma 50g vine⁻¹, Pseudomonas 50g vine⁻¹, 50:50:150g NPK vine⁻¹, Copper Oxychloride drench 0.2% and Quinalphos 0.05% significantly superior green berry yield over fully organic treatment and fully inorganic treatment.
- Death of vine due to *Phytophthora* foot rot of black pepper in Existing plantation was minimum in Potassium Phosphonate + *Trichoderma* treated vines when compared with other treatments.
- Supplementation package of practices treatment with foliar application of both zinc sulphate and sodium molybdate did not produce any significant change in berry yield

Extension Programmes

Highlights of extension activities

- Village Stay programme at Mananthavady for the rice cultivation.
- A seven days training programme on "*Scaling up of water productivity in Agriculture for livelihood*" was organized at PRS,Panniyur in association with ARS chalakudy and ICAR.
- Classes were handled to students of COA,Padanakkad during their RAWE Experiential learning on 12-03-2011at PRS, Panniyur .
- Technical sessions were carried out for farmers in association with Syndicate Bank on January 11

- Under ATMA programme of the Kannur district the scientists from this station handled various technical sessions.
- Revitalisation of Katampally area under paddy was materialized by the active involvement of scientists from this station by providing adequate training on Kaipad cultivation and soil health management prior to the season

Farm Advisory Services

In person	Over telephone	Through letters
156	246	-

Radio talks / TV programmes / Audio- video cassettes

Topic	Date	Name of Scientist
Pepper production Technology	8-2010	Dr.V.P.Neema
Planting of black pepper	6-2010	Dr Jacob.D

Important visitor

Sr. Asst. Director of Horticulture, Sakleshpur, Hassan

Finance

Head	Head of Account	Budget (lakhs)	Expenditure	Receipts
Non- plan	339-31-0034	33.00	2231539	
Plan	339-31-2251, 339-31-4436 339-31-4499	9.30	311999	1143182
OEAP				
Kudumbasree	339-31-2222	0.396	29864	
ICAR- AICRP Spices	339-31-6620	40.99	2852406	
NHM	339-31-8287	19.08	1759307	
SHM- Pineapple	339-31-8674	3.00	65450	
SHM Medicinal Plants	339-31-8277	20.00	166320	
Elite Planting Material	339-31-8766	1.80	117297	
Network centre	339-31-8453	4.00	0	
RKVY (Pepper)	339-31-8661	3.88	19606	
RKVY(Rice)	339-31-8527	9.70	366470	
RKVY- Coconut	339-31-8666	1.89	122258	
Sugandhi	339-31-8795	34.81	1950415	
Soil based nutrient (Agron)	339-31-8774	10.20	141865	
Soil based nutrient (Soil Science)	339-31-8775	1.17	12044	
Modernization	339-21-5118	26.70	1835180	
RF				464561
OEAP total			9438482	
Total		214.316	11982020	1607743

HIGH RANGE ZONE

REGIONAL AGRICULTURAL RESEARCH STATION

AMBALAVAYAL, WAYANAD

Research programmes

a. Major research achievements (highlights)

Eleven Plan Projects and 9 projects with the financial help of other agencies are in progress.

Plan Projects:

- Seed & Nursery Programme (Plan)
- Research on Pepper on High Ranges (plan)
- Research on Coffee based Cropping Pattern (Plan)
- Biotechnology Centre (RS to KADP-SF) (plan)
- Research on Cool Season Vegetables (plan)
- Hybrid Seed Production in Vegetables (Plan scheme shifted from ARS Chalakudy)
- Res. On comprehensive crop care programme for Wayanad Farmers
- Research on Scented Rice
- Adaptive Trials on Management of Pepper
- Research on Medicinal Plants
- Research on Ginger/Turmeric

EAP Projects:

- AICRP on Spices (ICAR 75%-25%)
- Sugandhi - Integrated Pepper Development Project for Wayanad district
- Starting of Experimental Agrometeorological Advisory Service - AMB
- SHM - Setting up of of Leaf / Tissue Analysis Lab
- SHM - Rehabilitation of Existing Tissue Culture Lab at RARS, Ambalavayal
- SHM - Establishment of Bio Control Lab
- RKVY Paddy Scheme - Increasing production and availability of quality seeds of high yielding and traditional varieties of paddy in Wayanad district
- RKVY - Enhancing milk production through increased production and availability of fodder in Wayanad district
- National Horticulture Mission on Spices
- NAIP - Multi Enterprise Farming Models to Address the Agrarian Crisis of Wayanad District of Kerala

The details of the research projects are mentioned below:

(1)Spices

(1.1)Black pepper

Comparative studies of 13 varieties of pepper and studies on clonal variations in Panniyur-1 are in progress.

(1.2) Ginger

Germplasm of 27 Ginger varieties are being preserved in the station. Maran, V₂E_{5.2}, Rio-de-Janeiro are found promising among them.

(1.3) Turmeric

Germplasm of 36 Turmeric varieties are being preserved in the station.

2. Rice

Germplasm of 109 varieties of rice are being preserved in the station. The experiment on evaluation of short duration varieties is in progress. Six lines were selected and the CYT is in progress.

(2.1) Scented Rice

17 varieties of scented rice preserved in the station.

3. Vegetables

The seed production and distribution of vegetables like tomato, ladies finger, brinjal, bittergourd and cool season vegetables are being undertaken.

1. PRODUCTION OF VEGETABLE HYBRIDS

Brinjal: Arka Neelkant, Arka Kesav, Singhnath, Bholanath, Haritha, Surya, Swetha, Kodungallur Local and Kanjoor Local were taken as parents, of which Arka Neelkant, Arka Kesav, Surya and Swetha formed the male parents and the rest of the varieties were used as female parents. Crossing was done between these hybrid combinations and seeds were collected from these combinations. Performance of the hybrid seeds is being evaluated at the RARS, for which field planting is already over and multilocational trials are to be carried out.

Capsicum chinensis: Eleven lines of *Capsicum chinensis* were evaluated to observe their yield potential. Among the lines, CC1 gave the highest average yield of 2.74 kg/4 sq.m, followed by CC2 (b), in which the yield was 2.38 kg. The yield in the other lines is as follows.

(3.1) Cool Season Vegetables.

Under the plan project on cool season vegetables/ varieties of cabbage, carrot, potato, turnip, cauliflower, palak, radish etc were tested under Wayanad condition.

Cabbage: Three varieties of cabbage viz. Golden Acre, Pusa Mukta and NS 183 were tried at the RARS. Out of the three varieties, Golden Acre gave the highest yield (9.3 kg/4 sq.m) followed by NS-183(6.48kg). Pusa Mukta recorded the lowest yield (6.34kg).

Cauliflower: Five varieties of cauliflower viz. Pusa Sarad, Pusa Snowball K1, Sneha, Basant and Pusa Himjyoti were tried at the RARS. Out of these five varieties, Basant recorded the highest yield (10.35kg/4 sq.m), followed by Pusa Sarad (2.85kg). The yield obtained in Sneha and Pusa Snowball K1 was 2.1 and 1.15 kg, respectively. Pusa Himjyoti gave the lowest yield (0.870 kg/4 sq.m).

Chinese cabbage: Yield obtained in Chinese cabbage was 11.5 kg/4 sq.m and the maximum size of the head obtained was 375g.

Knol khol: White Vienna variety of knol khol was planted which gave an yield of 15.5kg from an area of 4 sq.m. Maximum weight of tuber obtained was 465g.

Radish: Pusa Hima, HQ and Pusa Chetki varieties of radish were evaluated. Among the three varieties, Pusa Hima recorded the maximum yield of 24.1kg/4 sq.m, followed by Pusa Chetki (8.80 kg) and HQ (7.5 kg).

Potato: Tropical potato varieties viz. Kufri Pukhraj, Kufri Surya and Kufri Badshah were evaluated to see their performance under mild sub tropical conditions of Wayanad. Cent percent germination was observed in all the varieties. Kufri Surya outperformed the other two varieties in terms of yield, number of tubers and tuber size. The average yield of Kufri Surya from 75 plants was 14.5 kg, whereas in Kufri Pukhraj and Kufri Badshah, it was 4.70 and 6.50 kg, respectively. The average number of tubers in Kufri Surya was 9 whereas in both Kufri Pukhraj and Kufri Badshah, it was 5.

4. Mixed cropping:

Mixed cropping in the garden lands with arecanut, cardamom, and pepper is in progress. The data are being analysed.

5. Agromet Advisory Service

Weather data is being collected and based on the meteorological data, weekly weather data bulletins are issued to 50 selected farmers of the District and also reach to farmers through Malanad Channel (Regional TV Channel).

6. Medicinal and Aromatic plants

More than 120 medicinal and aromatic plants were so far collected and are maintained at this station and also providing the planting materials of medicinal plants to farmers.

7. Central Sector Scheme (National Horticulture Mission)

As the part of this scheme planting materials of clove, all spice, garcinia, cinnamon, nutmeg etc were produced and supplied to farmers.

8. Ornamental Plants:

The survey for collecting the germplasm of various ornamental plants is in progress. The collected plants are being protected and nurtured. Planting materials of different ornamental plants were produced and supplied to farmers.

Research Programmes under AICRP Spices

Genetic resources

Black pepper

Germplasm collection, characterisation, evaluation and conservation

Collected 49 pepper cultivars from PRS, Panniyur.

Crop improvement

Black pepper

CVT 2000 series

Among different cultivars of pepper Panniyur-1 showed the highest wet weight of berries/standard (4.99kg) followed by Cul 5489 (2.4kg). Lowest wet weight was recorded in PRS 22 (0.15kg). Panniyur-1 showed the maximum dry weight of berries/standard (1.89kg) followed by PRS 21(1.01kg). Lowest dry weight was recorded in PRS 22 (0.057kg). Panniyur-1 recorded the maximum number of spikes/standard (702) followed by Cul 5489 (471.5). Lowest number of spikes was recorded in the cultivar, PRS 22(61.5). Panniyur-1 showed the highest spike length (15.23cm) followed by Coll 1041 (14.37 c m) and Lowest spike length was recorded in PRS 17 (8.7 cm). Maximum setting percentage was shown by PRS 22, Cul 5489, Coll.1041, Karimunda OP(98%). Minimum setting percentage was recorded in Cul 5308(90%). Panniyur-1 recorded the highest number of berries/spike (88.06) followed by Cul 5489 (74.23) Lowest number of berries/spike was recorded in Karimunda (local check).Panniyur-1 recorded the highest hundred berry weight (14.23g) followed by Coll1041 (13.062g) while lowest was recorded in the cultivar PRS 22 (6.0 g). Maximum Hundred berry volume was shown by HP813(26.75 cc) followed by HP1411 (26.25cc). Minimum berry volume was recorded in PRS 17 (14.35 cc)

Crop protection

Black pepper

Management of Phytophthora foot rot of black pepper

There was no significant difference between treatments for disease incidence and yield. The control plot showed more yellowing and defoliation and death of vines compared to the treated plants.

Ginger

Management of soft rot of ginger (biofumigation using cabbage)

The highest germination percentage(95%) was recorded in the plots in which rhizomes were treated with rhizobacterial antagonist and endophytic bacterial antagonist respectively. The lowest germination percentage(86.5%) was recorded in absolute control plots. The highest yield (20.25t/ha) was recorded in the plots in which biofumigation using cabbage was done. The lowest yield (9.99t/ha) was recorded in the plots in which rhizomes were treated with rhizobacterial antagonist. Soft rot, bacterial wilt and shoot borer incidence were recorded in the absolute control plot.

Management of bacterial wilt of ginger (biofumigation using cabbage)

The highest germination percentage(93.75%) was recorded in the plots in which rhizomes were treated with endophytic bacterial antagonist. The lowest germination percentage(88.75%) was recorded in plots in which rhizomes were treated with rhizobacterial antagonist. The highest yield (23.87t/ha) was recorded in the plots in which rhizomes were treated with endophytic bacterial antagonist. The lowest

yield (15.42t/ha) was recorded in the plots in absolute control plot. Soft rot, bacterial wilt and shoot borer incidence were recorded in the absolute control plot.

Farm Advisory Services

Queries of farmers were attended to either in person or over phone or through letters to the best possible extent.

Activities under RKVY Paddy Scheme

Major findings / achievements so far

- Procured around 30025 kg of paddy seeds from the farmers under participatory seed production.
- The seed produced and procured through the project is now selling to the farmers of Wayanad District through the sales counter and expecting a profit of around Rs.1.00 lakh.

Paddy Seed production at fields of RARS, Ambalavayal

Area - Total of 25 acres (under 3 season)

Seeds distributed – 800 kg.

(Gandhakasala, Jeerakasala, Deepthi, Athira, Uma, Kanchana etc.)

Lime distributed – 1000 kg.

Paddy Seed production at farmers field

Area - Total of 100 acres (under 3 season)

Nancha season – Malika Padasekharam, Ambukuthi – 10 acres

Puncha season - Kurumani padasekharam, Padinjarethara – 25 acres

Cheriyamala padasekharam, Kuruva, Pulpally – 25 acres

Nancha season – Cheriyamala padasekharam, Kuruva, Pulpally – 40 acres

Seeds distributed – 3200 kg. – Athira

Lime distributed – 12600 kg

Activities under RKVY Fodder Scheme

Major findings / achievements so far

- Planted Co – 3 fodder slips in 2 ha in RARS, Ambalavayal.
- Production & sale of fodder slips and green fodder of Co- 3 is in progress
- Collection and planting new species and varieties of fodder crops to test their suitability under Wayanad condition is in progress
- A fodder museum is being maintained (50 cents) with 25 fodder crops & varieties
- Three farmers training programmes on fodder production technology were conducted
- 60 farmers were selected and seeds and planting materials of different fodder crops were distributed

Activities under Agrometeorological Advisory Service

Weather data is being collected and based on the meteorological data, weekly weather data bulletins are issued to 50 selected farmers of the District and also to farmers through Malanad Channel (Regional TV Channel)

Finance

Head	Expenditure	To Comptroller's A/c	Receipts	Bank Interest
Non-Plan	12383204			
Plan	1398844			
NAIP	11701861			
Other EAPs	7012943			
ICAR RF	4926821		2984019	104653
KAU Revolving Fund	76142	275000	319285	7618
Farm Revenue	23368	2425000	2540407	22744

CARDAMOM RESEARCH STATION PAMPADUMPARA

Research programme

a) major research achievements (highlights)

I. AICRP on SPICES

CONCLUDED EXPERIMENT

1. PEP/CP/5.1 Adaptive trial on management of *Phytophthora* foot rot of black pepper in farmers

Black pepper (*Piper nigrum*) popularly known as the 'King of Spices' is one of the oldest and important spices of the world. The crop is also a major source of foreign exchange earner for the country. Foot rot is the most destructive disease prevalent in all pepper growing tracts of India and takes a heavy toll of the crop.

Phytophthora foot rot was least on (2.92 DI) black pepper vines where application of potassium phosphonate @ 0.3% as spraying and drenching and soil application of *Trichoderma harzianum* @ 50g / vine with 1 kg of Neem cake to the root zone. Vines protected by application of 1% Bordeaux mixture as spray and drenching copper oxychloride (0.2%) was found to be next best treatment . (6.33 DI.) Both of these treatments were significantly superior to the farmers practice. Yield date also showed the same trend. Highest yield was recorded in T1 (Potassium phosphonate (0.3%) + *Trichoderma harzianum* @50 gm/vine ie.,0.56 kg black pepper / vine) followed by T2 Bordeaux mixture 1% spray + COC 0.2 % drench ie.,0.51 kg black pepper / vine / year). Farmers practice resulted in highest DI (9.12) and lowest yield (0.4 kg black pepper / vine / year)

2) PEP/CI/3.1 Coordinated Varietal Trial 2000 – Series V

The experiment was started during 2002 with 12 black pepper entries and three replications so as to evaluate the performance of released varieties as well as promising selections of black pepper. Among the twelve accessions evaluated, significant differences existed in all the traits except no of berries per spike. The accession CUL 5308 registered significantly higher yield (875.85g) followed by HP 1411 (672.71g). 100 berry weight was maximum in HP 105 (8.6g) whereas maximum was recorded in Panniyur- 1 (14.33g) which was on par with all other varieties except HP 105, HP 813 and Karimunda .

3) PEP/CI/3.3 Coordinated Varietal Trial 2006 – Series VI

This program was started in 2008 at CRS, Pampadumpara so as to evaluate the performance of released varieties as well as promising selections of black pepper under high ranges of Idukki district. During 2007-08, a total of ten accessions namely IIB 20052, PRS-88 (Panniyur), Acc.No.53, Acc.No.106 (Sirsi), Acc.No.33 and 57 (Yercaud), C-1090, HP -39 (IISR Calicut), Panniyur-1 and a local cultivar *Karimunda* were evaluated in RBD comprising of three replications and six vines per plot. *Erythrina indica* was used as the standard. Observations on plant growth parameters showed that all the ten entries especially Panniyur-1, Accession 33, Accession 106 , Accession 57 and HP 39 showed good growth and vigour in the field.

4) PEP/CP/5.2 Trial on management of *Phytophthora* foot rot of black pepper in existing plantation

Analysis of pooled data for 2006-2007, 2007-2008 and 2010-2011 showed that among the five treatments black pepper vines treated with the treatment T4 (consortium of bacteria + *Trichoderma harzianum*) before onset of monsoon (May last week), during monsoon (July first week) and after monsoon (September first week) recorded lesser DI (2.89), which was found to be followed by T1 (Potassium phosphante 0.3% + soil application of *Trichoderma harzianum* (4.48 DI). Maximum dry berry yield was recorded for treatments T4 (*Trichoderma harzianum* + consortium of bacteria ie., 0.5 kg/vine), T2 (Bordeaux mixture spray and COC drench ie., 0.48 kg / vine) and T1 (potassium phosphonate spray and soil application of *Trichoderma harzianum* ie., 0.48 kg/vine) and they were on par. They were significantly superior to T3 (consortium of bacteria alone) and T5 (control)

5) PEP/CP/5.3 Trial on management of *Phytophthora* foot rot of black pepper in new plantation

The experiment was restarted during June 2010. All the three varieties of black pepper such as Panniyoor - 1, IISR-Shakthi, and IISR Thevam were planted for evolving a management strategy for foot rot of black pepper

6) PEP/CP/6.2 Management of *Erythrina* gallwasp in a popular standard of Black Pepper.

A survey has been conducted to ascertain the severity of gallwasp infestation in *Erythrina* a popular standard of black pepper in different panchyats of Idukki District. Three types of *Erythrina* has been identified to be used as standard of pepper vines. They are black thorned, white thorned and thornless. A scale has been developed to measure of infestation of the gall wasp.

7) CAR/CI/1.1 Germplasm collection, characterization, evaluation and conservation

Collection, characterization and conservation of superior cardamom clones from local farmers/planters field as well as clones tolerant to biotic and abiotic stresses from the Cardamom Hill Reserves (CHR) and adjoining Megamalai regions. Accessions that are performing consistently in terms of yield, tolerance to biotic and abiotic stresses and superior in quality parameters are further evaluated. This program was started in 1986 at CRS, Pampadumpara. Survey work was continued attempting to collect superior genotypes with special characters viz., high yield, tolerance to biotic and abiotic stress conditions and good quality capsules (possessing boldness, parrot green colour, superior aroma as well as flavour). A total of 159 cardamom accessions are presently conserved in the gene bank. Among them 73 cardamom accessions (CRSP 1-73) got IC numbers (547920 to 547992) from National Bureau of Plant Genetic Resources, New Delhi. In general, the yield performance was good and the highest fresh yield of capsules ($6300 \text{ g plant}^{-1}$) and dry yield ($1400 \text{ g plant}^{-1}$) of capsules was recorded in CRSP 84 followed by CRSP 26 with $4400 \text{ g plant}^{-1}$ and 978 g plant^{-1} of fresh and dry yield, respectively. CRSP 61 recorded maximum 100 capsule volume (180 cc) and weight (115 g) followed by CRSP 30 (175 cc and 100 g) suggesting higher boldness and lighter weight of capsules. These two attributes determines the market price of cardamom. Dryage percentage of CRSP 158 was found to be highest (23.2%) confirming its superiority in recovery percentage than all other accessions under study. CRSP 158 was also found to be tolerant to Thrips. Thrips infestation was highest in CRSP 48 (52 %) followed by CRSP 47 (45%). CRSP 44 was found to be susceptible to *azhukal* disease (40%). The capsule borer damage was recorded lowest for all accessions.

8) CAR/CI/3.5 Coordinated Varietal Trial 2005 – Series V

A total of seven accessions namely MCC 73, MCC 309, MCC 246, MHC 26 (ICRI, Myladumpara), CL 722 (RARS, Mudigree), PS 27 (CRS, Pampadumpara) and *Green Gold* (check) have been raised in three replications in randomized block design during October 2005. Three varieties viz., CL 722 (64.59), MCC 309 (57.83) and MCC 73 (57.73), registered more than 50 number of tillers per clump. Maximum 100 capsule volume was registered in GG (local check) (115cc) followed by MHC 26 (113.33 cc), whereas maximum 100 capsule weight of 95 g was recorded in PS 27, MCC 246 and MHC 26. Infestation by thrips was found to be lowest in PS 27 which was on par with MCC 73. Highest fresh yield ($3625.20 \text{ g plant}^{-1}$) and dry yield ($816.13 \text{ g plant}^{-1}$) was recorded by PS 27.

9) CAR/CI/3.6 Coordinated Varietal Trial 2007/2009 - Series VI

This experiment was started in June 2008 with 13 cardamom accessions raised in three replications in a randomized block design so as to evaluate the location specific adaptability of cardamom varieties suitable for Idukki district. During 2009-10, the planting has been completed. Since staggered planting was undertaken no uniformity among replications was observed. The experiment was re-laid out to get uniformity for the treatments during June 2010 as per Project Coordinator's decision. Initial observations of the restarted experiment shows that PLNo 14, PV 2, CRSP 19, and Green gold showed good growth with higher values for tiller height, leaf length and leaf width.

10) CAR/CP/6.5 Trial on management of panicle rot and clump rot diseases of cardamom in existing plantation

Minimum tiller infection was recorded for the treatment T3 (*Trichoderma harzianum* + consortium of bacteria @ 50 g/vine). The treatment T3 (*Trichoderma harzianum* + consortium of bacteria @ 50 g/vine) was found to be best treatment against panicle infection and capsule infection. Maximum yield of (0.68 kg dried capsule / plant) was recorded in treatment T3 (*Trichoderma harzianum* +

consortium of bacteria @ 50 g/vine). which was on par with the treatment T2 (Consortium of bacteria @ 50 g/vine ie., 0.67 kg dried capsule / plant).

11) CAR/CP/6.6 Trial on management of panicle rot and clump rot diseases of cardamom in new plantation

In this experiment the best treatment against Tiller infection, panicle infection and capsule infection for Green gold and PV 2 are T3 (*Trichoderma harzianum* + Consortium of bacteria @ 50 gm/plant) and this was followed by the treatment T2 (Consortium of bacteria @ 50 gm/plant)

For PV- 2 Highest yield was recorded for treatment T3 (*Trichoderma harzianum* + Consortium of bacteria @ 50 gm/plant ie., 0.64 kg/plant). For Green Gold the yield obtained for the treatments T3 (*Trichoderma harzianum* + Consortium of bacteria @ 50 gm/plant ie., 0.67 kg / plant), T2 (Consortium of bacteria @ 50 gm/plant ie., 0.66 kg/plant), T5 (Potassium phosphonate (0.3%) spray and drench ie., 0.66 kg / plant) and T1 (*Trichoderma harzianum* @ 50 gm/vine ie., 0.64 kg / plant) were on par .

12) CAR/CP/6.8 Comparison of effect of chemical treatments as well as bio-control agents against pseudostem rot of cardamom.*

Due to heavy summer showers received this year, the disease appeared only during April 2011 and the treatments are initiated.

13) CAR/CP/6.4 Management of cardamom root grub through entomopathogenic nematodes

A field experiment was conducted at CRS, Pampadumpara to evaluate the efficacy of two strains of *Heterorhabditis* sp. at two different concentrations against cardamom root grub. Application of EPN was found to be effective in reducing the population of cardamom root grub. Both the EPN concentrations @ 100IJ/grub or 200IJ/grub used in the study reduced the root grub population at par. However, the local isolate *H. indica* was found to be more effective than *H. bacteriophora* in suppressing the population of cardamom root grub (59.4%). The root grub mortality increased significantly when the nematode was applied alone or in combination with imidacloprid. In addition to increase in root grub mortality, combined application of nematode-imidacloprid increased the speed of kill compared to nematode or imidacloprid used separately. Imidacloprid is therefore compatible with entomopathogenic nematodes and the sluggishness brought about on cardamom root grub made easy entry of EPN in to the host resulting in accelerated speed of kill. A combined application of nematode and neonicotinoid is therefore suggested as a curative method in the management of cardamom root grub. Care should be taken to ensure adequate moisture content while applying EPN and application of EPN should be restricted to evening hours for better results.

14) CAR/CP/6.7 Evaluation of new insecticides/ biopesticides in cardamom against thrips and shoot and capsule borer

Thrips and shoot & capsule borer are the important insect pest infesting cardamom. In order to effectively manage these pests an experiment was initiated during 2010 (2009 December). At Pampadumpara , spraying Quinalphos @ 2ml/l was found to be the most significant treatment for the management of both pests when compared to all other treatments.. Ponem a neem based formulation was found to be equally effective in management of all these infestations significantly, and was found to be a better alternative for the management of shoot and capsule borer

15. GIN/CP/ 6.7 Management of Soft rot of Ginger (Bio-fumigation using Cabbage)

Cabbage has been raised and the crop residues incorporated in soil and beds were subjected to soil solarization.(April-May 2011)

16. GIN/CP/ 6.9 Management of bacterial wilt of of Ginger (Bio-fumigation using Cabbage)

Cabbage has been raised and the crop residues incorporated in soil and beds were subjected to soil solarization.(April-May 2011)

II. STATE HORTICULTURE MISSION PROJECTS

a) Establishment of a model floriculture nursery unit

Nursery production of ornamental plants are in progress. Our station maintains around 530 roses of different varieties. Planting materials of rose, dianthus, carnation, chrysanthemum, dahlia are been multiplied and distributed to farmers.

b) Establishment of a Bio-control Laboratory

Effective antagonistic microorganisms such as *Trichoderma sp.*, *Pseudomonas fluorescens* and *Bacillus sp.* has been collected from various centres for evaluating the bioefficacy and virulence against major diseases of cardamom and black pepper. Preliminary works had been undertaken, native antagonistic organisms has been identified. In vitro mass production of EPN strain using *Galleria mellonella* has been standardized. This local strain is found to be very effective against cardamom root grub, *Basilepta fulvicorne*. The application of this EPN against the root grub in the field has also been standardized. Cadaver form of this has been found to be effective and feasible against the root grub. The dosage has also been fixed. Testing of supplying the EPN in the form of solution is also standardized.

The construction of building for the bio control laboratory is now over. Purchase of a few equipments is pending. Proposal for employing skilled labours has been submitted as plan project, RKVY project and NABARD scheme

III. NATIONAL HORTICULTURE MISSION PROJECT ON SPICES

The project was been implemented at the station with the objective of producing good quality rooted cuttings of black pepper of elite cultivars that are adaptable to high ranges of Idukki district. The existing nursery infrastructures such as green house, mist chamber, potting mixture shed and hardening chambers had been effectively utilized for raising the black pepper nursery. Runner vines of popular black pepper varieties such as Panniyur 1 to 7, IISR Shakti, IISR Thevam, Malabar Excel, Girimunda and Karimunda have been multiplied in large numbers under open condition as well as in mist chambers using rapid multiplication propagation methods.

Single noded orthotropic shoots found to be more efficient under our situation in controlled condition. However phytophthora wilt was noticed through out the season due to the increased humidity and temperature. The establishment period of the single noded orthotropic shoots were reduced (within 1 ½ month) as compared to the runners from open field (3-4 months). Field management is also found to be easier in orthotropic type of propagation as compared to other methods.

IV. PLAN PROJECTS

1. Research on Cardamom

Identification of promising local cultivars in farmers' fields in Idukki district, their collection and maintenance in the germplasm. Development of hybrids between local cultivars and improved varieties for boldness, colour, drying percentage and also development of varieties through poly cross breeding and clonal selection.

Native antagonistic microflora like *Trichoderma* species, *Paecilomyces lilacinus*, *Pseudomonas fluorescence* and *Bacillus subtilis* were isolated from cardamom rhizosphere of CRS Pampadumpara and screened against fungal pathogens like *Colletotrichum sp.*, *Fusarium sp.*, *Pestalotia sp.* and root knot nematode (*Paecilomyces lilacinus*).

Talc based formulations of selected antagonists were prepared and is being used for field trials.

2. Strengthening black pepper research in high ranges

The project aims at the development of high yielding black pepper varieties from the local popular cultivars of Idukki district, germplasm collection, maintenance and evaluation of biocontrol agents for the management of diseases and pests of black pepper. Native antagonistic microflora like *Trichoderma* species, and *Bacillus subtilis* were isolated from pepper rhizosphere of CRS Pampadumpara and screened against pollu disease and Fusarium wilt of pepper. Talc based formulations of selected antagonists were prepared and is being used for field trials. Existing pepper plants in the farm are maintained by proper nutrient management and plant protection measures.

3. Organic Cardamom

A survey of nematodes of cardamom rhizosphere was done and found that spiral nematode *Helicotylenchus sp.* was the major nematode pest in major cardamom growing areas of idukki district. In farms practicing organic cardamom practices the population of bacterivorous, Fungivorous, and predatory nematodes were found to be highest and that of plant parasitic forms were lowest.

V. STATE PLANNING BOARD PROJECT

1. Soil based nutrient management plan for agro ecosystems of Kerala Nutrient management plan of 21 panchayaths of Idukki district was collected and data process is being done.

A) CONCLUDED EXPERIMENTS

PEP/CP/5.1 Adaptive trial on management of *Phytophthora* foot rot of black pepper in farmers field.

II. STATE HORTICULTURE MISSION PROJECTS

- 1) Establishment of a model floriculture nursery unit
- 2) Establishment of a Bio-control Laboratory

III. NATIONAL HORTICULTURE MISSION PROJECT ON SPICES

Plan Projects

1. Strengthening Pepper Research in high ranges
2. Strengthening black pepper research in high ranges
3. Organic Cardamom

V STATE PLANNING BOARD PROJECT

1. Soil based nutrient management plan for agro ecosystems of Kerala

Extension programmes

- a) Highlights of extension activities

Scientists regularly handle training classes to farmers on various aspects of spices production technologies, varieties, integrated nutrient management, value addition, insect pests and disease management of spices. Member of various Farmer groups as well as Self Help Groups visit the station and acquaint with the latest and novel technologies of spices. Field visits are routinely performed by scientists as a part of Multidisciplinary Diagnostics Team and suitable remedial measures are being suggested to the field problems. The scientists also perform explorations for the collection of new cardamom germplasm from local and adjacent areas. Research extension interfaces are held and all the field problems raised by the Agricultural Officers of Idukki district are discussed and recommendations suggested. Queries of individual farmer's are attended through telephone, letters and field visits are made if required. Some of the key field problems attended are capsule rot of cardamom, fungal *pollu* and quick wilt of black pepper, gall wasp in *Erythrina*, scale insects in black pepper and coffee locust.

Farm Advisory Services

In person	Over telephone	Through letters
85	195	2

Finance

Head	Expenditure (Rs)	Receipts (Rs.)
Non-plan	52,72,325	71,39,000
Plan	3,49,282	6,93,000
ICAR - AICRP	19,07,530	13,54,100
Other EAPs	58,48,907	64,50,000
Revolving Fund	53,387	53,194

SPECIAL ZONE OF PROBLEM AREAS

REGIONAL AGRL. RESEARCH STATION, KUMARAKOM

Academic Programmes

The final year BSc(Ag) students of the College of Agriculture, Vellayani were given the Rural Agricultural Work Experience at the station during October 2010.

Dr. K.G. Padmakumar, Associate Director served as Research Guide for Ph.D. of MG University. He has also served as Member of Board of Studies, Faculty of Fisheries.

Research Programmes

Major Research Achievements

Under the Rashtriya Krishi Vikas Yojana project (RKVY) on Enhancing productivity of rice in Kari lands of Kuttanad a biocontrol laboratory for the production of *Tichogramma japonica* and *Trichogramma chilonis* could be established at the RARS Kumarakom. Soil health cards based on the soil nutrient status were distributed to the farmers of the different Padashekarams of Karilands under this project. The varietal suitability trials under this project indicated that the Pokali rice variety Vyttila-6 is suitable to Kari soils. Pest and disease forewarning were given to farmers based on the weekly surveys in relation to climatic factors.

The RKVY project on bio waste and bio- energy recycling perfected a biowaste management strategy for house hold level adoption. The entire biowaste generated at each homestead can be processed in situ for biogas and vermicompost production. The clean energy and organic manure thus produced can partially replace LPG and fertilizer resulting reduction in carbon emission. The experimental Vigova broiler duck production taken up under this project revealed to be a viable and profitable enterprise suitable for wide adoption.

Organic pepper plot in two location in Idukki district could be established under the SHM project : " Establishment of organic pepper plots". High yielding pepper varieties of Panniyur1-7 were planted in this plots and maintained organically. The above high yielding varieties are multiplied and distributed by these farmer maintained pepper nurseries.

Another SHM project on Establishment of pest and disease surveillance unit could be completed during the current year. In this project surveillance work for the major pest and diseases were taken up in different part of Kottayam district. Severe incidence of cowpea mosaic, *Fusarium* wilt and *Phyllody* was observed during the summer months of 2010. Para pheromone traps for mango and vegetable fruit flies were made and distributed to farmers under this project. Development of a pest and disease forecasting model based on the data generated for three years is in progress.

The paddy mission project on evaluation of newer molecules for the management of rice pest and diseases of rice in Kuttanad could bring forth new green molecules for pest management in rice. The green chemicals Ferterra and Coragen were found to be most effective in managing rice stem borer while indoxacarb was found to be effective for managing rice leaf roller.

The SHM project : " Establishment of model pepper nursery" could provide sufficient infrastructure facilities for the production of good quality rooted pepper cutting for the farmers of Kottayam and Idukki districts. 1.5 lakh numbers of good quality Karimunda rooted pepper cuttings produced at this nursery could be distributed to the pepper farmers through the State Horticulture Mission.

Two soil fertility based projects were under operation during the current year. The project on soil fertility mapping of Kuttanad soils, about 1000 soil samples from 31 Padashekarams of Kottayam district were collected and analyzed for pH, EC, major nutrients and micro nutrients based on which soil fertility mapping was undertaken.

An integrated nutrient management package for Coleus could be evolved. The present inorganic fertilizer dose for Coleus can be reduced by 25 % by the use of biofertilizers, i.e. AMF or *Pseudomonas* or a combination of both. A fertilizer dose of 75:50:100 Kg NP and K / ha along with biofertilizers *Azospirillum* and phosphobacteria gave the highest tuber yield in cassava var. Vellayani braswa.

A model vermicompost demonstration unit was established at this station under the SHM project. Establishment of vermicomposting demonstration units.

Breeding works carried out in vegetable cowpea, KMV-1 with Co-6 has helped to identify 12 promising lines of vegetable cowpea with resistance/tolerance to cowpea aphid borne mosaic virus and the trial is in progress.

An organic package for rice production consisting of application of vermicompost and oil cakes along with biofertilizers viz. *Azospirillum*, Phosphobacter and *Fraturia* could be evolved, the package could enhance the biological activity of the soil as evident by the increased presence of beneficial microbes especially *Pseudomonas* and *Azospirillum*.

Under the RKVY project viz., Fish Biodiversity for Livelihood Enhancement-Establishment of cluster based Open water Food Fish and Ornamental Fish Breeding, Rearing for commercially important fishes in Kuttanad involving Women Self Help Group (SHG), operated by the aquaculture division, an open water cage fish farm of 225 cages was established in the open Kayal adjacent to RARS campus. Cage farming of Karimeen and endemic fishes is undertaken by involving women self Help Groups. This is the first cage fish farm of this kind in the country for Karimeen operated in this scale by involving women groups. This is now a major training centre for prospective farmers and officers of the department of Fisheries and as cage culture of Karimeen is a new technology developed by RARS through a series of studies.

Under this project and also funding from the ICAR mega seed project, an Aquarium centre for endemic fishes has been commissioned and this has become a star attraction for students and general public to observe the local fishes in its natural settings.

As part of this RKVY project, a Fish feed Unit has been commissioned where feed for local fishes is formulated, manufactured and sold to farmers. Now the fish feed requirement of the station is fully met from the unit. This is operated by women. The feed produced is commercially branded as 'Meenoot' and the same is now in high demand among farmers due to reasonable pricing and high quality.

Extension Programmes

Highlights of Extension Activities

During the current year 3 seminars and 25 training programmes were organized at this station. The scientists of the station had close linkage with the line departments. The field problems pointed out by the line departments was addressed and remedial measures prescribed. The scientists of the station Dr.A.V.Mathew, Professor (Plant Pathology), Dr.N.K.Sasidharan, Associate Professor (Agronomy) and Dr.D.Ambikadevi, Professor (Entomology) served as paddy cell members of Kottayam District and attended to the paddy cell activities. The Research and Extension interface at the district and block levels were attended by the scientists of the station.

The scientist of this station attended to 40 agricultural seminars, 10 scientist farmer interface and 9 on station training programme as detailed. On station and off camp training classes on mushroom cultivation, spawn production, rice diseases, fruit and leaf fall in nutmeg were handled by Dr.A.V.Mathew, Professor (Plant Pathology). Dr.D.Ambikadevi, Professor (Entomology) attended to training programmes on integrated pest management in rice and vegetables, bio control agents of rice pests, organic vegetable production and quality control of pesticides held at RARS, Kumarakom, Krishibhavans of nearby districts and at RAATC. Dr.N.K.Sasidharan, Associate Professor (Agron.) attended to training programmes on upland rice cultivation, principles and practices of organic crop production, integrated nutrient management in rice, weed management practices in rice, seed production programme in paddy, water hyacinth control, biowaste management and mechanisation of paddy cultivation held at RATTC, Krishi bhavans and at RARS, Kumarakom. Dr.Vandana Venugopal,

Associate Professor addressed to vermi composting, INM and soil fertility, organic farming, scientific banana cultivation and upland rice cultivation in seminars held at Krishibhavans and at block level. Dr. K. Geetha, Professor (Agronomy) organized trainings on soil fertility evaluation and management. Dr. Shajeesh Jan.P, Assistant Professor (Agro Meteorology) released regular agro met advisory bulletins. He has also issued biweekly agro met advisory bulletins to 86 selected farmers of the district.

Dr. K.G. Padmakumar, Associate Director served as Monitoring Team Member Matsya Keralam Project.

Farm Advisory Services

	In Person	Over Telephone	Through Letters
Plant Protection	350	270	0
Crop Management	220	315	0
Crop Improvement	120	1280	0
Farm Mechanization	110	34	0
Aquaculture	550	210	0
Animal husbandry	110	156	0

List of Publications

Scientific Papers

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3. Vandana Venugaopal, Sheela K.R and Geetha Kumarai, V.L. 2011. Evaluation of feasibility of colocasia as an intercrop in double sucker planting system of banana Var. Nendran. Abstr. In Proc. Of NSCFT. 2011, 20-22 Jan. 2011, CTCRI
4. Padmakumar, K.G., L Bindu, P.S. Sreerexha and Nitta Joseph, 2009. Food and Feeding behaviour of Golderm catfish *Horabagrus brachysoma* 9 gunther. *Indian J. Fish.*, 56(2) 139-142
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8. Padmakumar K.G., L Bindu VS. Basheer and A. Gopalakrishnan 2010. Threatened Fishes of the World: *Clarias dussumieri* (Valenciennes, 1840) (Clariidae) *Environ. Biol Fish.* 87: 297-298
9. Padmakumar, K.G. and L Bindu and P.S. Manu 2010 in situ conservation and stock enhancement of endemic fish resources through captive breeding and artificial sanctuaries. *Indian Journal of Animal Sciences*. 80(4) 63-70
10. Padmakumar, K.G. 2010. Biodiversity based Farming-A system approach to farming relevant for Kerala. *Proc. Nat. Seminar Sustainable Agriculture*, CMS College, Kottayam. pp14-19
11. K.G. Padmakumar, 2009. Inland Fisheries and Aquaculture in India: Harnessing the Potential, *Sagara sangamam, IFCOS*, Trivandrum, 137-147.
12. Padmakumar, K.G., L. Bindu, P.S. Sreerexha, A. Gopalakrishnan, V.S. Basheer, Nitta Joseph, P.S. Manu and Anuradha Krishnan. 2011. Breeding of endemic catfish *Horabagrus brachysoma* in captive conditions. *Curr. Sci.* 100(8) 1232-1235

Books

RARS Kumarakom. 2011. Thirty years of RARS- Glimpses on research accomplishments (Editors. Dr. K.G. Padmakumar and Dr. D. Ambika Devi). Kerala Agricultural University, Regional Agricultural Research Station, Kumarakom, Kottayam. P. 36

(i) Number of Visitors to the Institution (Farmer Group/Students)

9 student group and 3500 farmers

(ii) Important Visitors

1. Sri. Mullakkara Ratnakaran, Hon. Minister for Agriculture, Kerala
2. Sr. VN. Vasavan, MLA
3. Sr. Thomas Chazhikadan MLA
4. Sr. K. Jayakumar IAS, Addl. Chief Secretary and Agrl. Production commissioner
5. Smt. Radha V Nair, Dt. Panchayat President
6. Smt. Dhanya sabu, Kumarakom Panchayat President
7. Smt. Beena Binu, Standing committee chairperson Kottayam Dt. Panchayat
8. Smt. Rajitha Santhosh, Member Ettumanoor Block Panchayat
9. Sri Justine Mohan IFS, Project director Kuttanad Package

Infrastructure developed

Many developmental activities could be taken up under the various RKVY projects and modernization programme of KAU farms during the current year. A sales cum information centre, tender coconut parlor and accessory structures were newly established. Under the Kuttanad Package the wetland paddy fields were modified to accommodate the other wetland farming system components. A new duckery and cattle shed to shelter broiler ducks and buffaloes were newly established. The road towards the main office and to the aquarium complex were repaired and maintained. A cage culture center consisting of 250 fish cages and accessory facilities were newly developed. The desilting and strengthening of bunds of the channel and bunds in the farm area completed using machinery. The 8.7 ha water harvesting area cleared off aquatic weeds and wild growths. Chain link fencing to protect the reservoir newly provided. Chain link fencing around the fish breeding ponds and the farm border are the other development activity taken up.

Any other details

The inauguration of the various initiatives under the Kuttanad package projects and facilities developed under the RKVY projects was done in a function presided over by the Sri V.N.Vasavan MLA on 12.2.2011. Sri Mullakkara Rathnakaran, the honourable minister for Agriculture laid the foundation stone of the new laboratory complex and the new bio control laboratory. Sri V.N.Vasavan, MLA released the soil health card. Sri Thomas Chazhikadan MLA inaugurated the new Cage culture unit. Sri. K. Jayakumar, IAS, Additional Chief Secretary and Agrl. production commissioner delivered the Key note address and inaugurated the new aquarium complex and fish feed production unit. Dr. K.R. Viswambharan, the honourable Vice Chancellor of KAU, inaugurated the new Sales cum information Centre. Smt. Radha V Nair, released the souvenir published in this context. The detailed project report of the Hariyali project released by Smt. Beena Binu , standing committee chair person of the Kottayam District Panchayat.

Finance

Head	Expenditure (Rs.)	Receipts (Rs.)
Non-plan	18448539	
Plan	5452496	1784083
ICAR	370444	373311
Other EAPs	18374844	
Revolving Fund	896384	
Total	43542707	1040230
		3197624

RICE RESEARCH STATION, MONCOMPU

Research Programmes

I. Crop Improvement

1. Breeding short duration high yielding varieties of rice suited to Kuttanad (RIC-02-01-21-93/MON(9)KAU)

Based on yield, duration and quality characteristics, one culture viz., SD 36 (KAU M 108-262-1) developed from this project was released as MO. 21 (Prathyasa) for general cultivation in Kerala. The variety is of 102-105 days duration, yields about 5.0- 5.5 t/ha and is suited for double crop wetlands of Kuttanad where the cultivation of medium duration varieties during both the seasons brings about crop damage during saline water intrusion when Thanneermukkom barrage is opened during March.

One promising culture viz., MO8 20 KR was found to be suitable for cultivation in uplands in All India Co-ordinated Trials. During the period this culture was multiplied for testing in the uplands.

2. Breeding high yielding varieties of rice with resistance to important rice diseases of Kuttanad (RIC/03-02-08-93/MON(9)KAU)

Three promising cultures, M 87-1, M 87-5 and M 95-1 were multiplied during the period. The quality analysis of the advanced cultures is to be done. From the National screening trials BLB resistant varieties were collected for utilizing in the breeding programme. The following fresh crossings were made to evolve varieties with BLB resistance.

(1) Uma/ DV 85, (2) Jyothy/ BJ 1, (3) Remya/ BJ 1, (4) Krishnanjana/ DV 85.

3. Collection, maintenance and evaluation of rice (RIC/01-00-02-82/MON((9)KAU)

During the period, 28 varieties/ cultures selected from National Screening Nursery of AICRIP having Bacterial Blight resistance (score 0-3) were added to the germplasm.

Four hundred and eighty accessions were maintained which includes 96 traditional and 384 high yielding varieties/ cultures, exotic varieties etc.

4. Genetic analysis of gall midge resistance in rice and evolving resistant varieties for gall midge biotype 5 (RIC/03-01-11-99/MON(9)ICAR)

From the IET, 10 superior cultures with respect to yield and tolerance to pests especially Gall midge biotype 5 were advanced to preliminary yield trial. PYT will be repeated for one more season.

5. Breeding for high yielding rice varieties with resistance to major pests of Kuttanad (RIC/01-03-06-2003/MON(9)/KAU)

From the screening trials cultures/ varieties with resistance/tolerance to pests like stem borer, leaf folder were selected and used in the breeding program. The materials obtained from the crossing programme are in the advanced stages of selection

6. Breeding for high yielding rice varieties with resistance/tolerance to adverse soil conditions (RIC/01-03-06-2003/MON(9)/KAU)

The first part of the programme was a participatory screening of already existing rice varieties in different locations in the Kari lands of Kuttanad wherein around sixty rice varieties were tested in different locations of Kari lands. Results of the trial revealed that Uma, IR 47551 and IR 50138 can be recommended for cultivation at Karumady, Uma, Vytilla 2 and Krishnanjana in Purakkad Kari and Vytilla 6, IR 47544 and Uma in Vaikom Kari.

A parallel programme for developing new varieties incorporating high yield and resistance to adverse soil conditions was also taken up from 2004-05 onwards. Cross combinations involving the varieties adapted to the region were made and single plant selections were made from the segregating generations. The stabilized cultures were yield tested both at RRS, Moncompu and in farmer's fields in

the kari lands of Kuttanad. The promising cultures were selected for further trials and further evaluation is being done

7. Breeding for high yielding rice varieties with submergence tolerance (RIC-02-01-10-90/MON (9) ICAR)

Single plant selections are continued from the segregating populations involving flood resistant parents and high yielding varieties.

8. Characterization and Evaluation of medicinal rice (*Oryza sativa*. L) var Njavara

Single plant selections were continued from the heterogenous mixture of Njavara and high yielding types with short duration were selected. Seeds of Njavara Yellow were subjected to mutation @ 20 KR and the M1 generation was raised in the field during Addl crop 2010. Single plant selections were made and M2 generatio was raised in the field during Puncha 2010-11. Selection of superior plants was done during Puncha 2010-11..

AICRIP TRIALS

Six AICRIP trials as detailed below were laid out in the field during Kharif 2010.

9. Advanced Variety Trial - VE (RIC-02-01-10-90/MON (9) ICAR)

Eight entries received from DRR were tested with 3 checks in an RBD with three replications. Among the entries, Entry No.701 recorded the maximum yield of 5651.94kg/ha followed by Entry No. 704 with 4186.46 kg/ha and Entry No. 708 with 4175.6 kg/ha.

10. Advanced Variety Trial - 2- E (RIC-02-01-10-90/MON (9) ICAR)

Nine entries were tested during Kharif 2010 for yield and reaction to biotic stresses. Among the entries, Entry No.909 recorded the maximum yield of 5959.0 kg/ha followed by Entry No. 901 with 5732.7 kg/ha. and Entry No.907 with 4699.4 kg/ha.

11. Advanced Variety Trial - 1- E (RIC-02-01-10-90/MON (9) ICAR)

Ten entries received from DRR were tested in an RBD with three replications. Among the entries, Entry No.1010 recorded the maximum yield of 6513.kg/ha followed by Entry No.1009 with 6430.7 kg/ha and Entry No.1004 with 6093.7 kg/ha.

12. Advanced Variety Trial - 1- IME (RIC-02-01-10-90/MON (9) ICAR)

Thirty one entries were tested during Kharif 2010 for yield and reaction to biotic stresses in an RBD with three replications. Among the entries, Entry No.1212 recorded the maximum yield of 6071.6 kg/ha followed by Entry No.1213 with 5876.7 kg/ha and Entry No.1210 with 5844.3 kg/ha.

13. Initial Variety Trial - E (RIC-02-01-09-90/MON (9) ICAR)

Forty four entries received from DRR, Hyderabad along with local check were laid out in an RBD with two replications .Entry No.1121 recorded the maximum yield of 6578.3kg/ha followed by Entry No.1136 with 6501.5kg/ha and Entry No. 1135 with 6356 kg/ha.

14. Initial Variety Trial - IME (RIC-02-01-09-90/MON (9) ICAR)

Sixty three entries received from DRR, Hyderabad along with local check variety were laid out in an RBD with two replications Entry No.1325 recorded the maximum yield with 6111.1kg/ha followed by Entry No 1364 with 5471.6 kg/ha and Entry No 1321 with 5467.3kg/ha.

15. Seed production programme

II. Crop Management

A. Soil Science

1. Rice Productivity in relation to internal supply capacity of nutrients (RIC/ 02-02-18-2004/MON(3)/AICRIP)

The objective of this trial was to evaluate the field variability in soil supply capacity of nutrients and its relationship to rice productivity at current fertilizer management levels.

Nomission plots have statistically significant grain and straw yield reduction during all seasons of study.

Continuous P omission has resulted in visual P deficiency symptoms from the eighth season and consequent significant grain and straw yield reduction during the eighth and ninth seasons.

K omission plots are still giving grain and straw yields on par with POP applied plots even during the eighth season.

The Farmers' fertilizer practice (110:45:65 kg NPK ha⁻¹) of higher N and K application resulted only in grain and straw yield on par with POP (90:45:45 kg NPK ha⁻¹) indicating that there is no need for the higher dose of fertilizers which will only result in economic loss to the farmer.

AICRIP TRIALS

2. Screening of rice germplasm for Fe and Zn contents (RIC/08-00-01-2004/MON(3)/AICRIP)

This AICRP study was conducted at 11 locations of diverse environments and productivity potential. About 185 cultures including common set of four promising cultures (Aghoribora, Profulla, TKM 9 and Vasumathi) were screened at these locations for studying the influence of environment on the nutrient content of iron and zinc in brown rice (dehusked, unpolished)

Iron content of brown rice varied with the different locations for the promising cultures indicating apparent influence of environment on grain iron content. The zinc content in brown rice were relatively stable compared to that of iron content. The mean zinc and iron contents in brown rice across the test locations ranged from 20 – 32 ppm zinc and 15- 35 ppm iron. Higher content was recorded at Moncompu (24.9 – 40.0 ppm)

The location specific traditional cultures like Njavara group (11 varieties included for the study) were promising cultures for high iron (9.0 to 29.0 ppm) and zinc (30.3 to 36.4 ppm) content.

B. Agronomy

KAU NON PLAN

3. Permanent Manurial Trial

Twenty four years of Permanent Manurial Trial conducted in the farm revealed that continuous omission of nitrogen and /or phosphorous showed significant reduction in grain and straw yield. Omission of potassium alone did not show significant reduction in yield and was on par with plots fertilized based on soil test data. No fertilizer control treatments with or without straw incorporation showed significant reduction in yield than the fertilized plots. Fertilizer application on soil test basis gave 50% increase in yield than the control.

4. Response of pre-release Moncompu cultures to varying nutrient ratio and plant densities under wet sown conditions

The response of SD 36 (105-110 days) to nutrient ratios were studied for two seasons of 2010-11. The data revealed the nutrient ratios at or lower than the recommended dose (90:45:22.5) is sufficient for getting the potential yield. Confirmatory results could be obtained only after repeated trials.

AICRIP TRIALS

5. Weed control for direct sown rice under puddle condition

RIC/10-00-02-84/MON(1)ICAR

In this experiment the efficacy of new herbicides molecule viz. Penoxsulam (24 SC) @ 22.5 g ai/ha and 25 g ai/ha at 15- 20 days after sowing and Pyrazosulfuron (10 WP)@ at 4-7 days after sowing were evaluated along with weed free check and two hand weedings 20g ai/ha at 20 and 40 days after sowing in direct seeded rice under puddled condition. The results revealed that during Kharif and Rabi 2010-11 ,two hand weedings and weed free check recorded the higher grain yield and lowest weed population of grasses, sedges and broad leaved weeds. Among the herbicides evaluated, Pyrazosulfuron (10 WP) at 20 g ai/ha at 4-7 days after sowing was found to be more effective in controlling broad leaved weeds and sedges while Penoxsulam 24 SC applied @ 22.5 g ai/ha and 25 g ai /ha was found to be more effective in controlling grassy weeds. It was also found that grain yield obtained by the application of Penoxsulam 24 SC at the two doses was on par with Pyrazosulfuron (10 WP) at 20 g ai/ha but recorded significantly lower yield than that of two hand weedings and weed free check .

6. Yield maximization in rice

A field experiment was conducted during Rabi 2010 with an objective to find out the best management practice for optimizing grain yield in transplanted rice. The treatments were NPK @ 90:45:15 Kg/ha + FYM 5 T/ha as basal + MgSO₄ @ 20 Kg MgO /ha + lime top dressing 250 Kg/ ha (T1), NPK @ 90:45:45 Kg/ha (T2), NPK @ 45:22.5:7.5+FYM @ 10 t/ha as basal + (Azospirillum+ PSB+ Freturia) @ 2 Kg/ha (T3) and T4 FYM @ 5 T/ha as basal + NPK @ 90: 45:15 +Lime top dressing @ 250 kg/ha. The results revealed that T1 recorded significantly higher grain yield than that of other treatments. Results also revealed that reducing the fertilizer doze by 50% along with FYM 10 t/ha was found to be comparable with NPK @ 90 45: 15 Kg/ha + FYM 5 T/ha + lime top dressing @ 250 Kg/ha. Application of chemical fertilizers alone @ 90: 45:15 recorded significantly lower yield.

7. Weed dynamics in direct sown rice

In this experiment the efficacy of preplant, premergence and post emergence herbicides were evaluated along with two hand weeding one at 20 days & 40 days after sowing and use of cono weeder at 15 and 30 days after sowing with an unweeded check. The results of Kharif and Rabi season trials revealed that Hand weeding at 20 and 40 days recorded significantly higher grain yield, panicles per m² and panicle weight and lowest weed population of sedges, grasses and broad leaved weeds followed by Cono weeding at 20 & 40 days after sowing. Among the herbicides, post emergence application of Bensulfuron-methyl+ Pretilachlor (6.6 GR) @ 0.06+ 0.60Kg ai/ha 8-15 days after sowing was found to be effective in controlling the sedges, grassy and broad leaved weeds in direct sown rice.

Preplant application of Glyphosphate @ 0.75 Kg ai/ha at 15 days before establishment without land preparation and pre plant application followed by post emergence herbicides recorded significantly lower grain yield than all the other treatments

8. Selective mechanization to enhance rice productivity and profitability

Trials were conducted in farmers field to find out the efficacy of using Transplanter for transplanting rice seedlings in Kuttanad. The treatments were transplanting using Transplanter (T1), Manual transplanting (T2) and Direct sowing (T3). The results of Kharif and Rabi 2010 revealed that mechanical transplanting recorded significantly higher grain yield than that of Manual transplanting and direct sowing.

It was also observed that while the direct sown crop was completely lodged due to heavy rain at the time of maturity in October ,the transplanted crop was not affected.

III. Crop protection

A. Entomology

KAU PLAN

1. Biological Control of Rice stem borer in Kuttanad

(RIC/13-00-16-97/MON(4)KAU)

165 CC trichocards containing parasitoids of *Trichogramma japonicum* and *T. chilonis* were produced and are utilized in the OIPM trial of AICRIP and experimental plots of RRS, Moncompu for controlling stem borer and leaf folder. Yellow stem borer accounted for 10 to 40 % at vegetative stage while white stem borer for 60 to 90 percent. Observations on flowering stage revealed that yellow stem borer was the dominant species (74 to 100 %). While white stem borer accounted for 9 to 26 %. The mean egg parasitization was 66.09 %. The parasitoid species were *Telenomus* and *Tetrastichus*. *Xanthopimpla*, the larval pupal parasitoid of stem borer and *Apanteles*, larval parasitoid was also obtained.

2. Integrated pest and disease management

(RIC/03-01-08-2003/MON(4)/KAU)

982 kg *Pseudomonas fluorescens* was produced during this year and supplied to padasekharams for the control of rice diseases. The experiment was conducted during 2010-11 and found that *Pseudomonas* seed treatment and foliar application of neemazal @ 3 ml/l was the best treatment and the effect was on par with econeem, Trichocard, neem oil and *Pseudomonas* seed + soil +foliar treatments.

3. Surveillance for detecting incidence of pest and disease of rice (RIC/14-00-01-96/MON(4)KAU)

Population dynamics of insect pests assessed through light trap collection and conducting surveys. Highest catch of yellow stem borer was reported during last week of January and first week of February. The weather factors observed was mean max temp. 33°C, mean mini temp. 20-23°C and average RH-75%. The highest population of leaf folder was also observed in fourth week of January. In late sown areas severe infestation of thrips was observed. In several areas indiscriminate application of chemicals resulted in resurgence of minor pests like black bug, caseworm and WBPH. Severe infestation of black bug was observed in Kainadykizhakkupuram of Neelamperoor block, Devaswom Varambinakom, Chungameliechungam, Ashtamom and Thengumpallikkal of Edathua block, Panayapally 900 thekku, Panaludykliruvakam, Palakkudy kiliruvakkam and Modamkunnuthekku of Ramankary block and Pullatpadam and Vavakkaduvadakk of Kainakary block during the month of July. The weather factors observed was Mean max. temp 30°C, mean mini. temp. 23°C, Average RH- 87%. Severe attack of BPH was occurred in Mathhor padam of Thakazhy block and Pulikkakam of Nedumudy block during second week of February. Severe attack of WBPH was observed in Kuppapuram of Champakulam block and Azheekal of Ambalappuzha block during the month of August and Vadakkepuram of Thakazhy block and Pallathuruthy of Ambalappuzha block during the month of September.

4. Population dynamics and integrated management of leaf folder in rice (RIC/13-00-17-99/MON (4) KAU)

High dose of N and high seed rate increased population of leaf folder. In leaf folder pesticide trial, neem oil 2% found promising.

AICRIP TRIALS

Nine AICRIP trials as detailed below were laid out in the field during Kharif 2010.

5. Gall midge screening trial

(RIC/03-01-08-84 /MON(4) ICAR)

Trial was constituted with 32 cultures derived from 22 crosses and two susceptible checks. Observations were taken at 30 and 50 DAT. The entries JGL 17574, JGL 17578, JGL 17609, JGL 17644, JGL 17650, JGL 17788, JGL 17974, KAVYA, RP4930 – BA, SKL 32-70-15-10, SKL 32-70-15-14 and RP2068-18-3-5, recorded nil damage for gall midge biotype 5 at 30 DAT. At 50 DAT, three entries (JGL 17578, JGL 17788, JGL 17974) were highly resistant without gall midge attack, and JGL 17650 was resistant showing less than 1 % damage (0.92%), sixteen entries were moderately resistant (1 to 5%) six entries were moderately susceptible (6 – 10 %) and eight entries were susceptible (11 – 20%).

6. Gall midge biotype monitoring trial (GMBT) (RIC/03-01-08-84/MON(4) ICAR)

The trial was constituted with twelve gene differentials whose genetics is well known and six potential donors of gall midge resistance and two check varieties (TNI and B 95 – 1) . Among twenty entries ARC 6605 and Jhitpiti were resistant. Kavya, W 1263, Dukong 1, Madhuri L 9, MR 1523, INRC 202, INRC 3021, AGANNI and ARC 15831 were moderately resistant with less than 5 % damage against GMB 5 in Moncompu.

7. National Screening Nursery (NSN-2) (RIC/03-01-09-99/MON(4) ICAR Co – 0rd)

NSN – 2 was constituted with 580 entries (534 pre breeding cultures from IVT trial, 46 yield checks + Suraksha and TNI as pest evaluation checks). Screening was done against gall midge, stem borer and leaf folder. Entries 22021, 22025, 22029, 22031, 22032, 21282, 21285, 22072, 22131, HR 12 showed resistance to gall midge (score 0). IET no's 21873, 22003, 21645, 21646, 21906, 21840, 21847, 22150, 22172, 22174, 22179, 22201, 22226, 22235, 22239, 22245, 22035, 22070, 22087, 22129, 22137, 22145, 22147, 19800, 22043, 22047, 22048, 22051 and CH 45 showed less than 5 % damage against gall midge at 30 and 50 DAT.

Out of 580 entries 115 numbers showed nil damage against stem borer for dead heart damage and 195 entries showed nil damage for white ear head. 142 entries showed resistance to leaf folder.

8. Pesticide Compatibility Trial(PCT) Rabi 2010

The trial consisted of nine treatments viz. two insecticides, flubendiamide and spinosad each at 0.25g a.i/ litre and two fungicides isoprothiolane (1.5 ml/lit) and tricyclazole (0.6 g/lit.) as separate treatments in four possible combination. Spinosad when applied alone was the best treatment (6kg/plot). Spinosad and flubendiamide treatments showed lowest incidence of stem borer in vegetative stage and heading stage.

Kharif 2010

Pesticide Compatibility Trial was conducted to evaluate the compatibility of two groups of chemicals (insecticides and fungicides) based on their efficacy when applied as tank mix in the field during Kharif 2010. The insecticides included a combination product containing ethiprole and imidacloprid (Glamore 80 WG) and rhynaxypyr (Coragen 20 SC). The fungicides consisted of hexaconazole (Contaf 5 SC) and tricyclazole (Baan 75 SP). The trial included nine treatments consisting of ethiprole + imidacloprid @0.25 g/l, rhynaxypyr @0.3 g/l, hexaconazole @2 ml/l and tricyclazole @0.6 ml/l applied alone as individual treatments and also in four possible combinations. Based on the performance of treatments it was evident that rhynaxypyr @0.3g/l was the best treatment and its impact on grain yield was significantly superior to all other treatments. The combination treatment rhynaxypyr with tricyclazole reduced white ear damage significantly showing that there was no adverse impact on the efficacy of rhynaxypyr against stem borer due to its combination with fungicide tricyclazole confirming the compatibility of the chemicals when used as tank mix in the field.

9. Insecticide evaluation trial

(RIC/12-03-02-86/MON(4) ICAR) RABI 2010

Acephate 75 SP @ 1.6g/l is the best treatment in improving grain yield (6.54 kg / plot). At heading stage, white ear incidence was recorded up to 23.32 % in insecticide treatments compared to a maximum of 28.67 % in untreated control. The mean infestation ranged from 15.88 to 23.32 in insecticide treatments and lowest infestation (15.88 %) was recorded in acephate 75 SP treatment and it was on par with dinoteferon, flubendiamide and check treatment, monocrotophos. In the case of gall midge, all the treatments were significantly superior to the untreated control (28.53 %) in reducing the infestation. The percentage damage in these treatments ranged from 12.86 to 19.98 %. Leaf folder damage was lowest in the check treatment, monocrotophos (7.76) and it was on par with all other treatments showing 9 to 13 % reduction over the untreated (19.43 %)

Kharif 2010

Insecticide Evaluation Trial was carried out with an objective of evaluating efficacy of newer insecticide formulation against stem borer, gall midge and leaf folder. Based on the performance of the insecticide treatment for their efficacy in reducing pest infestation and their impact on grain yield, it was evident that the highest grain yield was recorded in standard check, monocrotophos (9.4 kg/plot) which was on par with acephate 75 sp (9.3 kg), combination product containing buprofezin 20 % + acephate (50 % WP) at a dose of 800 g, 900 g and 1000g/ha and acephate 95 SG. The percentage increase in yield in the above treatments ranged from 36.84 to 64.91 percent compared to untreated control (3.44 kg / plot).

During vegetative stage, the mean dead heart infestation due to stem borer attack varied between 3.83 and 11.21% DH in insecticide treatments while the control plots showed 8.8% DH. At heading stage, the white ear incidence was recorded up to 15.81 % in insecticide treatments compared to a maximum of 23.63% in untreated control. The lowest infestation was recorded in the combination product containing buprofezin 20 % + acephate (50 %WP) at a dose of 800 g/ ha. Gall midge infestation ranged from 7.5 to 16.64 % silver shoots at 30 DAT and 0.6 to 4.23 % SS at 50DAT. In the case of leaf folder, the insecticide treatments inhibited damage in a range of 5.00 to 10.21 % DL (damaged leaves) compared to 14.6% damaged leaves(DL) in control. There was maximum reduction of leaf folder damage in combination product containing buprofezin + acephate treatment (5 %) followed by Acephate 95 SG treatment (5.33 %).

10. Trap crop for stem borer management(TCSB)

The trial was conducted using stem borer susceptible variety Pusa Basmati I as trap crop. One row of Pusa Basmati, aromatic fine grained rice variety was planted as an inter crop for every 9 rows of

main crop (Jyothi) in east – west direction. The sowing time of trap crop was adjusted such that the trap crop flowers one week before flowering of main crop. The dead heart damage in the main crop at 50 DAT (%DH) though statistically non significant. White ear damage and grain yield were not statistically significant between treatments.

11. Monitoring of Pests and their Natural Enemies

Two species of stem borers were reported viz. yellow stem borer and white stem borer. At tillering stage, white stem borer was dominant (75.97 %) while at heading stage yellow stem borer dominated (86.36 %). The mean egg parasitization was 66.09%. The parasitoid species were *Tetrastichus* and *Trichogramma*. In the case of gall midge the mean parasitisation was 56.86 per cent ..

12. Gall Midge Special Screening Trial (RIC /03-01-08-84 /MON (4) ICAR)

The trial was constituted with 66 germplasm accessories and TNI as susceptible check. ARC 13516, WR 1-9-1-1, Madhuri L 9, Jhitpiti were identified as promising for Gall midge biotype-5. Out of 70 entries, eight were moderately resistant (1 – 5 % damage), 27 were moderately susceptible (6 – 10 % damage) and 35 were susceptible showing 11 – 25 % damage.

13. Multiple Resistance Screening Trial (RIC/03-01-08-84/MON (4)ICAR)

The trial was constituted with 55 entries comprising of 25 hybrids, 8 lines from Coimbatore, 9 lines from DRR, 4 from Rajendranagar and 2 from Manipur and with TNI , PTB33, Abhaya, Kavya, and Suraksha as checks. Screening was done against stem borer, gall midge and leaf folder. The entries RP 4683-29-2-645, RP 4683-32-1-684, RP 4686-48-1-935, RP 4687 -30-1-648, RP 4688-53-2-1259, CB -06-548, CB – 06-803, CB -08-534, CB- 08-536, RP 4684 -35-2-746, RP 4687 – 52-1192, RP 4687-52-2-1197 and DRRH – 3 were found promising.

B.Plant Pathology

14. Evaluation of new fungicidal formulation for the sheath blight control (RIC-12-02-06-89/MON (5) ICAR)

The trial was merged with location specific diseases by AICRIP from this year onwards.

15. National Screening Nursery (NSN)(RIC/03-02-03-84/MON (5) ICAR)

Out of 951 AICRIP entries tested during Kharif 2010, 37 cultures showed Resistant reaction (NSN1-10, NSN2-22, NHSN-3 and DSN-2) and 187 cultures showed Moderate Resistant (NSN1-39, NSN2-114, NHSN-11 and DSN-23)for major diseases like Blast, Sheath blight, Brown spot, Sheath rot and Bacterial leaf blight incidence

16. Disease Observation Nursery(RIC/13-00-04-89/MON (5) ICAR)

The fortnight trial was conducted with four rice varieties viz., Swarna, Tapaswini, TN 1 and IR 50 with the plot size of 50 m² each to identify the time and intensity of the diseases occurrence. Sheath blight incidence was moderate in IR 50 (31.33 %) and low in Swarna (11.08 %). There was high to very high intensity of sheath blight disease in almost all varieties. The highest intensity was recorded in normal sown crops of TN 1 (56.72 %) and late sown crop of Tapaswini (54.69 %).

17. Evaluation of new fungicidal spray formulations for blast control

(RIC/03-02-06-2004/MON(5)/AICRIP)

The trial was merged with location specific diseases by AICRIP from this year onwards. The treatments could not be applied due to the absence of blast disease in both season(Kharif 2010 and Rabi 2010-11).

18. Evaluation of fungicides for control of location specific diseases

(RIC/03-02-07-2004/MON(5)/AICRIP)

Hexaconazole 75 WG @ 0.13 g/lit and Kresoxin methyl 40% + Hexaconazole 8 % WG @ 1.0 ml/lit have found superior in checking the glume discolouration disease incidence over the control during Kharif 2010.

19. Pesticide Compatibility Trial

The insecticide fungicide combination molecule of Flubendiamide 3.5% + Hexaconazole 5% WG @0.17 gm/lit and 2.0 gm/lit was found to be effective against sheath blight disease, stem borer and leaf folder pests of rice during Kharif 2010 and Rabi 2010-11.

20. Chemical Control of Sheath rot disease of Rice

RIC/ 12-02-09 /MON (5) KAU

Treatment with Dithane M -45 @ 3g/l gave maximum yield during Rabi 2010 .

21. Screening of Rice Varieties against important disease of rice

RIC / 03-02-04-84 /MON (5)/KAU

During Rabi 2010 MO – 10, Remya showed resistance towards sheath rot.

External Aided Projects

1. Development of crop weather information system and forewarning models for sheath blight and BPH in rice in problem zone of kerala (funded by State Planning Board)

The incidence of sheath blight disease and pests like BPH, Stem borer and black bug were observed during Kharif 2010. Observation on pest and disease incidence was recorded at different stages and analysed the data. The data showed that the incidence of sheath blight was found to be severe at high seed rate(125 kg/ha) and high nitrogen level(120 kg/ha). The field micro climatic data like Air temperature and Relative Humidity were correlated with disease incidence. The minimum temperature ranged between 26.4 and 27.2°C and maximum temperature between 35.2 and 36.4 °C, the Relative Humidity was in the range of 88 to 91. The weekly weather forecast data are received from C-DAC, Pune during the month of October 2010. The crop data regarding variety, area and stage of other crops like Banana, Rice, Coconut and vegetables from 12 blocks of Alappuzha District were collected for making weekly advisory bulletin. The advisory services are being rendered to major crops like Banana, Coconut and vegetables in addition rice from November 2010 onwards. The advisory services are disseminated to the Assistant Directors of Agriculture, Agricultural Officers and selected farmers of the 12 blocks of Alappuzha District from the month of December 2010.

2. Fertility Mapping of Kuttanad soils

The State Planning Board project under the Food Security Programme and Funded by The Department of Agriculture was aimed at estimating the present nutrient status of Kuttanad soils and to arrive at location specific fertilizer recommendation. Preparation of padasekharam wise Soil Fertility Cards, Nutrient Inventory Book and thematic map of the region were also envisaged in the project. The work involved collection and analysis of the soil samples from the different double cropped paddy fields in Alappuzha district coming under 13 Krishi Bhavans and 4 Blocks. The major and micro nutrient analysis of 1632 soil samples collected from 16,000 acres of area were completed. All the padasekharams were found to be acidic in nature. The organic carbon content and Potassium were found to be in the medium to high range. The Phosphorus status ranged from medium to high in all the areas except in one per cent areas. Magnesium was deficient in all the padasekharams and Calcium in 64 per cent of the area. The micro nutrients Zinc and Copper were found to be deficient in 11 and 19 per cent of the area respectively. Deficiency of Boron was noticed in 42 percent of the area. Soil health cards were distributed to 30 farmers and the remaining cards are being prepared.

II . Promoting location specific research for increasing profitability from rice farming and enhancing livelihood security of the farmers of Kuttanad(Under Kuttanad Package)

Sub Project.1. Genetic improvement of rice to meet the location specific varietal needs of Kuttanad.

One short duration culture SD 36 (KAU M 108- 262-1) developed at the station was tested in farmers' fields and was released as "Prathyasa" (MO. 21) for general cultivation in Kuttanad based on its yield, duration and quality characteristics. The variety is of 102-105 days duration, yields about 5.0-5.5 t/ha and is rich in Fe and Zn and also has very good cooking quality and suited for double crop wetlands of Kuttanad. This variety can be alternated with a medium duration variety to complete the crop period early so as to avoid crop damage during saline water intrusion.

The germplasm available in the station was screened for various traits viz., seed dormancy, tolerance to major biotic and abiotic stresses and good cooking quality and donor varieties were selected for hybridization. Twelve crosses were made, the details of which are furnished below.

Vandana/Jyothi	Njavara/ Jyothi	Anjali/ Jyothi
Ahalya/ Jyothi	Jyothi/ Karuthacheera	Thavalakkannan/ Jyothi
Hraswa/ Jyothi	Hraswa/ Karuthacheera	Jyothi / JK 70
JK 70/ Ahalya	Gouri/ Karuthacheera	JK70/ Hraswa

The F1 generation of the crosses were planted in the main field during May 2010 and F2 seeds were collected from the selected plants of the above crosses. The F2 material was sown in the nursery during first week of December 2010 and planted in the main field during first of January 2011. The cultures were screened for reaction to major pests and diseases. Single plant selections were made based on morphological characters.

Sub Project 2. Site specific crop management technologies for rice in the different agro ecological zones of Kuttanad.

The two trials on Management technologies for site specific nutrient management and the trial on resource technologies for zero/ minimum tillage were planted in two locations in lower Kuttanad viz., Irumpanam Padasekaram in Kainakary Panchayat and Manathrakkad Padasekharam in Nedumudi Panchayat. Timely observations were recorded. The crop raised at two locations are being harvested and statistical analysis are in progress.

Sub Project 3 a) Identification and development of bacterial antagonists tolerant to Iron and Aluminium toxicity and salinity for the management of rice diseases in Kuttanad with special emphasis on sheath rot and false smut.

Soil samples were collected from 77 locations in lower kuttanad, upper kuttanad and kari areas. Biocontrol control agents viz., *Pseudomonas fluorescens* and *Bacillus spp.* were isolated from these samples. Out of 20 *Pseudomonas fluorescens* cultures, one isolate is effective against false smut disease under invitro condition. Nine *Bacillus spp* were isolated from soils collected from twenty locations from the above mentioned areas of Kuttanad. Effectiveness of these isolates in inhibiting the growth of false smut pathogen under invitro condition is being tested. The false smut pathogen were isolated from four different locations and three *Bacillus spp.* were isolated from different locations for pathogenecity studies.

Sub Project 3 b) Identification and field evaluation of promising biocontrol agents against major rice pests in Kuttanad

Daily observations from light trap installed in the station were taken till date. Rearing of *Corcyra* was done and the eggs collected were sterilized and cards prepared. These cards were kept in fields to collect parasites. The parasite collected was identified to be *Trichogramma sp.* Eggs of black bug were collected from the field and kept for parasite emergence. The emerged parasite was identified as *Telenomus cyrus Nixon*. An experiment was laid out for studies on the effect of insecticides on the natural enemies population. The infestation of stem borer and leaf folder were observed in the experimental plots. Insecticides viz., flubendiamide, spinosad, azadirachtin, buprofezine, dinotefuron, acephate and monocrotophos were sprayed. Observations on effectiveness of insecticides and its impact on the natural enemy populations were recorded. Cowpea seeds were sown around the field bund to study the population fluctuation of pests and natural enemies in the paddy crop. Larvae of leaf folder, skipper and hairy caterpillar were collected and emerged parasitoids were sent for identification.

Sub Project 4. Scaling up of early warning systems and devices for flood and climate prediction and pest and disease incidence

The project has got two components, an engineering component to analyse the data received from river guage stations on flood situation and weather data from IMD, to interpret the same using appropriate softwares and to transmit the information through digital display systems to the farmers.

The second component was to work out the crop weather relationship in terms of crop growth stages and incidence of pests and diseases. An experiment was laid out in the field using different varieties with different planting dates (at an interval of 15 days) for assessing the pests and disease incidence and correlating with the weather elements. Biometric observations were taken during vegetative, maturity and harvest stage. The different varieties planted different intervals are being harvested and observations are being recorded. Crop advisory services are being rendered to farmers once in a week.

Sub Project. 5a) Infrastructure facilities for Rice Research Station, Moncompu

Soil sample analysis of the site selected for the building has been completed. Estimate for the construction of the buildings has been prepared. The building design has been made and tender has been invited for the work.

Speed boat has been purchased and purchase of Mobile Training Unit is underway.

Sub Project. 5b) Establishment of Farmers Training Centre

Out of the 9 trainings proposed to be conducted during the 1st year, two trainings on INM and Quality seed production were conducted during the month of March 2011, making a total eight trainings during the year 2010-11 .

PADDY MISSION PROJECTS

1. Documentation, Conservation, seed multiplication and distribution of land races of rice in Kerala

Twenty two land races of rice were collected, conserved and multiplied in Wayanad. Purification of the varieties was carried out.

2. Participatory technology development for control of weedy rice

Effect of herbicides on the selective control of weedy rice and Stale Seed Bed Technique on the management of weedy rice were evaluated in farmers field .

Effect of wick wipe applicator to destroy the weedy rice panicles were tried in four locations of Kole, Kuttanad and Palakkad.

3. Screening of rice varieties for Climate Change

Yield performance and pest / disease incidence of seven varieties were evaluated for their suitability to the changing climatic conditions by planting them at monthly intervals . It was observed that the days taken for 50% flowering increased by one week (for Jyothi and Uma) when the planting date was delayed for one month. Delay in planting date resulted in yield reduction for all the varieties except Uma and Matta Triveni .

HRD activity

The scientists of the station took classes for Assistant Director of Agriculture and Agricultural Assistants of Alappuzha in the Pre season training organized by DOA during Kharif 2010 and Rabi 2011. They also took classes for farmers in the various seminars organized by Dept of Agriculture, NGO's FACT etc.

The scientists also participated actively in the Farmers Field School conducted by various krishi bhavans.

Participated in the Research-Extension Interface conducted by Department of Agriculture at Kottayam, Alappuzha and Pathanamthitta and BTT meetings of ATMA programme in Alappuzha district.

Field Visits

As members of Multidisciplinary Diagnostic team and Paddy mission, the scientists visited the field and provided suitable control measures for Farmers field problems of Alappuzha and Pathanamthitta districts.

Attended the pepper field visit programme of Agricultural Department for the selection of disease free pepper cuttings.

Farm advisory services

Analyzed about 70 soil and water samples brought by farmers, for pH and EC and gave proper advice to them for soil and water management.

The scientists of the station rendered Farm advisory services to the farmers of Kerala in person, through letters and also through telephone.

Weather based crop advisory services were rendered to farmers twice a week.

The paddy reapers provided from MP fund in 2008 are being given to farmers on rent basis based on their request.

Farm Advisory Services

In Person	Over Telephone	Through Letters
150	65	

Field Visit

No. of Visits	Problem identified	Recommendations
110	Acidity and Iron toxicity in rice, pests and diseases in rice and coconut, wilt disease in banana and pepper etc.	Need based recommendations were given

Radio talks/ TV Programmes/ Audio-Video Cassettes.

Topic	Date	Name of Scientist
Nelkrishi Innu Nale	15.02.2011	Dr. Leenakumari

List of Publications

Scientific papers

Devika, R., Leenakumary, S., Rema Bai, N., Surendran, M., Annie Koruth and Abraham Varughese. 2010. MO 21(Pratheeksha) – A short duration rice variety for Kuttanad. Directorate of Rice Research, Newsletter. pp.11

Menon M. V., Prameela P., Nimmy Jose. 2010. Agrobiodiversity laws – Recent trends and repercussions. In Ministry of Human Resource Development seminar on conserving Biodiversity – tools and Approaches March 19-21, 2010 p. 81-86.

Surendran, M., Reena Mathew, Reema Anand and Sheeja, V. R. 2010. Impact of weather factors, nitrogen level and seed rate on sheath blight occurrence in rice. Proceedings of National Symposium on Changing plant disease scenario in relation to climate change, 22-23 October 2010, Indian Phytopathological Society(Southern Zone) and Indian Institute of Spices Research, Calicut, pp. 52.

Leena Kumary, S., Devika, R., Reena Mathew, Annie Koruth, Reeny Mary Zacharia, Surendran, M., Nimmy Jose and Nisha, M.S. 2011. Kuttanaadan Nelkrishiyum Mankompu Nellu Gavaeshana Kaendhravm(Booklet)

Dr. Leena Kumary, S., Devika, R., Reena Mathew, Annie Koruth, Reeny Mary Zahariah, Surendran, M., Nimmy Jose and Nisha, M.S. 2011 Uma(Mo.16 Kaarshika Kaeralathinu Mankompu Nellu Gavaeshana Kaendhrathinte varadanam (Leaflet)

Dr Leena Kumary.S, Devika. R, Reena Mathew, Annie Koruth, Reeny Mary Zachariah, Surendran, M, Nimmy Jose and Nisha, M.S. 2011. Prathyaasa(Mo.21) Kuttanaattileiruppoorkrishikkanuyoa jyamaaya hraswakaala nellinam (Leaflet)

Dr.Leena Kumary. S. 2010 . Rice Germplasm in Kerala. In Sharma S. D (Ed) Genetic resources of Rice in India: Past and Present. Today and Tomorrow Publishers, New Delhi. P. 411-429

Zacharia.R.M., Mathew , S.K. and Krishna Reddy M. 2010 Characterisation and management of bitter gourd distortion mosaic viruses . Poster paper presented at 97th Indian Science Congress, University of Kerala, Thiruvananthapuram. 3rd to 7th January 2010

Reeny Mary Zacharia.March , 2010. Chippikkoon(leaflet), Rice Research Station, Moncompu.

Reeny Mary Zacharia.March , 2010. Palkkoon(leaflet), Rice Research Station, Moncompu

Reeny Mary Zacharia.March , 2010.koon(Brochure), Rice Research Station, Moncompu.

Finance

Head	Expenditure	Receipts
Non-Plan	58,32,862	5,82,558
Plan	7,50,927	
ICAR	29,83,291	
Other EAPs	7,43,637	

ONATTUKARA REGIONAL AGRICULTURAL RESEARCH STATION KAYAMKULAM

Academic programmes:

- Dr.Sverup John, Project Director & Head and Dr.M.Indira, Associate Professor, served as members in the advisory committee of Ph.D. student of College of Agriculture, Vellayani
- Dr.Sverup John, Project Director & Head served as a member in the advisory committee of M.Sc(Ag) student of college of Horticulture, Vellanikkara.
- Dr.Sverup John, Project Director & Head served as Project Co-ordinator of the group pulses and oilseeds (up to 3-7-2010).Dr.P.Sushamakumari, Professor (Agronomy) served as a member of the same co-ordination group up to 3-7-2010. and from 3-7-2010.
- Dr.T.N.Vilasini, Project Director &Head , Smt.Susamma.P.George, Associate Professor, Dr.M.Indira, Associate Professor, Dr.G.Suja, Associate Professor, and Dr.M.R.Bindu, Associate Professor served as the members of co-ordination group pulses & oilseeds .
- Dr.T.N.Vilasini, Professor(Pl.Path.) served as a member of the co-ordination group plant protection ,coconut and other palms and tuber crops.
- Dr.M.Indira, Associate Professor served as a member of the co-ordination group organic farming.
- Dr.Sverup John served as Executive committee member of Onattukara Vikasana Agency and District Committee member of NWDPR till 3/7/2010 and Dr.T.N.Vilasini is presently holding the charges
- Dr.T.N.Vilasini, Project Director &Head served as member of Scientific advisory committee of KVK, Alappuzha
- Dr.T.N.Vilasini, Project Director &Head served as member of District nodal agency of NWDPR, of Pathanamthitta District.

Major Research achievements (highlights)

Rice

- Released rice variety Thulam in 2010 as a high yielding, improved variety for the cheradi tracts of Kerala.
- Quality seed production of rice was carried out at chirayilkulam padasekharam in Nooranad with bhagya and uma varieties and a total quantity of 5960 kg. bhagya and 827 kg uma seeds were produced during mundakan 2009-10.
- Short duration rice variety "bhagya" is found to be suitable for upland cultivation in Onattukara
- Seed multiplication of two promising rice cultures for eastern lateritic region viz; cul-56 and cul-18 were done
- In the trials conducted during virippu season it was found that the optimum seed rate was 80 kg / ha and the best fertilizer dose was 70:35:35 for the variety Chingam. During mundakan, variety Dhanu recorded the highest yield of 4520 ha with 60:30:30 NPK/ha and there was no difference between the treatments. The trials conducted as SSF Kottarakkara revealed that the Makaram and Kumbhom recorded the maximum yield at 60:30:30 kg NPK /ha.
- Two cultures OM-2 and OM-3 were found to be promising in the farm trials and large scale demonstration trial. It will be released in the next state variety release committee .
- Application of cattle manure to supply 25 percent of the total recommended dose of N along with balance N and recommended dose of P&K as inorganic fertilizers gave optimum rice yield in Onattukara.
- Under the experiment Green technology for rice based cropping system in Onattukara, seeds of rice variety dhanu, sesamum variety thilarani, groundnut (TMV-7) cowpea (Kanakamani) and Bhindi (Arka anamika) were organically produced for the next season.
- Conducted IPM demonstration in selected padasekharams viz; Arunoottimangalam, Peruvelichal and Vazhuvadi during puncha season of 2010-11 in Thazhakkara Panchayat. The pest and disease incidences in IPM demonstration plots were significantly low compared to non-IPM plots and the population of natural enemies like carabids, coccinellid predators, dragon flies and spiders were relatively high in IPM plots.
- Established a biocontrol lab at ORARS, Kayamkulam. A total number of 72 cc trichocards of *Trichogramma japonicum* and 180 cc of *T. chelonis* were produced in the lab so far.
- An isolate of the entomopathogenic fungus *Beauveria bassiana* collected from leaf roller pest of paddy has been maintained in the lab.

Sesamum

- Under AICRP sesame (breeding) IVTS(27x3 RBD), AVTS (20x4RBD) and germ plasm maintenance (156) were conducted
- Twenty local "Ayali" types were collected and evaluated in the farm. Crossing with high yielding varieties viz; Kayamkulam-1, Thilak and Thilarani was carried out. Hybrid derivatives were selected
- Two hand weeding at 20 and 40 DAS recorded the highest seed yield of 523 kg/ha with a B:C ratio of 1.74. The yield recorded by two hand weeding were however on par with the applications of pre emergent weedicide oxyflurfen 0.10kg ai/ha followed by one hand weeding at 40 DAS and pendimethalin pre emergent weedicide application at 0.5 kg ai /ha followed by one hand weeding 40 DAS

Pulses

- Evolved two cowpea varieties – Sreya and Hridya during 2010
- Under the field experiment on management of cowpea pests "azadirachtin 300 ppm (nimbecidene) 0.2%" was found to be effective in managing cowpea pests viz pea aphid, epilachna beetle, pod borers and pod bugs when applied at 7th and 20th DAS and at pod formation stage if necessary .

Groundnut

- Under the screening trial with groundnut samples for pests and diseases in storage, the insect pests viz; *Tribolium castaneum*, *Laemophleus* sp. *Oryzophilus surenamensis*, *Rhizopertha dominica* and *Corcyra cephalonica* and the fungus *Aspergillus niger* were identified.

Coconut

- The CCCP project was implemented in ward 1&2 of Thazhakkara Gramapanchayath in Mavelikkara taluk and in ward 2 & 3 of Kandalloor Gramapanchayath in Karthikappally taluk of Alappuzha District from May 2010. One thousand coconut palms belonging to 174 and 113 farmers were selected and numbered at Thazhakkara and Kandalloor respectively. Integrated nutrient management as well as integrated pest & disease management measures were conducted in the selected palms. Project is in progress.
- Comprehensive coconut care programme was implemented at ward 5 of Thazhakkara panchayath and ward 16 of Pathiyoor panchayath from May 2009 onwards. The treated palm showed improvement in health, reduction in pests & diseases during this period.

Vegetables

- The combination treatment of rogor 0.25% + *Azadirachta indica* 5% oil based spray gave good control against ASLM in cucumber

Mission Programme:

i). Rice mission

a). Alappuzha District

Dr.T.N.Vilasini, Professor, Smt.Susamma.P.George, Asst.Professor(Sel Gr.), Dr.M.Indira, Associate Professor, Dr.G.Suja, Associate Professor and Dr.M.R.Bindu, Associate Professor served as members of rice mission programme of Alappuzha District.

Dr.Sverup John and Dr.G.Suja served as member of paddy cell of Alappuzha District.

Dr.P.Sushamakumari and Dr.M.R.Bindu, served technical support for fallow land cultivation, upland rice and intercrops of Cheravally area.

b). Pathanamthitta District

Smt.Susamma.P.George, Dr.M.Indira, Dr.G.suja and Dr.M.R.Bindu served as members of rice mission of Pathanamthitta District.

c). Kollam District

Smt.Susamma.P.George and Dr.M.R.Bindu served as members of rice mission

ii). Coconut mission

Dr.Sverup Jon, Project Director & Head served as the co-ordinator of coconut mission in the central zone. Dr.T.N.Vilasini, Professor is selected as the team leader of coconut mission in Alappuzha District. Dr.P.Sushamakumari, Smt.Susamma.P.George, Dr.M.Indira, Dr.G.Suja and Dr.M.R.Bindu served as members of the mission.

Farm Advisory services

In person	Over phone	Through letters
400	150	5

List of Publications

Scientific papers

- 4

Suja.G., Indira.M., Bindu.M.R and Vilasini T.N. (2011) Management of Pests of grain cowpea in Onattukara by organic methods *Proceedings of the 23rd Kerala Science Congress on 29-31 January 2011 at CESS, Trivandrum.*

Bindu M.R., M.Indira, G.Suja, T.N.Vilasini, and Ansu Achamma Yohananan (2011) Sreya a high yielding cowpea variety for food security - *Proceedings of the International Conference on the*

impact of climate change on food security on 3-5 March 2011 at Bishop Moore College, Mavelikkara pp – 44-47.

Indira.M., M.R.Bindu, G.Suja, P.Sushamakumari and T.N.Vilasini (2011) Seasonal and weather influence on yield of rice in the loamy sandy soils Of Onattukara - *Proceedings of the International Conference on the impact of climate change on food security* on 3-5 March 2011 at Bishop Moore College, Mavelikkara pp –88-91.

G.Suja, T.N.Vilasini, M.Indira, M.R.Bindu, R.Harsha, O.Jeeja and S.Simi (2011) Management of rice pests through sustainable means for food security *Proceedings of the International Conference on the impact of climate change on food security* on 3-5 March 2011 at Bishop Moore College, Mavelikkara pp –267 - 272.

Finance

Head	Expenditure (Rs.in lakhs)	Receipts (Rs.in lakhs)	Budget outlay of EAPs(in lakhs)	Actual funds received(during 2010-2011)(in lakhs)
Non-plan	22468721	1368621	106.480	9882750
Plan	8893504		13.89	
ICAR	229332		42.600	
Other EAP's	10805630		212.804	15899250
RF	393423		888832	

RICE RESEARCH STATION, VYTTILA

Research programme :

a. Major research achievements:

i) Rice and rice based farming system:

- The presence of the enzyme " Superoxide dismutase" has been confirmed by laboratory studies as the basis for the tolerance of rice to salinity.
- The Marker Assisted Breeding (MAS) for the introgression of salinity tolerance an inherent trait of pokkali varieties into two popular high yielding varieties of Kerala viz., Jyothi and Uma useful for Kuttanad region is underway.
- Evolution of a semi tall variety from the very popular tall rice variety VTL-3 of this station without losing its innate characters through mutation breeding is in the final stages of evaluation.
- In an experiment to study the nutraceutical properties of pokkali rice, high level of potassium, iron and zinc was found to be present in all the varieties of pokkali rice tested. The laboratory estimation of the contents of antioxidant compounds of the pokkali rice bran viz. oryzanol, tocopherol, tocotrienol is in progress.
- The laboratory estimation of both soil and water samples drawn from various padasekharams representing the organic pokkali tract did not reveal any traces of residual toxicity of major pesticides coming under organophosphates, carbamates etc.
- From the results of an integrated farming project involving pokkali rice and prawn, an yield of 550 kg of tiger prawn (*Penaeus monodon*) per ha was obtained in a period of 105 days of culture with supplementary feeding in pokkali ponds during the high saline phase.
- From the screening of the orchid germplasm, the varieties viz. Sonia, Sakura pink, Kasim white, Emma white and Caesar white were found to be profusely growing under saline environment and hence selected for large scale multiplication through tissue culture.

Extension and other activities.

Scientists of the station participated in various agricultural seminars and group meetings organised by the Department of Agriculture, Karshaka Samithis, Panchayats and input agencies. The scientists of the station have been nominated as members of the District Level Diagnostic team and attended to the farmers field problems. The Head of station has been nominated as the Member of the Pokkali Land Development Agency and attended the meetings convened by its Chairman, the District Collector of Ernakulam. The scientists of this center also have been nominated to function as technical experts for the District Horticultural Mission, Ernakulam, and Consultative Committee of the Ernakulam District Co-operative Bank.

Finance

Head of a/c	Provision for the year (lakhs)	Expenditure(Rs)	Station receipts(Rs)
Non plan	124.54	63.356	6.775
Plan	9.22	8.415	
ICAR/ Other EAPs	81.035	43.789	
Total	214.795	115.56	6.775

AGRICULTURAL RESEARCH STATION, THIRUVALLA

Research programmes

Major research achievements

Sugarcane

- Technology has been developed for hygienic preparation of cube jaggery with stainless steel moulds which is new to the region.
- High yielding red rot resistant sugarcane cultures, Viz., Culture no 12/97, 119/98 and 58/99 have been advanced to farm trial
- Zonal varietal trial for identifying early maturing varieties- 2005-2006 series Co 0209 recorded highest cane yield of 126.43 t/ha, CCS of 16.81 t/ha, CCS of 13.3% and sucrose of 18.7 %
- Zonal varietal trial for identifying early maturing varieties- 2007-2008 series CoSnK 03632 recorded max. cane yield of 123.11 t/ha, CCS of 15.1 t/ha, CCS of 12.2 % and sucrose of 17.3 %
- Zonal varietal trial for identifying early maturing varieties- 2008-2009 series CoSnk 05103 recorded maximum cane yield of 122.89 t/ha, CCS of 13.930 t/ha, CCS of 11.3 % and sucrose of 16.1 %
- Zonal varietal trial for identifying early maturing varieties- 2008-2009 series CoSnk 05103 recorded max cane yield of 122.89 t/ha, CCS of 13.9 t/ha, CCS of 11.3 % and sucrose of 16.1 %
- Zonal varietal trial for identifying midlate maturing varieties- 2005-2006 series CoM 0265 recorded maximum cane yield of 131.57 t/ha, CCS of 14.9 t/ha, CCS of 11.3 % and sucrose of 17.3 %
- Zonal varietal trial for identifying midlate maturing varieties- 2007-2008 series CoM 0316 recorded max cane yield of 119.95 t/ha, CCS of 12.12 t/ha, CCS of 10.13 % and sucrose of 14.5 %
- Pathogenicity of one new isolate (Isolate I Co TI 88322) along with five designated pathotypes viz., cf4 (Co 419), cf5 (Co 997), cf6 (CoC 671), kr I and kr II was tested on 14 differentials. On this basis, it can be concluded that there is a possibility of emergence of a new pathotype on Madhuri variety (Co TI 88322).
- Survey was conducted in three districts of South Kerala viz., Pathanamthitta, Alappuzha and Kottayam districts. Ring spot disease was noticed most commonly among the foliar diseases.

- Out of the 18 entries tested in the IVT (Early), eight varieties showed moderately resistant reaction; nine varieties showed moderately susceptible reaction and one variety showed susceptible reaction to plug method of inoculation. All the varieties showed resistant reaction to nodal method of inoculation.
- Out of the 16 entries tested in the IVT (midlate), only one variety showed moderately resistant reaction; thirteen varieties showed moderately susceptible reaction and one variety showed susceptible reaction to plug method of inoculation. All the varieties showed resistant reaction to nodal method of inoculation.
- Out of the 8 entries tested in the AVT (Early I plant), three varieties showed moderately resistant reaction; four showed moderately susceptible reaction and one variety showed susceptible reaction to plug method of inoculation. All the varieties showed resistance reaction to nodal method of inoculation.
- All the 12 entries tested in the AVT (Midlate) showed moderately susceptible reaction to plug method of inoculation. All the varieties showed resistant reaction to nodal method of inoculation
- Out of the six entries tested in the AVT (early) II Plant, only one variety showed moderately resistant reaction and five varieties showed moderately susceptible reaction to plug method of inoculation. All the varieties showed resistant reaction to nodal method of inoculation.
- Out of the seven entries tested in the AVT (midlate) II Plant, three varieties showed moderately resistant reaction and four varieties showed moderately susceptible reaction to plug method of inoculation. All varieties showed resistant reaction to nodal method of inoculation.

Vegetable

- The project on standardization of population density and nutrients in snake gourd in the riverine alluvium is advanced to farm trial with three treatments viz., recommended dose of fertilizer, 150% of recommended dose of fertilizers and farmers practice of fertilizer application.
- Under the RKVY project "Formulation of location specific production technologies for native vegetables, initial screening of varieties in bhindi, YLB and cucumber is completed in Southern, Onattukara and Problem zones. Standardisation of nutrient requirements of bhindi in the three zones has also been conducted for one season.
- Genetic upgradation of snake gourd variety Kaumudi is in progress.

Extension programmes

Highlights of extension activities

Scientists of this station served as the members of different BTT of ATMA Pathanamthitta district. Dr.T.M.Kurian, Professor, Dr.Jessy M.Kuriakose, Professor,Dr.V.R.Shajan., Associate Professor and Dr. Sajeena, Assistant Professor are the technical experts from Kerala Agricultural University in the SHM, RKVY and ATMA programmes for Pathanamthitta district. The scientists of the station were judges for selection of progressive farmers in Pathanamthitta district together with State Agriculture Department. Technical advice is being disseminated to farmers directly and also over phone. The scientists also visited problem fields as and when reported and gave necessary recommendations. Periodical field visits by experts are being conducted to monitor crop situation.

The meteorological data recorded in the station is utilized in the entire district of Pathanamthitta.

Scientists DR. T.M. Kurian, Dr. Abraham Varughese, Dr. Jessy M. Kuriakose and Dr. Sajeena. A participated in the interphase conducted by Kerala Agricultural University and Agricultural Department for the farmers. Dr. Abraham Varghese gave a presentation on rice cultivation and Dr. Sajeena. A on vegetable cultivation and IDM aspects.

Dr. Sajeena.A participated in the programme on "Scientists with farmers" at Mannancherry Panchayat during the programme on "Declaration of fallowless panchayat".

Scientists of the station participated in the exhibitions conducted at Mannancherry, Cherianad and Thrissur.

Dr. Abraham Varghese handled 2 classes, Dr. Jessy M Kuriakose handled 3 classes and Dr. Sajeena .A handled 21 classes to farmers of various Panchayats.

Farm advisory Services

In person	Over telephone
Scientists of this station gave advice on scientific cultivation of sugarcane, vegetables, banana, coconut, nutmeg etc as and when the growers approached and also suggested suitable control measures for field problems	Scientists of this station gave advice on scientific cultivation including suitable control measures for field problems in the major crops of the tracts.

Radio talks/TV programmes/ Audio-video cassettes

Topic	Date	Name of scientists
Radio talk at AIR on Bhoopradesha soojikayum, Madhuri enna karibum TV programme in Kairali channel in Bhoomigeetham programme	23-01-2011	Dr. Sosamma Cherian
G.I. Jaggery production and sugarcane cultivation at ARS, Thiruvalla	24-02-2011 and 26-02-2011	Dr. T. M. Kurian, Prof. & Head Dr. Sosamma Cherian, Dr. Shajan, Assoc.Prof. Dr. Sajeena. A, Asst. Prof.
G.I production by the farmers of Central Travancore	03-03-2011 and 05-03-2011	Dr. Sosamma Cherian
Scientific production of <i>Coccinia</i> at ARS, Thiruvalla and farmer's practice of cultivation of the snake gourd variety Kaumudy	17-03-2011 and 19-03-2011	Dr. Jessy M Kuriakose, Prof. Dr. Sajeena. A, Asst. Prof.
Scientific cultivation of snake gourd variety Kaumudy at ARS, Thiruvalla	10-03-2011 and 12-03-2011	Dr. Jessy M Kuriakose, Prof. Dr. Sajeena. A, Asst. Prof.

List of publications

Scientific papers

An abstract published by Dr. Beena Thomas, entitled Important Medicinal Orchids of Kerala in the National Seminar report of The Orchid Society of India (29-30 March 2011)

A full paper entitled ANTIVIRAL ACTIVITY OF *GANODERMA* SP. ON *GROUNDNUT BUD NECROSIS VIRUS* (GBNV) INFECTION ON COWPEA published by Dr. Sajeena. A in the International Journal "Crop Research" during May, 2010 (Vol. 41, No.3)

Popular Articles

An article on "The management of *Fusarium* wilt of cowpea" in the paper Malayala Manorama by Dr. Sajeena.A, Dr. T.M. Kuiran, Dr. Sosamma Cherian,

Dr. Jessy M Kuriakose and Dr. V.R. Shajan, Vol.

An article on "GI Registration to Central Travancore Jaggery" in the magazine Kerala Karshakan by Dr. Sosamma Cherian, Vol. 56 (9) p. 38-39 (2/2011)

An article on "Cultivation aspects of sugarcane" in the magazine Kerala Karshakan by Dr. Sajeena. A, Vol. 56 (9) p. 40-42 (2/2011)

Finance

Head	Expenditure (Rs.)	Receipts (Rs.)
Non-Plan	6041360/-	-
Plan	2,73,708/-	-
Other EAPs	87,79,042/-	-
Revolving Fund	-	8,70,644/-

FACULTY VETERINARY AND ANIMAL SCIENCES

CENTRE FOR PIG PRODUCTION & RESEARCH, MANNUTHY

Research Programmes

Major Research Achievements (Highlights)

1. The Center has evolved and implemented on a trial basis the terminal sire system of breeding for production of three breed combinations with Duroc as terminal sire (i.e. Duroc as terminal sire and crosses of Desi, Large White Yorkshire and Land race).
2. A study on the isolation and characterization of bacteria associated with gastroenteritis in weaned piglets. Bacteria causing gastroenteritis in weaned piglets, pathogenesis of isolates and antibiotic susceptibility pattern of isolates is studied.
3. Comparative study is undertaken on the efficiency of the two types of housing systems adopted for farrowing in relation with litter size, birth weight weakly weight gain and pattern of mortality till weaning in the crossbred piglets.
4. An investigation was carried out with the objective to determine the effect of organic chromium propionate supplementation on the growth of cross bred pigs. The supplementation of chromium propionate did not affect the growth or feed conversion efficiency of growing (Large White Yorkshire X Desi) cross bred pigs. There was non-significant decrease in triglycerides and increase in HDL cholesterol level, it can be beneficially used to improve the lipid profile of the cross bred pigs.
5. Study is undertaken to identify and characterize different allelic variants of Prolactin receptor and Follicle stimulating hormone - β genes in pigs and their association with reproductive traits. Blood samples were collected from 150 sows of three different breeds namely Duroc, Large White Yorkshire and Desi crossbreds. Genomic DNA was extracted using the standard Phenol: Chloroform extraction procedure. The tenth exon of PRLR and first exon of FSH- β gene were amplified by Polymerase Chain Reaction (PCR) using specific set of primers. Two genotypes AA and AB were observed at prolactin locus with frequency of 0.08 and 0.92 respectively. Two genotypes were identified at FSH β locus and the results are under analysis.
6. A project was undertaken to study the effect of dietary incorporation of spent brewers yeast on growth, feed efficiency, nutrient digestibility, carcass characteristics and economics in pigs. Thirty six weaned piglets were subjected to three dietary treatment viz. T1 – Ration with 0% spent brewers, T2- Ration with 2.5% spent brewers yeast and T3-Ration with 5% spent brewers yeast. The following parameters were recorded, daily feed consumption, body weight at fortnightly, blood urea nitrogen, total protein, triglycerides, Total cholesterol, HDL, calcium, phosphorous and Magnesium as well as observation on slaughter traits are also recorded. Data analysis is underway and results will be included in the next report.
7. Study was undertaken to know the effect of dietary incorporation of dried tuna waste silage on growth, feed efficiency, nutrient digestibility, carcass characteristics and economics in pigs. Thirty six weaned piglets were subjected to three dietary treatment viz. T1 – Ration with 0% dried fish, T2- Ration with 50 % of protein of dried fish replaced by dried tuna waste silage and T3-Ration with 100 % of protein of dried fish replaced by dried tuna waste silage. The following parameters were recorded. Daily feed consumption, body weight at fortnightly, blood urea nitrogen, total protein, triglycerides, total cholesterol, HDL, calcium, phosphorous and magnesium as well as observation on slaughter traits is also recorded. Data analysis is underway and results will be included in the next report.

Ongoing PG projects:

Ph.D. Projects

1. Dietary manipulation to improve serum lipid profile of pigs
2. Characterization of candidate genes and their association with litter traits in pigs

M.V.Sc. Projects

1. Dietary Zinc requirement of weaned piglets
2. Genetic variability of Retinol Binding Protein 4 locus in pigs
3. Clinical investigation on piglet enteritis

Extension Programmes

Highlights of extension activities :

The Centre provides technical knowledge to the progressive farmers in establishing the piggery units with respect of the construction of the pig house, health care, management, waste disposal and other problems faced on day to day basis over telephone and personal call. The Centre supplied about 2263 numbers of breeding and fattening piglets to farmers and generated Rs. 79 during the period.

List of Publications:

Scientific papers

: 6

1. Aripasath K, Usha A.P. and Raghunandanan K.V (2010) Polymorphism of microsatellite S0101 among indigenous pig population of Kerala. J.Vet Anim Sci.
2. Aripasath K, Usha A.P. (2010) Polymorphism of microsatellite marker S0005 among various indigenous pig populations of Kerala. Tamilnadu J.Vet Anim Sci.
3. Gopinathan A. and Usha A.P. (2010) Effect of different factors on weaning weight in Large White Yorkshire, desi and crossbred pigs. Ind.Vet J 87: 2 pp 156-158
4. Usha A.P and Thirupathy Venkatachalapathy R. (2010) Conservation and Genetic diversity of Angamali desi pig of Kerala, presented at National Conference on "Native livestock breeds and their sustainable use " on Sep 27-28 at Advanced Centre for Environmental studies and sustainable development, Mahatma Gandhi University, Kottayam, Kerala.
5. Thirupathy Venkatachalapathy R and Usha A.P (2010) Performance of Angamali desi pig of Kerala, presented at National Conference on " Native livestock breeds and their sustainable use" on Sep 27-28 at Advanced Centre for Environmental studies and sustainable development, Mahatma Gandhi University, Kottayam, Kerala.
6. Thirupathy Venkatachalapathy R and Usha A.P (2011) Strategies for the waste management in pig farms, presented at Symposium on "Waste management :Experience and Strategies, 5-7 Jan-2011 at College of Horticulture, KAU sponsored by DST.

No of visitors to the institution (farmer group /students)

Farmers group : 850

Students group : 120

Important visitors:

1. Hon. Mr. Mahlepala Herath, Chief Minister, Sabaragamuwa Provincial Council, Sri Lanka
2. Hon. Mr. Lal Wichramasinghe, Minister of Agriculture, Sabaragamuwa Provincial Council with high level delegation of farmers and officers, Sri Lanka
3. Mr.K.Kandasamy, Secretary, PGP Educational and Welfare Society, Chennai Tamil Nadu
4. Dr. A.R.Sirothia, Professor and Head, Department of Animal Genetics and Breeding, Veterinary College, Nagpur
5. Dr. Chandrasekhar Sahukar, Dy.Advisor Animal Husbandry and Dairy, Planning Commission, New Delhi

Finance

Head	Budget Estimate (Rs. in lakhs)	Expenditure (Rs.in akhs)	Receipts (Rs. in lakhs)
Non Plan CPPR	57.070	137.774	
Plan Scaling up of piglet production	60.000	87.091	69.998
EAP AICRP on Pigs	28.000	33.405	9.478
Total	145.07	258.27	79.476

UNIVERSITY LIVESTOCK FARM & FODDER RESEARCH DEVELOPMENT SCHEME, MANNUTHY

Research Programmes

Major Research achievements

- Feeding interventions for exploitation of genetic potential of CB cows.
- Hormonal interventions in infertility management
- Studies of biofuel technology
- Feeding strategies for optimum calf growth
- Studies on value added products from cow dung and urine

Extension Programmes

- Highlights of extension activities
- Conducted a Farmers Seminar on 30.07.2010
- Released a CD 'Ksheera sagaram' for farmers
- Released an English & Malayalam brochures for farmer.
- Conducted 15 sessions in farmers seminars and Training Programmes

Farm Advisory Services

In Person	Over Telephone	Through letters
24 Nos.	9 Nos.	Nil

List of publications

Scientific papers

1. Flamy A. Jacob, Jinesh Kumar N.S., Binoy Babu, C. and Joseph Mathew (2010). Effect of chopping on utilization of grass in Dairy Cows. Book of abstracts. 1st Kerala Women's Science Congress. 10-12 Aug. 2010. St. Teresa's College, Ernakulam. pp.83
2. Nisha, M.N., Joseph Mathew, Saseendran, P.C., Flamy A. Jacob, Jineshkumar, N.S. and Binoy C. Babu (2010). Effect of rubber mat flooring on the production performance and incidence of disease in dairy cattle. Book of abstracts. 1st Kerala Women's Science Congress. 10-12 Aug. 2010. St. Teresa's College, Ernakulam. pp. 91
3. Joseph Mathew (2010). Social, economic and environmental dimensions of sustainability in Animal Husbandry Production System. Paper presented in the one day workshop on "Sustainable Animal Husbandry for the officers of Animal Husbandry Department on 12.8.2010 at Institute of Management in Government Co-ordinated by Kerala State Veterinary Council.
4. Flamy A. Jacob, Jineshkumar N.S., Binoy C. Babu and Joseph Mathew (2010). Effect of lunar eclipse and full moon days on frequency of oestrus in dairy cows under farm conditions. Proceedings of the Veterinary Science Congress. 28th September 2010. Palakkad. Abstracts. pp.49
5. Binoy C. Babu, Flamy A. Jacob, Jineshkumar N.S. and Joseph Mathew (2010). A case study on hormone therapy in anestrus and repeat breeding buffaloes. Proceedings of the Veterinary Science Congress. 28th September 2010. Palakkad. Abstracts. pp.50
6. Jineshkumar N.S., Flamy A. Jacob, Binoy C. Babu and Joseph Mathew (2010). Effect of season on conception rate of dairy cattle in tropical farm conditions. Proceedings of the Veterinary Science Congress. 28th September 2010. Palakkad. Abstracts. pp.50

7. Ayub. A., Joseph Mathew and Sany Thomas (2010). Economic analysis of mid sized organized dairy farms. Proceedings of the Veterinary Science Congress. 28th September 2010. Palakkad. Abstracts. pp. 64
8. Smitha, S., A. Kannan, P.C. Saseendran, Joseph Mathew and K. Karthiayani (2010). Feed supplements to alleviate heat stress in New Zealand White rabbits reared under hot humid conditions. Proceedings of the Veterinary Science Congress. 28th September 2010. Palakkad. Abstracts. pp.65
9. Binoy C. Babu, Jineshkumar, N.S., Flamy A. Jacob and Joseph Mathew (2010). Efficiency of bio-digester in biofuel production and organic waste management. Souvenir. International Symposium Biovision 2010. Bioprocess Engineering 2010 Oct. 1-4. Organized by Dept. of Biotechnology, Sahradaya College of Engg. & Technology Co-sponsored by Kerala State Council for Science, Technology and Environment. pp.06
10. Binoy C. Babu, Jineshkumar, N.S., Flamy A. Jacob and Joseph Mathew (2010). Study on relationship between gestation length and sex of calves in buffaloes. Abstracts 20th Swadeshi Science Congress 6-8 Nov. 2010. CMFRI. Kochi. pp.80
11. Flamy A. Jacob, Jineshkumar, N.S., Binoy C. Babu and Joseph Mathew (2010). Nutritional intervention for exploiting milk production potential in dairy cows. Abstracts 20th Swadeshi Science Congress 6-8 Nov. 2010. CMFRI. Kochi. pp.81.
12. Jineshkumar, N.S., Flamy A. Jacob, Binoy C. Babu and Joseph Mathew (2010). Effect of energy supplementation on milk production in dairy cows. Abstracts 20th Swadeshi Science Congress 6-8 Nov. 2010. CMFRI. Kochi. pp.82.
13. Flamy A. Jacob, Joseph Mathew, Matilda Joseph, Jineshkumar, N.S., Binoy C. Babu, Mahesh, R., Rosemary, M. (2010). Effect of male Pheromones on the reproductive behaviour in cattle. Abstract book of 34th Annual Conference of Ethological Society of India and Colloquium on ethology from organism down to ethobiomolecule (ECEODE 2010). December 16-18, 2010. Organized by Centre for Arthropod Bioresources And Biotechnology (CABB), Dept. of Zoology, University of Kerala and Ethological Society of India.
14. Jineshkumar, N.S., Jacob, F.A., Babu, B.C., Mathew, J. and Nisha, M.N. (2010). Intervention in microenvironment for alleviating summer stress in milch animals. Book of Abstracts. First Indian Biodiversity Congress IBC 2010. National Seminar 28-30 Dec. 2010. Trivandrum. Organized by Centre for Innovation in Science and Social Action, Kerala State Biodiversity Board, University of Kerala and Navdanya, New Delhi. pp. 209
15. Mahesh, R., Joseph Mathew, Jineshkumar, N.S. and Flamy, A. Jacob (2011). Model Waste Management System for a dairy unit. Abstract. National Symposium. Waste Management. Experiences and strategies 5-7 January 2011. Organised by Dept. of Agricultural Microbiology, College of Horticulture, Kerala Agricultural University. sponsored by Dept. of Science and Technology, New Delhi.

Books - A reference manual on "Environmental Hygiene and waste Management"

Important visitors

High level delegation from the Sabaragamuwa Provincial council Government of Sreelanka

Finance

Head	Expenditure	Receipts
Non - Plan / Plan	Rs.1,85,13,689/-	Rs.59,96,119/-

K A U DAIRY PLANT, MANNUTHY

Extension programmes :-

a) Highlights of extension activities

(b) Details of activities (wherever applicable):

Dr.P.I.Geevarghese attended the following farmers seminar and allied activities

Attended the video conferencing with the farmers of Waynad district on 5-5-09 at ATIC centre and took class on Milk and Value addition.

Participated in the RAWE programme organized by the College of Horticulture, Vellanikkara on 30-7-09 at Elanad and took class on Milk products preparation.

Participated as resource person for the *Mughamugham*, programme organized by KAU in connection with *Karshakadinam* held on 17-8-09 at College of Horticulture, Vellanikkara.

Participated in the media seminar organized by the MRCMPU at Kalpetta on 1-10-09

Participated in the Agri- Food Technology meet held at Lulu convention Centre, Thrissur on 10-10-09 and presented a paper on Milk and value addition

Attended the Kodungallur Block Ksheera Karshaka Sangamam held at Kara on 7-11-09 and presented a paper on Practical suggestions for Profitable Dairy Farming.

Attended the Haritham-2009 conducted by the KVK, Thrissur and presented a paper on Value addition of milk on 21-10-09 at Vellanikkara.

Attended the 19 th Swadeshi Science Congress at College of Veterinary and Animal Sciences, Mannuthy from 10 th to 12 th December-2009 and acted as expert in the interaction section between the students and farmers with scientists.

Attended the Farmers seminar organized by the Cable T.V.Operators association at Communication Centre, Mannuthy on 15-2-10 and presented a talk on "Milk and milk products for health and profit"

Participated in the training programme organized by Dairy Training Centre under Dairy Development Department at Calicut for professional Dairy farmers and handled lecture on value addition of milk on 8-3-10

Farm Advisory Services

In person	Over telephone	Through letters
Consultancy was provided to 15 farmers/ entrepreneurs in the filed of milk processing and quality control	110 farmers were provided advice over phone	NIL

Radio talks / Audio-video cassettes :

Geevarghese .P.I. Factors affecting the Keeping quality of milk –Talk, Recorded on 10-11-09 and broadcast on 9-12-09- AIR, Thrissur

Dr.P.I.Geevarghese. Professor and Head.

Beena, A.K., Geevarghese,P.I. and Jayavardhanan, K.K.(2009) Detergent potential of a spoilage enzyme produced by *Bacillus* species isolated from sterilized skim milk

Proceedings of the 21 st Kerala Science Congress 29-31 st January 2009 Kollam- pp 47-48

Beena, A.K.,Geevarghese, P.I., Ranjini,A.R., and Riya T George 2009 Phychrotrophs – A threat to food security. Proceedings of the National seminar on food security and nutrition held at Thrissur on 6 th May- 2009 pp59

Beena A.K. and Geevarghese,P.I. 2009 Environment borne chemical contaminants in milk- A pertinent threat to consumers. JIVA-Journal of Indian Veterinary Association, VI.7 No. 2 pp 100-102

Geevarghese,P.I. (2010) Milk Processing and Value addition. Paper presented at the National workshop on Dairy Co- operatives in contemporary setting- Issues and strategies held at Gandhigram Rural Institute, Gandhigram on 18-3-10

Poster presented

Geevarghese,P.I., Rajakumar, S.N and Sudheer Babu, P. (2009) Manufacture of Paneer using Malabar tamarind (*Garcinia cambogia*) fruit extract as a coagulant . Poster presented at the 37th Dairy Industry conference held at Goa from 7th 9th January-2009.

Popular Articles

Beena A.K. and Geevarghese,P.I. "Current trends in packaging" 2009, College of Dairy Science and Technology Magazine pp 48-51

Sri. P Sudheer Babu Assistant Professor:

2 articles in referred journals and 1 poster presented in National conference.

Dr. S N Rajakumar Associate Professor : 4 Abstracts

Scientific article

Rajakumar, S.N., Sudheer Babu, P and Geevarghese,P.I. (2009) Process development for the manufacture of paneer fortified with calcium salts. Echo chronicle

Poster

Shruthi Thomas, Rajakumar, S.N., Geevarghese,P.I. and Anil, K.S. (2010) Manufacture of spiced Whey Beverage. Poster presented at the 38th dairy Industry conference held at Bangalore from 17 to 19th of Feb-2010

No. of visitors to the Institution (farmer group/students) : A total No of 6187

Sixteen groups of farmers Under ATMA visited the Unit and classes were taken on Value addition and quality control of milk

The plant was a centre of attraction for the visitors including school and college students, farmers, entrepreneurs etc.

During the period the Dairy plant procured Liters of cow milk and Liters of buffalo milk. An amount of Rs. 5363926 /- was collected by sale of milk and milk products during this period. During the financial year an amount of Rs.7.5 Lakhs (Rupees Seven lakh fifty thousand only) was transferred to the University account from the revolving fund of the Dairy Plant. Finance 2010-11

Head	Expenditure	Receipts
Non-Plan	456916	
Plan	2611505	
Plan scheme	21300	
ICAR	Nil	
Other EAP's	750000	13658
Re-imbusement of 50% Stipend from Board of Apprentice ship Chennai.		
Revolving Fund	4585881	5363926

AICRP ON POULTRY IMPROVEMENT PROJECT, MANNUTHY

Publications/Extension Activities

Abstracts:

- 1 P. Girish Kumar, R.R. Churchil, A Jalaludheen, K. Narayanankutty, A. Kannan and P.A. Peethambaran. Qualitative and quantitative characters of Tellicherry Chicken. Proceeding of XXVII Annual Conference and National Symposium of Indian Poultry Science Association, at Chennai, 16 – 18 Sept. 2010
- 2 P. Girish Kumar, R.R.Churchil, A Jalaludheen, K. Narayanankutty, A. Kannan and P.A. Peethambaran. Farmers profile, rearing practices and mortality pattern of native chicken rearing in Nothern Kerala. Proceeding of XXVII Annual Conference and National Symposium of Indian Poultry Science Association, at Chennai, 16 – 18 Sept. 2010

Scientific articles:

1. R.R. Churchil, K. Narayanankutty, P. Ezhil Praveena and Raseena Karim, (2010). Influence of egg dimension characters on fertility and hatchability traits in White Leghorn birds. Indian Veterinary Journal, 87(1): 53-56.
2. K. Narayanankutty, R.R. Churchil, P. Ezhil Praveena and Raseena Karim, (2010). Fertility, hatchability and embryo mortality pattern of defective eggs in White Leghorn chicken, Indian Veterinary Journal 87(3): 291-293

Others:

1. Malayalam publications on various topics on Poultry rearing in different Malayalam dailies-3 numbers
2. Radio talk through A.I.R. – 2 numbers

M.V.Sc. & Ph.D students produced

Ongoing - one Ph.D

5. Training given

Internees, under graduate and post graduate Veterinary students, Veterinary surgeons, Assistant Directors - Training in Poultry rearing, Artificial Insemination etc.

Expenditure – Receipt Statement (01-04-2009 to 31-03-2010)

EXPENDITURE (Rs)		
Head of Account	Budget Provision	Expenditure
Pay & allowances	17,90,000	40,12,858
Travelling Allow.	30,000	44,999#
Recur. Exp.	35,84,000 (2884000 + 7,00000*)	35,69,001
Equipments	-	
Works	-	
Total	54,04,000	76,26,858

*37.5% revenue share paid back to the centre # excess T.A. adjusted with RC

CENTRE FOR ADVANCED STUDIES IN POULTRY SCIENCE, MANNUTHY

Extension Programme.:

a. Highlights of Extension Activities :

Farm Advisory Services.

In Person	Over Telephone	Through Letters
520	732	4

List of Publications

Anitha. P, Jalaludeen. A., Peethambaran , P. A., Usha P.T.A and Leo J (2011) Study on organochlorine residue in foraging ducks. International Journal of Current Research.3(4) 305-308)

Other publications in proceedings of seminar/symposia

- (a) Kanagaraju P., Jalaludeen. A and Anitha P (2010) Effect of parental age and hatching egg weight of Japanese quails on hatchability and chick weight- Proceedings of international Poultry expo and Conference-2010 on Technological Advances in Poultry production, health and management, 8-10 January, 2010 at VC & RI, Namakkal
- (b) Anitha P. and Jalaludeen A.(2010). Women empowerment through Poultry Production. National symposium on Advances in Concepts of Animal Welfare, Health and Animal Husbandry. XI Convention of Indian Association of Women Veterinarians. 6-8 January 2010.
- (c) P. V. Bhadra, P. Anitha, A. Jalaludeen and P. A Peethambaran (2010) Effect of dietary supplementation of turmeric and tulasi on physiological profile of layer Japanese quails - Paper presented in the National seminar on Emerging opportunities in alternate poultry farming systems - 22-23 April 2010 at madras veterinary College, Chennai, TN
- (d) K. V Shibu, P. Anitha and P.A Peethambaran Effect of dietary supplementation of dried bovine spleen on production performance of broilers. Proceedings of national seminar on Strategies for Animal welfare in commercial livestock production 2010 at CV & AS, Mannuthy
- (e) P Anitha, A Jalaludeen P A Peethambaran and J .Leo(2010) Nutritional and Physiological status of foraging ducks- - Paper presented in the National seminar on Emerging opportunities in alternate poultry farming systems - 22-23 April 2010 at madras veterinary College, Chennai, TN
- (f) Padwal N.P, Anitha P, Leo J, Ajith B and Jalaludeen, A (2010) Production performance of Japanese quails fed on different dietary protein levels – Paper presented in the National seminar on Emerging opportunities in alternate poultry farming systems - 22-23 April 2010 at madras veterinary College, Chennai, TN

Other Details if any –

- (a) Production of livestock and poultry feed: 1512.8 metric tones
- (b) From the revolving fund hatchery the following numbers of chicks were sold.
 - i. Gramalakhshmi : 425
 - ii. Grama Priya : 29187
 - iii. Colour Grama Priya : 6087

Finance

Head	Expenditure(Rs)	Receipt(Rs)
Non-Plan	1349854.00	
Revolving Fund	2,36,16,727.22	2,47,20,068.75

LIVESTOCK RESEARCH STATION, THIRUVAZHAMKUNNU,

Research Programmes

a. Major Research achievements

Network project on buffalo improvement

- Established a superior herd of 41 Murrah buffaloes in the station with purchase from the native tract in Haryana and ensued breeding programmes.
- Progeny testing programme initiated with Murrah buffalo bull semen test doses supplied from Central Institute for Research on Buffaloes.
- Studies on the productivity and adaptability of Murrah buffaloes based on recordings of growth, milk production and reproductive parameters.
- Purchase of cryocans, milk analyzer, chaff cutter, computer, video microscope, tractor and weighing balance for the effective implementation of the breeding, feeding and herd performance evaluation trails in the project, and to strengthen the laboratory facility of the station.
- The present herd strength is 46
- The total milk produced during 2010-11 is recorded to be 1680.8 Kg
- The average peak yield was 12.13 ± 0.71 Kg
- The average day at which peak yield attained was 42.25 ± 5.72
- The individual daily milk yield of murrah buffaloes found to be as high as 13.7 Kg
- Average age at first AI was found to be 1025.36 ± 71.47 days
- Average number of inseminations required for conception was found to be 2.27 ± 0.36
- Average age at first calving was found to be 1432.8 ± 140.42 days
- Average birth weight of buffalo calves were found to be 36.4 ± 1.5

All India coordinated research project on agro forestry.

Research results of AICRP on Agroforestry (2010-11)

- The suitability trial with MPTs as standard for pepper suggested *Acacia auriculiformis* as the best support for black pepper in terms of pepper yield and tree growth characteristics. *Artocarpus heterophyllus* was another promising candidate as pepper standard.
- Biomass and volume production tables have been prepared for all the nine multipurpose trees under investigation.
- *Ailanthus triphysa* is a better candidate for Agroforestry plantings on account of its lower lateral spread and deep-rooted nature. The poor performance of *Ailanthus triphysa* in closely spaced stands suggests its non-suitability for growing in stands and compact blocks. However, it may be recommended for widely spaced boundary planting and/or mixed species stands
- Intercropping ginger in *Acacia mangium* stands managed at moderate to high thinning intensity (1066 to 533 trees ha^{-1}) offer better results as compared to un-thinned stands (1600 trees ha^{-1}).
- Root activity patterns in two-year-old *Acacia mangium* as affected by planting density and pruning were evaluated using ^{32}P tracer soil injection method. Higher root activity was observed at 25 cm lateral distance and 30 cm soil depth for trees planted at 2×1 m spacing while widely spaced trees (1250 trees ha^{-1}) showed root spread beyond 75 cm lateral distance. Tree pruning in general, increased root activity for all planting densities. Studies showed that intercropping is possible at early growth phase of *A. mangium* trees.
- Provenance evaluation trial on teak (*Tectona grandis*) was conducted as part of AICRP on Agroforestry. Among the selected 30 teak accessions, the Nilambur provenances (Nellikutha, Cherupuzha and Karulai accessions performed better).
- Stand density manipulation such as tree pruning and planting density regulation showed considerable variations. Results indicated that closer spacing (2×1 m) may be suggested for early biomass/ volume production such as for pulpwood/ fuel wood while wider spacing (2×4 m and

4x4m) can be adopted for producing quality saw logs. Stem taper in general increased with decreasing planting densities.

- Preliminary results of the compatibility trial of different fodder tree-grass combinations in a silvo-pastoral system showed that *Gmelina arborea* showed better growth performance after two years of planting. Among the fodder grass HBN performed better in the early stages of tree growth.
- Scientific articles were published including some in the well-known international journals such as Forest Ecology and Management, Agroforestry systems, Plant and Soil, International Tree Crops Journal and Indian Journal of Agroforestry.
- The technologies developed at this centre have been made available to the public through Package of Practices Recommendations of KAU. POP recommendations for teak, ailanthus, and bamboo both under nonspecific as well as mixed species systems were formulated.

Performance evaluation of Attappady black goat in semi intensive rearing.

- Production performance of the native Attapady black goat evaluated based on fortnightly weight and other body measurement recordings of the kids.
- Breeding performance evaluation of Attapady black bucks in the unit and selection of superior bucks.
- Reproductive performance of the breeding does evaluated based on selected reproductive parameters.

Crossbred cattle

- The performance of crossbred cattle through the years was evaluated and found that the milk production is getting reduced over the period.
- A Station project on Performance of male calves for meat is under progress.
- A method to detect early pregnancy in cows from 25 day post insemination was evolved.

Extension Programmes

a) Highlights of extension activities

1. Dr. K.Anil Kumar took Class on Projects in Animal Husbandry Sector in a seminar organized by District Panchayath Palakkad on 15/6/2010.
2. Dr.R.S.Abhilash took class on "Infertility in cattle at Continuing Veterinary Education program conducted by Veterinarians club Mannarkkad on 18/6/2010
- 3) Dr.Ajith.K.S. took class on "Problems faced by dairy farmers" t "Ksheerasangamam" organized by Dairy Development Department on 2/7/2010
- 4) Dr.Ajith.K.S. took class on "Zoonotic diseases" to dairy farmers at a seminar conducted by Animal Husbandry Department under the auspices of ASCAD project on 5/9/2010
- 5) Dr.K.Anil Kumar took class on "Broiler Rabbit farming at Kulakkallur,Idukki District on 29/9/2010
- 6) Dr.K.Anil Kumar took class on "Broiler Rabbit farming" at a training programme conducted by LMTC Kudappanakunnu ,Trivandrum on 8/7/2010.
- 7) Celebrated chingam 1 by conducting a farmers seminar at veterinary dispensary kottopadam. Dr.R.S.Abhilash took class on bovine infertility and Dr.Asha.K.Raj took classes on fodder production. Fodder slips were also distributed to the farmers
- 8) Dr.K.Anil Kumar took class on Animal Husbandry scenario in Kerala at VPC Mannarkkad on 20/10/2010 under the auspices of Department of Animal Husbandry.
- 9) Dr.Ajith.K.S and Dr.Asha.K.Raj took class on Poultry production in a farmers seminar conducted by District Library Council Palakkad on 15/1/2011.
- 10) Dr.K.Anil Kumar took class for farmers on Kissan Ghosti conducted at VPC Mannarkkad on 7/3/2011.
- 11) Dr.R.S.Abhilash took class for farmers on Farmers school conducted at Mannarkkad 29/3/2011.

Farm Advisory Service

In person	Over Telephone	Through Letters
334	35	3

List of Publications**Popular Articles**

Venalkaalathum pachapullinai Silage	Nov. 10	Karshakan.	Dr. Asha.K.Raj, Dr.S.Biju, Dr.Ajith.K.S
Pasuvinu pullu pasuvinoppam pullu	sept 10	karshakasree	Dr.Asha.K.Raj
Kalitheetakkanuyogyamaaya vriksha vilakal	Nov 10	karshakan	Dr.Asha.K.Raj

Finance

Head	Expenditure	Receipts
Non-Plan 379-36-0008	12056930	
Plan 379-31-2251 Seed & Nursery	44765	
379-36-2385 Goat	162139	6034013
379-36-2204 Addl Facilities	4147261	
ICAR 379-33-6621 AICRP on AF	2526143	
379-36-6683- Buffalo Scheme	4596981	
Other EAPs		
Revolving Fund	0	0
Total	23534219	6034013

CENTRE FOR ADVANCED STUDIES IN ANIMAL GENETICS & BREEDING, MANNUTHY

Academic programmes

Intake capacity & No. of students enrolled during 2010-11	Out turn of students during 2009-2010		
	Male	Female	
UG	--	--	UG
PG(discipline-wise)	03	0	PG
Ph.D. (Discipline-wise)	2	1	Ph.D

Research Programmes:

ALL INDIA COORDINATED RESEARCH PROJECT ON GOAT IMPROVEMENT (MALABARI FIELD UNIT)

OBJECTIVES

1. To assess the production performance of goat breeds in farmer's flocks under village management system and improve the germplasm through selection.
2. To evaluate the socio-economic status of goat breeders and the economics of goat production in farmers' flock.
3. To disseminate the pro-poor goat based technologies under field conditions and assessment of their impact on goat production.

HIGHLIGHTS AND ACHIEVEMENTS

AICRP on goat improvement (Malabari field unit) came into financial existence on 2nd April, 2001 with the main objective to bring about the improvement in the farmers flock in its home tract. So the registration of farmer's flock and the genetic improvement were carried out in six field centres and the elite germplasm centre in College of Veterinary and Animal Sciences, Mannuthy, Thrissur. The field centres were Tellichery, Thaliparambu, Badagara, Perambra, Thavanur and Tanur which are located in Kannur, Kozhikode and Malappuram districts of Kerala. As per technical programme baseline information on production and reproduction traits, management practices and production trend were recorded and analyzed. A total of 20 bucks of Malabari breed selected on the basis of body weight and growth rate from the home tract were already in different field centres and eight bucks were selected during the current year.

The flock strength of registered animals under field unit was 1321 including 771 adult female goats as on 30 September, 2010. During the year 2010, addition due to birth was 398 while reduction due to death and sale of animals were 74 and 363 respectively. 1312 animals among different age group were draft during the period.

The overall least squares means of body weights at below one, three, six and nine months of age were 3.43 ± 0.06 , 9.06 ± 0.13 , 14.92 ± 0.30 and 19.18 ± 0.63 kg respectively. Centre and year of birth had significantly affected body weights at different age groups. Sex had significant effect at all ages except nine months of age. Type of birth also had significant effect at all age groups except six months of age. Males and single born kids were significantly heavier over females and multiple born kids.

The average daily milk yield recorded in the current half year was 0.63 ± 0.03 litres. The percentage of singles, twins, triplets and quadruplets were 39.95, 48.74, 8.29 and 3.02 respectively in the total population under study during the period. The percentage of multiple births was higher in Badagara (66.67%) followed by Tanur (62.86%) and Thalassery (61.73%). As per the technical programme, elite male animals were distributed to farmers free of cost. A total of 20 bucks of Malabari breed selected on the basis of body weight and growth rate from the home tract were already in different field centres and additionally eight bucks were distributed in the current year. Out of total 28 bucks, 5, 4, 3, 3, 3, 5 and 5 were distributed to the Thalassery, Badagara, Tanur, Thaliparambu, Perambra and Thavanur respectively.

ICAR FIELD PROGENY TESTING SCHEME

This All India Co-ordinated Research Project of ICAR coordinated by the Project Directorate on Cattle, Meerut was started in the year 1994.

Objectives

1. To undertake progeny testing of crossbred bulls on a large scale in the field for genetic improvement.
2. To standardize suitable criterion for identifying potential bull mothers in the field.
3. Develop methodology for computing genetic evaluations.

The programme envisages testing of 30 HF crossbred bulls in each batch having 50 to 75 per cent exotic inheritance and dam's ME minimum milk yield 4500 kg. Out of the 30 bulls 15 bulls are selected from Military Dairy Farm, 10 from BAIF (Bharatiya Agro-Industries Foundation, Pune) and 5 from GADVASU (Guru Angan Dev Veterinary & Animal Science University, Punjab). The period of bull usage of each batch will be 15 months. The bull should be free from gross physical defects. The target is to record a minimum of 30 daughters from each test bull spread over 3 different units namely GADVASU, Kerala Agricultural University (KAU), and BAIF. This will involve inseminations at least 300 cows per bull at each unit. A population of about 9000 cows per unit thus will be needed for test mating with 30 bulls.

In KAU, the scheme is in operation in six milk societies viz. Chemapamkandam, Marottichal, Chuvannamannu, Chirackakode, Avannur and Ayyappankavu of Thrissur district of Kerala. Besides these field centres, the bulls are tested in two large herds viz. the University Farm at Thumburmuzhy and Divine Farm at Chalakudy. The total financial allocation during this XI plan period for this unit is 1.61 crores.

Summary and Research Highlights

1. So far 9 batches of bulls have been sampled and the use of tenth batch has been started since 01.07.2009. First lactation milk yield of progeny of first six batches have been completed.
2. During the period under report 3055 inseminations of the test bulls (10 batch) were carried out in the field units.
3. The overall conception rate of the bulls under current batch is 36.4 as per the follow up till 31.12.2010.
4. Overall average 305 days milk yield of 3287 Sunandini cows in different parities in the six field units of Thrissur district was estimated to be 2003 ± 8 kg and the average milk yield of 287 cows, which completed lactation during this year, is 2276 ± 22 kg.
5. Average fat percentages in the milk of cows in the farmer's houses have been collected. The average fat percentage of the morning milk of lactation was found to be 3.58, 3.82 and 3.91 during 2, 5, and 8 month of lactation. In the evening milk the corresponding figures were 4.33, 4.57 and 4.66 percent.
6. Socio economic statuses of 1967 dairy farmers in Thrissur district have been collected so far and during this year 290 farmers have been enrolled.
7. The main occupation of the cattle owners (74 %) was agricultural farming and nearly seventy percent of them had education at least upper primary level and the percentage of illiterate was only 3.2.
8. Land holding size of the majority (39.8%) of the cattle owners was 10 and 50 cents and around 69 percent of the dairy farmers were having land only less than 100 cents.
9. The average herd size of the dairy farmers was three. Forty six percent of the cattle owners had only one cow and 34 percent had 2 adult animals. Only 2.7 percent of the farmers kept five or more than 5 cows.
10. Average first lactation milk yield of the first, second, third, fourth, fifth and sixth batch bulls were respectively 1958, 1976, 2098, 2190 and 2209, 2466 kg with an average age at first calving of 1136, 1125, 1204, 1195, 1160 and 1129 days. The overall average milk yields of other contemporary calvers in the field of different parities were only 1676, 1639, 1792, 1886 2036 and 2206 kg.
11. Progenies of 7th and 8th batch have started calving. The average milk yield of 94 progenies of VII batch bulls, which have completed first lactation, was 2574 kg and their average AFC was 1115 days.
12. Information generated from the scheme have been helpful in formulating state breeding policy and prediction factors developed using the field records have been incorporated in the package and practice of the University.

Benefits derived from the projects.

1. Milk production in the area of operation has been increased. Daughters of the bulls produced 500 kg more milk than their mothers and their contemporaries.
2. Developed a ratio factor for 305-day milk yield from the peak yield. Lactation milk yield = Peak yield * 215.48.
3. Developed regression factors for predicting the 305 days milk yield based on the test day yield at monthly, fortnightly intervals and also any single day milk yield in any stages of lactation with high accuracy. This has got lot of practical application for estimating milk yield under field conditions.
4. Farmers around the societies where the scheme work is going on are getting veterinary services from the veterinarians engaged in the scheme.
5. Vaccination and infertility camps are conducted at the societies by the scheme using the experts in the university.
6. Mineral mixtures and deworming drugs are supplied from the scheme to the farmers.

7. Information generated in the scheme has been incorporated in the latest package and practices of the Kerala Agricultural University.
8. Information gathered through this scheme had been helpful tips for formulating cattle breeding policy of Kerala state.

Economic Impact

More than 3500 female progenies have been born in the field from the highly pedigreed bulls used during the last 8 years period. The test result indicated that the average first lactation milk production of these progenies is 500 kg more than that of other crossbred cattle in different parities. Thus it could be estimated that these animals would have produced 15 lakhs kg (3000*500) more milk amounting to Rs.3 crores (15lakhs *Rs 20) as additional revenue. If the calving interval is taken as 18 months this increased amount works out to be 2 crores per year. This is with out taking into the consideration of the increased production of the subsequent generations from these progenies.

KAU SCHEMES

1. Vechur cattle conservation project.

The main objective of this centre is to conserve the only native cattle of Kerala-the Vechur and distribute the germplasm to progressive farmers. At present the unit is functioning as a central germplasm centre for Vechur cattle. A Vechur bull station is also maintained to make available good quality semen to farmers. One of the Vechur cow maintained at the centre is recognized as the smallest cow in the world as per Guinness World Record Book released during last year.

During the period mentioned 29 animals were distributed to interested farmers and 250 doses of good quality semen were also supplied to Vechur farmers.

2. Research on Rabbit.

The rabbit farm is established at the centre and is functioning as a source of seed material for broiler rabbits. Four breeds viz., Soviet Chinchilla, New Zealand White, White Giant and Grey Giant are maintained at this centre. The farmers interested in rabbit rearing were given on hand training on rabbit management.

During the period 451 rabbits were supplied to interested farmers and necessary advices were also given on economic rabbit rearing.

AHD- "Genetic analysis of Rabbits in Kerala"

Blood samples were collected from different breeds and genomic DNA was isolated using Phenol Chloroform method. Growth hormone and Myostatin genes were partially amplified and sequenced, sequences were analyzed for homology. Research is proceeding through the analysis of polymorphism in Growth hormone and Myostatin.

AHD Scheme on "Genetic analysis and marker assisted selection in Malabari goats using Microsatellite markers"

Research is proceeding through collection of blood samples and preparation of high molecular weight genomic DNA from whole blood using Phenol Chloroform method.

KSCSTE Project on Establishment of Elite germplasm centre for Malabari goats and training for goat breeders

Following equipments were purchased under this scheme-PCR machine, Deep Freezer, Accucel bovine photometer, Laptop, Digital Projector, Mastitis detector, Milk analyzer, Biochemical Analyzer, Estrous detector, Liquid nitrogen container, Slurry pump and Ultrasound scanner.

Extension programmes

1. Farmers contact programme in every month.
2. Conducting study classes for the farmers in the societies collaborating with the scheme.
3. Conducting cattle infertility camps, vaccination camps in the area of operation of the scheme.

The Rabbit unit, Goat Farm and Vechur centre functioning in this Centre extends all technical and other support to farmers involved in farming. A regular contact and counseling programmes either through phone or mail is arranged to clear various problems arise during various stages of farming. All

necessary training were given to various type of farmers like unemployed youth, ladies etc. to get involved in Animal Husbandry activities.

Farm Advisory Services

In person	Over Telephone	Through letters
57 Nos.	300 Nos.	20 Nos.

Field Visit

No. of visits	Problem identified	Recommendations
Visited KLDB farm, Dhoni, Palakkad	To study about Boer goats	

Radio talks/TV programmes/Audio-video cassettes

Topic	Date	Name of Scientist
Goat farming		Dr. Raghavan, K.C., Professor
Goat Farming (VHSE students)		Dr. Radhika.G., Asst. Professor

List of publications

Scientific papers

1. Aravindakshan, T.V., Simi, R.S. and Binoy, A .M. (2011). Individual identification and paternity determination in Asian elephant by using microsatellite markers. *Indian Journal of Animal Sciences* 81 (1): 44-47.
2. Bhosale, R.A., Aravindakshan, T.V., Raghavan K.C. and Simi, R.S.(2011). Cloning and sequence analysis of the growth hormone gene in Asian elephant, Submitted to the *Indian Journal of Animal Sciences*
3. Naicy Thomas, Anilkumar, K., and Usha, A.P. (2011). Effects of DNA microsatellite markers on age at first calving. *Indian Vet J.*, 88(2): 28-30.
4. Lali. F. Anand and K.A. Bindu.(2011). Microsatellite BM1500 polymorphism and milk production traits in Vechur and crossbred cattle of Kerala. *Veterinarski Arhiv.* 81(1):35-42
5. Bindu, K.A., Raghavan, K.C and Raghunandanan, K.V. Microsatellite Marker Polymorphism in Malabari Goats *Indian Veterinary Journal* (Accepted for publication in July 2011)
6. Rajeev, M. and Aravindakshan, T.V. (2010). Molecular cloning and characterization of alpha lactalbumin gene of Vechur cattle. *Indian Journal of Animal Sciences* 80 (6): 541-546.
7. Antony, P.X., Nair, G. K., Mini, M., Jayaprakasan, V., Aravindakshan, T.V., George, S and Karunakaran, S. (2010). Identification of immunodominant proteins of *Pasteurella multocida* from ducks. *Indian Veterinary Journal* 87 (4) : 329-331.
8. Bindu .K.A., and Raghavan, K.C 2010. Haemoglobin Polymorphism in Malabari Goats. *Veterinary World* 3:74-75.
9. Raghavan, K.C (2010) Myths about Dairy cattle breeding . *Journal of Indian Ve. Assoc.* 8 : 2, 72-75
10. Anilkumar, K, Usha A.P. and Raghunandanan, K.V. (2007). Elucidation of random amplified polymorphic DNA markers in crossbred cattle. *Journal of Veterinary and Animal Sciences*. 38:4-7
11. Bindu .K.A., Raghavan .K.C and Raghunandanan, K.V 2010. Glutathione Polymorphism in Malabari Goats. *Indian Journal of Animal Research* 309-310.
12. Bindu, K.A., Raghavan, K.C. and Raghunandanan, K.V. 2010. Blood Protein Polymorphism in Malabari Goats. *Journal of Veterinary and Animal Sciences* (Accepted for publication).
13. Naicy T., Anilkumar, K, Usha A.P. and Raghunandanan, K.V. (2010). Allelic effects of two DNA microsatellite markers on milk fat percentage of crossbred dairy cows of Kerala- Accepted for publication in *Journal of Veterinary and Animal Sciences*.

14. Radhika,G, Raghavan, K.C, Ajithkumar,S , Reghunandanan K.V, Rani Alex and Naicy Thomas (2010) Effect of breed on serum levels of trace minerals in goats of Kerala. Accepted for publication in FAO CIHEAM journal, Options Mediterraens
15. T.V. Raja, R. T. Venkatachalapathy and A. Kannan, (2010).Estimates of Genetic and Phenotypic parameters on Birth weight of crossbred cattle raised under organized farm conditions, *Journal of Animal and Veterinary Advances* 9 (17):2275-2278.
16. Aripasath K, Usha A.P.and Raghunandanan K.V.(2010) Polymorphism of microsatellite S0101 among indigenous pig population of Kerala. *J.Vet Anim Sci*.
17. Aripasath K, Usha A.P. (2010) Polymorphism of microsatellite marker S0005 among various indigenous pig populations of Kerala. *Cherion*
18. Gopinathan A. and Usha A.P. (2010) Effect of different factors on weaning weight in Large White Yorkshire, desi and crossbred pigs *Ind vet J* 87: 2 pp 156-158
19. P.M.Rojan and K.A.Bindu.2010.The Factors Affecting the Duration of Gestation in Rabbits. *Indian Veterinary Journal*.(Accepted for publication in August 2011).
20. Muhammed E.M. and Mathew S (2010) . Exploring Public health implications of Native germplasm in commercial dairy production. Proceedings of the National Seminar on Strategies for Animal Welfare in commercial Livestock Production 6th February 2010, Veterinary College Mannuthy. Pp 15.
21. Reshmi R.C. and Stephen M (2010). Evaluation of lactation milk yield in crossbred cattle. *Indian Vet.J.* 87:363-364.
22. Muhammed E.M. and Stephen Mathew (2010). Glowing genes. *JIVA* 8 (1): 65-68.
23. Stephen Mathew (2011). Presented a lead paper on 'Consideration of certain factors for initiating sire evaluation programmes under field conditions' in the Conference on New Horizons in Animal Breeding Technologies for Accelerating Livestock Production and health at IVRI, Bereilly (UP) during January 20-21, 2011. Pp37-42.
24. Bindu K.A. Presented a paper on 'Genetic diversity in Malabari goats' in the 5 th European Symposium on South American Camelids and first European meeting on fibre animals at Sevilla, Spain during October 6-8, 2010.
25. Bindu K.A., Arun R. , Sudina K. and Raghunandanan, K.V. 2010. 'Association of myostatin gene (MSTN) polymorphism with economic traits in rabbits. Fifth European Symposium on South American Camelids and first European meeting on fibre animals at Sevilla, Spain during October 6-8, 2010.
26. Naicy Thomas, Anilkumar, K. and Siju Joseph.(2010). Association of three DNA microsatellite markers with milk fat percentage of crossbred dairy cattle of Kerala. International symposium-Biovision 2010- Bioprocess engineering. Sahrdaya College of Engineering and Technology, Kerala, India, October 1-4.

Finance

Total	Expenditure	Receipts
Non-plan	2872167	45,345 (Rabbit)
Plan	2277729	1,41,190 (Vechur Project)
ICAR	6389023	
Other EAPs + Misc.	2476770	Nil
Revolving Fund	Nil	Nil
Total	14015689	186535

UNIVERSITY VETERINARY HOSPITAL, KOKKALAI

Research Programmes

Externally Aided Project on "Anaesthesia and Operation Theatre Management" funded by Animal Husbandry Department, Kerala

a. Major Research achievements

1. Modernised the existing Operation theatre with facilities for inhalation anaesthesia
2. Established inhalation anaesthesia unit for the administration of anaesthetics like halothane, isoflurane and sevoflurane with centralized facilities for oxygen supply, anesthetic ventilator and patient monitoring using multipara monitor.
3. Minor research projects were selected and conducted research work in different aspects of anaesthesia management and surgery.
4. Anaesthetic protocols for various surgical interventions in elective and emergency surgical patients were standardized and documented.
5. Based on the study training modules are being prepared for future training programmes for field veterinarians.
6. Protocols for maintenance and management of operation theatre with minimum facilities and maximum sterile conditions were established.
7. Documented methods for patient monitoring during anaesthesia and surgery.

Farm Advisory Services

In Person	Over Telephone	Through Letters
Regularly carried out both in person and over telephone services to public		

Field Visit

No. of Visits	Problem identified	Recommendations
Given doorstep service to livestock farmers whenever necessary		

List of Publications

Scientific papers - 1

Popular Articles - 1

Finance

Head	Expenditure	Receipts
Non-Plan	28,71,479	-
Plan	14,340	-
ICAR Dev. Grant	NIL	NIL
Other EAPs -Anaesthesia & Operation Theatre Management	75,004/-	75,004/-
Revolving Fund	5,48,789	6,18,727

LIVESTOCK PRODUCTS TECHNOLOGY (MEAT TECHNOLOGY UNIT)

Research Programmes

- Various research activities and marketing studies with respect to irradiated meat and meat products were conducted. Exhibition and popularization of the irradiated products was also conducted. It was observed that irradiated meat is having an extended storage life of 20 to 35 days and radiated products is having 60 to 75 days depending on the nature of the product.
- Preparation of smoked dried beef was standardized and shelf life assessed.

- Studies on utilization of pork skin collagen (PSC) were conducted. The research has indicated that PSC can act as a desirable fat replacer in beef burgers without compromising the eating qualities.
- Studies on the standardization and quality evaluation shelf-stable picnic sausage are currently under way. The product offers great scope for small scale entrepreneurs including women SHGs since no refrigeration facilities are required to market the product.

Extension Programmes

- Production, processing and marketing of meat and meat products with annual turnover of around Rs.98 lakhs.
- Preventing the exploitation of farmers by middle-men by fixing a reasonable purchase price for meat animals including broiler duck and rabbit.
- Providing trained manpower to the meat industry.
- Popularizing novel meat products and processing technologies (reports attached)
- Demonstrating the various facets of meat production, preservation and processing to different categories of visitors and students.

Farm Advisory Services

In Person	Over Telephone	Through Letters
Technical Advice for modernization of slaughterhouses in the local bodies of State.	In person and through visits	
Technical advice and preparation of project for male buffalo calf rearing for meat purpose	In person	

Finance

Head	Expenditure (Rs.)	Receipts (Rs)
Plan	27,15,920	17,83,000
Revolving Fund	83,51,663	97,79,387
Transferred to Comptroller	9,00,000	-----

REGIONAL CATTLE INFERTILITY RESEARCH CENTRE VELLIMADUKUNNU, KOZHIKODE

Research programmes

Research proposals submitted:

a. Fishereies

1. "Prelude to the biodiversity of Kadalundy estuary" Project submitted to the Director of Fisheries, Govt. of Kerala, Vikas Bhavan, Trivandrum
2. "Aquatic bio communities of Kadalundy estuary" Project submitted to the Kerala State Council for Science, Technology and Environment, Pattom, Trivandrum

b. Agricultural Engineering

1. "Studies on the effect of low cost poly house technology, micro-irrigation techniques and organic fertigation on yield and quality of vegetable cultivation in urban area" Project submitted to the Kerala State Council for Science, Technology and Environment, Pattom, Trivandrum

Extension programmes

1. Conducted two day seminars on Home management emphasizing on fish culture and Integrated approach for house hold development.
2. Handled a class on Culture og Live feeds for aquarium fishes
3. Conducted a class on breeding of gold fishes in natural ponds
4. Conducted a class on Packing and transportation of dry fry and fingerlings.

Farm Advisory Service

Subject	In person	Over telephone	Through letters
a. Veterinary	712	854	Nil
c. Fisheries	519	1984	Nil

Finance

Head	Expenditure	Receipts
Non-Plan		
Plan	Rs.331142.00	Rs.2345.00 (miscellaneous)
ICAR		
Other EAPs		
Revolving fund	Rs. 223299.00	Rs. 232720.0

FACULTY OF FISHERIES

FISHERIES STATION, PUDUVEYPU

Research Programmes:

Major Research achievements

- (i) Diet of trash fish along with pelleted feed was found to be an efficient diet for achieving Effective nursery management providing supplementary feed and adequate water exchange enabled to achieve optimum survival of post larvae and fry of *Chanos chanos* (Milk fish- Poomeen), *Mugil cephalus* (Grey mullet – Thirutha) and *Liza parsia* (Mullet – Kanambu)
- (ii) Polyculture of mud crabs, *Scylla serrata* and *S. tranquebarica* along with brackish water fish species enabled to achieve better production from wet land farming system.
- (iii) A combination better growth and production of mud crab under culture condition.
- (iv) Mollusc meat(clam & squid) was seen to be ideal diet for berried mud crabs in hatching tanks

Extension Programmes

Highlights of extension activities

Distribution of fish seed for promoting brackishwater farming:

Though there is immense potential for fish production from vast and varied brackishwater resources, non availability of ample seed remains as the main hindrance for taking up farming endeavours. Since inception of the station, fish seed collection and distribution have been a major activity. Puduveypu, a newly accreted wet land, is located close to Cochin bar mouth and tidal inundation of channels, canals and other low lying water bodies in the area results in recruitment of post larvae and fry of different varieties of fish and shrimps during their respective breeding seasons. They are collected using different gears, segregated and transferred to nurseries for rearing them till fingerling stage. Annually lakhs of seed are collected, reared and distributed to the farming community, research institutions and used at the station for farming purposes.

However due to the massive dredging, land filling and construction activities in connection with the multi crore projects like Liquefied Natural Gas Terminal (LNG Terminal), Single Point Mooring Project (SPM Project) of Kochi Refineries, Liquefied Petroleum Gas Filling Station of Indian Oil Corporation(IOC), Oceanarium Project of Dept. of Fisheries, Govt. of Kerala, Headquarters of Centre for Marine Living Resources and Ecology(CMLRE) of Govt. of Kerala. etc. ecological conditions in the Puduveypu wetland have changed drastically and adversely affected seed recruitment to the area. Consequently availability of post larvae of *C.chanos*, *M. cephalus* and *L. parsia* has been very poor during the report period when compared to the same period last year.

As an effort to manage the new situation, seed production of pond breeding fishes like *Etroplus surantensis*, *Oreochromis mossambicus*(Tilapia), has been taken up in a big way. Five ponds, comprising of 0.25 ha. ,after appropriate preparation have been stocked with mature male and female *E. surantensis*, providing egg attachment substrata and other congenial conditions for breeding. Similarly mass production of Tilapia seed has also been initiated.

In all, 68,655 seed of commercially important brackish water fish species were distributed during the report period generating an income of Rs.2,01,342/-. Species wise details are furnished hereunder.

Sl. No	Species	No. distributed
1	<i>Liza parsia</i> (Mullet- Kanambu)	
2	<i>Oreochromis mossambicus</i> (Tilapia),	30,130
3	<i>Etroplus surantensis</i> (Pearl spot-karimeen)	14,930
4	<i>Chanos chanos</i> (Milkfish-Poomeen)	9,445
5	<i>Mugil cephalus</i> (Grey mullet-Thirutha)	8,550
	Total	5,600
		68,655

Details of activities

- ❖ Information dissemination on eco-friendly aquaculture
- ❖ Technical guidance on water quality management
- ❖ Awareness campaign on conservation of aquatic biodiversity including mangroves.
- ❖ Celebration of "Environment Day" and "Farmers Day"

Farm Advisory Services

In Person	Over Telephone	Through letters
350	1500	2

List of Publications: Dr. M. M. Jose, Professor & Head

Popular articles:

"Mangroves and its uses" (In press)

Books :

Sustainable Aquaculture- Principles and Practices (Co-author.)

Important visitors

Dr.G.K.Sivaraman and Dr.Vishnuvinayakam, MFV division CIFT, Kochi

Dr. V.Kripa, Head, Environmental Dvn.

Dr.S.Velayudhan, Principal Scientist, CMFRI, Kochi

Dr. H.M.Sankara Subrmanyam, Biotechnology Dvn., M. S. Swaminathan Research foundation, Chennai.

Dr. Tadaghi Kajita, Associate Professor, Chiba University, Japan

Details of sale of seeds/ planting materials/ bio-control agents etc.

Item	Quantity	Revenue (Rs)
<i>Liza parsia</i> (Mullet – Kanambu)	30,130	30,500
<i>Oreochromis mossambicus</i> (Tilapia)	14,930	59,720
<i>Etroplus suratensis</i> (Pearlspot – Karimeen)	9,445	46,122
<i>Chanos chanos</i> (Milk fish – Poomeen)	8,550	34,200
<i>Mugil cephalus</i> (Grey mullet – Thirutha)	5,600	30,800
Mangrove seedlings	8,800	8,800
Total	77,445	2,10,142

Other details

Mangrove seed distribution:

Mangroves are a special group of plants that grow in inter-tidal areas, wet land and marshes of the tropical and subtropical regions. Coastal and estuarine mangrove vegetation with its dense growth acts as a bioshield and play protective role against soil erosion, tidal impact, sea surges, cyclones and tsunami. Mangrove swamps support the breeding grounds and rich feeding pastures for several marine and brackishwater fish & shrimps. However systematic destruction of mangrove has been going on for the last several decades for human activities.

In order to create awareness among the people on the importance of this coastal vegetation, known as biological coast guard, Fisheries Station has taken an initiative for its afforestation in the coastal areas. In all 8800 seed and seedling of different mangrove species were distributed during 2010-11.

Details are as follows:

Species	Number
<i>Rhizophora mucronata</i> (henb I-Å)	2000
<i>Bruguiera cylindrica</i> (sNdnb I-Å)	2500

<i>B. gymnorhiza</i> (U ₁ -A)	2500
<i>Avicennia officianalis</i> (D, q)	1800
Total	8800

Karshaka dinam celebrations:

Karshaka dinam was celebrated on 17.08.2010. A meeting was organized on the day, 40 *kudumbasree* members and local marginal farmers participated in the programme. Sri A.S.Benny Bernard, Chairman, Welfare Committee, Elankkunnappuzha Grama Panchayat inaugurated the function. Dr. M.M.Jose, Professor & Head presided. Smt. Jalaja, Ex-grama panchayat member offered felicitation. Dr. Shoji Jose, Subject Matter Specialist KVK, Narakal offered a class on the integrated crop management in the coastal wetland. Sri. P.A. George, Administrative Assistant welcomed the gathering and Sri K.K. Reghuraj, Farm Officer offered vote of thanks. Seed and seedling of different vegetables were distributed as part of the programme.

Earlier, all participants were taken to the farming area and explained details of the various works going on at the station. All participants appreciated the management of crops raised on the fish pond bunds in an integrated manner.

Finance

Head	Expenditure	Receipts
Non-Plan	35,24,489.00	Rs.4,37,729.00
Plan	9,28,774.00	
ICAR	--	
Other EAPs RKVY	--	
Revolving Fund	--	
Total	44,53,263.00	

Chapter IV

EXTENSION

Directorate of Extension is involved in co-ordinating the extension education activities of Kerala Agricultural University. The extension functions are carried out through the various extension units viz., Krishi Vigyan Kendras, Communication Centre, Central Training Institute, ATIC. The Public Relation wing of the University, KAU Press. The NSS Units of various colleges under the University also comes under the Directorate of Extension. It is concerned with initiating new extension programmes, advocating changes in agricultural policy and streamlining the organizations of various outreach programmes for the benefit of farmers and field extension functionaries of the state.

Organizational set up

Chief Executive :

The Vice Chancellor

Officers i/c of Extension :

Director of Extension

Associate Directors of Extension (NZ, CZ, SZ)

Heads of Stations directly under the control of DE
(Communication Centre, ATIC,

KAU Press, CTI)

Heads of KVKs

(Thrissur, Palakkad, Malappuram, Kannur,
Wayanad, Kottayam and Kollam)

During the period under report Dr. M.K. Sheela continued as DE i/c till 03.07.2010. Subsequent to the regular posting of Director of Extension through direct selection Dr. P.V. Balachandran, Professor & ADR took over the position on the AN 03.07.2010 and is in the chair till date.

Dr. S. Mothilal Nehru., ADE (SZ)

Dr. C.B. Manomohan ADE (CZ) upto 11.01.2011

Dr. R. Muraleedhara Prasad taken charge as ADE with effect from 01.02.2011

Dr. S. Ravi , Associate Director (NZ)

Dr. Jayasree Sankar, Professor (Soil Science) served as Scientific Officer to DE. Subsequent to her posting as OSD ATIC, Dr. Binoop P. Bonny , Associate Professor was posted as Scientific Officer to DE from 26.08.2010 on working arrangement from Communication Centre, Mannuthy and is continuing till date.

MAJOR EXTENSION/EDUCATION ACTIVITIES INITIATED UNDER DOE

Agri Expo at Mannanchery, Alappuzha.

Under the leadership of the Mannanchery Grama Panchayath a mega programme was conducted in connection with the declaration of the Panchayath as the first *Tharisu Rehitha Nelvayal Gramam* (XenipclnX s ÅhbÅ {Kmaw) - First fallow free rice village - in the State. An exhibition organized in this connection, highlighting the native as well as released varieties of rice from KAU along with other contributions made by the University. This exhibition was conducted under the leadership of the Directorate of Extension, KAU

In addition to the exhibition, a village stay programme which facilitated coming together of farmers, scientists, officers of the Department of Agriculture, agricultural students and school students was arranged on 7th and 8th of April 2010. The objective was to evaluate and delineate further developmental projects in agriculture and allied areas at Mannanchery Grama Panchayath. All the preparatory works were done for this show during the period under report.

Formulation of Organic Farming Policy and banning of red/yellow labeled chemicals.

Directorate of Extension actively participated in formulation of Organic Farming Policy of the State by attending and contributing in the state level meetings held for the purpose and was also associated with Organic Mission Project. A state level meeting was organized at KAU headquarters for discussing the feasibility of banning red/yellow labeled chemicals in the state. The meeting held on 13.12.2010 was attended by the Hon'ble Minister for Agriculture, scientists of KAU, ICAR institutions, KVKs and State Department of Agriculture.

Facilitation of Agriculture Development through Panchayathi Raj Institutions.

DoE actively participated in the Agriculture Development initiatives of Panchayathi Raj Institutions in the State. Director of Extension ensured the services of KAU scientists in local level agricultural developmental projects as resource persons and consultants. Directorate of Extension participated in the promotion of vegetable production programme of Tanniyam Grama Panchayath which was inaugurated on 05.06.2010 and also in the Samagra Nadan Pachakkari Gramam programme of Panancheri Grama Panchayath. It helped in introducing vegetable protected cultivation and initiating vegetable SHG of women in these areas. Haritha manappuram project was another initiative in Thrissur District in which DoE was involved at grass root level.

Paddy Mission Project

Actively involved in the paddy mission projects of popularizing upland rice cultivation in the state. Inauguration of the harvest of Upland paddy cultivation at Central Prison, Viyyoor by Hon'ble Minister of Agriculture was held on 03.08.10. Methran Kayal Rice farming project for Kuttanad and comprehensive project for kole land paddy cultivation was also taken up actively by the Directorate of Extension.

Biological Control of Papaya Mealy Bug

Attended a workshop on Papaya Mealy Bug Control at Zonal Project Directorate, Bangalore on 30.11.2010. The parasitoids was released for the control of Papaya Mealy Bugs in the State at a function organized for the purpose at Tavanur on 09.12.2010. Directorate of Extension took the lead in getting scientists of KAU in multiplying the parasitoids and imparted training to KVKs SMS in this project. KVK was involved in organizing training for Agricultural Officers and farmers.

Kerala Agri Food Technology Meet:

Kerala Agri Food Technology Meet was organized in collaboration and financial support of the State Industries Department at Lulu Convention Centre, Thrissur, from 24.02.2010 to 27.02.2010. It provided interaction platform for scientist, entrepreneurs and instructors from food industries, agricultural food processing and allied agricultural sectors. The exhibition and seminar organized as part of the programme drew a huge crowd.

National Conference of KVKs at Udaipur

Kerala Agricultural University participated in the exhibition conducted in connection with the National Conference of KVKs at Udaipur from 21st to 24th December 2010 and bagged the appreciation of the ICAR officials and other dignitaries who visited the exhibition.

Labour Support Group programme

The project proposal submitted by the Director of Extension titled Labour Support Group KVK Model under State Food Security Programme at an estimated project of Rs.100 lakhs was approved by the

Department of Agriculture, Government of Kerala. The project has seven specific components being implemented through KVKs of Pathanamthitta, Palakkad, Thrissur, Malappuram, Wayanad and Kannur Districts by Directorate of Extension. The project is being actively implemented in the above KVKs with a view to achieve the target.

Regular Activities

KVKs: Regular activities involved organising SAC meetings of KVKs co-ordinating its programme through monitoring visits and other facilitating services. HRD training were organized for the SMS of KVKs at CTI. Technology week celebration were organized through all KVKs in the state. Pre action plan meetings were organized to discuss the programme and programme for the next year also a review of the activities taken up through KVK was organized. Co-ordination and major achievements in the financial and physical targets of all state plan schemes implemented through KVK. Attended the meetings at ZPD, Bangalore interfaces at National Level.

Zonal Research Extension Advisory Committee

Participated in the ZREAC meeting that provided a platform for farmers, extension officers, scientists in the different agricultural zone of the state.

National Service Scheme

The NSS activities of KAU is accomplished through 10 colleges under 14 Programme Officers, under the overall control of the Director of Extension who also acts as the NSS Programme Coordinator of KAU. Special camp was organized at Nenmara by the College of Horticulture. May socially relevant programmes like blood donation camps, environmental day celebration, medical camps, were organized by the various NSS Units.

Workshops/Seminars/Exhibition/visits participated

1. Attended Agro Biodiversity Constraints - Challenges and solutions at Govt Guest House, Thycaud, Trivandrum on 17.9.2010 organized by Dept. of Agriculture.
2. Participated in the exhibition organized as part of National Conference of KVKs at Udaipur from 21st to 24th December 2010
3. Workshop of KVKs of Zone VIII under National Initiative on Climate Resilient Agriculture at ZPD, Bangalore on 09.2.2011
4. Food Security Seminar at Kollam organized by State Department of Agriculture on 21.2.2011
5. Visited the Network Project on Development of Expert System for Crop and Animal Enterprises at TNAU, Coimbatore
6. National Workshop on 'Reaching the Unreached' opportunities and challenges in Tech-Mediated Conveyance of Extension & Open & distant education in agriculture at College of Fisheries, Panangad on 22nd November 2010 in collaboration with Pan Common Wealth Forum.
7. State Level Workshop on Remandating functions of Directorate of Extension on March 17, 2011.

Dr.R.M.Prasad, Associate Director of Extension

Joined duty as Associate Director of Extension on 1.2.2011.

I Associated with the following activities of KAU

1. Workshop on Re-orienting Agricultural Extension in KAU
2. Meeting to discuss plan schemes at State Planning Board, Thiruvananthapuram
3. Annual Plan Meeting of KVKs of Kerala
4. Project Associate, National Agri. Innovation Project of NCAP on Women Empowerment in Agriculture

II Associated with the following activities outside KAU

1. Resource Person for Trainers Training of KILA
2. Capacity Assessment (CA) expert for Ministry of Panchayathi Raj, Govt. of India for the State of Rajasthan
3. Member of the Sub Group(Group I) on Agricultural Extension constituted by the Planning Commission, GOI for the 12th five year plan

Dr. S. Ravi, Associate Director of Extension (North Zone)

Attended the ZREAC meeting at Pilicode for Northern Region and headed the section on projects on extension.

Attended the ZREAC meeting at Pattambi for Central Region.

Prepared a proposal to establish a extension unit at Kozhikode "Centre for Farmer Oriented Research and Extension" for submission to the executive sub committee on Research and Extension

Handled a PG course Pl.Path. 518. 'Epidemiology and Forecasting of Plant Diseases' at College of Horticulture, Vellanikkara.

Guiding a M.Sc.(Ag.) student in Plant Pathology.

Serving as Advisory Committee member of two Ph.D. and two M.Sc.(Ag.) students

Report of the activities of ADE (SZ), KAU, Vellayani campus for the Year 2010-11

Dr. S. Mothilal Nchru

Associate Director of Extension (SZ) is vested with the responsibility of planning, monitoring and reviewing the various extension and development activities in Vellayani and other campuses of KAU in the southern region. To coordinate activities of KVKs of KAU, ICAR institutes, NGOs functioning in Thiruvananthapuram, Kollam, Pathanamthitta, Alapuzha and Kottayam districts also is the mandate of the ADE (SZ). He represented the University in various decision making processes of the Government as well. He has functioned as the state-level technical advisory group (TAG) member of the local self-government programmes. He was the member of curriculum steering sub-committee and Board of Examination of Vocational Higher Secondary Education (VHSE). He has served as a member of state-level Energy Management Agency.

Associate Director of Extension is holding the additional charge of the Head of the Department. He is actively involved in the teaching, research and extension activities of the Department of Extension.

In addition, he is holding the additional charge of the Public Information Officer of the College of Agriculture, Vellayani.

Academic programmes

During the reporting period the ADE (SZ) has offered one UG and two PG courses and coordinated and taken the leadership in preparing and revising the RAWWE manual. He has functioned as the advisory committee member of 10 PG and one Ph.D students of the Department. Four certificate courses were proposed from the Department which got approval of the Academic Council during the period. During the period draft regulations was prepared for certificate, diploma and PG diploma courses, after detailed discussion and consultation with the college-level functionaries.

Research and development interventions

Two externally aided projects and two plan funded projects and one inter-disciplinary project were in operation during the report period. In all these five projects, ADE has taken a lead role as co-Principal investigator and project team member and has taken part in all the field activities also. The details are given below:

External-aided projects:

1. Towards strengthening Vocational Higher Secondary Education in Agriculture in Kerala

2. Crop productivity enhancement through capacity building of members of farmers club in Thiruvananthapuram District
Plan-funded projects:

1. Establishment of Technology Development Centre cum Information KIOSK
2. Effective Technology Dissemination through farmer field school and improve the capacity of farmer leaders through various training techniques

Interdisciplinary projects:

1. Impact of nutritional counselling and life-style intervention on obese adults in partnership with the Home Science department.

PG projects:

He is also a member of the advisory committee of 10 PG students and one PhD student.

Other research/ development activities:

1. Chaired a session in the 28th Zonal Research Extension Advisory Committee (ZREAC) meeting on "Social Science projects" and deliberated actively in the proceedings.
2. He attended several meetings of the Trivandrum district panchayat inter-disciplinary team on agriculture.
3. Served as the Organising committee member of 'Vellayani kayal samrakhshna padhati'.
4. Got approval for two external-aided projects namely, 'Finishing school for VHSE certificate holders' and 'An assessment of human resource requirement and career planning of VHSE certificate holders with the total outlay of 14 lakhs. These projects are funded by the Directorate of VHSE.

Extension activities:

He was the General convenor of the Organising committee for the agricultural exhibition at Mannanchery in Alappuzha District as part of "Tharisurehitha Nel vayal grama Prakhyapanam". The programme was started with harvest festival inaugurated by Hon. minister of finance Dr. Thomas Isaac. The final year students of College of Agriculture actively participated in this programme. The agricultural exhibition was inaugurated by Hon. Agricultural Minister. Sri. Mullakkara Ratnakaran. ADE took part in all the activities related with festival and the exhibition.

Other activities:

- Served as the member of state-level selection committee of State Department of Agriculture continuously for the last three years to select best farmer and best extension-worker etc.
- Dr. S. Mothilal Nehru is acting as member of State level Task Force on local Self Government Programmes and is regularly attending the meetings.
- He was the Public Information Officer of the College of Agriculture, Vellalyani.
- Chaired one session on "Social Science projects presentation" and deliberated actively in all the sessions.
- Attended the "Technology Day" of different KVKs in his jurisdiction.

International assignments:

As a part of the cultural exchange between Commonwealth countries, the ADE (SZ) and district panchayat officials including its president visited the Limpopo province in South Africa from 5th July to 15th July 2010, which was facilitated by the Commonwealth 'Local Government Forum' through its 'Good Practices Scheme' to share the expertise in planning and implementation of identified projects in 'Decentralised Planning model' of Kerala.

COMMUNICATION CENTRE, MANNUTHY

Academic programmes

Title of the course	No. of students	Course teacher
Dairy Extension (1+1)	20	Dr. Binoo P Bonny
Entrepreneurship Development & Communication Skills (1+1) Bsc forestry	22	Dr. Binoo P Bonny
Introduction to Agriculture (1+1)	20	Dr. Binoo P Bonny
Pl. Path 3101 (2+1) Crop pests and diseases, Co-operation and Banking students	38	Dr. S. Estelitta
Extn. 3210(2+1) Behavioural sciences for co-operative extension for B.Sc.(Co-op) for the 2007 batch students of College of Co-operation and Banking, Vellanikkara	36	Dr. S. Helen
Forestry Extension (1+1)	22	Dr. Binoo P Bonny

Extension programmes

Sl.No.	Exhibition	Place	Date	Scientists
1	KAU Pavilion in Thrissur Pooram Exhibition 2010	Thekkinkad maidan, Thrissur	12.03.2010 to 25.05.2010	Convenor -Dr. S. Estelitta Joint Convenors - Smt.Santha K.K, Dr.Jyothi Bhaskar, Dr.S.Helen
2	Karshkadinam	Pananchery Panchayath	17.08.2010	Dr. S. Estelitta, Smt.Santha K.K, Dr.Jyothi Bhaskar, Dr.S.Helen
3	RAWE-2010 Exhibition	Kizhakkanchery Grama Panchayath	27.11.2010 to 28.11.2010	Extended support from Communication Centre
4	KAU Pavilion 5 th National Congress of KVK's	The State Agri. University, Udaipur	20.12.2010 to 24.12.2010	Extended support in preparing posters & exhibits
5	Polima, 2010	St. Joseph High school, Mathilakam	1.01.2011 to 03.01.2011	Convenor -Dr. S. Estelitta Joint Convenor- Dr.Jyothi Bhaskar
6	Flower Show 2011	Thekkinkad maidan, Thrissur	21.01.2011 to 25.01.2011	Convenor - Dr.Jyothi Bhaskar Joint Convenor- Dr.S.Helen
7	Agri Food Technology Meet 2011	Lulu Convention Centre, Thrissur	24.02.2011 to 27.02.2011	Finance Committee Convenor: Dr.Jim Thomas Seminar Committee Chairman: Dr.R.M.Prasad, Seminar Committee Co-Chairman: Dr.S.Helen, Food committee Convenor: Dr.Jyothi Bhaskar
8	National Energy Congress	College of Horticulture, Vellanikkara	04.03.2011 to 06.03.2011	Exhibition Committee Chair person: Dr.Estelitta.S, Co-Chair Person: Dr.S.Helen Registration Committee Co-Chair person- Dr.Jyothi Bhaskar

Farm Advisory Services

Scientists	In person	Over telephone	Through letters/email
Dr. S. Estelitta,	300	750	40
Smt. K.K, Santha	250	600	30
Dr. P. Nandakumar	100	300	25
Dr. P. Suseela	52	More than 2000	26
Dr. Jyothi Bhaskar	200	400	25
Dr. Binoo P. Bonny	50	100	-
Dr. S. Helen	40	150	-

Field visit

No. of visits	Problem identified	Recommendations
100	Uncultivated land, Army worm in rice fields Drying of nutmeg trees Drying of banana leaves, Mandari in coconut	Developed Farm Plan IPM in rice Drenching with fungicide IPM in banana IPM in coconut

Radio talks/TV programmes/Audio-video cassettes

Topic	Date	Name of scientist
KAU News	Every Friday	Dr. Jyothi Bhaskar, Dr. S. Estelitta, Smt. Santha. K.K, Dr. S. Helen
Modern methods of irrigation & pumpset selection in Doordharasan Kendra, Trivandrum	08.02.2011	Dr. P. Suseela
Talk in micro irrigation in All India Radio, Thrissur	22.02.2011	Dr. P. Suseela
Protected cultivation – advantages types of structures, climate control in All India Radio, Calicut	10.11.2010	Dr. P. Suseela

List of publications

Scientific papers

Scientists	Subject	Journal	Publication details	Page No.
Dr. P. Suseela	Percolation pond is effective in ground water recharge	Spice India	November 2010	19 - 21
Dr. P. Suseela	Ground water pollution is a serious issue	Spice India	September 2010	4 - 11
Dr. Binoo P Bonny	4P-A decentralized community Based PPP model for women empowerment in agriculture.	National workshop on Engendering Agricultural Production & Marketing	Avinasalin, Deemed University, Coimbatore	
Dr. Binoo P Bonny, Dr. R Muraleedhara Prasad, Dr. Suma Paulose	Agro-system performance index (API) – A Quantitative Approach to evaluate the sustainability of rice production systems.	Journal of Sustainable agriculture	November 2010	758 - 777

Dr.S.Helen	Assessment of problem solving capacity of agriculture expert system by farmers	Agricultural extension review	July September 2009	18-20
Dr.S.Helen	Assessment of preferences of farmers on participatory approach	Madras Agricultural Journal	January June 2008	245-248
Dr.S.Helen	Problem solving capacity of Agricultural expert system.	National Seminar on Extension Management; reforms - initiatives & impact.	Tamilnadu Agricultural University, Coimbatore	
Dr.Binoo P Bonny Dr.Joy Mathew	Farm Translate Network – An approach to reorient university Agricultural Extension	Journal of social science	July 2010	
Dr.Binoo P Bonny, Dr.P.Rajendran	Women Self Help group (SHG) in Agricultural developments	National workshop on PPP for Gender Mainstreaming in Agri entrepreneurship development, KAU, Vellanikkara	November 2010	
Dr.P.Suseela	Best Management practise for moisture conservation in coconut garden	Indian Coconut Journal	July 2010	12-24
Dr.P.Suseela	Irrigation in coconut plantation more precisely	Indian Coconut Journal	February 2011	2-4.
Dr.P.Suseela	Greenhouse revolution ...The next green revolution	Spices India (English)	August 2010	4 – 10

Technical Bulletins

Popular Articles

- Dr.P.Suseela.2010. 'Conserve soil conserve life forms', Karshakan, September 2010 . 27-28.
- Dr.P.Suseela.2010 "Excess application of chemical fertilisers affect drinking water", Spice India, November 2010 27-28.
- Dr.P.Suseela.2010. "Cover mat for soil conservation", Indian Coconut Journal, September 2010. 4-6.
- Dr.P.Suseela.2010. "Various kinds of green houses", Karshakabhoomi, November 2010. 26-27.
- Dr.P.Suseela, 2010. "Efficient irrigation" VFPCCK, Krishiyankanam, Kerala Vol 15(5) pp 22 – 23.
- Dr.P.Suseela, 2010. "Next green revolution is through greenhouse revolution" VFPCCK, Krishiyankanam, Kerala Sept, Oct 2010, 15(3) : 28-30.
- Dr.P.Suseela, 2010. "Green hot cultivation", Harithabhoomi, Aug- 2010 Vol I(4) pp: 30-32.
- Dr.P.Suseela, 2011. "We can do our irrigation ourself", Harithabhoomi, March 2011, Vol 1 (ii) pp 6 – 7.
- Dr.P.Suseela, 2011. "Selection of emitters in microirrigation", Karshakan, March 2011 Vol 1993) pp 28 – 31.

- Dr.P.Suseela, 2011. "Drip irrigation for coconut plants for saving water to increase yield" Karshakasree, March 2011, Vol (16) 7, pp 22 - 24.
- Dr.P.Suseela, 2010. "Measure to make rain water to penetrate into the soil" Harithabhoomi, July 2010, Vol I (3) pp 6 - 11.
- Dr.P.Suseela, 2010. "We can change our life style to take measures to recharge ground water" Karshakan, July 2010, 18(7) pp 67 - 69.
- Dr.P.Suseela, 2010. "Greenhouses for food security" Spices India (Mal), Vol 23(8) pp 4 - 9.
- Dr.P.Suseela, 2011. "We can protect ponds to ensure water for irrigation" Harithabhoomi, Feb 2011, Vol I (10) pp 20 - 21.
- Dr.P.Suseela, 2010. "Be conscious about water pollution" Spice India (Mal), October 2010, Vol 23(10) pp 27 - 29.
- Dr.P.Suseela, 2010. "Hare bhare powda gharom ke sarif harithakranthi" Spice India (Hindi), Aug 2010, Vol 22 (8) pp 4 - 9.
- Dr.P.Suseela, 2010. "Higher fertilizer application leads to pollute the drinking water seriously" Spice India (Mal), Nov 2010, Vol 23(11) pp 27 - 28.
- Dr.P.Suseela, 2010. "Ground water pollution is a serious issue" Spice India (English), Vol 23(9) pp 4 - 11.
- Dr.P.Suseela, 2010. "We can protect the living beings through the protection of soil" Karshakan, Sep 2010, Vol 18(09) pp 27 - 28.
- Dr.P.Suseela, 2010. "Bhoojal pradooshana eak gambhir samasya" Spice India (Hindi), Sep 2010 Vol 22(9). pp 4 - 11.
- Dr.P.Suseela, 2010. "Geotextile for soil protection" Karshakasree, Aug 2010, Vol 15(12)pp26 - 27.
- Dr.P.Suseela, 2010. "Soil conservation & stabilization measure using coir geotextiles of different varieties" Indian coconut Journal, Sept 2010, Vol 1 (9) pp 4 - 6
- Dr.P.Suseela, 2011. "Treadle pump for irrigation & exercise" Karshakan, Feb 2011, Vol 19 (2) pp 28 - 29
- Dr.P.Suseela, 2010. "Measure to utilize greenhouse throughout the year" Harithabhoomi, Sept 2010, Vol I (5) pp 24 - 27

Books

Dr.P.Suseela 2010. A chapter on "Efficient irrigation in coconut garden". In a nutshell - Essays on coconut. Coconut Development Board

No. of visitors to the Institution (farmer group/students)

Farmers: 447

Students: 293

Extension personnel: 65

Details of sale of seeds/planting materials/bio-control agents etc.

Item	Quantity	Revenue
Publications		Rs. 6,01,718.00

Finance		
Head	Expenditure	Receipts
Non-Plan	2,56,746	8,56,582
Plan	15,07,737	-
ICAR(Specify)	17,00,000	-
Other EAPs(Specify)	-	-
Revolving Fund	-	-
Grand Total	34,64,483	8,56,582

AGRICULTURAL TECHNOLOGY INFORMATION CENTRE (ATIC), MANNUTHY

Faculty Improvement Programme

- a. Deputation of Scientists for Seminars / workshops/Symposia
Dr. Jayasree Sankar.S., Officer on Special Duty, ATIC participated in the one day National Workshop on ATICs on 3rd July 2010 at ICAR Conference Hall, NASC, New Delhi.

Details of Lecture sessions as part of video conferencing

The project is an ISRO-KSPB sponsored programme and the video conferencing process is maintained by both ISRO for technical help and KSPB and expert centres for content. Topics are selected based on the feed back and suggestion from the farmers of the five blocks that are collected by the co-ordinators of the VRC's.

KAU ATIC is the expert centre which caters to five blocks in Waynad namely Noolpuzha, Mananthavady, Kapetta, Meppady, Sulthanbathery. Five lecture and interactive sessions have been completed during 2010-2011.

The project 'M-Agriculture in KAU' has been initiated and is functional at ATIC with the technical support of M-Governance facilities of the IT Mission. Research Associate joined the project on March 1st 2011. Through this plan project KAU provides SMS regarding trainings offered by KAU, technologies / value added products available, experts contact details, seeds / planting materials available and such other information. Nearly 12,000 farmers across the state are registered beneficiaries of this project.

Extension Programmes

1. Sales Counter shifted to ATIC building on 6th Sept. 2010 inaugurated by the Hon'ble Vice Chancellor.
2. Onam Fair: An onam fair was conducted on August 19th 2010 at Sales counter of ATIC, Mannuthy. A stall to market fruits, vegetables, dairy products and processed food products to the public at reasonable rates were opened at ATIC Centre, Mannuthy in addition to the sale of quality planting materials.
3. ATIC on the Internet: The details regarding services and sale of quality planting materials, seeds, publications and other value added products can be accessed in the website of KAU web site - www.kau.edu/extension/atic.
4. Help line – telephones - (0487-2370540 & 2371340) functions at the Agricultural Technology Information Centre, Mannuthy to clarify farmers queries regarding availability of quality planting materials, production problems etc.
5. Postal dispatch of vegetable seeds, KAU publications, mushroom spawn etc. are also taken up at Agricultural Technology Information Centre to the benefit of the farmers who reside in far off places.
6. A 'Karshika Vayanashala' (Agricultural Library) has been established where information on agriculture and allied sectors, Internet files, leaflets, folders and news paper clippings are catalogued and properly filed. All KAU publications are made available for reference in this library. Visual display using video cassettes are also provided in this library.
7. *Involving students in ATIC Technology Dissemination Process*
 - i. The Veterinary & processed fruit and Vegetable counter of ATIC is being run by students of College Of Veterinary & Animal Sciences as part of their Earn While You Learn Programme (EWYL) w.e.f 2/12/2000. The stall is open from 8 am to 7 pm on all days including holidays. The students are paid @ 2.5% of the total turnover per month for their services and as such the public gets better services through this counter as it is run by qualified hands. The total transaction through the veterinary counter amount to Rs.1,09,62,412/- during 2010-2011 and the students received Rs.2,74,052/- which is 2.5% of the transaction.

ATIC Interaction Hall – A venue for high profile meetings of the University

The ATIC is a chosen venue for all the top level meetings of the University including the General Council, Academic Council, Career Advancement Programme (CAP), Public meetings of MLA's workshops, seminars, POP meetings, major meetings of the Vice- Chancellor and Directorate of

Extension to name a few. Simultaneous sessions of 50 members each can be accommodated in the Interaction Hall and the Library Hall.

Details of Sale of seeds / planting materials / bio-control agents etc.

The feed back collected from farmers visiting the ATIC was that uninterrupted supply and service facilities to the farming community is required. To facilitate this, incentive linked production and service system has been evolved for the steady supply of finished products and quality material by utilizing the services of trained manpower through co-operative movements under the technical supervision of KAU.

Transactions for the year 2010-2011

Sl.No	Name of Items	Quantity(Nos.)	Amount(Lakhs)
1.	Meat Products	47305	63,08,257.00
2.	Diary Products	219609	26,89,123.00
3.	Vegetable Seeds (Turmeric seed – 407 kg, Ginger seed – 449 kg, Sesame – 63 kg, vegetable seeds – 1499 kg)	2418 kg	25,28,569.00
4.	Fruit Plants	86730	21,74,421.00
5.	Value added Products (Processed fruit products, cocoa chocolates, mushroom spawn, Honey, coconut oil etc.)	87020	16,06,722.00
6.	Seedlings of ornamentals, medicinal, spice, forestry and vegetable plants	159652	15,15,545.00
7.	Plantation Crops	21986	5,18,998.00
8.	Poultry Products	396964	9,52,375.20
9.	Miscellaneous (Dried cowdung, danthapala oil, Psuedomonas, Tricoderma, Njavara etc.,)	7615	3,58,153.00
10.	Publications	12080	2,76,292.00
11.	Aquarium	2999	16,648.00
Sale Proceeds			1,89,45,103.70
Invoice Settlement & Rent			4,78,255.30
Grand Total			1,94,23,359.00

Infrastructure Developed : Utilizing the funds received from the Director of Research the existing counter was strengthened in the following manner.

- Established an A/c seed store
 - Purchased display & storage racks
 - New freezers for Veterinary counter
- Photocopier & LCD projector to help in information dissemination

2. Other details if any

Vegetable Cultivation

The area adjacent to the NH-47 was taken up for cultivating coleus.

Reception Counter: The visitors will be provided with required information or directed to the concerned scientist / departments at the reception counter. The exact number of farmers visiting the ATIC seeking farm advice.

Finance

Head	Expenditure	Receipts
Plan	50,22,835/-	43,59,000/-
Revolving Fund	1,96,06,612/-	1,94,23,359/-

KAU PRESS, MANNUTHY

Introduction

The KAU Press is engaged in Printing quality information materials like Krishi Vignana manjeri, technical bulletins, research journals, annual reports, agenda notes, minutes of different GC meetings, budget estimates, hand outs, catalogues, audit reports, research projects, proposals, question papers, miscellaneous items like coupons, bus pass, receipt books, registers, application forms, prospectus, proforma, notices, invitations, writing pads, letter heads, academic record, certificates, course curriculum, syllabus, field note books, note file leaves, current file leaves, practical manuals, kaipadhenu, newsletters, package of practices recommendations (Agri. & Vety.) etc. Besides the above, the Kerala Agricultural University Press also undertakes binding works related to files, documents, reports, training notes, workshop and seminar proceedings.

Details of activities

187 printing works were received and altogether 178 works were completed during the period.

Staff Strength (as on 31st March 2011)

<i>Administrative staff</i>	<i>No. of posts</i>			<i>Remarks</i>
	<i>Sanctioned</i>	<i>In position</i>	<i>Vacant</i>	
Administrative Assistant	1	1	-	
Assistants	3	2	1	
Typist	1	1	-	
Peon	1	1	-	
Sweeper-cum-Attendant	1	-	-	
Technical Staff				
Press Manager	1	-	1	
General Foreman	1	-	1	
Senior Foreman	1	1	-	
Junior Foreman	1	1	-	Retired on 31.03.2011
Proof Reader	2	1	1	In charge of Press Manager
Copy Holder	2	-	2	
Computer	1	1	-	
Printer	8	-	8	Full vacant from 01-04-2010
Compositor	5	1	4	4 vacancies from 1-4-2010
Binder	10	2	8	8 vacancies from 1-4-2010
Helper	1	1	-	

- Due to acute dearth of staff one DTP Operator, three Printers and three Binders were re-engaged for one more year. Also one Printer and two Binders were also appointed additionally on contract basis by conducting interview and practical test by giving wide publicity.
- Out of the 34 sanctioned technical posts in different categories at KAU Press, only 8 posts are remaining altogether. Printing section is devoid of permanent Printers from 1-4-2010. This seriously affect the smooth functioning of the Press.

Finance

Head of account	Expenditure (Rs.)	Receipts (Rs.)
Non-plan 404-40-1103	48,00,463	-
Plan 404-40-2278 404-40-3426	17,81,996 99,008	27,34,357 (including FT bills)
Total	66,81,467	27,34,357

CENTRAL TRAINING INSTITUTE, MANNUTHY

Extension Programmes

1. A proposal for establishing a Farm Transition Network (FTN) – a participatory Technology Facilitation Programme, at an estimate cost of ₹36 crore – was submitted to the Planning board.
2. A proposal for establishment of International Research and Development Institute for Human Resources in Farm Science at an estimated cost of ₹8 crore submitted to ICAR.
3. A proposal for establishment of National Institute for Research and Development of Human Resources and Entrepreneurship in Tropical and Subtropical Horticulture has been submitted to State Horticulture Mission (₹15 crore).

TRAINING PROGRAMMES CONDUCTED THROUGH THE CENTRAL TRAINING INSTITUTE, MANNUTHY DURING 2010 –2011

I Vocational Training Programme:

Sr No	Order No. & date	Name of Training Programme	Venue	Course Director	Fee Details	Actual Exp.	Period of Training
1	Trg(1) 314/10-31/3/10	Training programme on Small Holder Dairying and Clean Milk Production	Live Stock Research Station, Thiruvazhankunnu	Dr. K. Anil Kumar, Asso. Professor & Head	2 batches Rs.60,000/- per batch	Rs.50000/- pay	10 days 5-4-2010 to 14-4-2010 & May 2010
2	Trg (1) 422/10-20/4/10	Training programme on Techniques in Plant Molecular Biology	CPHMB, College of Horticulture, Vellanikkara	Dr. D. Girija Professor	Rs.30,000/- for 6 trainees in 1 batch	Rs.25000/- pay	2 weeks 20-4-2010 to 3-5-2010
3	Trg (1) 312/10-26/4/10	Training programme on Applications of Bioinformatics in Modern Biology	Bioinformatics Centre, IT-BT Complex, KAU, Vellanikkara.	Dr. R. Kenavachandran, Pro. & Co-ordinator	Rs.15000/- 1 batch-3 trainees.	Rs.12000/- pay	1 month 26-4-2010 to 28-5-2010
4	Trg (1) 372/10-3/5/10	Training programme on Microbial Gene Manipulations	CPBMB, CPH, Vellanikkara	Dr. D. Girija Professor	Rs-1,00,000/- 1 batch for 10 trainees	Rs.33333/- pay	2 week 20-4-2010 to 3-5-10
5	Trg(1) 452/10-5/5/10	Training programme on Techniques & Application of Tissue culture	RARS Pattambi	Dr. M.L. Jyothi Professor	Rs 20,000/- 1 Batch for 4 trainees	Rs.16000/- pay	May 2010 (one month duration)
6	Trg (1) 454/10-7/5/10	Hands on Training for skilled workers in Animal Husbandry	Live Stock Research Station, Thiruvazhankunnu	Dr. Anil Kumar, Asso. Professor & Head	Rs-52,800/- per hatch	Rs.44000/- pay	10 th to 19 th May 2010 and June 2010. (10 days)
7	Trg (1) 456/10-24/5/10	Training on Total Farm Mechanisation	Irinjalakkuda Block Panchayath.	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs- 2,40,000/- for 2 batches Rs.1,20,000/- per batch	Rs.101300/- pay	1-6-2010 to 20 working days
8	Trg(1) 395/10-20/5/10	Training programme on Techniques in Plant Molecular Biology	CPBMB, College of Horticulture, Vellanikkara	Dr. D. Girija Professor	Rs. 95,000/- 1 hatch	Rs.79163/- pay	20-5-2010 to 7-6-2010
9	Trg (1) 507/10-20/5/10	Training programme on Techniques in Plant Molecular Biology	CPBMB, College of Horticulture, Vellanikkara	Dr. D. Girija Professor	Rs. 42000/- 1 hatch of 6 trainees	Rs.35000/- pay	17-5-10 to 17-6-10
10	Trg(1) 104/10-22/5/10	Training programme on Use of Mechanical Coconut Climbers	ARS, Mannuthy	Dr. U. Jaikumaran, Prof & Head, ARS, Mannuthy	Rs. 4,44,000/- 6 batches 20 trainees per hatch	Rs.439980/- pay	Jul-10
11	Trg (1) 498/10-22/5/10	Training programme on Isolation & Screening of native antagonists from pepper and cardamom Rhizosphere against foot rot pathogens of pepper	Cardamom Research Station Pampadumpara, Idukki.	Dr. Dhanya, M. K. Assis. Pro. CRS	Rs.4200/- 1 candidate in 1 hatch	Rs.3500/- pay	24-5-2010 to 29-5-2010
12	Trg (1) 875/10-27/5/10	Training programme on Mechanised Paddy Transplanting.	ARS, Mannuthy	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs.1,05,000/- 1 hatch 21 trainees.	Rs.90125/- pay	May last week and June 1 st week (15 working days)
13	Trg (1) 552/10-27/5/10	Training programme on Propagation Techniques in Fruit Crops	Cashew Research Station, Anakkayam	Dr. P. Rajendran Professor & Head,	Rs. 20,000/- 4 candidates in 1 hatch	Rs.16000/- pay	2-6-2010 to 1-7-2010
14	Trg (1) 312/10-26/5/10	Training programme on Mechanised Paddy Transplanting	ARS, Mannuthy	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs.1,70,000/- 1 hatch 34 trainees.	Rs.143350/- pay	20 working days from 24-5-2010

15	Trg (1) 418/10 -16/6/10	Hands on Training in the Preparation of Milk Prod.	KAU Dairy Plant, Mannuthy	Dr. P. J. Geevarghese Pro	Rs. 9,900/- in 1 batch	Rs. 8250/- pay	16-17 June 2010
16	Trg (1) 440/10 -19/6/10	Training on Structural Bioinformatics for Genome and Proteome Analysis	Bioinformatics Centre, II-BT Complex, KAU, Vellanikkara.	Dr. J. Kesavachandran, Pro & Co-ordinator	Rs. 5000/- per 1 trainee in 1 batch	Rs. 4000/- pay	1 week Duration from 21 - 26 June 2010
17	Trg (1) 618/10 -25/6/10	Training on Total Paddy Mechanisation	Parlakkad, Wadakkanchery Block Panchayath	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 1,12,500/- for 25 trainees in 1 batch	Rs. 93750/- pay	15 Working Days from 28-6-2010
18	Trg (1) 618/10 -30/6/10	Training on Total Paddy Mechanisation	Parlakkad, Wadakkanchery Block Panchayath	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 1,12,500/- for 25 trainees in 1 batch	Rs. 93750/- pay	15 Working Days from 30-6-2010
19	Trg (1) 618/10 -1/7/10	Training on Total Paddy Mechanisation	Parlakkad, Wadakkanchery Block Panchayath	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 1,12,500/- for 25 trainees in 1 batch	Rs. 93750/- pay	15 Working Days from 1-7-2010
20	Trg (1) 677/10 -3/7/10	Training Programme on Preservation and Processing of fruits and Vegetables	Dept. of Home Science, COA, Vellayani	Dr. Mary Ukkuru P. Professor & Head and Dr. Rani John, Asst. Prof.	Rs. 15000/- 1 batch for 10-15 trainees.	Rs. 12500/- pay	10 working days 5-16 July 2010
21	Trg (1) 255/10 - 23/6/10	Training Programme on Total Agricultural Mechanisation	ARS, Mannuthy	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 6000/- 1 batch 1 trainee.	Rs. 5500/- reimburse	20 working days from 8 - 27 March 2010
22	Trg (1) 440/10 - 13/7/10	Training Programme on Structural Bioinformatics for Genome & Proteome Analysis	Bioinformatics Centre, II-BT Complex, KAU, Vellanikkara.	Dr. R. Kesavachandran, Pro. & Co-ordinator	Rs. 5000/- 1 batch 1 trainee.	Rs. 4000/- pay	1 week duration from 14-21 July 2010
23	Trg (1) 724/10 - 16/7/10	Training Programme on Production of Paper bags from Waste Paper Materials	Communication Centre, Mannuthy	Dr. S. Estelitta, Professor & Head, Communication Centre.	Rs. 15000/- 2 batch for 30 trainees.	Rs. 12000/- pay	5 Days duration during 10-11 (1st batch from 19-23 July 10)
24	Trg (1) 697/10 - 16/7/10	Training Programme on Ornamental Fish Culture and Aquarium Keeping	Communication Centre, Mannuthy	Dr. S. Estelitta, Professor & Head, Communication Centre.	Rs. 22,500/- 1 batch for 15 trainees.	Rs. 18700/- pay	4 Days duration from 20-23 July 2010
25	Trg (1) 497/10 - 21/6/10	Training Programme on Summer Training in Techniques & Applications of Biotechnology	CPBMB, College of Horticulture, Vellanikkara	Dr. P. A. Nazzeem, Professor, CPBMB	Rs. 1,00,000/- per batch for 13 trainees - 2 batches	Rs. 54165/- pay	1st batch from 21-6-2010 to 3-7-2010
26	Trg (1) 380/10 - 16/7/10	Training Programme on Vegetable Cultivation & Seed Production	F.S.R.S., Sadanandapuram	Dr. S. Regeens, Professor & Head,	Rs. 30,000/- in 6 batches for 20 trainees	Rs. 24000/- place	1 Day duration on July - August 2010
27	Trg (1) 730/10 -21/7/10	Training programme on Mechanised Paddy Transplanting.	Erode District, Tamil Nadu	Dr. U. Jaikumaran, Prof & Head, ARS, Mannuthy	Rs. 1,00,000/- 1 batch - 20 trainees.	Rs. 83330/- pay	15 working days from 22-7-2010 to 5-8-2010
28	Trg (1) 732/10 - 22/7/10	Training Programme on Techniques in Molecular Biology and Biotechnology	CPBMB, College of Horticulture, Vellanikkara	Dr. P. A. Nazzeem, Professor, CPBMB	Rs. 37,500/- per batch for 5 trainees - 2 batches	Rs. 31250/- pay	3 Weeks Duration 1st batch from 22-7-10 to 12-8-2010
29	Trg (1) 743/10 - 24/7/10	Training Programme on Job Training in Industrial Microbiology	College of Agriculture, Vellayani.	Dr. A. Sakcer Husain, Assistant Professor (SS), Dept. of Agri. Extension	Rs. 18,000/- in 1 batch for 23 trainees	Rs. 15000/- place	10 Days duration during July - August 2010
30	Trg (1) 737/10 - 27/7/10	Training Programme on Mushroom Cultivation	Rice Research Station, Mancompu	Dr. Reeny Mary Zacharia, Asst. Prof. (SS)	Rs. 17,910/- per batch 2 batches for 25 trainees	Rs. 14925/- place	2 Days Dur. during 3rd Week of July 10
31	Trg (1) 638/10 -5/8/10	Training Prog. on Quail Production and Mgt.	CAS in Poultry Science,	Dr. P. Anitha, Asso. Prof.	Rs. 5,500/- per batch 2 batches	Rs. 4170/- pay	2 Days Dur. in July & Aug 10
32	Trg (1) 456/10 - 6/8/10	Training on Total Farm Mechanisation	Irinjalakkuda Block Panchayath.	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 2,40,000/- for 2 batches Rs. 1,20,000/- per batch	Rs. 1,03,300/- pay	10-8-2010 to 20 working days
33	Trg (1) 751/10 - 3/8/10	Training Programme on Novel Pickle Chutneys with Spices & Indigenous Foods	College of Agriculture, Vellayani.	Dr. P. Geetha, Asst. Prof. (Sl. Gr.) & Dr. Nirmala, Asst. Prof.	Rs. 12,500/- 2 batches for 20 trainees per batch	Rs. 10,410/- place	5 Working days during July-October 2010
34	Trg (1) 751/10 (1) - 3/8/10	Training Programme on Up Gradation training for the preparation of Ethnic food Products	College of Agriculture, Vellayani.	Dr. Rajani M. Asst. Prof & Smt. Soffie Cherian Asst. Prof. (Sl. Gr.)	Rs. 10,500/- 3 batches for 20 trainees	Rs. 8,750/- place	3 Working Days during July - December 2010
35	Trg (1) 788/10 - 18/8/10	Training programme on Use of Mechanical Coconut Climbers	ARS, Mannuthy	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 78,000/- 1 batch for 100 trainees per batch	Rs. 65,000/- pay	3 working days during July - August 2010

36	Trg (1) 787/10- 18/8/10	Training Programme on Paddy Mat Nursery Raising	ARS, Mannuthy	Dr. U. Jaikumaran, Prof & Head, ARS, Mannuthy	Rs. 1,27,500/- 3 batches @ Rs. 42,480/- for 50 trainees	Rs. 1,06,200 -pay	During August 2010
37	Trg (1) 786/10- 18/8/10	Training Programme on Paddy Mat Nursery Raising	ARS, Mannuthy	Dr. U. Jaikumaran, Prof & Head, ARS, Mannuthy	Rs. 1,27,500/- 3 batches @ Rs. 42,480/- for 50 trainees	Rs. 1,06,200 -pay	During August 2010
38	Trg (1) 791/10- 26/8/10	Training Programme on Techniques and Application of Plant Tissue Culture	ORARS, Kayamkulam	Dr. M.R. Bindu, Associate Professor	Rs. 65,000/- 1 batch for 13 trainees	Rs. 52,000/- place	2 Weeks from 2-9-10 to 20-9-10
39	Trg (1) 638/10 - 14/9/10	Training Prog. on Quail Production and Mgt.	CAS in Poultry Science,	Dr. P. Anitha, Asso. Prof.	Rs. 5,500/- per batch 2 batches	Rs. 4170/- pay	2 Days Duration in July & Aug. 10
40	Trg (1) 901/10 - 14/9/10	Training Programme on Machine Transplanting for Kudumbasree Members	Vellanchery	Dr. Jayan . P.R., Asso. Prof & Head, Dept. of FPME, Project Dir. (DIFM), KCAET	Rs. 6,500/- 1 batch for 10 trainees	Rs. 6000/- place	2 Days duration during September 2010
41	Trg(1) 697/10 - 6/10/10	Training Programme on Ornamental Fish culture & Aquarium Keeping	Communication Centre, Mannuthy	Dr. S. Estelitta, Professor & Head, Communication Centre.	Rs. 22500/- 1 batch for 15 trainees.	Rs. 18750/- pay	5 Days duration during October 2010
42	Trg(1) 917/10 - 24/9/10	Training Programme on Repair & Maintenance of Farm Machinery	Tavanur	Dr. Jayan . P.R., Associate Professor & Head, Dept. of FPME, Project Director (DIFM), KCAET	Rs. 25,025/- 1 batch for 20 trainees	Rs. 22750/- place	5 Days duration from 27- 9-10 to 1-10-10
43	Trg(1) 919/10 - 18/10/10	Training Prog. on Training on Techniques & Applications of Biotechnology	CPBMB, College of Horticulture, Vellanikkara	Dr. Ambily Paul, Asst. Prof., KVK, Sadanandapuram	Rs. 100000/- 1 batches for 20 trainees	Rs. 16660/-	2 Weeks duration from 18.10.10 to 30.10.10
44	Trg(1) 982/10 (i)- 20/10/10	Training Programme on On the Job Training	KVK, Kollam	Dr. Ambily Paul, Assistant Professor, KAK, Sadanandapuram	Rs. 5600/- 2 batches for 25 trainees	Rs. 4400/- pay	12 Days duration during Dec 2010- Jan 2011
45	Trg(1) 1070/10 - 20/11/10	Total Paddy Mechanisation	ARS, Mannuthy	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 1,00,000/- 1 batch for 15 trainees	Rs. 83,335/- paid	15 Working days from 20-11-2010 to 4-12-2010
46	Trg(1) 900/10 - 19/9/10	Training Programme on Ornamental Fish Culture	College of Fisheries, Panangad	Dr. T. V. Anna Mercy, Professor	Rs. 10,800/- 2 batches	Rs. 9000/- place	5 Days duration during 2010-11
47	Trg(1) 936/10 - 2/12/10	Training programme on Total Paddy Mechanisation	Changanassery, Madappilly Block Panchayath	Dr. U. Jaikumaran, Prof & Head, ARS, Mannuthy	Rs. 1,70,000/- in 1 batch for 25 trainees	Rs. 1,02,000 /-pad	15 working days during Dec. 2010
48	Trg(1) 1169/10 - 26/11/10	Training Programme on Mushroom Spawn Production	RRS, Moncompu	Dr. Reeny Mary Zacharia, Asst. Prof. (SS)	Rs. 33,510/- in 2 batches for 15 trainees	Rs. 27,925/- pad	4 Days duration during 2010-11
49	Trg(1) 980/10 1/12/10	Training Programme on Molecular Techniques in Microbiology	Dept. of Agri. Microbiology, College of Horticulture, Vellanikkara	Dr. D. Gunja, Prof. of Agri.	Rs. 40,000/- in 1 batch for 4 trainees	Rs. 33,330/- pad	2 Weeks duration during Dec. 2010
50	Trg(1) 1016/10 7/12/10	Training Programme on Production of Paper bags from Waste Paper Materials	Communication Centre, Mannuthy	Dr. S. Estelitta, Professor & Head, Communication Centre	Rs. 15,000/- in 1 batch for 12 trainees	Rs. 5,000/- pad	5 Days duration during Dec. 2010
51	Trg(1) 380/10 6/12/10	Training Programme on Vegetable Cultivation & Seed Production	F S R S, Sadanandapuram	Dr. S. Regeena Professor & head, FSRS, Sadanandapuram	Rs. 79920/- in 12 batch for 40 trainees	Rs. 66600/- place	1 days duration Nov 2010 to March 2011
52	Trg(1) 1130/10 6/12/10	Training Programme on Total Agricultural Mechanisation	Pazhayammur Block Panchayath	Dr. U. Jaikumaran Prof & Head, ARS, Mannuthy	Rs. 125000/- for 25 trainees in 1 batch	Rs. 105500/- pad	20 working days duration from 4/12/10
53	Trg(1) 1168/10 9/12/10	Training Programme on Total Agricultural Mechanisation	Mullassery, P.O. Peravallur	Dr. Jaikumaran, ARS Mannuthy	Rs. 28,000/- for 20 trainees in 1 batch	Rs. 23300/- pad	3 working days from 13.12.10 to 15.12.10
54	Trg(1) 919/10 6/12/10	Training Programme on Hands on Training Molecular Biology & Biotechnology	CPBMB, College of Horticulture, Vellanikkara	Dr. Sujatha R, Asst. Professor CPBMB & Dr. P.A. Nazem, Prof & Head, CPBMB, COH	Rs. 25000/- for 5 trainees in 1 batch	Rs. 20830/- pad	2 Weeks duration from 8.12.2010 to 21.12.2010

55	Trg(1) 1151/10 13/12/10	Training Programme on Culture of Ornamental Fishes & Aquarium Keeping	Communication Centre, Mannuthy	Dr.S.Etelinta, Professor, Communication Center, Mannuthy	Rs- 18000/- @ Rs.1500/-each, 1 batch 12 trainees	Rs. 18000/- -pad	4 days duration during Dec. 2010
56	Trg(1) 1209/10 13/12/10	Training Programme on Operation and Maintenance of Dairy Process Equipment	KAU, Dairy Plant, Mannuthy	Dr.P.Sudheer Babu, Associate Professor, KAU, Dairy Plant,	Rs. 13500/- for 27 trainees in 3 batches	Rs. 11250/- -pad	From 13.12.2010 to 15.12.2010
57	Trg(1) 834/10 14/12/10	Training Programme on Plant Tissue Culture Techniques	ARS, Mannuthy	Dr. C. Narayanan Kutty, Prof. (Hort.), ARS, Mannuthy	Rs.20000/- for 4 trainees in 3 batches	Rs. 8330/- -pad	30 working days duration during Dec. 2010 to Jun. 2011
58	Trg(1) 1292/10 7/1/11	Training Programme on Dairy Entrepreneurship Developments	Live Stock Research Station, Thiruvazhamkundu Palakkad	Dr.K. Anil Kumar, Asso. Professor & Head Live Stock Research Station, Thiruvazhamkundu	Rs.45000/- for 20 trainees in 1 batch	Rs. 37500/- -pad	5 days duration from 11.1.2011 to 15.1.2011
59	Trg(1) 1292/10(i) 7/1/11	Training Programme on Dairy Entrepreneurship Developments	Live Stock Research Station, Thiruvazhamkundu Palakkad	Dr.S.Biju, Asst.Professor	Rs.45000/- for 20 trainees in 1 batch	Rs. 37500/- -pad	5 days duration from 16.1.2011 to 20.1.2011
60	Trg(1) 1292/10(ii) 7/1/11	Training Programme on Dairy Entrepreneurship Developments	Live Stock Research Station, Thiruvazhamkundu Palakkad	Dr.R.S.Abhilash, Asst.Professor Live Stock Res. Station, Thiruvazhamkundu	Rs.45000/- for 20 trainees in 1 batch	Rs. 37500/- -pad	5 days duration from 21.1.2011 to 25.1.2011
61	Trg(1) 1292/10(iii) 7/1/11	Training Programme on Dairy Entrepreneurship Developments	Live Stock Research Station, Thiruvazhamkundu Palakkad	Dr.K.S.Ajith, Asst.Professor Live Stock Research Station, Thiruvazhamkundu	Rs.45000/- for 20 trainees in 1 batch	Rs. 37500/- -pad	5 days duration from 26.1.2011 to 30.1.2011
62	Trg(1) 1097/10 12/1/11	Training Programme on Cultivation Technology of Tropical Mushroom	Dept.of Plant Pathology, College of Agriculture, Vellayani	Dr.M.Suharban, Professor & Head, Dept. of Plant Pathology, COA, Vellayani	Rs.3300/- for 11 trainees in 1 batch	Rs.2750/- -place	2 days duration from 6th to 7th Aug.2010
63	Trg(1) 59/11 23/1/11	Training Programme on Total Agricultural Mechanisation	College Of Agriculture, Palakkad P.O, Kasaragod	Dr.U.Jaikumaran, Professor & Head, ARS, Mannuthy	Rs.150000/- for 20 trainees in 1 batch	Rs. 150000/- -pay	20 working days duration from 20.1.11 onwards
64	Trg(1) 1289/10 23/1/11	Training Programme on Techniques and Application of Microbiology	Cashew Research Station, Anakayam	Dr.P.Rajendran, Professor & Head, CRS	Rs.50000/- for 5 trainees in 1 batch	Rs. 40000/- -pay	2 months duration from 1.2.2011 to 31.3.2011
65	Trg(1) 59/11(i) 3/2/11	Training Programme on Total Agricultural Mechanisation	College Of Agriculture, Palakkad P.O, Kasaragod Dist.	Dr.U.Jaikumaran, Professor & Head, ARS, Mannuthy	Rs.450000/- for 20 trainees in 3 batches	Rs. 450000/- -pay	20 working days duration from 20.1.2011 onwards
66	Trg(1) 677/10 5/2/11	Training Programme on Preservation and Processing of fruits and Vegetables	Dept. of Home Science, College of Agriculture, Vellayani	Dr.Rani John, Asso.Professor, Dept. of Home Sci, College of Agri, Vellayani	Rs.13000/- for 15-20 trainees in 2 batches	Rs. 10750/- -place	5 working days duration during Feb 2011
67	Trg(1) 123/11(i) 10/2/11	Training Programme on Apiculture	Krishu Vigyan Kendra Kollam	Dr.Bindu Podikunju Asst. Professor, KVK, Kollam	Rs.11520/- for 25 trainees in 1 batch	Rs.9600/- -pay	6 working days duration during Feb - March 11
68	Trg(1) 123/11(ii) 10/2/11	Training Programme on Mushroom Cultivation	Krishu Vigyan Kendra Kollam	Dr.Bindu Podikunju Asst. Professor, KVK, Kollam	Rs.12720/- for 25 trainees in 1 batch	Rs. 10600/- -pay	6 working days duration during Feb - March 2011
69	Trg(1) 31/11 21/2/11	Training Programme on Quail Production and Management	CAS in Poultry Science, Mannuthy	Dr.P.A.Pectambar an Director, CAS in Poultry Sci, Mannuthy	Rs.7500/- @ Rs.500/- per head for 15 trainees in 2 batches	Rs. 4585/- -pay	2 working days duration during Jan - March 2011
70	Trg(1) 980/2010 3/3/11	Training Programme on Molecular Techniques in Microbiology	Dept. of Agriculture Microbiology, College of Hort. Vellankkara	Dr.D.Girija, Professor, Dept. of Agriculture Microbiology, COH, Vellankkara	Rs.30000/- for 6 trainees in 1 batch	Rs. 12500/- -pay	2 weeks duration from 31.1.2011 to 14.2.2011
71	Trg(1) 791/10 5/3/11	Training programme on Techniques & Application of Tissue culture	ORARS, Kayamkulam	Dr.M.R.Bindu, Asst.Prof, ORARS, Kayamkulam	Rs.25000/- for 65 trainees in 1 batch	Rs. 20000/- -place	From 10.3.2011 to 23.3.2011
72	Trg(1) 900/10 16/3/12	Training programme on Ornamental Fish culture	College of Fisheries, Panangad	Dr.T.V.Anna Mercy, Professor, College of Fish., Panangad	Rs.10800/- for 25 trainees in 2 batches	Rs. 9000/- -pay	From 21.3.2011 to 25.3.2011

Stipendiary Training Programme						
Sl No.	Order No. & date	Name of Training Programme	Venue	Course Director	Fee Details	Period of Training
1	Trg(1)301/10-16/4/10	Training on Meat Plant Operation and Maintenance	Meat Technology Unit, Mannuthy.	Dr. P. Kuttinarayanan, Professor & Head	Rs. 43,200/-	1 Year Duration 2010-11
2	Trg(1)300/10-16/4/10	Training on Meat Processing Cum Plant Operation	Meat Technology Unit, Mannuthy.	Dr. P. Kuttinarayanan, Professor & Head	RS.75,600/-	2 Year Duration 2010-11,12
3	Trg(1)176/10-4/5/10	Training on Wholesome Meat Production & Meat Processing Tech.	Meat Technology Unit, Mannuthy.	Dr. P. Kuttinarayanan, Professor & Head	Rs.86,400/-	1 Year Duration 2010-11
4	Trg(1)668/10-3/7/10	Training Programme on Hatchery Mgt	Centre for Advanced Studies in Poultry Science, Mannuthy	Dr. P. Amitha, Associate Professor	Rs. 1,20,000/-	1 Year Duration from August 2010 to July 2011
5	Trg(1)219/10-17/7/10	Training Programme on Veterinary Laboratory Techniques Pharmacy & Nursing	University Veterinary Hospital, Kakkal, Thrissur.	Dr. M. K. Narayanan, Assistant Professor (SS)	Rs.60,000/- in 2 batches for 5 candidates	6 Months Duration from May - November 2010.
6	Trg(1)977/10-30/10/10	Training Programme on Operation, Maintenance and Servicing of Farm Machinery (FSA-Master Trainers)	ARS, Mannuthy	Dr. U Jaikumar, Professor & Head, ARS, Mannuthy	Rs.4,91,000/-	6 months duration, from November 2010-May 2011

In-Service Training Programme							
Sl No	Order No. & date	Name of Training Programme	Venue	Course Director	Fee Details	Actual expn.	Period of Training
1	Trg(1) 524/10 21/10/10	Training Programme on Precision Farming and Protected Cultivation	KCAET, Tavanur	Dr. E. K. Mathew, Prof. & PI, PFDC, Head KCAET, Tavanur & Dr. Lalaja. S. Menon, Asst. Prof., PFDC, KCAET	Rs.40800/- @ Rs.10200/- 4 batch of 30 trainees per batch	Rs.34,000/- place	2 Working days during Dec.2010 to Jan.2011
2	Trg(1) 472/10 3/11/10	Training Programme on Current concepts in Therapeutic Mgt. Prevention & Control of Mastitis	Dept. of Vety. Epidemiology & Preventive Medicine, CoVAS, Mannuthy	Dr. K. Vijayakumar, Assoc. Professor	Rs.24,000/- 2 batch for 10 trainees per batch	Rs.20,000/- pad	3 Days duration:- 1 st batch: 8.11.10 to 10.11.10 2 nd batch: 13.12.10 to 15.12.10
3	Trg(1) 218/10 6/11/10	Advanced Training on Anaesthesia, Monitoring and Operation Theatre Management	University Vety. Hospital	Dr. M.K.Narayanan, Asst. Professor (S.S)	Rs.64,320/- @ Rs.32,160/- 2batch of 6 trainees per batch	Rs.26,800/- pay	5 Working Days duration from Oct 10 to
4	Trg(1)5 54/09 16/11/10	Training Programme on Unit Operation in Milk Processing	KAU Dairy Plant, Mannuthy	Dr. C. T. Sathian, Professor & Head,	Rs. 6600/- in 1 batch	Rs.5500/- pad	12 working days from 18-11-10 to 2-12-10
5	Trg(1)6 10/10 20/11/10	Recent Advances in Diagnosis Control & Prevention of Infectious & Contagious Diseases	COVAS, Pookot, Wayanad	Dr. Sanis Juliet, Asst Professor & Head	Rs. 6,00,012/- @ Rs. 2,00,004/- in 3 batches for 20 trainees	Rs.1,66,670/- pad	18-11-2010 to 26-11-2010
6	Trg(1)6 10/10 13/12/10	Recent Advances in Diagnosis Control & Prevention of Infectious & Contagious Diseases	COVAS, Pookot, Wayanad	Dr. Sanis Juliet, Asst Professor & Head	Rs. 6,00,012/- @ Rs. 2,00,004/- in 3 batches for 20 trainees	Rs.1,66,670/- pad	18-11-2010 to 26-11-2010
7	Trg(1)4 73/10 23/11/10	Training on Advances in Small Animal Practices	Dept. of Clinical Vet Medicine, CV & AS, Mannuthy	Dr. N. Madhavanunni, Asst. Prof.	Rs.17,700/- in 1batch for 10 trainees	Rs.14,750/- pad	29-11-2010 to 3-12-2010
8	Trg(1)1 141/10 23/11/10	Training on Ideal Vaccination Techniques	COVAS, Pookot, Wayanad	Dr. Sanis Juliet, Asst Professor & Head	Rs. 7,00,020/- @ Rs. 1,40,000/- in 5 batches for 20 trainees	Rs.1,16,670/- pad	4 working days during 10-11
9	Trg(1)1 012/10 23/11/10	Training Programme on PCR and Related Techniques	COVAS, Pookot, Wayanad	Dr. Raghu Raveendran, Asst. Prof. & Head	Rs.57,000/- in 1batch for 4 trainees	Rs.47,500/- pad	15 working days during Dec.10-Jan 11
10	Trg(1)1 141/10 27/12/10	Training Programme on Ideal Vaccination Techniques	COVAS, Pookot, Wayanad	Dr. Sanis Juliet, Asst Professor & Head	Rs. 7,00,020/- @ Rs. 1,40,000/- in 5 batches for 20 trainees	Rs.1,16,670/- pad	4 working days during from 3-1-11 to 6-1-11
11	Trg(1)2 18/10 12/1/11	Training Programme on Advanced Training on Anaesthesia, Monitoring and Operation Theatre Mgt	University Vety. Hospital, Kakkal	Dr M K Narayanan, Assistant Professor, University Vety Hospital, Kakkal	Rs. 64320/- @ Rs.32160/- in 2 batches for 6 trainees	Rs.26800/- pad	5 days during from Oct.2010 to Dec. 2010
12	Trg(1)1 141/10 27/1/11	Training Programme on Ideal Vaccination Techniques	COVAS, Pookot, Wayanad	Dr Sanis Juliet, Assistant Professor & Head, COVAS, Pookot	Rs. 700020/- @ Rs.140004/- in 5 batches for 20 trainees	Rs.116670/- pay	4 working days duration during 10 to 11
13	Trg(1)1 141/10 7/2/11	Training Programme on Ideal Vaccination Techniques	COVAS, Pookot, Wayanad	Dr Sanis Juliet, Assistant Professor & Head, COVAS, Pookot	Rs. 700020/- @ Rs.140004/- in 5 batches for 20 trainees	Rs.116670/- pay	5 working days duration during 10 to 11

Sl. No.	Order No. & date	Name of Training Programme	Venue	Course Director	Fee Details	Actual Expenditure	Sponsoring Agency	Period of Training
1	Trg(1)17 2/10 29/4/10	Training Programme on Horticulture Extension Management	Hotel Elite International, Thrissur, Sponsored by MANAGE, Hyderabad	Dr. Joy Mathew Professor & Head and Dr. Alexander George Professor CTI, Mannuthy	Rs. 1,41,000/- 2 batches for 30 trainees		MANAGE, Hyderabad	5 Days during 26-30 April 2010 & 11-15 May 2010
2	Trg(1)66 6/10 1/7/10	Training Programme on Preparation and operationisation Comprehensive District Agricultural Plan (C-DAP)	Hotel Elite International, Thrissur, Sponsored by MANAGE, Hyderabad	Dr. Joy Mathew Professor & Head and Dr. Alexander George Professor CTI, Mannuthy			National Institute of Agriculture Extension & Management (MANAGE), Hyderabad	5 Days during 5-9 July 2010

International Training Programme

Sl. No.	Order No. & date	Name of Training Programme	Venue	Course Director	Fee Details	Actual Expenditure	Sponsoring Agency	Period of Training
1	Trg(1) 1224/10	Interactive Internalisation Experience & Study Visit	CTI, Mannuthy	Dr. Joy Mathew & Dr. Alexander George	Rs. 807180/-	Rs. 807180/-	The office of the Sabaragamuwa Provincial Council Government Of Sri Lanka	Duration from 27th January to 2nd February 2011

Sponsored Training Programme

Sl. No.	Order No. & date	Name of Training Programme	Venue	Course Director	Fee Details	Actual Expenditure	Sponsoring Agency	Period of Training
1	Trg(1)2 5/10 20/4/10	Training Programme on Production of Tissue Culture Plants (Banana)	Dept. of Plant Bio-technology, College of Agriculture, Vellayani	Dr. K. B. Soni, Associate Prof.	Rs. 30,000/- 2 batches for 25 trainees	Rs. 25,000/- place	Kudumbasree, TVPM	2 Weeks from 1/2/2010
2	Trg(1)2 08/10 6/4/10	Training Programme on Ornamental Fish Culture	Dept. of Fishing Biology, College of Fisheries, Panangal	Dr. T. V. Anna Mercy Professor	Rs. 1,26,900/- 2 batches @ Rs. 63450/- per batch	Rs. 1,05,750/- pay	The Marine Product Export Development Authority, Kochi	5 Days during April 2010
3	Trg(1)4 9/6/10 17/5/10	Training Programme on Soil Sample Collection Using GPS and Soil Processing	Rice Research Station, Mancompu	Dr. Annie Koruth, Associate Professor	Rs. 30,000/- 2 batches for 60 trainees	Rs. 30,000/- place	Department of Agriculture	2 batch One day Duration 17 & 18 May 2010
4	Trg(1)5 18/10 18/5/10	Training to district Co-ordinator of National Mission on Medical Plants	AMPRS, Odakkali	Dr. Baby Sakria, Professor & Head	Rs. 35,000/- 1 batch for 14 trainees		Horticulture Mission, Kerala	5 Days Duration 18 - 22 May 2010
5	Trg(1)1 9/1/10 7/7/10	Training Programme on Quality Seed Production	Rice Research Station, Moncompu	Dr. S. Leena Kumari, Associate Professor	Rs. 24,000/- 1 batch for 30 trainees	Rs. 20,000/- place	RKVY Project	2 Days duration During July - August 2010
6	Trg(1)1 07/4/10 27/7/10	Training Programme on Development of Value Added Products based on Mushroom	College of Agriculture, Vellayani	Dr. S. Chellammal, Professor	Rs. 54,000/- in 2 batches for 25 trainees	Rs. 45,000/- place	SHM	6 Days duration during July - September 2010
7	Trg(1)6 24/10 2/8/10	Training Programme on Commercial Production of Orchids	Dept. of Pomology and Floriculture, College of Horticulture, Vellanikkara	Dr. P.K. Rajeevan, Professor & Head, Dept. of Pomology & Floriculture	Rs. 17,100/- in 1 batches for 3 trainees	Rs. 14,250/- pay	National Research Centre for Orchids, Pakyong, Sikkim	5 Holidays Duration During July-August 2010
8	Trg(1)9 5/1/10(i) 1/10/10	Training Programme on On the Job Training in Nursery Management and	College of Agriculture, Vellayani	Dr. G. Sobhana & Dr. G. S. Sreedaya, Assistant Professor	Rs. 23,400/- 3 batches for 28 trainees @ 7800/- per batch	Rs. 19,500/- place	1 st batch - The Principal, GVHSS, Kulathur 2 nd batch - The Principal, VHSS for Girls, Thiruvallam	4-10-2010 to 20-10-2010 1-11-2010 to 15-11-2010

		Ornamental Gardening						3 rd batch:- The Principal GVHSS, Veerankavu	1-12-2010 to 15-12-2010
9	Trgt 179 51/10 1/10/10	Training Programme on On the Job Training in Plant Protection	College of Agriculture, Vellayani	Dr. C. Nandakumar, Professor, Agri. Entomology	Rs. 15,600/- 2 batches for 28 trainees @ Rs. 7800/- per batch	Rs. 13,000/- place		1 st batch:- The Principal, GVHSS, Kulathur	4-10-2010 to 20-10-2010
10	Trg (1)1017/10 20/10/10	Training Programme on Integrated Pest and Disease Management	Rice Research Station, Moncompu	Dr. Reeny Mary Zacharia, Asst. Prof.	Rs. 27,840/- 1 batch for 20 trainees	Rs. 23,200/- place		2 nd batch:- The Principal GVHSS, Veerankavu	1-12-2010 to 15-12-2010
11	Trgt 115 23/10 21/10/10	Training Programme on Protected Cultivation & Water Management	Various districts or at KCAET, Tavanur	Dr. E. K. Mathew, Professor & PI, PFDC, Head Dept. of Irrigation & Drainage Engineering, KCAET, Tavanur & Dr. Anu Varghese, Asst. Prof., PFDC, KCAET, Tavanur	Rs. 98,160/- 4 batches for 30 trainees @ Rs. 24,540/- per batch	Rs. 81,800/- place		National Committee on Plasticulture Applications in Horticulture (NCPAII), New Delhi the funding agency of Precision Farming Development Centre (PFDC)	2 Working days during May-July 2011
12	Trgt 11 951/100 11- 21/10/10	Training Programme On the Job Training in Plant Protection	College of Agriculture, Vellayani	Dr. C. Nandakumar, Prof. of Agri. Entomology	Rs. 5,400/- 1 batch for 28 trainees	Rs. 4,500 place		The Principal GVHSS, Parassala	9 working days from 18-27 Nov-ember 2010
13	Trgt 11 951/100 11- 21/10/10	Training Programme on On the Job Training in Nursery Management and Ornamental Gardening	College of Agriculture, Vellayani	Dr. G. Sobhana, Prof. & Head & Dr. G. S. Sreedaya, Assistant Professor	Rs. 5,400/- in 1 batch for 28 trainees	Rs. 4,500 place		The Principal GVHSS, Parassala	9 working days from 18-27 November 2010
14	Trgt 11 951/100 11- 21/10/10	Training Programme on On the Job Training in Fruits & Vegetables	College of Agriculture, Vellayani	Dr. G. Sobhana, Prof. & Head, TSS, Vellayani & Dr. M. Abdul Wahab, Prof. & Head, Dept. of Olericulture, Vellayani	Rs. 5,400/- in 1 batch for 28 trainees	Rs. 4,500 place		The Principal GVHSS, Parassala	9 working days from 18-27 November 2010
15	Trgt 11 522/10 - 27/10/10	Training Programme on Precision Farming in Horticulture Crops	KCAET, Tavanur	Dr. E. K. Mathew, Prof. & PI, PFDC, Head KCAET, Tavanur & Dr. Jalaja S. Menon, Asst. Prof., PFDC, KCAET, Tavanur	Rs. 1,47,240/- @ Rs. 24,540 6 batches for 30 trainees per trainees	Rs. 1,22,700/- placed		National Committee on Plasticulture Applications in Horticulture (NCPAII), New Delhi the funding agency of Precision Farming Development Centre (PFDC)	2 Working days during November 2010 January 2011
16	Trgt 11 480/10 - 2/11/10	Training Programme on Knowledge Support Sources for the IFSM	CTI, Mannuthy	Dr. Joy Mathew Professor & Head and Dr. Alexander George Professor CTI, Mannuthy	Rs. 7,00,000/- 1 batch	Rs. 5,83,000/- paid		TERI, Trivandrum	During 2010-11
17	Trgt 11 1076/10 2/11/10	Training Programme on On the Job Training	RVK, Kollam	Dr. Geetha Lekshmi P.R. Assistant Professor	Rs. 2,000/- 1 batch for 27 trainees	Rs. 1600/- paid		The Principal DVVHSF, Thalavoor	13 Days duration November 2010

18	Trg(1)8 97/10 (i) 3/11/10	Training Programme on Operation & Maintenance of Agro-Chemical Equipments	RRS, Moncompu	Dr. Manoj Mathew, Asst. Prof.	Rs. 59,460/- 2 batches for 15 trainees	Rs. 24,775/- place	Kuttanad Package	2 Days duration 2 nd week of Nov 2010 & 2 nd week of Jan 2011
19	Trg(1) 897/100 (i) - 3/11/10	Training Programme on Operation & Maintenance of Self Propelled Rice Transplanter & Direct Seeder	RRS, Moncompu	Dr. Manoj Mathew, Asst. Prof.	Rs. 37,380/- 2 batches for 15 trainees	Rs. 15,575/- place	Kuttanad Package	2 Days duration 3 rd week of Dec 2010 & 2 nd week of Jan 2011
20	Trg(1) 1124/10 23/11/10	Field Training for VHSE Students	RARS, Pilicode	Dr. Meera Manjusha A.V., Asst. Professor	Rs. 4020/- 1 batch for 48 trainees	Rs. 3350/- place	Govt. VHSS, Trichanipur	13 working days from 15-11-2010 to 30-11-2010
21	Trg(1) 1124/10 (i) 23/11/10	Field Training for VHSE Students	RARS, Pilicode	Dr. Sashikanti, Assoc. Professor	Rs. 4800/- 1 batch	Rs. 4000/- place	AKASGVHSS, Poyyannur	13 working days from 15-11-2010 to 30-11-2010
22	Trg(1) 1217/10 6/12/10	Training Programme on Reaper Cum Binder	Vallemchery	Dr. Jayan P.R., Associate Professor & Head, Dept. of IPME, Tavanur	Rs. 7150/- 1 batch for 10 trainees	Rs. 6500/- place	DIFM project of KCAET, Tavanur	2 Days duration 2 nd & 3 rd of Dec. 2010
23	Trg(1) 1124/10 5/12/10	Training Programme on Field Training For VHSE Students	RARS, Pilicode	Dr. Meera Manjusha A.V., Assistant Professor, RARS, Pilicode	Rs. 4020/- 1 batch for 27 trainees	Rs. 3350/- place	The Principal Higher Secondary School, Kallekottu kavu, Trichanipur	13 Days duration from 1.12.2010 to 16.12.2010
24	Trg(1) 1247/10 20/12/10	Training Programme on Freshwater Prawn Culture	College of Fisheries, Panangad	Dr. K.R. Salim, Assistant Professor (SS), Dept. of Agriculture, College of Fisheries, Panangad	Rs. 124740/- 1 batch for 21 trainees	Rs. 103950/- place	National Fisheries Development Board, Hyderabad	7 Days duration from 15 - 21 Dec 2010
25	Trg(1) 1273/10 21/12/10	Training Programme on the Job Training for VHSE Students	KVK, Sadanandapuram, Kollam	Dr. Bindu Podikunju, Assistant Professor, KVK, Kollam	Rs. 1000/- 1 batch for 23 trainees	Rs. 800/- pad	The Principal DVVHSE, Mylom	13 Days duration during Dec. 2010 to Jan. 2011
26	Trg(1) 1124/10 29/12/10	Training Programme on the Job Training for VHSE Students	RARS, Pilicode	Dr. Shashikanti, Associate Professor	Rs. 3900/- 1 batch for 24 trainees	Rs. 3250/- place	The Principal GVHHS, Irrayani, Kasarogud	10 Days duration from 3.1.2011 to 13.1.2011
27	Trg(1) 1289/10 30/12/10	Training Programme on Techniques & Applications of Plant Tissue Culture	CRS, Anakkayan	Dr. P. Rajendra n., Professor & Head	Rs. 20000/- 1 batch for 2 trainees	Rs. 16000/- pad		2 months duration from 1.1.2011 to 28.2.2011
28	Trg(1) 1057/10 17/1/11	Training Programme on Orientation Training for Newly Recruited Asst Professor of KAU	Central Training Institute, Mannuthy	Dr. Alexander George	Rs. 59050/- 20 trainees per batch	Rs. 59050/- pay	KAU, Mannuthy	6 Working days duration during 2010- 2011
29	Trg(1) 1316/10 21/1/11	Training Programme on Ornamental Fish Culture	College of Fisheries, Panangad	Dr. T.V. Anna Mercy, Prof, College of Fish, Panangad	Rs. 132300/- 1 batch for 25 trainees	Rs. 110250/- pad	Under NAIP Project, RARS, Ambalavayal, Wayanad	Duration during from 24.1.2011 to 28.1.2011
30	Trg(1) 48/11(i) 23/1/11	Training Programme on Operation and Maintenance of Power Tillers	Farming System Research Station, Sadanandapuram	Dr. Bini Sam, Associate Professor (Farm Machinery) FSRS, Sadanandapuram	Rs. 23580/- 3 batch for 10 trainees @ Rs. 7860/- per batch	Rs. 19650/- place	Under Paddy Mission V (RKVY)	Duration during Feb. 2011 to May 2011

31	Trg(1) 48/11 23/1/11	Training Programme on Operation of Coconut Tree Climbing Device and Brush Cutter	Farming System Research Station, Sadamandapuram	Dr Bini Sam, Associate Professor (Farm Machinery) PSRS, Sadamandapuram	Rs.24900/-5 batch for 10 trainees @ Rs.4980/- per batch	Rs.20750/- place	Under Paddy Mission V (RKVY)	Duration during Feb.2011 to May 2011
32	Trg(1) 956/10 23/1/11	Training Programme on Cashew Production Technology	Cashew Research Station, Madakkathara, Thrissur	Dr.Jose Mathew, Professor & Head and Dr. Gavas Ragesh, Asst. Professor, CRS, Madakkathara	Rs.127500/- 1 batch for 50 trainees	Rs.106200/- place	Directorate of Cashew and Coco Dept., Kera Bhavan, Kochi	3 working days Duration during Jan.2011 to Feb. 2011
33	Trg(1) 55/11 2/2/11	Training Programme on Soil Health Management and Integrated Nutrient Management	Rice Research Station, Moncompu, Alappuzha	Dr.Reena Mathew, Associate Professor, and Smt.Nummy Jose, Assistant Professor, RRS, Moncompu	Rs.10680/- 1 batch for 20 trainees	Rs.8900/- place	Under Kuttanadu Package	1 day Duration during last week of Jan.2011
34	Trg(1) 55/11(1) 2/2/11	Training Programme on Quality Seed Production	Rice Research Station, Moncompu, Alappuzha	Dr.R.Devika, Associate Professor, and Dr.S.Leenakumary, Professor & Head, RRS, Moncompu	Rs.9600/- 1 batch for 20 trainees	Rs.8000/- place	Under Kuttanadu Package	1 day Duration during first week of Feb. 2011
35	Trg(1) 55/11(1a) 2/2/11	Training Programme on Mass Multiplication of Biocontrol Agents	Rice Research Station, Moncompu, Alappuzha	Sri.M.Surendran, Assistant Professor, and Dr.Reeny Mary Zacharia, Assistant Professor, RRS, Moncompu	Rs.14520/- 1 batch for 20 trainees	Rs.12100/- place	Under Kuttanadu Package	1 day Duration during first week of Feb. 2011
36	Trg(1) 74/11 3/2/11	Training Programme on Farm Mechanisation	Kelappan, College of Agricultural Engineering & Technology, Tavanur	Er.Sindhu Bhaskar, Assistant Professor, KCATE, Tavanur	Rs.30000/- 1 batch for 10 trainees	Rs.25000/- pay	Under ATMA Project, By Agricultural Officer, Krishi Bhavan, Velom, Poolakkool, Kozhikode	7 working days Duration from 21.2.2011 to 27.2.2011
37	Trg(1) 97/11 5/2/11	Training Programme on Achiever Farmers on Agriculture and Allied Areas	Communication Centre, Mannuthy	Dr.S.Estelitta, Professor, and Dr.Jyothi Bhaskar, Associate Professor, Communication Centre, Mannuthy	Rs.8300/- 1 batch for 1 trainees	Rs.6640/- pay	Under ATMA Scheme, by Assistant Director of Agriculture, Koyilandy	19 working days Duration from 20th Jan.2011 onwards
38	Trg(1) 100/11 8/2/12	Training Programme on Ornamental Fish Culture	College of Fisheries, Panangad	Dr.T.V.Anna Mercy, Professor, College of Fisheries, Panangad	Rs.150000/- 1 batch for 20 trainees	Rs.104175/- pay	Under NFDB, Hyderabad	7 working days Duration from 7.2.2011 to 13.2.2011
39	Trg(1) 557/10 18/2/11	Training Programme on Production and Marketing of farm - fresh Milk	Department of Dairy Science, COVAS, Mannuthy	Dr.R.Geetha, Assistant Professor, Dept. of Dairy Science, COVAS, Mannuthy	Rs.27600/- 1 batch for 20 trainees	Rs.23000/- pay	Under Rural Development Block	5 working days Duration from 21 st to 25 th Feb 2011
40	Trg(1) 125/11 11/2/11	Training Programme on Total Agricultural Mechanisation	ARS, Mannuthy	Dr.Shyla Joseph, Assistant Professor, ARS, Mannuthy	Rs.120000/- for 20 trainees in 1 batch	Rs.100000/- pay	Under Sponsorship Agricultural Officer, Krishi Bhavan, Venkitangu	20 working days duration from 7.2.2011 to 27.2.2011
41	Trg(1) 98/11 18/2/11	Training Programme on Mechanized Paddy Transplanting	ARS, Mannuthy	Dr.Shyla Joseph, Assistant Professor, ARS, Mannuthy	Rs.88000/- for 22 trainees in 2 batches	Rs.146500/- pay	Under Sponsorship Assistant Director of Agriculture, Anthikkal	15 working days duration from 15.2.2011 to 2.3.2011

42	Trg(1) 132/11 22/2/11	Training Programme on Bed Farmer at Kaipad Area	KCAET, Tavanur	Dr. Jayan P.R., Asst. Prof. & Head, Dept. of FPME, Project Dir. (DIFM), KCAET, Tavanur	Rs. 34650/- for 16 trainees in 5 batches	Rs. 31500/- place	Under the project, Development of Innovative Farm Mechanization Package for Kerala	5 working days duration from: 26.3.2011 to 30.3.2011
43	Trg(1) 192/11 3/3/11	Training Programme on Total Farm Mechanisation	ARS, Mannuthy	Suma Nair, Assistant Professor, ARS Mannuthy	Rs. 240000/- for 50 trainees in 1 batch	Rs. 200000/- place	Under the RKVY Paddy Mission Project	20 working days duration from 7.3.2011 onwards
44	Trg(1) 170/11 28/2/11	Training Programme on Micropropagation in Black Pepper	Centre for Plant Biotechnology and Molecular Biology, COH, KAU, Vellanikara	Dr. P.A. Nazem, Prof. & Head, CPBMH, COH, Vellanikara	Rs. 12000/- for 1 trainee in 1 batch	Rs. 10000/- pay	Under sponsorship of Harrisons Malayalam Limited, Idukki	From 28.2.2011 to 11.3.2011
45	Trg(1) 193/11 3/3/11	Training Programme on Food Security Army Coconut Crown Force (FSA - CCF)	ARS, Mannuthy	Dr. U. Jaikumar an, Professor & Head, ARS, Mannuthy	Rs. 65100/- for 20 trainees in 1 batch	Rs. 54250/- place	Under the RKVY Project	6 working days duration during 1 st week of March 2011
46	Trg(1) 206/11 4/3/11	Training Programme on Food Security Army Green Cadet Corps (FSA - GCC)	ARS, Mannuthy	Dr. U. Jaikumar an, Professor & Head, ARS, Mannuthy	Rs. 247200/- for 20 trainees in 1 batch	Rs. 200000/- place	Under the RKVY Project, FSA Service Centre Development Programme, Kerala	50 Saturdays during April 2011 to May 2011
47	Trg(1) 237/11 11/3/11	Training Programme on Total Agricultural Mechanisation	ARS, Mannuthy	Dr. U. Jaikumar an, Professor & Head, ARS, Mannuthy	Rs. 450000/- for 20 trainees in 3 batches @ Rs. 125000/- per batch	Rs. 375000/- place	Under the RKVY Project, FSA Service Centre Development Programme, Kerala	20 working days Duration from 8.3.2011 to 27.3.2011
48	Trg(1) 236/11 11/3/11	Training Programme on Total Agricultural Mechanisation	ARS, Mannuthy	Dr. U. Jaikumar an, Professor & Head, ARS, Mannuthy	Rs. 150000/- for 20 trainees in 1 batch	Rs. 125000/- place	Under the RKVY Project, FSA Service Centre Development Programme, Kerala	20 working days Duration from 5.3.2011 to 25.3.2011
49	Trg(1) 256/11 16/3/11	Training Programme on Ornamental Fish Culture	Department of Fishery Biology, College of Fisheries, Parangad	Dr. T.V. Anna Mercy, Professor, Coll ege of Fisheries, Parangad	Rs. 21450/- for 15 trainees in 1 batch	Rs. 17875/- pad	Under ATMA Scheme, by Deputy Director of Fisheries, Patturakkal P.O., Thirissur	3 Days duration from 17.3.2011 to 19.3.2011
50	Trg(1) 164/11 9/3/11	Training Programme on Fruits and Vegetable Processing	Department of Processing Technology, COH, KAU Thirissur	Dr. K.B. Sheela, Pro., Dept of Processing Technology, COH, KAU Thirissur	Rs. 15000/- for 10 trainees in 1 batch	Rs. 12500/- pay	Under ATMA Project, by Agricultural Officer, Krishi Bhavan, Kamur	3 working days Duration from 17.3.2011 to 19.3.2011
51	Trg(1) 244/11 16/3/11	Training Programme on Training for KVK Staff of KAU	CTI, Mannuthy	Dr. Joy Mathew & Dr. Alexandra George, Prof., CTI, Mannuthy	Rs. 100000/- for 20 trainees in 2 batches @ Rs. 50000/- per batch	Rs. 83332/- pay	Under ICAR Scheme - Strengthening of DOE 10-11	2 working days Duration from 22.3.2011 to 26.3.2011
52	Trg(1) 247/11 16/3/11	Training Programme on Organic Farming	Krishi Vigyan Kendra, Sadanandapuram, Kollam	Dr. Sheeba Rebecca Isaac, Associat e Professor and Dr. Ambily Paul, Asst Prof., KVK, Sadanandapura m, Kollam	Rs. 78000/- for 20 trainees in 2 batches @ Rs. 39000/- per batch	Rs. 62400/- pay	Under Sponsorship Principal Agricultural Officer, Kollam	5 days duration during March 2011
53	Trg(1) 247/11(i) 16/3/11	Training Programme on Organic Farming	Krishi Vigyan Kendra, Sadanandapuram, Kollam	Dr. Sheeba Rebecca Isaac, Ass. Prof. and Dr. Geetha Lekshmi, P.R., Asst Prof., KVK, Sadanandapur Kollam	Rs. 52000/- for 20 trainees in 4 batches @ Rs. 13000/- per batch	Rs. 41600/- pay	Under Sponsorship Principal Agricultural Officer, Kollam	2 days duration during March 2011
54	Trg(1) 722/10 11/3/11	Training Programme on Total Paddy Mechanization	ARS, Mannuthy	Dr. U. Jaikumar an, Professor & Head, ARS, Mannuthy	Rs. 10000/- for 2 trainees in 1 batch	Rs. 8450/- reimburse	Under Sponsorship by Agricultural Officer, Mulantholathery avu	20 working days Duration from 16/7/2010 to 11/8/2010

55	Trgt 1) 28/11 22/3/11	Training Programme on Operation of Paddy Combine Harvester	ARS, Mannuthy	Suma Nair, Assistant Professor, ARS Mannuthy	Rs. 150000/- for 10 trainees in 1 batch	Rs. 125000/- place	Under Sponsorship by RKVY Paddy Mission Project	20 working days Duration from 22.3.2011 onwards
56	Trgt 1) 21/6/11 30/3/11	Training Programme on Organic Farming	PRS, Panniyar, Kannur	Dr. P.Jayaraj Assistant Professor, PRS, Panniyar, Kannur	Rs. 52000/- for 20 trainees in 4 batches	Rs. 44000/- pad	The Principal Agricultural officer, Kannur	2 days Duration during April-May 2011
57	Trgt 1) 21/6/11 30/3/11	Training Programme on Organic Input Production and Quality Control	PRS, Panniyar, Kannur	Dr. P.Jayaraj Assistant Professor, PRS, Panniyar, Kannur	Rs. 51000/- for 20 trainees in 1 batch	Rs. 42500/- pad	The Principal Agricultural officer, Kannur	10 days Duration during April-May 2011
58	Trgt 1) 21/6/11 30/3/11	Training Programme on Organic Farming and Quality Control	PRS, Panniyar, Kannur	Dr. P.Jayaraj Assistant Professor, PRS, Panniyar, Kannur	Rs. 39000/- for 20 trainees in 1 batch	Rs. 32500/- pad	The Principal Agricultural officer, Kannur	5 days Duration during April-May 2011

Radio talks/TV programmes/Audio, Video Cassettes

Topic	Date	Name of Scientist	Channel
Kettariyuka Noorumenikku		Dr. Joy Mathew	AIR, Trichur

List of Publications

Scientific Paper: Bino P. Boney and Joy Mathew, 2010, Farm Transition Network (FTN) – A Participator Approach to Reinvent University Agricultural Extension in India, Journal of Social Science 23(3): 171-178.

Finance

Head	Expenditure (Rs.)	Receipts (Rs.)
Non-Plan	43,04,136-00	1,11,166 (Room Rent)
Plan	1,27,401-00	Nil
ICAR (Specify)	Nil	Nil
Other EAPs (Training))	59,05,028-00	62,05,507-00*
Revolving Fund	Nil	Nil

PUBLIC RELATIONS OFFICE, MANNUTHY

Head of Offices during the period:

Dr. T S Rajeev, Assistant Professor was holding the charge of Public Relations Officer from 01-04-2010 to 02.06.2010

Sri B. Ajithkumar, took over as Public Relations Officer from 02.06.2010.

1. 1313 press clippings pertaining to Kerala Agricultural University from various news papers were collected and forwarded to the office of Hon'ble Vice-Chancellor and Registrar, KAU.
2. 178 press releases on various research and development activities of the University were issued to various news papers during the period under report.
3. 103 advertisements received from various institutions of KAU have been published through the advertisement agency of KAU.

4. Media allegations against the university were promptly countered through corrective statements.
5. Extensive news coverage was arranged for various University functions.
6. Arranged publication of a special page on KAU in 'The Hindu' dated 15/09/2010.
7. KAU diary 2011 and KAU Calendar was published in November 2010.
8. Work on publishing a brochure on KAU and Comprehensive Telephone Directory is in progress.
9. KAU news letter was revived after a gap of 4 years and published in July 2010, October 2010 and February 2011. A supplement on ICAR Sports 2010 was also published.
10. The unit acted as a media resource centre by providing necessary information related to agriculture, research and development activities of the University to various print and electronic media

KRISHI VIGYAN KENDRA, THRISSUR

Extension Programmes

Highlights of extension activities

Farmers' field school & FLD in cool season vegetables

Recently, cultivation of cool season vegetables especially cabbage and cauliflower has gained momentum in Kerala. Cultivation of cabbage and cauliflower was initiated in farmers' fields by the KVK through its FLDs about three years back. The crops were introduced in small scale in the rural households in various parts of Thrissur district.

The FLDS conducted by KVK, Thrissur, during 2008 and 2009 in Mathilakam Block were very successful and attracted more farmers in the whole district for homestead cultivation. The FLD started with 10 farmers in 2008 created a great impact and during next year around 150 farmers started cultivation of cabbage & cauliflower in Mathilakam Block. Subsequently farmers were convinced to take up large scale cultivation of cabbage and cauliflower. During 2010-11, many women groups came forward for seedling production of cabbage & cauliflower for local supply. In Mathilakam Block alone, nearly 25000 seedlings of cabbage & cauliflower were produced and sold through women groups during 2010-11 extending the adoption of cultivation by around 750 farmers in Mathilakam Block. At the same time cultivation of cabbage & cauliflower spread to other areas in the District and in many locations, large scale cultivation was started.

During 2010-11, KVK Thrissur selected three women groups in Nadathara Panchayat for the conduct of FFS and FLD of cool season vegetables viz. cabbage & cauliflower. A total area of 0.2 ha was brought under cultivation by 25 women farmers. During cultivation, emphasis was given for organic manuring and bio control measures against pests & diseases. The intervention changed the pest management concepts of the farmers resulting in drastic reduction in the use of pesticides. The production of cabbage & cauliflower from the area was 5.1 tons. The women groups had sufficient marketing skill and with help of KVK they could sell their produce through reputed super markets of Thrissur. Unemployed rural woman could earn an amount of Rs. 4200/- within a short span of 70 days.

The FLDs & FFS on cool season vegetables which were effectively organized by KVK created tremendous impact among the farming community extending the area of cultivation and production of farm fresh, toxic free vegetables. Moreover they could get acquainted with the cultivation aspects of a new crop in the plains of Kerala. It also helped to improve their decision making capacity and marketing skills, stimulating local innovation for sustainable agriculture.

Production of quality vegetable seedlings for self sufficiency in vegetables among rural households of coastal districts

The steep rise in the price of vegetables has upset the food budget of rural households. Moreover, the high rate of residues in the vegetables has been causing considerable health problems in the district. This has prompted rural, peri-urban and even urban households to produce vegetables in space available around the house and even in terraces. The limited space vegetable gardens can accommodate only 5-10 seedlings of few essential vegetables. Generally the seeds are available in packets containing 50-1000 seeds and majority of the seeds are wasted. This will result not only in loss of money but also wastage of quality seeds produced with great effort and care in government and University farms.

The above situation prompted KVK, Thrissur to examine the feasibility of raising good quality seedlings in central locations and distributing seedlings at the correct time as per the requirement of the homesteads. In vegetables such as tomato, chilly, brinjal, cabbage, cauliflower and amaranthus the practice of sowing seeds in beds/trays and transplanting seedlings is being adopted. In bhindi and cucurbits seedlings raised in poly bags are planted as such in the field. The unavailability of seedlings during the planting season has deterred many housewives from cultivating vegetables. Moreover, damage of seedlings in the early stage due to ants, damping off etc is very common.

To overcome these problems, KVK, Thrissur decided to conduct a FLD on vegetable seedlings at Mathilakam Panchayat in the coastal area of Thrissur district. Two women groups, Thanal and Mathilakam Agri Club, voluntarily came forward to participate and popularize the programme. The Assistant Director of Agriculture, Mathilakam Block offered all assistance in the implementation. KVK, Thrissur provided infrastructure support in the form of UV stabilized polythene sheets for rain shelter, Pro-trays and inputs for raising seedlings such as coirpith compost, vermiconpost, pseudomonas, etc. Good quality seeds of HYV's of vegetables suitable for each season were also supplied from KVK for the FLD. Seedlings of tomato, chilly, brinjal, amaranthus, cabbage, cauliflower, drumstick and bhindi were supplied during appropriate season of the year.

About 20000 seedlings of different vegetables were distributed among the coastal panchayats of the district by the farmers clubs. More than 70% of the seedlings produced were of cool season vegetables, which were accepted by the rural housewives with great enthusiasm. The scientists of KVK inspected the nursery at every stage, right from the construction of rain shelter, preparation of pro-trays and care and management of seedlings.

Trainings were organized at the above centres in which many farmers participated. The trainings included technical aspects for construction of low cost rain shelters with locally available materials; use of UV stabilized sheets and technology for production of cool season vegetable seedlings which was literally unheard and unknown in the locality. The rural women were trained to fill pro-trays with perlite vermiculite mixture and transplanted the seedlings at the correct stage.

The intervention of KVK, helped to popularize the following technologies in Mathilakam and nearby panchayats

- Construction of low cost rain shelters
- preparation of pro-trays and raising seedlings of cool season vegetables
- seasonal selection of vegetables adapted to the locality
- nursery management practices for all vegetables

Studies conducted in the target areas at the end of the season had shown that the intervention of KVK has helped to considerably boost the production of vegetables in homesteads in the coastal panchayats. The women folk were highly satisfied in the availability of fresh vegetables free from pesticides in the household. Since all households did not cultivate all crops, there was considerable exchange of produce among housewives which helped to establish better contacts and co-operation among the people. This also resulted in less dependence on local market of vegetables.

Fodder development for sustainability of livestock farming in Thrissur district

High cost of labour, sharp rise in cost of feeds and non-remunerative pricing of milk had caused a serious crisis in dairy farming in the district. The number of dairy farmers was steadily decreasing in the district, resulting in acute shortage of milk especially during summer months.

House-to-house surveys were organized under the RKVY Project on fodder being implemented at KVK-Thrissur. Results of the survey reveal that more than 70-80% of the total income of the dairy farmer was spent on feeds during major part of the year. The monsoon period encourages growth of grass and the cattle could survive on that. Only 10% of dairy farmers could meet their fodder requirement from cultivated fodder. More than 50% of farmers had at least 0.04 ha, which could be brought under appropriate fodder crops. It was also learnt during the survey that knowledge about the prospect of cultivating fodder and fodder grasses for different agro climatic situations, propagation and management practices were very limited among the farmers in all the 12 Panchayats surveyed. Lack of availability of planting materials during the seasons in the locality was also a felt problem.

In the above context, the following strategy was adopted for popularization of fodder cultivation:

- Training in fodder production and scientific feeding management to dairy farmers and extension functionaries of line departments.
- Large scale multiplication and distribution of planting materials of fodder grasses and trees.
- Conduct of FLDs and OFTs in progressive farmers fields.
- Establishing model dairy unit, fodder gene bank and fodder production units at KVK.

About 12 No. of trainings were organized in Pazhayannur, Nadathara, Vellangallur, Velookkara, Irinjalakuda, Puthanchira, Mala and Padiyoor Panchayats in which more than 500 farmers participated. Literature on scientific fodder cultivation and planting materials were distributed to all progressive farmers who attended the trainings.

The following FLDs and OFTs were conducted to test the adaptability of new high yielding fodder grasses and trees and popularization of the seeds:

1. Popularisation of Hybrid napier variety 'Sampoorna'
2. Popularisation of Agathi for small ruminants
3. On farm production of organic manure in coconut gardens

The demonstrations were conducted in Nadathara, Vellangallur, Velookkara, Irinjalakuda and Pazhayannur Panchayats. More than 300 farmers in Vellangallur, Ollukkara, Irinjalakuda and Pazhayannur blocks have taken up cultivation of Hybrid Napier varieties such as Killikkulam-1, Sampoorna, Supriya and Suguna found suitable for the respective vregion. Above 50000 slips were distributed to farmers as nucleus planting materials which was multiplied to produce about 6 Lakh slips in farmers fields under the supervision of KVK Scientists. About 20 hectares have been newly planted with fodder grass resulting in additional fodder production of 6000 to 7500 tons annually. This helped dairy farmers to overcome the acute scarcity of fodder during the summer months and resulted in less dependence on concentrates and improved the net profit and BC ratio.

- a. Seminars / exhibitions / demonstrations on farm mechanistion and precision farming covering all blocks of the district
- b. Popularisation of improved fodder varieties

Farm Advisory Services

	In Person	Over Telephone	Through Letters
768		1456	175

Field visit : 108

List of Publications

Item	Title	Authors name
Technical reports	Ground water recharge studies	Mary Regina.F.
News letters	News letter Volume 5 Number 1	
Popular articles	Rain shelter cultivation	U. Sreelatha
	Pesticide-free cabbage & cauliflower	U.Sreelatha, K.G.Sangeetha, K.T.suman & Koshy Abraham
	Vegetable seedling production-Mathilakam model	U.Sreelatha, K.G.Sangeetha, & K.T. Suman

Finance

Head	Expenditure	Receipt
ICAR- 411-40-5504	85,80,573	1,06,81,000
Tissue culture lab-SHM- 411-05-8586	2,50,315	1,50,000
Low cost feed formulation for cattle- ATMA- 411-05-8622	1,51,212	-
Fodder production- RKVY- 411-31-8563	17,01,246	41,16,000
Silage making- KSCSTE- 411-05-8540	45,826	-
Mushroom spawn production- SHM- 411-05-8741	2,99,908	3,00,000
State food security programme- 411-31-8700	1,52,520	-
Elite seed & planting material- 411-31-8766	1,50,000	1,50,000
Labour support group- 411-40-8760	8,73,040	11,10,000
Revolving Fund	1741307	-

KRISHI VIGYAN KENDRA, PALAKKAD

Academic programmes:

1. Dr. E.R. Aneena is the major advisor of Ms.Simi M.C (M.Sc student of College of Horticulture)

Research programmes:

- i. A portable split biogas plant suitable for farmers with one cow or only small animals was developed at KVK as part of its on farm testing programme.
- ii. A portable light trap for pest monitoring in rice was developed at KVK Palakkad and is being demonstrated in several districts.
- iii. Augmentation of vegetable seed production in summer rice fallows using harvested rain water: This state government funded programme for rain water harvesting using the old and damaged irrigation tank which was abandoned for about 25 years was undertaken. The harvested rain water was used for vegetable seed production.

Extension programmes

Promotion of Eco friendly agricultural practices

Eco friendly agriculture is a thrust area of KVK Palakkad and this KVK has been implementing various activities in this direction. The major technology transfer activities were as below:

Eco friendly plant protection:

The activities included popularisation of pheromone traps for control of fruit fly in vegetables, use of KAU portable light trap for pest monitoring in rice, pheromone traps for mango fruit fly control. Several hundred pheromone traps for mango fruit fly were distributed in 'Muthalamada' an important mango growing area of the district, thereby reducing the use of harmful pesticides to a large extent. Several awareness programmes against the excessive use of harmful chemicals and for promotion of these eco-friendly techniques were organised throughout the district. Campaigns and trainings for control of papaya mealy bug using bio control agents were also taken up in a big scale.

Energy saving implements:

Popularisation energy saving implements for puddling paddy lands and dry ploughing for dry seeded rice were taken up in a large scale. As a result farmers became aware on the adverse effects of use of excessive energy and the benefits of conserving energy and fuel by the use of energy efficient implements. KAU Puddler for wet land puddling and tractor operated rotovator for dry ploughing were the major implements popularised in the district by KVK. As a result, the 'Metal Industries Limited' a Kerala Government undertaking has started manufacturing KAU Helical Blade puddler.

Pesticide free cool season vegetables:

Promotional activities for growing cool season vegetables like cabbage and cauliflower (unconventional in this area) was taken up. Thousands of seedlings were distributed to farmers. Campaigns were conducted in schools to create awareness on production and use of pesticide free vegetables in homesteads itself.

Promotion of organic farming:

Promotion of organic farming practices were also taken up. Earth worms were distributed to the farmers so as to promote vermin-composting in homesteads. Techniques for on-farm production of organic manure were demonstrated to farmers and training programmes were organised.

As a result of these activities in the last three years, the awareness on eco-friendly agriculture has been boosted up. Such techniques have become increasingly popular and the activities are more and more covered in visual as well as print media. KVK could play a pivotal role in promoting eco friendly agriculture in the District.

Exhibition and 'scientist with farmer' at Mannanchery, Alappuzha

KVK set up a pavilion in the exhibition organized at Mannanchery depicting the technologies popularized by the Kendra. Dr. Shaji James, Programme Coordinator, and Dr. M. Ameena, SMS participated in 'scientist with farmer programme' organized jointly by Mannanchery grama panchayath and the KAU.

Participation in Agri Food Technology Meet

KVK participated in Agri Food technology meet conducted during 24th to 31st of February 2011 at Lulu convention centre, Thrissur. KVK. Showcased various technologies and diversified value added products.

KVK programmes on Rice Mechanization

During the year KVK Palakkad has put a major thrust on transfer of technology in the field of rice mechanization through trainings and demonstrations. As a result of demonstrations and trainings conducted by the KVK the extend of adoption of new rice machinery has increased. Many 'Nel Karshaka Samithis' (Rice farmers' societies) who had machines like transplanter, seeder, reaper etc. were not using them properly due to lack of training and awareness. In addition to KVK trainings, we could organize a series of programme in collaboration with the department of agriculture, ATMA etc. These programmes included lectures, video presentations, field demonstrations and one day trainings. As a result farmers now started using machinery like reapers and rice transplanters. Some of the machines which had been kept idle for more than 2-3 years have been serviced and put to use. The farmers are now aware of the advantages of labour saving mechanization and KVK trained youth have emerged as the leaders in the dissemination of the technology in many grama panchayats.

Karshaka dinam

The New Year day of Malayalam calendar, Chingam 1st is celebrated as Farmers' day in Kerala. KVK, Palakkad organised Karshaka Dinam with zeal on 17.08.2010, in which people's representatives, our SAC members and OFT, FLD partners gathered on the occasion. Block Panchayath president Sr. Ahammed Kunji inaugurated the function. Members of SAC, Sri. C.M. Neelakandan, President Pattambi Service Cooperative Society

And Sri S. Padmanabhan of NABARD joined in the function.

World Environment Day

The world environment day was celebrated on 5th June 2010 at Ashadeepam school, Koonathara, a school for mentally challenged children. Farmers of Koonathara Padasekhara samithi and students and teachers of Govt. High School, Koonathara participated in the programmes.

SCIENTIFIC ADVISORY COMMITTEE (SAC) MEETING

The XIV Scientific Advisory Committee meeting was held on 28th July 2010 under the chairmanship of Dr. P.V. Balachandran, Director of Extension, KAU. Dr. D.V. Srinivasa reddy, Representative of Zonal Project Director, Zone VIII, ICAR, Bangalore attended the meeting. Sri. V. Ahamed Kunji, President, Pattambi Block Panchayat, Dr. I. Johnkutty, ADR, RARS, Pattambi, Heads of various line departments, and farmer's representatives attended the meeting. The activities undertaken by the Kendra were evaluated and critical suggestions for improvement were made. A compilation of phone in programme of KVK 'Vithum kaikkottum' and a 10 minute video on activities of KVK Palakkad were released.

Launching of KAU Helical blade Puddler

The manufacturing technology of KAU helical blade puddler developed by Dr. Shaji James, Programmed Coordinator, was transferred to Metal industries Ltd. Shoranur by KAU. Sri Elamaram Kareem honorable minister for industries launched the product on 25.02.2011 on the occasion of the inauguration of Agri Food technology Meet at Lulu convention centre Thrissur in presence of Dr. K.R Viswambaran honorable Vice chancellor of KAU.

RAWE programme

Students of B. Sc. (Agriculture) from College of Agriculture at Vellayani were with this Kendra for their Rural Agricultural Work Experience programme. KVK scientists guided them to conduct the Participatory Rural Appraisal and farmers training sessions. They had a good opportunity to get exposed to various activities of KVK

ON - FARM TESTING

Suitability of Ground nut in sandy rice fallows and river beds during summer

An OFT was conducted during the summer season of 2010 in sandy rice fallows of Ummathoor padashekhararam in Anakkara grama panchayath in an area of 1 ha to test the suitability of ground nut which has lesser water requirement and good market demand. Farmers perceived ground nut cultivation as a lucrative option which gave return within a short span of 3 months with very little labour investment recording an yield of 1142 kg/ha and a net return of Rs 20538/- per ha. Raising ground nut has the advantages of reduced weed incidence, skipping lime application and high build up of residual organic matter for the next rice crop. Anakkara Grama Panchayath has decided to take up ground nut cultivation in 5 ha during 2011 by allocating funds in their annual plan.

Concurrent growing of cowpea in dry sown rice for reducing weed incidence and enhancing organic matter build up

Wider adoption of dry seeded rice is constrained by poor yields which can be attributed to high weed infestations. Success of such a system mainly depends on the management practices that can effectively check the growth and development of weeds. Hence, sowing of rice along with cowpea @6 kg/acre followed by incorporation at the time of flowering by spraying 2, 4-D @ 1.0 kg/ha at 30 days after sowing was tested in Vilayur and Thirivegappura Grama panchayath in an area of 1ha. Concurrent growing with cowpea has resulted in weed suppression of 60 % for 40 days due to early rapid growth and weed smothering nature of cowpea.

Use of pigmented rice variety 'kunjukunjuvarna' to combat weedy rice infestation in paddy

In an attempt to address the problem of weedy rice infestation in paddy, use of pigmented rice variety like was tried in Kondoorkkara and Kannadi padashekham where weedy rice infestation is reported to be very serious. Use of pigmented rice cultivars will help to easily rogue out weedy rice plants before flowering and will reduce the weed seed inoculum. Though the variety is pigmented to some extent, the practice of cultivating 'Kunjukunjuvarna' doesn't yield any encouraging response from farmers for roguing out wild rice plants.

On Farm Production of Organic Manure in Coconut garden.

To combat scarcity of organic manure in coconut garden, assessment of three low cost and simple techniques for on farm production of organic manures was continued for second year in farmer's fields. The methods tested were *insitu* green manure production by growing sun hemp, composting of coconut wastes and growing glyricidia as intercrop. Farmers preferred *insitu* green manure production by growing sun hemp as it is easy, labour saving and economically viable.

The final recommendations for micro level situation is Sowing of sunhemp seeds during May and *insitu* incorporation after flowering is having good practicability as it is easy, labour saving and economically viable

Effect of VAM for Nendran Banana

The efficiency of VAM along with chemical fertilizers for Nendran banana was tested in farmer's field in Anakkara Panchayath. VAM applied banana plots recorded 41 tonnes of fruit per hectare which is 23% more than recommended practices. VAM application could save the fertilizer N, P and K to the extent of 25%, 50% and 25% respectively.

The technologies assessed were

Technology option 1 (Farmer's practice) - FYM-6kg as basal-Factom phos-575gm-Potash-300/plant

Technology option 2 - FYM-10kg as basal-Urea-420gm-Rajphos-575gm-Potash-500gm/plant in 6 splits

Technology option 3 - FYM-10kg-VAM-50gm as basal-Urea-315gm-Rajphos-288gm- Potash-375gm/plant in 6 splits

The final recommendations for micro level situation is for getting higher yield in banana, VAM can be applied as basal dose which can save 25%N,50%P and 25%K

Management of leaf folder in rice

An OFT on Management of Leaf folder was conducted at Pattithara Padasekharam in an area of 4 hectare. The efficacy of Flubendiamide 20% WG @ 50g IN 200 Litres of water was tested against Acephate 755SP @1.5g/litre.. The options of the technologies were:

Technology Option 1: Farmers Practice: Application of Quinalphos 25%EC-2 ml/litre

Technology Option 2: Recommended Practice : Application of Acephate 75% SP-1.5g/litre

Extent of adoption-20%

Technology Option 3: Alternate Practice: Spraying Flubendiamide 20% WG (Takumi) @50g in200litres of water/acre after 40 days of transplanting the rice seedlings

The final recommendations for micro level situation is application of Flubendiamide 20% WG @ 50g IN 200 Litres of water was very effective for control of Leaf folder in Rice.

Management of Papaya mealy bug (*Paracoccus marginatus*)

An OFT on Management of Papaya Mealy Bug was conducted in different areas in Palakkad District like Vilayur, Thachampara.

Technology Option 1: Farmers Practice: Powerful Spray of water as a jet on the attacked area of plant

Technology Option 2: Recommended Practice: Soap solution@5g/litre

Technology Option 3: Alternate Practice:

1) Soap solution-Neem oil-Kerosene spray (4ml+5ml+3ml in 1 litre of water) for food crops and Malathion 50EC-20ml/10L of water for all other plants.

2) *Verticillium lecanii* @5g/L as a biocontrol agent against this mealy bug.

The final recommendations for micro level situation is application of *Verticillium lecanii* @5g/L was equally effective as Malathion Spray.

Portable solar dryer for dehydration of vegetables

An OFT on modified portable solar dryer was conducted. Inside the dryer, an average temperature of 6°C higher than the outer temperature was obtained. Improved retention of shape, colour and flavour in dehydrated vegetables was observed. Yielded dehydrated products free from physical contamination.

Development and evaluation of portable light trap for pest monitoring in rice

The problem identified was yield loss due to pest attack. In order to minimize the pest attack an innovative idea of Development and evaluation of portable light trap was done to test against the pest attack.

The technologies assessed were Solar cum biogas powered light trap. The results are the portable light trap (refined unit) is found to consume less electricity compared to conventional light trap with enhanced pest monitoring capacity & ease of operation and the final recommendations for micro level situation is the refined 'Portable light trap' without a costly solar panel is recommended

KAU Portable Split Biogas plant

The KAU Split biogas plant was further modified with a stirring arrangement so as to prevent scum build-up. The results of the OFT could reveal that the gadget of 500 litres digestion capacity is suitable to farmers having 1 cow. The biogas plant could produce 300-400 litres of biogas per day and could be run trouble free for the last six months. The results are Portable split biogas plant was found efficient for homesteads with considerable saving in cooking fuel cost. It was more hygienic than conventional biogas plants and suitable for farmers with one cow or only small animals (goats/poultry). The final recommendations for micro level situation is the KAU split biogas plant is recommended for use in thickly populated areas where the holding size is very small.

Farmers field school

The Kendra has organized knowledge intensive farmers field school to bridge the gap of farmer's scientific knowledge in rice cultivation. The programme commenced during virippu season at Koonathara padashekaram from 18-5-08. Smt. N. Geetha Devi President, Vaniyamkulam Grama panchayath inaugurated the programme. Ten farmers lead by Sr. V.K Shankarankutty who are actively engaged in rice farming were selected for attending the sessions. The programme covers various aspects of rice cultivation such as agronomic practices, eco friendly pest management practices, field observation, pest management and use of machineries for scientific rice cultivation. An average yield of 4.5 tonnes/ha was recorded in this area.

STATE GOVERNMENT FUNDED PROJECTS

I. Funds were allotted by the State Planning Board from the Department of Agriculture for the following On Farm Testings and front line demonstrations implemented by KVK, Palakkad.

1. OFT on evaluation of upland rice varieties suitable for coconut garden was tested in an area of 0.4 ha in Anakkara Panchayath.
2. The ongoing OFT on techno-economic evaluation of selective mechanization of direct seeded rice culture was done at Polppully and Vilayur grama panchayaths.
3. FLD on Popularising cucurbitaceous vegetables as rice fallow crop to sustain the income of rice farmers of Palakkad district was demonstrated at 5 acres of Pattithara grama panchayath Akkara panchayath.

II. State government funded project entitled 'Development and demonstration of rice machinery packages for the major rice production systems of Palakkad District' at a total cost of Rs. 1867000/- was commenced.

FRONT LINE DEMONSTRATIONS

Mechanised rice cultivation

The advantages of mechanization of crucial operations in rice cultivation by the use of cost saving implements was demonstrated during the virippu season in Melmuri and Erayoor padashekharas of Koppam gramapanchayath, Koonathara padashekharas of Vaniyamkulam gramapanchayath, Choorikkadu padashekharas and Pathi of polppully grama panchayath, Paravathepadam padashekharas of Thenkurissi grama panchayat and Kavalappara padashekharas of Shoranur municipality. Demonstrations of KAU Helical blade puddler was done at Thenkurissi, Polpulli, Shankaramangalam and Melmuri. The net return was increased to 20% by use of this helical blade puddler.

Wet land puddling done by KAU Helical blade puddler could save puddling time and cost to the extent of 40 %. Use of eight row and 4 row self propelled rice transplanters enabled timely planting along with reduction in cost of operation.

Management of Sigatoka leaf spot of banana

Due to the unseasonal rainfall, leaf spot disease of banana, known as *sigatoka* disease was spreading throughout the banana growing areas of the district. The demonstration conducted in Melmuri area could illustrate that spraying of propiconazole (Tilt) 1 to 2 liters/ plant @ 1ml/litre is effective for control of this disease.

Management of fruit fly in mango

Eco friendly pest management technique was implemented in 250 ha of Muthalamada area. 1400 Pheromone traps were distributed in this area in order to combat the problem of fruit fly attack.

Rotovator for land preparation in dry seeded rice

The use of energy efficient tillage implement 'tractor operated rotovator' for land preparation for dry seeded rice in virippu season was demonstrated at Muthuthala, Koppam and Vilayur grama panchayaths. The fine tilth obtained by the use of rotovator and its energy conservation aspects were demonstrated.

Silica application in iron toxic soils for productivity improvement

Technology of silica application in iron toxic soils for productivity improvement was demonstrated in puthuppariyaram and parali panchayaths in an area of 3 ha during rabi season. Silica application has reduced the requirement of liming and resulted in 30% yield increase over control plots.

Koottumindakan with *Samyuktha* and *Makaram* in 70:30 proportion and scientific management

The proper varietal combination of *sumyuktha* and *makaram* in 70:30 inkootumundakan system was demonstrated in an area of 1 ha during virippu season in thrithala Panchayaths. The variety *Samyuktha* is very much suitable for dry sowing with good grain and straw yield. It performed well giving good yield compared to existing short duration varieties.

Weed management in wet seeded rice using pre emergent herbicides

The technology of weed management using pre emergent herbicide sofit was demonstrated in an area of 3ha in Parali and Pallassana panchayaths during rabi season. Pre emergent herbicides are very effective for initial weed control

Application of herbicide either by spraying or by broad casting with sand were found equally effective. In a scenario of severe labour shortage and high labour cost herbicide application is cheaper and is cost effective.

Cultivation of tuber crops in homesteads for food security

Cultivation of *amorphophallus* and *colocassia* in rural home steads for house hold food security was demonstrated for 50 farm families of Thrithala panchayaths by supplying quality planting materials. These tuber plants thrive well under partially shaded situations of homestead. Tuber crops are more nutritious and much safer than the pesticide contaminated vegetables from market and year round availability of household food is ensured.

Scientific Management of Weeds in Direct sown rice.

Low cost management of weeds using pre and post emergent herbicides viz., Refit and Almix were demonstrated in direct sown rice in an area of 5 ha during Viruppu season in farmers fields of Keezhayoor and Anakkara Padasekharam. The yield was increased at an extensive rate of 35%. The net return was increased in a doubled rate.

Popularization of Coleus var Suphala

The newly released high yielding with good cooking quality coleus var. Suphala was demonstrated in 10 farmer's fields in Kadambazhipuram Panchayath in an area of 0.05 ha. The FLD is in progress.

IIHR banana special

The use of micronutrient formulation promoted by IIHR 'banana special' containing 4.3% of Zn, 2.7% Boron, 0.7% Mn, 1.5% Iron and 0.6% Cu was demonstrated in Agali, Thachampara, Koppam and Thiruvegappura panchayaths.

Management of bud – rot in Coconut

Bud rot management demonstrations were conducted for two hundred bud rot affected palms in Perumatty. 1% Bordeaux mixture was applied on spindle leaves and perforated sachets with two grams Mancozeb were tied to the top of leaf axils. The yield was increased to 19% when compared to the normal yield of the area. The incidence of the diseases is reduced to the maximum of 50%.

Management of Stem Bleeding in Coconut

The management of stem bleeding in coconut were demonstrated in an area of 1 ha for 10 farmers in K.K Challa area. The following methods were demonstrated in the farmers field.

1. Phytosanitation
2. Neem cake application
3. Calixin 25ml per 25 lit/Palm

The disease incidence was reduced from 52 to 31% with a yield increase of 23%.

Farm Advisory Services

In person	Over telephone	Through letters
65 Nos.	342 Nos.	15

List of publications

(KVK News Letter ((Date of start, Periodicity, number of copies distributed etc.)

- Date of start : January 2006
Periodicity : Half yearly both in English and Malayalam
Number of copies distributed : 250
Latest issue details : KVK Palakkad News letter Vol.V issue 2 September 2010

Important visitors: -

1. Dr. D.V. Srinivasa Reddy Representative of Zonal Project Director, Zone VIII, ICAR, Bangalore on the occasion of the XIIIth Scientific Advisory Committee meeting was held at this Kendra on 28th July 2009
2. Sri. C.P. Muhammed MLA, Pattambi visited KVK on 23.09.2010 on the occasion of Kerala Legislative assembly subcommittee meeting to review the KVK activities.

Finance

Head	Expenditure	Receipts
ICAR	7450305	9701538
Revolving Fund	189841	261571
State Planning Board OFT/FLD	63000	63000
State Govt. Food security programme	697582	750000
State Govt Paddy Task Force	1422850	1867000

KRISHI VIGYAN KENDRA KUMARAKOM, MALAPPURAM

List of Publications

Popular Articles : 4 Nos

Item	Title	Authors name	Number
Research papers	Dissemination of coconut water vinegar technology as a model for upliftment of rural women through Agriculture based enterprises	Seeja Thomachan Panjikkaran and Habeeburrahman P.V.	Abstracts of 1 st Kerala Women's Science Congress. 10-12 August 2010. P. 95-96
	Promotion of rice mechanization in Malappuram district of Kerala through empowerment of rural women	Sajeena S. and Habeeburrahman P.V.	Abstracts of 1 st Kerala Women's Science Congress. 10-12 August 2010. P. 92.
Technical reports	Dehydrated mushroom adds to income. <i>In</i> Agritech-Interventions Harbingers of prosperity.		ICAR 2010. Pp. 184-185
News letters	Vol. V	Ed Dr. Habeeburrahman,P.V.	1000
Book chapters	Rare medicinal plants of western ghats in Kerala and their Ayurvedic uses. <i>In: Herbal Perspectives: Present and Future,</i>	Deepu Mathew and Seeja Thomachan Panjikkaran. 2010	Eds.T.Parimelazhagan, S.Manian,M.Pugalenthi, SSPH. Pp. 63-79.
	Coconut processing technologies for rural transformation – Case study on coconut water vinegar.	Seeja Thomachan Panjikkaran, Deepu Mathew and Habeeburrahman P.V. 2010	<i>In a nut shell – Essays on coconut. Coconut Monograph.</i> Ed. Dr. C.V. Ananda Bose. CDB. Pp. 129-133.

Finance

Head	Expenditure(Rs.)	Receipts(Rs.)
ICAR	11367761	
Other EAP's		
Revolving Fund	294743	548948

KRISHI VIGYAN KENDRA KANNUR, PANNIYUR

Farm Advisory Services

In Person	Over Telephone	Through Letters
920	1230	

Radio talks/ TV Programmes/ Audio-Video Cassettes.

Topic	Date	Name of Scientist
1) Soil and water conservation measures	30/4/10	Dr Thulasi V
2) Paddy Task Force mechanisation	13/7/10	Dr Abdul Kareem
3) Cool Season Vegetable	15/10/10	Dr Poornima Yadav PI
4) Food processing	3/11/10	Dr Sharon CL
5) Scientific feeding of cattle	10/2/11	Dr Lalu
6) Pheromone traps	10/2/11	Manu CR

List of Publications

Scientific papers

Compact Area Group Approach (CAGA) – An Innovative Farmer Participatory Extension Mechanism for Ensuring Control of Coconut Eriophyid Mite (*Aceria guerreronis*) by Mobilizing Group Action
Rafeekher M, Dr Abdul Kareem. Presented in 4th Horticulture Congress Held at Pusa New Delhi, on 18- 21 November 2010

News letters- 1 issue- 500 numbers

Popular articles

Pashuvinum Bhakshyasuraksha Dr Lalu, K in Karshakan Nov2010

Palilninnu Pullilekku Dr Lalu, K in Karshakasree apr 2011

Extension literature

Chippikkoon - Manu CR, Dr Sharon CL, Dr Abdul Kareem

Sheetakala Pachakarikal - Dr Poornima Yadav, Dr V Thulasi

Pheromone keni - Dr Manu CR

Books

Gopalanam - Dr Lalu K, Dr Poornima Yadav, Manu CR

Manthoppilekku - Rafeekher M, Dr Sharon CL, Dr Abdul Kareem, MV Premarajan

2. No. of visitors to the institution (farmer group, students) - 862

Important visitors

- a. Sri. K Sudhakaran MP, Kannur
- b. Sri CKP. Padmanabhan, MLA, Taliparamba
- c. Dr. Sairam, Senior Scientist, ZPD, Bangalore
- d. Dr. B.T. Raydu, Senior Scientist, ZPD, Bangalore
- e. Dr. K. Prathapan, Mission Director, SHM
- f. Sri. K.C.Sasidhar, Chief General Manager, NABARD

Finance

Head	Expenditure	Receipts
ICAR	77,91,093	71,76,200
Other EAPs		

1. NABARD	3,03,365	4,33,800
1. Farmers Science Museum	22,500	1,19,000
2. Federating Farmers clubs to act as agents for diffusion of technological innovations with help of team of KVK led Expert Emeritus Faculty	3,84,600	3,72,000
3. Development of smoking stick from coirpith for smoking rubber sheets		
II. SHM	8,91,816	6,32,500
1. Gardeners' training programme	1,00,000	1,00,000
2. Mushroom spawn production unit		
Revolving Fund	13,99,670	13,75,924

KRISHI VIGYAN KENDRA WAYANAD, AMBALAVAYAL

Extension Programmes

The main mandate of the KVK is

1. To conduct On Farm Trials on the identified problems and thrust areas
2. To conduct Front Line Demonstration (FLD)
3. To conduct vocational trainings for the practicing farmers, farm women, rural youth, self help groups, etc., so as to enable them to internalize the knowledge and skills on agricultural and allied fields and put into practice so as to improve their standards of living through better and improved income generation activities.
4. To conduct training programmes for extension functionaries so as to keep them updated with the latest technologies in the field of agriculture and allied sectors.

Farm Advisory Services

In Person	Over Telephone	Through Letters
345	Many	

Radio talks/TV programmes/Audio, Video Cassettes

Topic	Date	Name of Scientist
Value Addition in Jackfruit		Dr. Anitha Chandran. C.

Important Visitors

1. Dr. S. Prabhu Kumar (Zonal Project Director)
2. Dr. V. Sadamad (Agriculture Advisor – State Planning Board)

Finance

Head	Expenditure	Receipts
ICAR	57,59,768	79.12
Revolving Fund	11,58,959	21,99,031

KRISHI VIGYAN KENDRA KOTTAYAM, KUMARAKOM

Extension programmes:

2. Highlights of extension activities:

Front line demonstrations

1. Intercropping cassava with cowpea
2. Integrated nutrient management oincoconut
3. Application of nutrients according to crop requirement based on soil test values
4. Use of trichogramma egg cards against stem borer and leaf folder in rice
5. Minisett planting technique with scientific crop management in amorphophallus
6. Hardening of banana tissue culture plants
7. Promotion of cowpea variety Vellayani Jyothika
8. Use of pheromone traps for the management of melon fruit flies

On Farm Testing

1. Assessment of fodder hybrid napier varieties under scientific management
2. Assessment of rice variety MO-21 in Kottayam district under scientific management
3. Assessment of newly released ginger varieties Karthika and Athira in Kottayam district under scientific management practices
4. Assessment of the performance of cool season vegetable cabbage varieties in Kottayam
5. Assessment of the performance of cool season vegetable cabbage varieties in Kottayam
6. Assessment of rice variety Vytilla 6 in kari soils of Kuttanadu under scientific management
7. AMF application for increasing P u se efficiency in banana
8. Integrating pheromone traps in the management of pumpkin caterpillars *Diaphania indica*
9. Assessment of neem soap formulation for the management of sucking pests and borers in cowpea

Farm Advisory Services

In person	Over Telephone	Through letters
32	650	

List of Publications

Item	Title	Authors name	Number
Popular articles	Soil test based fertilizer application in cops, Fertigation, Organic manures	Dr Sailaja kumari.M.S Dr K.J.Joseph Dr Anu.G.Krishnan Dr Vandana Venugopal Dr Anu.G.Krishnan, K.J.Joseph Dr Vandana Venugopal Dr Vandana Venugopal Dr K.J.Joseph	
Others (Pl. specify) Brochure	Composting	K.C. Rajan, Elizabeth K. Syriac	2000
Book			

Important Visitors:

Dr. S. Prabhukumar, Zonal Project Director, Zone-VII KVKs \

Farmer groups:

Date	Name of Krishhubhavan	No. of farmers
17.12.2010	Kuttampuzha, Pallarimangalam	20
30.03.2011	Lakshadweep	20

Students

Date	Batch & institution	No. of students
1.11.2010 to 4.11.2010	2007 batch students, College of Agriculture, Vellayani	14

Finance

Head	Expenditure	Receipts
ICAR	5383078	
SHM Project	600000	
REVOLVING FUND	324241	641522

KRISHI VIGYAN KENDRA, KOLLAM

List of Publications**Scientific papers**

Sheeba R. I, Jiju P Alex, Bindu P. 2010. CRISP- A farmer participatory approach for enhancing rice production in Kollam district, Kerala , Abstracts of National seminar on SFRL, Annamalai University, 2010

Subaida Beevi. S and Girija Devi, V .2010. The role of self help groups in empowering rural women in India. International Journal of Interdisciplinary Social Sciences 5(9)

Ambily Paul and Nandakumar C. 2010. Biology of coreid bug, *Paradasynus rostratus* Dist. In different hosts. Abstracts of International Conference on Coconut Biodiversity for Prosperity, 25-28 th Oct-2010. P.129

Sheeba R.I, Bindu P and Shalini Pillai. 2011. Evaluation of minisetts as planting material in cassava. National seminar on Climate change and Food security- Challenges and opportunities in tuber crops, CTCRI, Sreekariyom, 2011

Shalini Pillai and Sheeba R.I. 2010. Integrated nitrogen management in rice with *Sesbania rostrata*. 2010. National Symposium on Resource conservation and Management, ISA, Bangalore, 2010

Geethalekshmi PR. 2010. Fruit developmental studies in Red Banana. Indian Biodiversity Congress , Trivandrum, 2010

Technical reports

1. Samrithi 2010 - Dr. Bindu P, Dr. Sheeba R.I

2. KVK Kollam over the years- Dr. Bindu P, Dr. Sheeba R.I and Dr. Geetha lekshmi P.R

3. Classification and characterization of farming systems in district wise AEZ of Kerala- Palakad district. - Dr. Jacob John, Bindu Podikunju, Paul Lazerus

News letters- 2 issues

Popular articles

1. Homesteads promises cash and sustainability- Dr. Sheeba R.I, Dr. Shalini Pillai and Dr. Rajasree, Intensive agriculture 2010

2. Heliconia- Dr. Geetha lekshmi P.R- Kerala Karshakan 2011

3. Integrated farming for food security -Dr Sheeba RI and Dhanya k Gopi- Haritham- Deepika 2010

Extension literature

Manual on cashew apple processing- Dr. Subaida beevi

Book chapter

1. Entomopathogenic Bacteria in pest management- Dr. Ambily Paul

2. Predators in Pest management- Dr. Ambily Paul

Book lets

1. Goat rearing in homesteads- Dr. M.O. Kurien

2. Technological upgradation in Banana- Dr. Geetha lekshmi P.R

3. Rice farming- newer trends and experience sharing- Dr. Sheeba R. I, Sreeja S & Dhanya K Gopi

2. i) No. of visitors to the institution (farmer group, students)

a. ATMA- inter district visit from Kazhakoottam block

b. ATMA- visit from Kundara, Chathannoor and Karunagappally block

c. VHSS students from Mylom, Thalavoor, Avaneeswaram, Anchal, Kadambanad and Kottarakkara

d. Students – Aritha Vidyalayam, Peroor, Govt. High School, sadanandapuram

ii) Important visitors

g. Sri. Mullakkara Ratnakaran, Agrl. Minister, Kerala State

h. Adv. Ayisha Potti, MLA, Kottarakkara

i. Dr.S. Prabhu Kumar, Zonal Project Director, Zone VIII, ICAR

j. Dr. B.T. Raydu, Senior Scientist, ZPD, Bangalore

k. Sri. K.C.Sasidhar, Chief General Manager, NABARD

l. Smt. Rohini Varma, AGM, NABARD

m. Smt Preeta Balan, Ward member, Vettikavala

Finance

Head	Expenditure	Receipts
Non-Plan	-	-
Plan	-	-
ICAR	5889144	6135000
Other EAPs	164281	220420
KSCSTE project	101901	101901
SPB project (CRISP)	95815	241000
RKVY project (Goat unit)	60000	60000
SPB Block level workshop		
<i>Sub Total</i>	6311141	6758321
	318561	195164
Revolving Fund		

CHAPTER V

CENTRAL LIBRARY, KAU, VELLANIKKARA

Extension programmes

a) Highlights of extension activities

Central Library is a centre for Apprenticeship Training in Library & Information Sciences., Sanctioned by Board of Apprenticeship Training , Govt. of India. Trainees are selected in the Central Library through an Interview and engaged in Central Library and College Libraries of KAU. Four Apprentice Trainees are being trained at the Central Library in every year.

The Central Library also extends it's support to following KAU Libraries and other Institutional Libraries for Automation , Installation and Customization of various Library Management Software's.

Other details if any

Central Library of Kerala Agricultural University functions from 10 am to 6 pm. on all working days. The total collection of the library is about 40 Thousand which includes books, gift books, Theses and bound Volumes. The collection also contains about 800 CD ROMs.

The Library has Acquisition Division, Technical Division, Theses Division, Maintenance Division, Circulation Division, Periodical Division, Reference Division, and IT division.

Books

1250 Books has been purchased by the Acquisition Division and added to the collection during this year after processing the documents such as classification, cataloguing, assigning keywords etc by the Technical Division.

Theses

104 Thesis were added during the year 2010-11 and the total collection was 3048

Journals

51 Print Journals were subscribed during the year 2010 – 2011.

CAB Abstracts 1990+ (online) has been subscribed for the year 2010-11 and it is accessible to the following Institutions under KAU.

College of Agriculture, Vellayani & Padannakkad
College of Fisheries, Panangad
College of Veterinary and Animal Sciences, Mannuthy and Pookot
College of Dairy Science and Technology, Mannuthy
College of Cooperation, Banking and Management, Vellanikkara
College of Forestry, Vellanikkara and
Pineapple Research Station, Vazhakulam

Finance 2010-2011

Head	Expenditure	Receipts
Non-Plan	Nil	Nil
Plan	46,95,748	39,09,000
ICAR (DEV GRANT)	6,14,000	6,14,000
Other EAPs	Nil	Nil
Revolving Fund	Nil	Nil

മെയിൻ ക്യാമ്പസിൽ ഫെബ്രുവരി 16 - 20, 2011 ൽ നടത്തപ്പെട്ടു. ഇൻഡ്യയുടെ നാനാ ഭാഗങ്ങളിൽ നിന്നും 43 സ്ഥാപനങ്ങളുടെ ടീമുകൾ ഈ കായിക മേളയിൽ പങ്കെടുത്തു. മേളയുമായി ബന്ധപ്പെട്ട ചടങ്ങുകളിൽ ബഹു: എം.എൽ.എ. ശ്രീ. രാജാജി മാത്യു തോമസ്, ബഹു: തൃശൂർ കോർപ്പറേഷൻ മേയർ ശ്രീ. ഐ.പി.പോൾ, ശ്രീ.കെ.വി. ദാസൻ, തൃശൂർ ജില്ലാ പഞ്ചായത്ത് പ്രസിഡണ്ട് തുടങ്ങിയവർ പങ്കെടുത്തു.

ഈ മീനിൽ ടീമംഗങ്ങളും ഓഫീഷ്യൽസും ഉൾപ്പെടെ രണ്ടായിരത്തിലധികം പേർ പങ്കെടുത്തു. മീനിൽ പഞ്ചാബ് അഗ്രിക്കൾച്ചറൽ യൂണിവേഴ്സിനി, ലുധ്യാന, യൂണിവേഴ്സിനി ഓഫ് അഗ്രിക്കൾച്ചറൽ സയൻസസ് ബാംഗളൂർ, ഗുരു അംഗർ ദേവ് വെന & ആനിമൽ സയൻസ് യൂണിവേഴ്സിനി, ലുധ്യാന എന്നിവ യഥാക്രമം ഒന്നും രണ്ടും മൂന്നും സ്ഥാനങ്ങൾ നേടി. കാർഷിക സർവ്വകലാശാലയുടെ വിഭജനത്തിനു മുൻപ് നടന്ന പരിപാടി എന്ന നിലയ്ക്ക് ഈ സ്പോർട്ട്സ് മീൻ പ്രത്യേക പ്രാധാന്യം അർഹിക്കുന്നു. ഐ.സി.എ.ആർ ൽ നിന്നും പ്രത്യേക ധനസഹായമായി ലഭിച്ച തുക കൊണ്ടാണ് ഈ കായിക മേള നടത്താനായത്.

ഐ.സി.എ.ആർ ൽ നിന്നും ലഭിച്ച തുക (50 ലക്ഷം രൂപ) ഉപയോഗിച്ച് യൂണിവേഴ്സിനി സമൂഹത്തിന്റെ ചികിത്സാ അഭിലാഷമായിരുന്ന സെന്റർ സ്റ്റേഡിയത്തിന്റെ നിർമ്മാണം വെള്ളാനിക്കര മെയിൻ ക്യാമ്പസിൽ ആരംഭിക്കാൻ സാധിച്ചു. ഗ്രൗണ്ടിന്റേയും ട്രാക്കിന്റേയും പണി പൂർത്തീകരിക്കുകയും ഗ്യാലറിയുടെ നിർമ്മാണം തുടങ്ങിവയ്ക്കാനും ഈ കാലയളവിൽ സാധിച്ചു. കൂടാതെ ഈ ഫണ്ട് ഉപയോഗിച്ച് വെള്ളാനിക്കരയിൽ നിലവിലുള്ള ബാസ്കറ്റ് ബോൾ, വോളിബോൾ കോർട്ടുകൾ നവീകരിച്ചു.

ഐ.സി.എ.ആർ കായിക മേളയിൽ അത്ലറ്റിക് ഇനങ്ങൾ കൂടാതെ Basketball, Volleyball, Table Tennis, Shuttle, Kho Kho, Kabbadi എന്നീ ഗെയിമുകളും ഉണ്ടായിരുന്നു.

ഈ കായിക മേളയുടെ ഉദ്ദേശ്യലക്ഷ്യമായ വിവിധ സംസ്ഥാനങ്ങളിൽ നിന്നുള്ള യുവജനങ്ങളുടെ കൂടിച്ചേരലിലൂടെ ഉണ്ടാവുന്ന National Integration സഹലമാകുവാൻ സാധിച്ചു എന്നാണ് വിലയിരുത്തപ്പെടുന്നത്.

CHAPTER VI

DIRECTORATE OF STUDENTS WELFARE

ഡയറക്ടറേറ്റ് ഓഫ് സ്റ്റുഡന്റ്സ് വെൽഫെയറിന്റെ പ്രധാന ലക്ഷ്യം കാർഷിക സർവ്വകലാശാലയിൽ പഠിക്കുന്ന വിദ്യാർത്ഥികളുടെ ക്ഷേമം ഉറപ്പാക്കുക എന്നുള്ളതാണ്. കലാ - കായിക മത്സരങ്ങൾ, വെള്ളാനിക്കര കാമ്പസുകളിലെ എന്നിവ സംഘടിപ്പിക്കുക, വിദ്യാർത്ഥികളുടെ പഠനയാത്രകൾക്കും മണ്ണുത്തി അനുവദിച്ചുകൊടുക്കുക, പഠനകാലത്ത് വിവിധ സ്മാപനങ്ങൾക്കും സർവ്വകലാശാലയുടെ കീഴിലുള്ള ബന്ധുക്കൾ സഹായങ്ങൾ യഥാസമയം നേടിക്കൊടുക്കുക, എൻ.സി.സി. പ്രവർത്തനങ്ങൾ ത്വരിതപ്പെടുത്തുക, എംപ്ലോയ്മെന്റ് ആന്റ് ഗൈഡൻസ് ബ്യൂറോയുടെ പ്രവർത്തനങ്ങൾക്ക് മേൽനോട്ടം വഹിക്കുക തുടങ്ങിയ ക്രിയാത്മക പ്രവർത്തനമേഖലയാണ് ഈ ഡയറക്ടറേറ്റിനുള്ളത്.

ഈ ഓഫീസിന്റെ മേൽനോട്ടം വഹിക്കുന്നത് ഡയറക്ടർ ഓഫ് സ്റ്റുഡന്റ്സ് വെൽഫെയർ ആണ്. റിപ്പോർട്ട് കാലയളവിൽ ഡോ. ജോസ് ജോൺ ചുങ്കത്ത്, ഡയറക്ടർ ഓഫ് സ്റ്റുഡന്റ്സ് വെൽഫെയറിന്റെ ചുമതല 22.5.2011 വരെ നിർവ്വഹിച്ചു. 23.5.2011 മുതൽ ശ്രീ. ഇ.യു. രാജൻ, ഡയറക്ടർ ഓഫ് സ്റ്റുഡന്റ്സ് വെൽഫെയറിന്റെ ചുമതലകൾ നിർവ്വഹിക്കുന്നു. ശ്രീ. ഇ.യു. രാജൻ, ഡെപ്യൂട്ടി ഡയറക്ടർ ഓഫ് സ്റ്റുഡന്റ്സ് വെൽഫെയറിന്റെയും (സ്പോർട്സ് ആന്റ് ഗെയിംസ്) ചുമതലകൾ നിർവ്വഹിക്കുന്നു.

റിപ്പോർട്ട് കാലയളവിൽ വെന്ററിനറി സർവ്വകലാശാലയും ഫിഷറീസ് സർവ്വകലാശാലയും രൂപീകൃതമായതുമൂലം 4 കോളേജുകൾ ഈ സർവ്വകലാശാലയിൽ നിന്ന് വേർപെടുത്തപ്പെട്ടു. ഇപ്പോൾ 8 കോളേജുകളാണ് സർവ്വകലാശാലയുടെ ഭാഗമായുള്ളത്.

കായിക അധ്യാപനത്തിനും വിദ്യാർത്ഥികുക്ഷേമകാര്യ പ്രവർത്തനത്തിനും ആവശ്യമായ സഹകരണങ്ങൾ സർവ്വകലാശാലയുടെ കീഴിലുള്ള 8 കോളേജുകൾക്കും നൽകിവരുന്നു.

കായിക വിനോദം

യൂണിവേഴ്സിറ്റി എംപ്ലോയ്മെന്റ് ഇൻഫർമേഷൻ ആന്റ് ഗവേണൻസ് ബ്യൂറോ

2011 ഫെബ്രുവരി 1 - 31 തീയതി മുതൽ 2011 മെയ് 31 -ാം തീയതി വരെ യൂണിവേഴ്സിറ്റി എംപ്ലോയ്മെന്റ് ഇൻഫർമേഷൻ ആന്റ് ഗവേണൻസ് ബ്യൂറോ മണ്ണൂർ, നടത്തിയ പ്രവർത്തനങ്ങൾ സംബന്ധിച്ച റിപ്പോർട്ട്.

1. ഭരണം :

2011 ഫെബ്രുവരി 1 മുതൽ 24 വരെ ശ്രീ. സി. രാജു ഡേവിഡും ഫെബ്രുവരി 24 മുതൽ മെയ് 31 വരെ ശ്രീ. സജു എസ്.എസും ആയിരുന്നു റിപ്പോർട്ട് കാലയളവിൽ ഓഫീസ് ചുമതല നിർവഹിച്ചിരുന്നത്. 2 ക്ലർക്ക്, 1 ടൈപ്പിസ്റ്റ്, 1 പ്ലാൻ എന്നീ തസ്തികകളിൽ ജീവനക്കാർ ഉണ്ടായിരുന്നു.

2. ഇൻഡിവിജൽ ഇൻഫർമേഷൻ :

റിപ്പോർട്ട് കാലയളവിൽ ആകെ 355 പേർക്ക് (190 പേർക്ക് നേരിട്ടും 165 പേർക്ക് ടെലിഫോണിലൂടെയും) അവർക്കാവശ്യമായ വിവരങ്ങൾ (തൊഴിൽ സാധ്യതകൾ, സ്കോളർഷിപ്പുകൾ, ഉപരിപഠനം, സ്വയം തൊഴിൽ സാധ്യതകൾ തുടങ്ങിയ വിവരങ്ങൾ) കൃത്യമായി നൽകിയിട്ടുണ്ട്.

3. സമൂഹപരിചയം :

ഈ കാലയളവിൽ 12 സമൂഹപരിചയയിലൂടെ 98 ഉദ്യോഗാർത്ഥികളെ പങ്കെടുപ്പിച്ച് പരിശീലനം നൽകിയിട്ടുണ്ട്.

4. സ്കൂൾ / കോളേജ് സന്ദർശനം :

റിപ്പോർട്ട് കാലയളവിൽ തൃശ്ശൂർ ജില്ലയിലെ 16 വിദ്യാഭ്യാസസ്ഥാപനങ്ങൾ സന്ദർശിച്ച് ബ്യൂറോയുടെ പ്രവർത്തനങ്ങളെക്കുറിച്ചും ഉപരിപഠനം, സ്വയം തൊഴിൽ, മൽസരപരീക്ഷകൾ എന്നിവ സംബന്ധിച്ചും വിവരങ്ങൾ നൽകിയിട്ടുണ്ട്.

5. കരിയർ പ്രഭാഷണം :

കോളേജുകളിലും മറ്റ് വിദ്യാഭ്യാസ സ്ഥാപനങ്ങളിലുമായി റിപ്പോർട്ട് കാലയളവിൽ സ്കോളർഷിപ്പുകൾ കോഴ്സുകൾ, പരിശീലനങ്ങൾ, തൊഴിൽ സാധ്യതകൾ എന്നിവ സംബന്ധിച്ച് 14 കരിയർ പ്രഭാഷണം നടത്തിയതിലൂടെ ഉദ്യോഗാർത്ഥികളും വിദ്യാർത്ഥികളുമായ 1811 പേർക്ക് പ്രയോജനം ലഭിച്ചിട്ടുണ്ട്.

6. വിവര ശേഖരണം :

സ്കോളർഷിപ്പുകൾ, കോഴ്സുകൾ, പരിശീലനങ്ങൾ, തൊഴിൽ സാധ്യതകൾ എന്നിവ സംബന്ധിച്ച 374 വിവരങ്ങൾ ശേഖരിച്ച് ഉദ്യോഗാർത്ഥികളുടെ റഫറൻസിനായി ഓഫീസിൽ സൂക്ഷിച്ചിട്ടുണ്ട്.

7. കോച്ചിങ് ക്ലാസ്സ് :

റിപ്പോർട്ട് കാലയളവിൽ 3 കോച്ചിങ് ക്ലാസ്സ് സംഘടിപ്പിച്ചതിലൂടെ 154 ഉദ്യോഗാർത്ഥികൾക്ക് പ്രയോജനം ലഭിച്ചിട്ടുണ്ട്.

8. സൈക്കോളജിക്കൽ ടെസ്റ്റ് :

25 പേർക്ക് റിപ്പോർട്ട് കാലയളവിൽ സൈക്കോളജിക്കൽ ടെസ്റ്റ് നടത്തി വ്യക്തിപരമായ കൗൺസലിങ് നടത്തുകയുണ്ടായി.

9. വ്യക്തിഗത മാർഗ്ഗനിർദ്ദേശം :

റിപ്പോർട്ട് കാലയളവിൽ തൃശ്ശൂർ ജില്ലയിലെ വിവിധ എംപ്ലോയ്മെന്റ് എക്സ്പെഞ്ചുകളിൽ പേര് രജിസ്ട്രർ ചെയ്ത 43 ഉദ്യോഗാർത്ഥികൾക്ക് വ്യക്തിഗത മാർഗ്ഗനിർദ്ദേശം നൽകുകയുണ്ടായി.

10. കരിയർ എക്സിബിഷൻ

റിപ്പോർട്ട് കാലയളവിൽ തൃശ്ശൂർ, മലപ്പുറം, പാലക്കാട്, കോഴിക്കോട് എന്നീ ജില്ലകളിലെ വിവിധ സ്ഥാപനങ്ങളിലായി 7 കരിയർ എക്സിബിഷൻ നടത്തിയതിലൂടെ വിദ്യാർത്ഥികളും ഉദ്യോഗാർത്ഥികളുമായ 1170 പേർക്ക് പ്രയോജനം ലഭിച്ചു.

11. ബുള്ളറ്റിൻ :

പ്രതിമാസം ഒന്ന് വീതം 4 ബുള്ളറ്റിനുകൾ റിപ്പോർട്ട് കാലയളവിൽ പ്രസിദ്ധീകരിച്ചിട്ടുണ്ട്. ഇതിലൂടെ യൂണിവേഴ്സിറ്റിയ്ക്ക് കീഴിലുള്ള വിവിധ കോളേജുകൾ, 75 എംപ്ലോയ്മെന്റ് എക്സ്പെഞ്ചുകൾ, മനു വിദ്യാഭ്യാസസ്ഥാപനങ്ങൾ എന്നിവിടങ്ങളിൽ അനവധി ഉദ്യോഗാർത്ഥികൾക്ക് വിവിധ കോഴ്സുകൾ സംബന്ധിച്ച പുതിയ വിവരങ്ങൾ നൽകാനും ഉദ്യോഗാർത്ഥികളുടെ വ്യക്തിത്വ വികസനത്തിന് അനുഗുണമായ അറിവുകൾ നൽകാനും സാധിച്ചിട്ടുണ്ട്.

12. കരിയർ ലൈബ്രറി

സൗകര്യപരമായ രീതിയിലുള്ള ഒരു കരിയർ ലൈബ്രറി എംപ്ലോയ്മെന്റ് ഡിപ്പാർട്ട്മെന്റ് അനുവദിച്ച തുക ഉപയോഗിച്ച് ഫെബ്രുവരി മാസത്തിൽ പ്രവർത്തനമാരംഭിച്ചു.

13. സാമ്പത്തികം :

എംപ്ലോയ്മെന്റ് ഡിപ്പാർട്ട്മെന്റിൽ നിന്നും അനുവദിച്ച തുക ഉപയോഗിച്ച് വാങ്ങിയ എൽ.സി.ഡി പ്രൊജക്ടർ, സ്ക്രീൻ, ലാപ്പ് ടോപ്പ്, റഫറൻസ് ബുക്കുകൾ എന്നിവ ഫെബ്രുവരി മാസം മുതൽ കരിയർ ക്ലാസ്സ്/സെമിനാർ എന്നിവയ്ക്ക് ഉപയോഗിച്ചുവരുന്നു.

1 കേരള റിമൗണ്ട് ആൻഡ് വെറ്ററിനറി സ്കോളർഷിപ്പ് (NCC) മണ്ണുത്തി.

- എൽലാ പ്രവൃത്തി ദിവസങ്ങളിലും രാവിലെ 8.30 മുതൽ 8, വൈകിട്ട് 4.30 - മുതൽ 6.30 വരെയും അധ്യാപനസംഗ്രഹങ്ങൾക്ക് പരിശീലനം നടത്തപ്പെട്ടു.

- എൽലാ വ്യാഴാഴ്ചകളിലും വൈകിട്ട് 4.30 മുതൽ 6.30 വരെ പരമേശ്വരൻ പ്രിയൻ പരിശീലനം നടത്തി. 2011 റിപ്പബ്ലിക് ദിന ക്യാമ്പിൽ പങ്കെടുത്ത കേന്ദ്രങ്ങൾക്ക് മണ്ണുത്തി യൂണിറ്റിൽ വച്ച് സ്വീകരണം ഏർപ്പെടുത്തി.

- എൻ. സി. സി സർട്ടിഫിക്കറ്റ് പരീക്ഷകൾ - 2011 മാർച്ച്

ബി - സർട്ടിഫിക്കറ്റ് - എ ഗ്രേഡ് - 14
 ബി ഗ്രേഡ് - 33 } ആകെ - 27

സി - സർട്ടിഫിക്കറ്റ് ബി ഗ്രേഡ് - 10
 സി ഗ്രേഡ് - 19 } ആകെ - 29

- എൻ.സി.സി കോഴ്സുകൾ

- B.Sc (Forestry) - 2010 ബാച്ച് 30 വിദ്യാർത്ഥികൾ
- BVSc & AH - R&V NCC 221 - 35 വിദ്യാർത്ഥികൾ
- R&V NCC 121 - 33 വിദ്യാർത്ഥികൾ

2010 ലെ മികച്ച NCC കേന്ദ്രങ്ങൾ യൂണിറ്റ് ഗ്രൂപ്പ് അടിസ്ഥാനത്തിലുള്ള മുഖ്യമന്ത്രിയുടെ സ്കോളർഷിപ്പ് ലഭിച്ച കേന്ദ്രങ്ങൾ

- SUO. അനൂരാഗ്
- U.O. കാർത്തിക പി.
- SGT. നിധിൻ മോഹൻ

2010 - 2011 ട്രെയിനിങ് വർഷത്തെ 40 പരമേശ്വരൻ (120പിരിയഡുകൾ) ഫെബ്രുവരിയിൽ പൂർത്തിയാക്കി.

2011 - 2012 ട്രെയിനിങ് വർഷത്തെ ക്ലാസ്സുകൾ ഏപ്രിൽ മാസം ആരംഭിച്ചു.

- 65 കേന്ദ്രങ്ങളെ ട്രെയിനിങ്ങിന്റെ ഒന്നാം വർഷത്തിലേക്ക് പുതുതായി ചേർത്തു. ആകെ കേന്ദ്രങ്ങൾ 182.

CHAPTER V11

**DIRECTORATE OF PHYSICAL PLANT
VELLANIKKARA**

ENGINEERING DIVISION, PANANGADU

Finance

Head of Account	Provision for the year	Expenditure	Station Receipts
Non Plan	45.046	43,57,526.00	1,27,700.00
Plan	Nil	Nil	Nil
ICAR	Nil	Nil	Nil
Other EAPs	Nil	Nil	Nil
Revolving Fund	Nil	Nil	Nil

ELECTRICAL SUB DIVISION, VELLANIKKARA

Finance

Head	Expenditure	Receipts
Non-Plan	a) 2,48,8693 (Establishment)	28,58,116
	b) 3,69,423 (works)	
Plan		
ICAR		
Other EAPs		
Revolving Fund	Nil	

CHAPTER VIII

KAU ESTATE, VELLANIKKARA

PLANT PROPAGATION AND NURSERY MANAGEMENT UNIT,
CAMPUS DEVELOPMENT, KAU P.O., VELLANIKKARA, THRISSUR

Research programme

Details of research projects / Development projects

Completed projects during 2010-2011:

Name of project	Funding Agency	Name of PI	Name of Co-PI	Outlay
SHM Project on Rehabilitation of existing tissue culture lab at PPNMU	SHM	Dr. Anitha.S, Assoc. Professor	Dr. Lisamma Joseph Assoc. Professor	8 lakhs

Farm Advisory Services :

In person	Over telephone	Through letters
3000	500	-

List of publications : 9

Scientific papers : 8

- Lissamma Joseph, Anitha, S. and K. Aravindakshan 2010. Performance evaluation of Coconut cultivars under rain fed conditions. International Conference on Coconut Biodiversity for Prosperity 25-28th October 2010 at CPCRI, Kasaragod. pp 38
- Lissamma Joseph, Anitha, S., K. Aravindakshan and V. K Raju 2010. Survey, conservation and multiplication of early season jackfruit (*Artocarpus heterophyllus* Lam.) in Kerala. In *Horticulture, Horti- Buiness and Economic Prosperity – Book of Abstracts 4th Indian Horticulture Congress -2010* (Eds Singh A. K., Awasthi, O. P. and verma, M. K.). 18-21st November 2010. New Delhi. pp 32
- Anitha, S. 2010. Cost effective eco-specific technology for organic manuring in direct seeded rice. *Green farming* 1(2):120-123
- Anitha, S. and Jose Mathew. 2010 Direct and residual effect of concurrent growing of dhaincha (*Sesbania aculeate*) in wet- seeded rice (*Oryza sativa*) on the productivity of rice-rice cropping system. *Indian Journal of Agricultural Sciences* 80 (6): 487-492
- Anitha, S., Jose Mathew and C. T. Abraham. 2010. Dual cropping of rice (*Oryza sativa*) and green manure crops - A cost effective management alternative for direct seeded semi-dry system of rice cultivation. *Indian Journal of Agronomy* 55 (3): 165-170
- Anitha, S. and Jose Mathew. 2010. *In situ* green manuring with daincha (*Sesbania aculeata* Pers.): a cost effective management alternative for wet seeded rice (*Oryza sativa* L.) *Journal of Tropical Agriculture* 48(1-2): 34-39
- Anitha, S., Lissamma Joseph and K. Aravindakshan 2010. Integration of meat goats on the productivity of coconut farm. International Conference on Coconut Biodiversity for Prosperity 25-28th October 2010 at CPCRI, Kasaragod. pp 92

Anitha, S. 2011. Residual effect of concurrent growing of daincha (*Sesbania aculeate*) in wet seeded rice on the performance of succeeding transplanted rice. *Green farming* 2(2):155-157

Anitha, S. 2011. Concurrent growing of green manure crops in rice. *Plant Environment Interaction* (ed. Trivedi, P. C.) Pointer Publishers, Jaipur, Rajasthan, India, pp.157-170

Finance

Head of A/C		Expenditure (Rs.)	Receipts (Rs.)
Plan	<u>Development of main campus</u>		
	Development of Botanical Garden	1,36,11,798	-
383-31-3302	Intensive vegetable seed production programme	3,15,039	-
383-31-3305		6,50,060	-
383-31-3323			
ICAR			
383-31-8287	CSS-NHM Spices	13,08,101	-
383-21-5118	Modernization of agricultural farms	47,76,987	-
Other EAPs			
383-31-8260	SHM Project on Rehabilitation of existing tissue culture lab at PPNMU	8 lakhs	-
383-31-8551	Net work project on production and distribution of quality planting materials	1.79171lakhs	-
383-31-8661	RKVY Project on – Development of Production units for hybrid Coconut seedlings and other Planting materials in three districts of Kerala	8.89 lakhs	-
383-31-8766	Production and Distribution of Elite seeds and planting material- Network Project	5 lakhs	-

A/C No.	Revolving fund	Expenditure (Rs.)	Receipts (Rs.)
1112	Establishment of Central Nursery	16,67,746	4474642*
1867	Coconut Oil Production	2,81,427	807191
67108274666	Production and distribution of quality planting materials –TC plants	-	101255
67139240993	Development of Production units for hybrid Coconut seedlings and other elite planting materials	127500	123735

* Internal receipt Rs. 35, 50,000 transferred to Comptroller, KAU

CHAPTER IX

FINANCE AND ACCOUNTS

The Kerala Agricultural University over the last several years got quite insufficient grant-in-aid from Government. This resulted in the university having accumulated liabilities against non-plan grant. In the year 2010-11, the non-plan grant-in-aid to University was Rs.96.34 Crores. This was 10% more than that of the year 2009-10.

As against 10% increase allowed in non-plan grant, the increase in actual expenses was more than 60%, consequent on declaration of DA of 30% and 2006 UGC arrears of 30%.

The inadequate non-plan grant-in-aid in the previous years has put the University in to a total liability of Rs.190 Crores as on 31.03.2011 as noted below:-

		(Rs. In Crores)
A	Amount to be deposited in the PF Account from 2000-01 to 2010-11	66.35
B	Interest on the above amount	31.08
C	Amount to be paid towards DCRG, CVP, DR etc from 01.01.2009 onwards	28.11
D	Refund of amount taken from ICAR / EAP funds used for non-plan expenditure	22.11
E	Audit fee due to Local Fund Audit	5.00
F	Salary, Terminal surrender, new pensionary benefits, increase in salary due to pay revision	37.35
	Total	190.00

In addition to this, an amount of Rs.14.45 Crores will be needed for payment of UGC arrears to teachers for the period from 01.01.2006 to 28.02.2010.

Apart from the above, University will need Rs.150.43 Crores for the current year expenses. Considering the liability of Rs.190 Crores and additional requirement of Rs.150.43 Crores, total requirement for the year 2011-12 will come to Rs.340.43 Crores. As against this, the non-plan allocation for 2011-12 is only Rs.115.608 Crores. Taking in to account the anticipated internal receipts of Rs.6.25 Crores, the University will be running short of Rs.218.572 Crores on non-plan funds at the end of this financial year.

In the case of Plan grant-in-aid, allocation for last year was Rs.51 Crores. Out of this, Rs.36.25 Crores for regular plan schemes and Rs.7.6875 Crores for specific plan projects were received. For 2011-12 plan grant-in-aid allocation is Rs.45 Crores. In this, Rs.18 Crores is meant for specific plan projects. Approval of Government is required for such schemes. During 2010-11 the assistance received from ICAR, OEAP and other external funding agencies is Rs.562194254.

FUNDS RECEIVED AND INTERNAL RECEIPTS FOR 2010-11

A	Grant-in-aid non-plan	Rs.963400000
B	Grant-in-aid plan	Rs.439375000
C	ICAR	Rs.221469876
D	Other EAPs	Rs.340724378
E	Internal resources	Rs.141331509

BUDGET ESTIMATE 2010-11 IN KAU BUDGET

Item	Resources (Rs. In lakhs)	Expenditure (Rs. In lakhs)
Non-plan grant-in-aid	10096.000	15018.168
Plan grant-in-aid	5800.000	6212.182
ICAR	2000.000	2000.000
OEAP	1600.000	1600.000
Internal resources	1429.602	-
TOTAL	20925.602	24830.350
Foundation Fund	5.000	5.000
Loans and suspense	1263.350	1263.350
Revolving Fund	256.000	256.000
TOTAL	22449.952	26354.700
Opening / Closing Balance	1465.453	(-) 2439.295
GRAND TOTAL	23915.405	23915.405

University has started On-line accounting system developed by the University itself.

The plan fund of the University is earmarked from 2011-12 as for non salary items. The University has been using every month nearly Rs.1.25 Crores of plan fund for paying salary and wages. As it is provided by the Government, University may not be in a position to use plan amount for salary. This will necessitate in University finding out more non plan funds, for booking the salary now being booked against plan, in non-plan.

Kerala Agricultural University is divided to form Kerala Veterinary and Animal Sciences University & Kerala University of Fisheries and Ocean Sciences. Hardly 20% of the staff of KAU have gone to these Universities, KAU is still holding the liability of paying pension to all the 4400 pensioners, irrespective of they got retired from the stations now in control of KVASU and KUFOS. The monthly commitment on pension of KAU comes to Rs.4 Crores. For other expenses such as salary, wages etc it needs another Rs.6 to Rs.6.5 Crores. In addition to this there will be huge expenses on retirement benefits to be released after March 2012.

APPENDIX I

LIST OF MEMBERS OF GENERAL COUNCIL

EX-OFFICIO MEMBERS

- | | | | |
|----|--|----|---|
| 1 | The Chancellor | 20 | Sri. Rajaji Mathew Thomas MLA
(Member, General Council of KAU)
Thenguvilayil House Chemboothra,
Pattikkad (P.O) Thrissur-680652, |
| 2 | The Pro-Chancellor. | 21 | Sri.C.K.P.Padmanabhan, MLA Member,
General Council of KAU Chengal, Kizhakkepurayil,
Kunhimangalam, Kovvapuram.P.O. Kannur. |
| 3 | The Vice-Chancellor,
Kerala Agricultural University,
Vellanikkara, Thrissur. | 22 | Prof. C.Raveendranath, MLAMember,
General Council of KAU Lakshmi Bhavan
Panthalathu Lane,Kanattukara, Thrissur. |
| 4 | The Agricultural Production Commissioner,
Government Secretariat, Thiruvananthapuram | 23 | Sri.Thomas Chazhikadan M.L.A
(Member, General Council of KAU) Chazhikkat,
S.H.Mount P.O Kottayam - 686006 |
| 5 | The Principal Secretary to Government,
Department of Agriculture,
Government Secretariat, Thiruvananthapuram. | 24 | Sri.Pallipram Balan, MLA
(Member, General Council of KAU)
Pushpa Nivas, Shri Shilpa Housing Apartment,
Karattuvayal, Kanhangadu P.O.,
Kasargode, PIN-671 315. |
| 6 | The Principal Secretary to Government,
Department of Finance,
Government Secretariat, Thiruvananthapuram. | 25 | Vacant |
| 7 | The Principal Secretary to Government,
Department of Fisheries,
Government Secretariat, Thiruvananthapuram. | 26 | Dr. T.Pradeep kumar,
(Member, General Council of KAU)
Associate Professor,
Department of Olericulture,
College of Horticulture, Vellanikkara |
| 8 | The Principal Secretary to Government,
Department of Animal Husbandry,
Government Secretariat, Thiruvananthapuram. | 27 | Dr. Jose Joseph,
(Member, General Council of KAU)
Professor, College of Agriculture Padannakkad,
Kasaragod - 671328 |
| 9 | The Director of Agriculture,
Thiruvananthapuram. | 28 | Dr. K Aravindakshan
(Member, General Council of KAU)
Central Nursery, K.A.U,Vellanikkara |
| 10 | The Director of Animal Husbandry,
Thiruvananthapuram. | 29 | Dr. N. Vijayan,
(Member, General Council of KAU)
Professor,
College of Veterinary & Animal Sciences,
Mannuthy |
| 11 | The Director of Dairy Development,
Thiruvananthapuram | 30 | Kum. Ayswarya R. Venu (2005-03-38)
(Member, General Council of KAU) Neelambari,
Koduvazhanoor P.O Kilimanoor,
Thiruvananthapuram |
| 12 | The Director of Fisheries,
Thiruvananthapuram. | 31 | Sri. Mohammed.A (2006-02-26)
(Member, General Council of KAU)
Kelappaji College of Agricultural Engineering &
Technology, Tavannur, Malappuram |
| 13 | The Principal Chief Conservator of Forests,
Thiruvananthapuram. | 32 | Sri. Shah.A
(Member, General Council of KAU) Administrartive
Officer, College of Agriculture, Vellayani,
Thiruvananthapuram. |
| 14 | The Chairman, Rubber Board,
Kottayam - 686 002. | | |
| 15 | The Chairman, Spices Board,
Sugandha Bhavan, NH By Pass, PB No. 2277
Palarivattom (P.O), Kochi - 682 025. | | |
| 16 | The Chairman,
Marine Products Export Development Authority,
Panampilly Nagar, Kochi | | |
| 17 | The Director,
CPCRI, Kasargod - 671 124. | | |
| 18 | The Director,
KFRI, Peechi, Thrissur - 680 653. | | |
| 19 | Dr.N.V.Nair
Director,
Sugarcane Breeding Institute,
Coimbatore - 641007, Tamilnadu | | |

- | | |
|--|--|
| <p>33 Sri. Sivakumar.N.I.
(Member, General Council of KAU)
Section Officer, College of Agriculture,
Vellayani, Thiruvananthapuram</p> <p>34 Sri. M.S.Pushpakumar,
(Member, General Council of KAU)
Permanent Labourer,
College of Veterinary & Animal Sciences, Mannuthy</p> <p>35 Sri. Chandran.V.B,
(Member, General Council of KAU)
Permanent Labourer,
Banana Research Station, Kannara.</p> <p>36 Dr.A.Anilkumar,Professor
(Member, General Council of KAU)
House No. 7A, Lane B, Devaswam Lane,
Keshavadasapuram, Pattom P.O,
Thiruvananthapuram</p> <p>37 Dr.S.Balaraman
(Member, General Council of KAU)
SWARAM, Mundakkal, Kollam</p> <p>38 Prof. S.Leenakumari
(Member, General Council of KAU)
Rice Research Station Moncompu
Thekkekara P.O Alappuzha - 688 503</p> <p>39 Shri.R.Hali
(Member, General Council of KAU)
Former Director of Agriculture "PEARLHILL",
Attingal, Thiruvananthapuram</p> <p>40 Shri. Sathyan Mokeri
(Member, General Council of KAU)
Shree Achutham, Mokeri (P.O) via
Anakkattil, Kozhikode</p> | <p>41 Shri K. Dinesh Babu
(Member, General Council of KAU)
Jilla Panchayat Member, Vattappachayil Veedu,
Meeyannur (P.O), Kollam.</p> <p>42 Smt. Bijimol, M.L.A
(Member, General Council of KAU)
Panthaluparambil, Elappara (P.O)Idukki</p> <p>43 Shri. P.V. John Pottas
(Member, General Council of KAU)
Pottas, Machiplavu Adimali, Idukki</p> <p>44 Shri Jose Manparambil
(Member, General Council of KAU)
Pizhak (P.O), Pala, Kottayam</p> <p>45 Shri. Ravindran Master
(Member, General Council of KAU)
Perumbayil House Vadanappally, Thrissur</p> <p>46 Smt.E.S.Ramadevi Amma
(Member, General Council of KAU)
Mullasseril, Kuriyode (P.O) Chadayamangalam</p> <p>47 Sri.C.R.Das
(Member, General Council of KAU)
"Vikas", Mannuthy, Thrissur</p> <p>48 Sri.Saju Paul M.L.A
(Member, General Council of KAU)
Panthalungal, Vengoor (PO)
Perumbavoor, Emakulam - 683 546</p> <p>49 Sri. Sunil Kumar .K,
(Member, General Council of KAU)
Section Officer, AC E III Section,
University of Kerala, Palayam,
Thiruvananthapuram.</p> |
|--|--|

LIST OF EXECUTIVE COMMITTEE MEMBERS

- | | |
|---|---|
| <p>1 Sri. K.R Viswambharan
Vice Chancellor,
Kerala Agricultural University, Vellanikkara, Thrissur</p> <p>2 Agricultural Production commissioner,
(Member, Executive committee of KAU)
Government secretariat, Thiruvananthapuram.</p> <p>3 Principal Secretary to Government, Finance
Department (Expenditure),
(Member, Executive committee of KAU)
Governmentsecretariat, Thiruvananthapuram</p> <p>4 Sri.Rajaji Mathew Thomas, M.L.A,
(Member, Executive Committee of KAU)
Thenguvilayil House, Chemboothra Pattikkad P.O,
Thrissur - 680652.</p> <p>5 Dr.N.V.Nair Director,
(Member, Executive committee of KAU)
Sugarcane Breeding Institute,
Coimbatore - 641007, Tamilnadu</p> <p>6 Dr. K Aravindakshan
(Member, Executive committee of KAU)
Central Nursery, K.A.U, Vellanikkara</p> | <p>7 Dr.A. Anilkumar, Professor
(Member, Executive committee of KAU)
House No. 7A, Lane B, Devaswam Lane ,
Keshavadasapuram, Pattom P.O, Thiruvananthapuram</p> <p>8 Prof. C.Raveendranath, MLA
(Member, Executive committee of KAU)
Lakshmi Bhavan Panthalathu Lane,,
Kanattukara, Thrissur.</p> <p>9 Shri. P.V. Ravindran Master
(Member, Executive committee of KAU)
Perumbayil House Vadanappally, Thrissur</p> <p>10 Shri.K.Dinesh Babu
(Member, Executive committee of KAU)
Jilla Panchayat Member
Vattappachayil Veedu Meeyannur (P.O), Kollam.</p> <p>11 Prof. S.Leenakumari
(Member, Executive committee of KAU)
Rice Research Station Moncompu
Thekkekara P.O Alappuzha - 688 503</p> |
|---|---|

During the period under report 13 meetings were held.

SUB COMMITTEES OF THE EXECUTIVE COMMITTEE

I Finance Committee

1. Vice-Chancellor - Chairman
2. Finance secretary to Government - Member
3. Agricultural Production Commissioner - Member
4. Sri. Rajaji Mathew Thomas, M.L.A - Member
5. Comptroller - Convenor

II Planning, Development & Resource Mobilization Committee

1. Sri. K. Dinesh Babu - Chairman
2. Prof. C Raveendranath, M.L.A - Member
3. Dr. K. Aravindakshan - Member
4. Dr. A Anilkumar - Member
5. Prof. S. Leenakumari - Member
6. Sri. Ravindran Master - Member
7. Director of Research - Member
8. Comptroller - Member
9. Director of Extension - Convenor

III Research & Extension Review Committee

1. Prof. S. Leenakumari - Chairperson
2. Sri. Rajaji Mathew Thomas, M.L.A - Member
3. Prof. C Raveendranath, M.L.A - Member
4. Dr. A Anilkumar - Member
5. Sri. K. Dinesh Babu - Member
6. Sri. Ravindran Master - Member
7. Dr. K. Aravindakshan - Member
8. Director of Extension - Member
9. Director of Research - Convenor

IV Establishment Committee

1. Prof. C Raveendranath, M.L.A - Chairman
2. Sri. Rajaji Mathew Thomas, M.L.A - Member
3. Dr. K. Aravindakshan - Member
4. Sri. Ravindran Master - Member
5. Dr. A Anilkumar - Member
6. Sri. K. Dinesh Babu - Member
7. Prof. S. Leenakumari - Member
8. Registrar - Convenor

V Education, Career Development & Student Welfare Committee

1. Dr. A Anilkumar - Chairman
2. Prof. C Raveendranath, M.L.A - Member
3. Sri. Rajaji Mathew Thomas, M.L.A - Member
4. Sri. K. Dinesh Babu - Member
5. Sri. P. V Ravindran Master - Member
6. Prof. S. Leenakumari - Member
7. Dr. K. Aravindakshan - Member
8. The Dean, COA, Vellayani - Member
9. The Dean, KCAET, Tavanur - Member
10. The Dean, COF, Panangad - Member
11. The Dean, COVAS, Mannuthy - Member
12. Director (Acad & P.G Studies) - Member
13. Director of Students Welfare - Convenor

VI Works Committee

1. Sri. Ravindran Master - Chairman
2. Sri. Rajaji Mathew Thomas, M.L.A - Member
3. Prof. C Raveendranath, M.L.A - Member
4. Dr. K. Aravindakshan - Member
5. Dr. A Anilkumar - Member
6. Sri. K. Dinesh Babu - Member
7. Prof. S. Leenakumari - Member
8. Director of Physical Plant - Convenor

VII Legal Monitoring Committee

1. Dr. K. Aravindakshan - Chairman
2. Prof. C Raveendranath, M.L.A - Member
3. Dr. A Anilkumar - Member
4. Prof. S. Leenakumari - Member
5. Sri. P. V Ravindran Master - Member
6. Sri. K. Dinesh Babu - Member
7. Sr. Standing Counsel - (Special Invitee)
8. Registrar - Convenor

SUB COMMITTEES OF THE GENERAL COUNCIL

I STATUTE SUBCOMMITTEE

- | | | |
|--------------------------------|---|-------------|
| 1. Smt. E.S. Bijimol, MLA | - | Chairperson |
| 2. Sri. C.K.P.Padmanabhan, MLA | - | Member |
| 3. Sri. Pallipram Balan, MLA | - | Member |
| 4. Dr. T.Pradeep Kumar | - | Member |
| 5. Sri. C.R.Das, | - | Member |
| 6. Dr. S.Balaraman | - | Member |
| 7. Dr. Jose Joseph | - | Member |
| 8. Sri. A.Shah | - | Member |
| 9. Sri. K.Sunilkumar | - | Member |
| 10. Sri. N.L.Sivakumar | - | Member |
| 11. Registrar | - | Convenor |

II ACCOUNTS COMMITTEE

- | | | |
|---------------------------------|---|----------|
| 1. Sri. C.K.P.Padmanabhan, MLA | - | Chairman |
| 2. Sri. Pallipram Balan, MLA | - | Member |
| 3. Sri. Saju Paul, MLA | - | Member |
| 4. Sri. Thomas Chazhikadan, MLA | - | Member |
| 5. Sri. Sathyan Mokeri | - | Member |
| 6. Dr. T.Pradeep Kumar | - | Member |
| 7. Sri. R.Hali | - | Member |
| 8. Sri. A.Shah | - | Member |
| 9. Sri. M.S.Pushpakumar | - | Member |
| 10. Sri. V.B.Chandran | - | Member |
| 11. Comptroller | - | Convenor |

III ASSURANCE COMMITTEE

- | | | |
|---------------------------------|---|----------|
| 1. Sri. Saju Paul, MLA | - | Chairman |
| 2. Smt. E.S.Bijimol, MLA | - | Member |
| 3. Sri. Thomas Chazhikadan, MLA | - | Member |
| 4. Sri. John Pottas | - | Member |
| 5. Sri. Jose Manaparambil | - | Member |
| 6. Smt. E.S.Ramadevi Amma | - | Member |
| 7. Kum. Ayswarya R.Venu | - | Member |
| 8. Sri. Arun S. | - | Member |
| 9. Dr. N.Vijayan | - | Member |
| 10. Registrar | - | Convenor |

APPENDIX II

LIST OF STAFFS AT KAU HEAD QUARTERS, VELLANIKKARA

Vice-chancellor	Dr.K.R.Viswambharan	28.3.2007	Continuing
Registrar i/c	Dr.Jobi.V.Paul	25.1.2007 upto	11.6.2010
	Dr.C.B.Manomohan	11.6.2010	11.1.2011
	Dr.T.R.Gopalakrishnan	11.1.2011	28.2.2011
	Dr.P.B.Pushpalatha	28.2.2011	Continuing
Comptroller	Sri.R.Jayakumar	5.10.2009	Continuing
Director of Research	Dr.D.Alexander	19.11.2005	3.7.2010
	Dr.T.R.Gopalakrishnan	3.7.2010	3.7.2010AN
	Dr.D.Alexander	3.7.2010AN	17.7.2010
	Dr.T.R.Gopalakrishnan	17.7.2010	Continuing
Director (Acad & P.G.Studies) i/c	Dr.P.K.Asokan	19.8.2008	Continuing
Dy.Reg/Dy.Com/AOGr.I/EO/PRO/FA			
	Ammini V.M.	Higher Grade	
	Chandrika V.R.	No grade	
	Jaseentha M.	No grade	
	Sherly Mathew C.	No grade	
AO Gr.II/AC/AR/RO			
	Dinesan K.	No grade	
	Kuruvilla K.J.	No grade	
	Mary Joseph N.	No grade	
	Prema B Nair	Higher Grade	
	Remani P.V.	No grade	
	Usha C.	Higher Grade	
	Vijayalakshmi K.S.	Higher Grade	
Pool Officer			
	Jayakumar M.C.	No grade	
Section Officer			
	Ajayakumar P.K.	No grade	Mohini P. Higher Grade
	Akber Ali K.M.	No grade	Narayanan V.N. Higher Grade
	Anitha Venugopal	No grade	Pradeep A. Higher Grade
	Anithakumari A.	No grade	Pradeep K. No grade
	Babychan T.J.	No grade	Prema P.P. No grade
	Beena V.K.	No grade	Rajan M.E. Higher Grade
	Boby Abraham	Higher Grade	Rajeswary A. No grade
	Chamunni P.V.	No grade	Raveendranathan C. No grade
	Dalika E.K.	No grade	Sarojini K.N. Higher Grade
	George K.M.	No grade	Sathiascelan V.S. No grade
	Harinath K.	Higher Grade	Sreejith P. Higher Grade
	Indira Devi K.	Higher Grade	Sreekumar K. No grade
	Jacob Joe P.A.	Higher Grade	Sudha K.B. No grade
	Jayasankar K.V.	No grade	Sujatha Bai K. No grade
	Kishore A.W.	Higher Grade	Suresh kumar P.S. No grade
	Krishna Prakash P.	No grade	Thimose P.J. No grade
	Many M.A.	Higher Grade	Unni V. No grade
	Meera K.	Higher Grade	Unnikrishnan Nair N.V. Higher Grade
	Mohanan K.	Higher Grade	Valsala N.K. Higher Grade
			Venugopalan I.K. No grade
			Yousufali E.A. No grade

Section Officer (FC&D)

Easwary P.K. Higher Grade
 Noel R. Higher Grade
 Parameswaran K.K. Higher Grade
 Sarada P. Higher Grade

Assistant

Abdul Hakeem. B. Senior Grade
 Abdul Kader P.B. Dr. Selection Grade
 Abdul Rasheed V.Y. Selection Grade
 Anjali R. Senior Grade
 Anju M.L. Selection Grade
 Anto Varghese Senior Grade
 Arun B. Asok Senior Grade
 Arun Sankar Selection Grade
 Babu K.D. Selection Grade
 Bhagya Lakshmi V.R. Senior Grade
 Bijith B.L. Senior Grade
 Chandrika C. Selection Grade
 Deepa K.S. Senior Grade
 Deepa V.D. Selection Grade
 Deepthy V. Senior Grade
 Denny C.V. Selection Grade
 Devassy T.M. Selection Grade
 Dhanya. S. Grade II
 Girish M. Grade II
 Gopakumar C.S. Selection Grade
 Gopakumar S. Senior Grade
 Haridas P.C. Selection Grade
 James K.D. Selection Grade
 Jayakumar K S. Grade II
 Jayan N.B. Selection Grade
 Jitha K.S. Selection Grade
 Johnson P.I. Selection Grade
 Jolly D. Menachery No grade
 Joy M.U. Selection Grade
 Jyothi S. Sharma Selection Grade
 Kanthi T.R. Selection Grade
 Lalithambika P.S. Selection Grade
 Madhu Mohan A.S. Senior Grade
 Malathi T.V. Selection Grade
 Manikantan M.B. Selection Grade
 Manikuttan C. Selection Grade
 Manoj Kumar K. Senior Grade
 Manojkumar K.C. Selection Grade

Office Superintendent

Parukutty M.K. No grade
 Rajini M.A. No grade
 Sajany M.K. No grade
 Selmath K.U. No grade
 Sreemathi Kumari P. No grade
 Vincent T.A. No grade

Shiras B. No grade
 Sukumari T.K. Higher Grade
 Surendran I.A. Higher Grade
 Umaiva V.H. No grade
 Valsala K.A. Higher Grade
 Vilasini E.R. Higher Grade

Mini. A.C. Senior Grade
 Mohamed Shereef F.A. Selection Grade
 Muhammed Shanar. V. M. Senior Grade
 Nisha K. Krishnan Senior Grade
 Noushad K.I. Senior Grade
 Peter V.P. Senior Grade
 Pius V.R. Grade I
 Pradeesh K.R. Senior Grade
 Prasanth Augustine Senior Grade
 Prasanth G. Grade II
 Prathish K.P. Grade II
 Radhakrishnan N. Selection Grade
 Raphijan P.H. Selection Grade
 Ratheesh R. Senior Grade
 Remani K.K. Selection Grade
 Roshini T.M. Senior Grade
 Sajeer T.N. Grade II
 Salil V.G. Senior Grade
 Santhosh P. Selection Grade
 Sarada P.M. Selection Grade
 Seema T. Senior Grade
 Shanmugharajan S. Selection Grade
 Smitha K.A. No grade
 Sobha K.S. Selection Grade
 Sreekumar P. Grade II
 Subramanian K.V. Selection Grade
 Sudharma K.K. Senior Grade
 Sudheer G. Selection Grade
 Sudheer N.B. Selection Grade
 Suja George Senior Grade
 Sujatha C. Senior Grade
 Suresh M.N. Grade II
 Symon P.J. Selection Grade
 Thilakan T.A. Selection Grade
 Valsala P.V. Selection Grade
 Vidya S. Senior Grade
 Vijayakumar.P. Senior Grade
 Vijesh C.V. Senior Grade
 Yamuna. K.B. Grade II

Typist

Babitha P.K. Selection Grade
 Baby T.D. Selection Grade
 Dhanya. T.M. Senior Grade
 Joseph K.V. Senior Grade
 Joseph. E.L. Senior Grade
 Lalitha V. Selection Grade
 Leena T.J. Selection Grade

Narayanan T.P.
 Radhakrishnan P.K.
 Rajan A
 Rajesh. T.S
 Ramachandran A
 Remani P.
 Sabarish V.
 Vinod Xavior

Selection Grade
 Selection Grade
 Grade I
 Senior Grade
 Grade I
 Selection Grade
 Senior Grade
 Grade I

Bus Attendent

Anilkumar P.B.
 Radhakrishnan Nair P.
 Ratnakumaran P.S
 Saji Antony K
 Sasi S.
 Suresh Kumar S.

Grade II
 Grade II
 Grade II
 No grade
 Grade II
 Grade II

Class IV

Anoop K A
 Balesh.M.B.
 Biju T.V
 Bineesh N.V.
 Chandru K.K.
 Dilshad C
 Janaky P.R.
 Kochammu A.

Grade II
 Grade II
 No grade
 Selection Grade
 Selection Grade
 Selection Grade
 Selection Grade
 Selection Grade

Mohanan I.V
 Mukami M.K.
 Rajan M.K.
 Ramachandra Bahadur A.
 Santhosh K.K.
 Shajahan N.B
 Sobhana V.R
 Sujana K.V

Senior Grade
 Selection Grade
 Selection Grade
 Selection Grade
 Selection Grade
 Grade II
 Selection Grade
 Selection Grade

APPENDIX III

LIST OF STAFFS IN VARIOUS CAMPUSES

COLLEGE OF AGRICULTURE, VELLAYANI

Faculty position as on 31.3.2011

Agronomy

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Prof. & Head	Dr. M. Abdul Salam,	14	12	2
Professor	Dr. V.L. Geethakumari,			
	Dr. R. Pushpakumari,			
	Dr. P.Sukumari,			
	Dr. M.Meerabai,			
	Dr. K.R. Sheela ,			
	Dr. Sansamma George,			
	Dr. S. Lakshmi,			
	Dr. O. Kumari Swadija,			
	Dr. S.M. Shahul Hameed,			
Asso. Prof.	Sri. Jayakrishna Kumar			
Asst.Prof.	Dr. Shalini Pillai			
	Dr. Usha C. Thomas,			

Plantation Crops and Spices

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Pro. and Head	Dr.B.K.Jayachandran	1	1	Nil
Professor	Dr.G.R.Sulekha	2	1	1
Asso. Professor	Dr. P.C. Jessykutty	1	1	Nil

Pomology and floriculture

Cadre	Name	Sanctioned posts	In position	Vacant
Prof. & Head	Dr.C.S.Jayachandran Nair	1	1	0
Professors	Dr. Sheela , V.L. , Dr. Sabina George T.	2	2	0
Assoc. Prof		1	0	1

Olericulture

Position	Sanctioned strength	Current incumbents	No of vacancies	Remarks
Professor	3	1. Dr. M. Abdul Vahab(Head) 2. Dr. V.A. Celine 3. Dr. I. Sreelathakumary(NARP)	Nil	
Farm officer	2	1. Sri. L.Mohan Das		
Lab Asst.	1	2. Sri. J.Saji		
Peon.	1	3. Smt. R.Ajithakuamari		

Processing Technology

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr.K.Vasanthakumar	1	1	0
Associate Professor	Dr. Mini C	1	1	0

Biotechnology

Cadre	Name of Scientist	Sanctioned posts	In position	Vacant
Professor (Biotechnology)	Dr. B.R. Reghunath	1	1	0

Asso. Professor (Biotechnology)	Dr. Swapna Alex Dr. K. B. Soni	2	2	0
Asst. Professors (Biotechnology)	*Dr. Deepa S Nair, Asst. Pro. (Hort)	4	0	4
Teaching Assistants (Temporary posts) against Assistant Professor	1. Kavitha.B 2. RajiPrasad 3. Athira.A.P 4. MeeraSukumaran.			
Lab Assistant				
Field Assistant		1	0	1
Class IV		1	0	1
		1	1	Nil

- Posted against the vacancy of Dr.K.Rajmohan, Professor

Plant Physiology

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor		1	0	1
Associate Professor	Dr. R.V. Manju Dr. Roy Stephen Dr. M. M. Viji (on LWA)	2	3 In Asst. Prof's.vacancy	Nil
Asst. Professor	Nil	3	0	3
Class Four	Becna B. K	1	1	Nil

Plant Breeding

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant	Remarks
I. KAU	i) Dr.D.S.Radhadevi ii) Dr.Maya Devi.P iii)Dr.SunnyK. Oommen iv) Dr. D. Wilson v) Dr.K. Arya	5	5	-	
1. Prof.					
2. Asso. Prof.	Dr.V.G. Jayalekshmy	4	1	3	
3. Assistant Professor	Mrs. Seeja. G. i) Dr.P.Manju i) Dr. K.M. Abdul Khader	1	1	-	
II NARP (SR)Prof.		2	2	-	

Extension

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Asso.Dir. & Head	Dr. S. Mothilal Nehru	01	01	---
Professor	Dr. C. Bhaskaran			---
Professor	Dr. R. Prakash			
Professor	Dr. N.P. K. Sushama	Expired on 13.7.10		
Professor	Dr. V.B. Padmanabhan			
Professor	Dr. S. Shilaja			
Professor	Dr. B. Seema			
Professor	Dr. A. Anilkumar			
Asso.Prof.		05	--	
Assistant Professor(SS)	Dr. Sakeer Husain (relieved on working arrangement - 22.1.11)	04		
" "	Dr. Allan Thomas (Joined on 1.1.11)			

Agri. Entomology

Designation	No. of posts		Name of incumbent	Remarks
	Sanctioned	In position		
Prof.			College of Agriculture Dr. C. Nandakumar, Dr. K. Sudharma Dr. R. Krishnakumar	
			NARP (SR) Dr. Hebsy Bai, Dr. N. Anitha	
			AICRP on Nematode pests Dr. M.S. Sheela, Dr. T. Jiji	ADR and Head
			AINP on Pesticide residues Dr. S. Naseema Beevi Dr. Thomas Biju Mathew	
			AICRP on Honey Bees Dr. S. Devanesan	
Asso. Prof.			AICRP on Honey Bees Dr. K.S. Premila	
			AINP on Pesticide Residues Dr. Thomas George	
			College of Agriculture Dr. M.H. Faizal	
Asst. Prof.			College of Agriculture Dr. Reji Rani	
			AICRP on Nematode pests Dr. K.D. Prathapan	
			AICRP on Honey Bees Dr. V.S. Amritha	

Plant Pathology

Cadre	Name of Scientist	Sanctioned post	In position	Vacant
Prof & Head	Dr. M. Suharban	Professor	1	-
Professor	Dr. K.K. Sulochana	Professor	1	From Jan2010
Professor	Dr. P. Santha Kumari	..	1	-
..	Dr. A Naseema	..	1	-
..	Dr. C.Gokulapalan	..	1	-
..	Dr. V.K. Girija	..	1	-
..	Dr. C.A. Mary	..	1	-
..	Dr. Lulu Das / substituted by Dr.D.Geetha from Dec2010	..	1(tillDec10))	-
..	Dr. P.J. Joseph	..	1	-
..	Dr. K.Umamaheswaran	..	1	-

Animal Husbandry

Position	Sanctioned strength	Current incumbents	No of vacancies
Professor	1	-	1
Associate Professor	2	1. Dr.R.S.Jiji 2. Dr.M. O. Kurien	-

Senior Farm Supervisor	2	1. Sri. G. Venu	-
Farm Assistant Grade II	4	2. Sri. J. Sudha Kumar	-
Class IV		1. Smt. Prasanna Kumari	-
Milk recorder		2. Sri. A. Anil Kumar	
Agri. Economics		3. Sri. G.V.Saju	
		4. Sri. S. Shaji	
			vacant
			vacant

Position	Sanctioned strength	Current incumbents	No of vacancies	Remarks
Professor	1			
Associate Professor	1	Dr. Elsamma Job		Head
Asst. Professors	4	Smt. Santha A.M.		
Class IV	1	Nil	4	
		1	1	Provisional

Soil Science & Agricultural Chemistry

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr. N. Saifudeen Dr. Sumam Susan Varghese Dr. Sumam George Dr. Sam. T. Kurumthottal Dr. P. B. Usha Dr. C. R. Sudharmai Devi Dr. R. S. Shehana, Dr. K. Ushakumari Dr. K. C. Manorama Thampatti Dr. Usha Mathew Dr. E. Komala Amma	1	11 (CAP)	
Asso. Pro.		8	0	
Asst. Prof.		4	0	4

Agri. Statistics

Cadre	Name of Scientist	Sanctioned posts	In position	Vacant
Professor	Dr. Vijayaraghava Kumar	1	1	Nil
Assoc. Prof.	Smt. Brigit Joseph	1	1	Nil
Asst. Prof.		4*	0	4 (* two posts were shifted to Dept. of Plant Biotechnology)

Micro biology

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr. P. Sivaprasad			
Professor	Dr. K. S. Meenakumari			
Assoc. Professor	Dr. K. N. Anith			

Agri. Entomology

Designation	No. of posts	Name of incumbent	Remarks
	Sanctioned	In position	

Professor		11	College of Agriculture Dr. T. Nalinakumari Dr. M. S. Sheela Dr. C. Nandakumar Dr. K. Sudharma Dr. R. Krishnakumar	Professor and Head till 5.6.09 ADR (Plant protection), & Professor and Head from 6.6.09
			NARP (SR) Dr. Hebsy Bai Dr. N. Anitha	
			AINP on Pesticide residues Dr. S. Naseema Beevi Dr. Thomas Biju Mathew	
			AICRP on Nematode pests Dr. M.S. Sheela Dr. T. Jiji	
			AICRP on Honey Bees Dr. S. Devanesan	
Associate Professor		3	AICRP on Honey Bees Dr. K.S. Premila	
			AINP on Pesticide Residues Dr. Thomas George	
			College of Agriculture Dr. M.H. Faizal	
Assistant Professor		2	AICRP on Nematode pests Dr. K.D. Prathapan	
			AICRP on Honey Bees Dr. Reji Rani. O.P	

Home Science

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
1	Professor	1	3(2) promoted by career advancement	-
	Dr.S.Chellammal Professor & Head Dr.Mary Ukkuru.P Dr.P.V.Nandini			
2	Assoc. Professor	2	5(3) promoted by career advancement	-
	Dr.C.Nirmala Dr.M.Rajani Dr.P.Geetha Dr.Rari John Smt.Soffie Cheriyan			
3	Asst. Professor	4 (upgraded to Asst. Prof.(S.S)	2 (S.S) 2	2
	Dr.Suma Divakar Dr.Beela.G.K.			
	Total	14 (12*) 2 posts shifted One Post shifted to College of Fisheries, Panangad and One to College of Horticulture, Vellanikkara	9+1*	

COLLEGE OF HORTICULTURE, VELLANIKKARA

Faculty position : Plan/Non Plan/EAP (Specify)

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Plan				
Non-Plan			30	
Total			78	
		138	108	30

(List of scientists is given as Appendix.1 (as on 31/3/2011))

LIST OF TEACHING STAFF AS ON 31/03/2011 (under the establishment of this office)

Sl No	Name	Designation	Department	Remarks
1	Dr Jesy K Thomas	Professor	Ag Economics	HOD
2	Dr EK Thomas	Professor	Ag Economics	IFFCO - Paul Pothen Chair
3	Dr K Sathesh Babu	Professor	Ag Economics	
4	Dr P Indiradevi	Professor	Ag Economics	
5	Dr A Prema	Assot. Professor	Ag Economics	
6	Dr KP Visalakshi	Professor	Ag Engineering	HOD
7	Dr VR Ramachandran	Professor	Ag Engineering	W/A at AESC
8	Er PK Sureshkumar	Asst. Professor	Ag Engineering	
9	Er Suma Nair	Asst. Professor	Ag Engineering	
10	Dr Sosamma Jacob	Professor	Ag Entomology	HOD
11	Dr MK Sheela	Professor	Ag Entomology	
12	Dr AM Ranjith	Professor	Ag Entomology	
13	Dr Susannamma Kurien	Professor	Ag Entomology	
14	Dr FMH Khaleel	Professor	Ag Extension	HOD
15	Dr S Bhaskaran	Professor	Ag Extension	
16	Dr P Ahamed	Professor	Ag Extension	
17	Dr Jiju P Alex	Assop. Pro.	Ag Extension	
18	Dr Jayasree Krishnankutty M	Asst. Professor	Ag Extension	
19	Dr B Ajithkumar	Asst. Professor	Ag Meteorology	
20	Dr D Girja	Professor	Ag Microbiology	HOD
21	Dr MV Rajendran Pillai	Professor	Ag Microbiology	Officer i/c, Academic Cell
22	Dr K Surendra Gopal	Asso. Professor	Ag Microbiology	
23	Sri P Gangadharan	Asso. Professor	Ag Statistics	HOD

24	Dr C Laly John	Asst. Prof.	Ag Statistics	
25	Sri S Krishnan	Asst. Prof.	Ag Statistics	
26	Smt TK Ajitha	Asst. Prof.	Ag Statistics	
27	Dr PS John	Professor	Agronomy	
28	Dr Mercy George	Professor	Agronomy	
29	Dr PA Joseph	Professor	Agronomy	
30	Dr C George Thomas	Professor	Agronomy	
31	Dr KE Usha	Asst. Prof.	Agronomy	
32	Dr Meera V Menon	Asst. Prof.	Agronomy	
33	Dr P Prameela	Asst. Prof.	Agronomy	

P - 56
Asst P - 13
Alex P - 10

34	Dr PA Nazeem	Professor	CPBMB	Head ADR at KAU HQ
35	Dr A Augustine	Professor	CPBMB	
36	Dr R Keshavachandran	Professor	CPBMB	
37	Dr PA Valsala	Professor	CPBMB	
38	Dr A Suma	Professor	CPBMB	
39	Dr R Sujatha	Asst. Prof.	CPBMB	
40	Smt PS Abitha	Assistant Professor	CPBMB	
41	Dr V Usha	Professor	Home Science	HOD
42	Dr V Indira	Professor	Home Science	
43	Sri EU Rajan	Asst. Prof.		W/A at DSW
44	Dr KT Presanna Kumari	Professor	Plant Breeding & Genetics	
45	Dr CR Elsy	Professor	Plant Breeding & Genetics	
46	Dr E Sreenivasan	Professor	Plant Breeding & Genetics	under suspension
47	Dr Rose Mary Francies	Asso. Pro.	Plant Breeding & Genetics	
48	Dr Dijee Bastian	Asso. Pro.	Plant Breeding & Genetics	
49	Dr Jiji Joseph	Asst. Prof.	Plant Breeding & Genetics	
50	Dr Sally K Mathew	Professor	Plant Pathology	HOD
51	Dr T Sheela Paul	Professor	Plant Pathology	
52	Dr TJ Rehumath Niza	Professor	Plant Pathology	
53	Dr S Beena	Professor	Plant Pathology	
54	Dr Vimi Louis	Asso. Pro.	Plant Pathology	
55	Dr K Nandini	Professor	Plant Physiology	HOD
56	Dr EV Nybe	Professor	Plantation Crops & Spices	HOD
57	Dr PC Rajendran	Professor	Plantation Crops & Spices	
58	Dr PV Nalini	Professor	Plantation Crops & Spices	
59	Dr VS Sujatha	Professor	Plantation Crops & Spices	
60	Dr MR Shylaja	Professor	Plantation Crops & Spices	
61	Dr M Asha Sankar	Professor	Plantation Crops & Spices	
62	Dr N Miniraj	Professor	Plantation Crops & Spices	
63	Dr K Ajith Kumar	Asso. Pro.	Plantation Crops & Spices	
64	Dr B Suma	Asso. Pro.	Plantation Crops & Spices	
65	Dr PK Valsalakumari	Professor	Pomology & Floriculture	
66	Dr T Radha	Professor	Pomology & Floriculture	
67	Dr CK Geetha	Professor	Pomology & Floriculture	
68	Dr Sarah T George	Professor	Pomology & Floriculture	Officer i/c, LMC
69	Dr NK Parameswaran	Asso. Pro.	Pomology & Floriculture	
70	Dr P Jacob John	Professor	Processing Technology	HOD
71	Dr KB Sheela	Professor	Processing Technology	
72	Dr PB Pushpalatha	Professor	Processing Technology	Registrar i/c, KAU
73	Dr PK Sudhadevi	Professor	Processing Technology	
74	Dr P Sureshkumar	Professor	Radio Tracer Laboratory	Head
75	Dr P Sreedevi	Professor	Radio Tracer Laboratory	
76	Dr PK Sushama	Professor	Soil Science & Agricultural Chemistry	HOD
77	Dr M Subramonia Iyer	Professor	Soil Science & Agricultural Chemistry	ADR at KAU HQ
78	Dr Betty Bastian	Professor	Soil Science & Agricultural Chemistry	

LIST OF TEACHING STAFF IN SCHEMES AS ON 31/03/2011

Sl No	Name	Designation	Department	Remarks
1	Dr CT Abraham	Professor	AICRP on Weed Control	Associate Dean i/c
2	Dr T Girija	Professor	AICRP on Weed Control	
3	Dr KM Durgadevi	Professor	AICRP on Weed Control	
4	Dr PK Rajeevan	Professor	AIC on Floriculture IP	Head
5	Dr S Sarada	Asst Pro.	AIC on Floriculture IP	
6	Dr B Simi	Asst Pro.	AIC on Floriculture IP	
7	Dr KR Lyla	Professor	AICRP on BCCP	Head
8	Dr Babu M Philip	Professor	AICRP on BCCP	under suspension
9	Dr GHSLV Prasada Rao	Professor	Meteorology	Head & ADR at KAU HQ
10	Smt P Lincy Davis	Asst. Prof.	Meteorology	
11	Dr TE George	Professor	Olericulture	Head
12	Dr VK Raju	Professor	Olericulture	ADR at KAU HQ
13	Dr Salikkutty Joseph	Professor	Olericulture	
14	Dr PG Sadhankumar	Professor	Olericulture	
15	Dr P Indira	Professor	Olericulture	
16	Dr KP Prasanna	Professor	Olericulture	
17	Dr K Krishnakumary	Professor	Olericulture	
18	Dr KV Suresh Babu	Professor	Olericulture	
19	Dr T Pradeepkumar	Asso.Prof.	Olericulture	
20	Dr S Nirmaladevi	Professor	AICVIP on Vegetable Crops	
21	Smt Sainamole Kurian P	Asst. Prof.	AICVIP on Vegetable Crops	
22	Dr S Prasannakumari Amma	Professor	Cadbury - KAU CCRP	Head
23	Dr EK Lalitha Bai	Professor	Cadbury - KAU CCRP	
24	Dr JS Minimol	Asst. Prof.	Cadbury - KAU CCRP	
25	Dr VV Radhakrishnan	Professor	AINP on Medicinal & Aromatic Plants	Head
26	Dr C Beena	Asst. Prof.	AINP on Medicinal & Aromatic Plants	
27	Dr A Latha	Associate Professor	AINP on Medicinal & Aromatic Plants	
28	Dr Mani Chellappan	Associate Professor	AINP on Agricultural Ornithology	Head
29	Dr KP Satheesan	Professor	AINP on Agricultural Ornithology	
30	Dr Haseena Bhaskar	Associate Professor	AINP on Acarology	

LIST OF NON-TEACHING STAFF AS ON 31/03/2011

Sl No	Name	Designation	Department	Remarks
1	Smt KS Vijayalakshmi	Administrative Officer Gr I		Head of office
2	Sri MW Wilson Raj	Section Officer (Hr Grade)		
3	Smt PV Ambika	Section Officer (Hr Grade)		
4	Sri C Kunhunny	Section Officer (Hr Gr)		

5	Sri P Sreekumar	Section Officer		
6	Sri KN Murukesh	Section Officer		
7	Smt PK Sreedeviamma	Section Officer (FC&D) (Hr Gr)		Steno to Dean
8	Smt KT Vijayalakshmi	Section Officer (FC&D) (Hr Gr)		
9	Dr AT Francis	Assistant Librarian	College Library	
10	Smt VC Sathy	Seln Gr Assistant		
11	Smt M Shakila Begum	Seln Gr Assistant		
12	Sri P Sivaprasad	Seln Gr Assistant		
13	Sri AD Sujith	Sr Gr Assistant		
14	Smt KR Surya	Sr Gr Assistant		
15	Sri PS Samgeeth	Sr Gr Assistant		On LWA for 5 yrs
16	Sri AG Godwin	Sr Gr Assistant		On deputation
17	Sri SL Prathapan	Sr Gr Assistant		
18	Sri Jithiesh Hysinth	Sr Gr Assistant		
19	Sri AY Fazil	Assistant		
20	Smt VS Swapna	Technical Assistant	College Library	
21	Sri P Balakrishnan	Technical Supervisor Gr I	Agricultural Engineering	
22	Sri PR Sathian	Farm Superintendent	LMC	
23	Sri AG Rajendra Babu	Farm Manager Gr I	Agronomy	
24	Smt Valsamma George	Farm Manager Gr II	Plant Pathology	
25	Sri PC Uthaman	Farm Manager Gr II	LMC	
26	Sri PK Sreekumar	Seln Gr Farm Officer	CPBMB	
27	Sri M Ananthakrishnan	Seln Gr Farm Officer	STCR, SS&AC	
28	Sri TP Gangadharan	Senior Gr Farm Officer	Ag Meteorology	
29	Sri P George Joseph	Farm Officer Gr II	Plantation Crops & Spices	
30	Smt CR Rekha	Farm Officer Gr II	Pomology & Floriculture	
31	Smt OR Sulaja	Farm Officer Gr II	Plantation Crops & Spices	
32	Smt Femina	Farm Officer Gr II	Pomology & Floriculture	On leave for 2 years
33	Smt P Letha	Hostel Matron	Ladies' Hostel	
34	Smt Z Sareena	Seln Gr Typist	Academic Cell	
35	Sri AK Anoop	Senior Gr Typist		
36	Smt PG Preethimol	Senior Gr Typist		
37	Smt Jolly D Karerakkattil	Lab Asst Gr II		
38	Smt VM Baby	Lab Asst Gr II	SS& AC	
39	Smt VP Sindhu	Lab Asst Gr III	Ag Entomology	
40	Sri KA Vinod	Lab Asst Gr III	STCR, SS&AC	
41	Sri EM Sineesh	Lab Asst Gr III	College Library	
42	Sri V Kuttykrishnan	LDV Driver Gr I	Ag Engineering	

43	Sri PM Suresh	LDV Driver Gr II	Ag Engineering	
44	Sri RG Bahu	Duplicating Operator	Academic Cell	
45	Smt K Santhakumary	Duplicating Operator		
46	Smt KV Ambika	Class IV	College Library	
47	Sri MS Sabarinathan	Class IV		

COLLEGE OF AGRICULTURE, PADANNAKKAD

Faculty position

Cadre	Name of the Scientist	Sanctioned post	In position	Vacant
Plant Breeding and Genetics				
Professor	Dr. P.C. Balakrishnan Dr. K. P. Kuriakose	2	3	3
Associate Professor	Vacant	1		
Assistant Professor	Dr. T. Vanaja	3		
Agriculture Botany				
Professor	Vacant	1	-	1
Plant Pathology				
Professor	Dr. M. Govindan Dr. K.P. Mamooty Dr. K. K. Sulochana	2	3	0
Associate Professor	Vacant	1		
Agronomy				
Professor	Dr.R. Pushpakumari Dr. Anil Kumar.A.S	2	2	7
Associate Professor	Vacant	4		
Assistant Professor	Vacant	3		
Agricultural Meteorology				
Assistant Professor	Vacant	1	-	1
Horticulture				
Professor	Dr. A. Rajagopalan Dr. Giridharan Dr. Baby Lissy Markose	1	4	3
Associate Professor	Dr. P. Anitha	3		
Assistant Professor	Vacant	3		
Soil Science				
Professor	Dr. P.R.Suresh	1	3	1
Associate Professor	Vacant	1		
Assistant Professor	Dr. Biju Joseph Dr. R. Gladis	2		
Entomology				
Professor	Dr.R. Ushakumari	2	3	5
Associate Professor	Dr. K.M. Sreekumar	1		
Assistant Professor	Mr.B. Ramesha	5		
Plant Physiology				
Associate Professor	Dr. G.V Sudharsanarao	1	1	1
Assistant Professor	Vacant	1		
Microbiology				

P-18
 Asp-32
 Asop-16
 AL-1
 Asobe-1

Professor	Vacant	1	-	1
Bio Technology				
Associate Professor	Vacant	1	-	2
Assistant Professor	Vacant	1		
Agricultural Extension				
Professor	Dr. Jose Joseph	1		
Associate Professor	Dr. M. J. Mercykutty	1	2	3
Assistant Professor	Vacant	3		
Agricultural Economics				
Professor	Dr. C. Latha Bastine	1		
Associate Professor	Dr. Anil Kuruvila	1	2	2
Assistant Professor	Vacant	2		
Agricultural Statistics				
Assistant Professor	Vacant	2	-	2
Home Science				
Associate Professor	Dr. B. Prassannakumari	-	1	
Assistant Professor	Vacant	2	-	1
Agricultural Engineering				
Associate Professor	Sri. George Mathew	1	1	1
Assistant Professor	Vacant	1		
Physical Education				
Assistant Professor	Vacant	1	1	-
Professor	Dr.E.Soman	-		
Computer Science				
Assistant Professor	Vacant	1	-	2
Animal Husbandry				
Assistant Professor	Vacant	1	-	1
Agricultural Meteorology				
Assistant Professor	Vacant	1	-	1
Assistant Librarian	Vacant	1	-	1
Officer i/c Academic				
Professor	Vacant	1	-	1
Associate Dean	Vacant	1	-	1
Total		66	26	40

COLLEGE OF FORESTRY, VELLANIKKARA

Faculty position

Cadre	Name of the Scientist
Associate Dean	Dr.B.Mohan Kumar, Professor
Professors	Dr.P.K.Ashokan, Dr.K.Sudhakara
Associate Professor	Dr.K.Vidhyasagaran, .E.V.Anoop, . DrP.O.Nameer Dr.A.V.Santhoshkumar, Dr.T.K.Kunhamu, Dr.Animon (on leave)

Staff Strength as on 31.03.2010

Scientific	Total
Scientific	9
Administrative	7
Supporting	3

COLLEGE OF CO-OPERATION, BANKING & MANAGEMENT

Faculty position:

Department & Designation	No. of posts		Name of the incumbent	Vacant	
	Sanct- ioned	In position			
Asso. Dean	1	0	Dr. U. Ramachandran	1	
Department of Co-operative Management					
Professor	1	0	Nil	1	
Assoc. Pro.	2	0	Nil	2	
Assoc. Prof.	5	5		0	
			1. Dr. Philip Thomas		
			2. Dr. A.M. Jose		
			3. Dr. E. Vinaikumar		
			4. Dr. G. Veerakumaran		
			5. Sri. E. G. Ranjitkumar		
2. Department of Rural Banking and Finance Management					
Professor	0				
Assoc. Professor	2	0	2	1	
Assoc. Professor	5	3		2	
			1. Dr. Molly Joseph		
			2. Dr. E.V.K. Padmini		
			3. Dr. K.M. George		
			4. Dr. M.A. Lizy		
3. Department of Rural Marketing Management					
Professor	1	0	Nil	1	
Assoc. Professor	2	0	Nil	2	
Assoc. Professor	5	5		0	
			1. Dr. A. Sukumaran		viii.
			2. Sri. Philip Sabu		i.
			3. Sri. M. Mohanan		
			4. Dr. Vanaja Menon		
			5. Dr. Ushadevi. K.N.		
4. Department of Development Economics					
Professor	1	0	Nil	1	
Professor		1	Dr. U. Ramachandran	0	
		1	Retired on 30 the April 11		
	4	4		0	
			1. Dr. K. A. Suresh		
			2. Smt. Shaheena, P.		
			3. Smt. K.A. Sunandha		
			4. Sri. Jacob Thomas, M.		
(a) Computer Science (Attached to the Dept. of Development Economics)					
Assoc. Professor	1	1	Sri. P.J. Boniface	0	
(b) Agricultural Extension (attached to the Dept. of Co-operative Management)					
Assoc Prof	1	1	Dr. R. Sendilkumar	0	

15000-1
 P-3
 Asst P-
 Asst P-22

COLLEGE OF VETERINARY & ANIMAL SCIENCES, POOKOT

Faculty position

DEPARTMENTS	PROFESSORS	ASSOCIATE PROFESSORS	ASSISTANT PROFESSORS
DEAN	Dr Leo Joseph		
Veterinary Anatomy	(Vacant - 1)	1.Dr.Maya (Vacant - 1)	1.Dr Rajini C.V 2.Dr.Leena Chandrashekar (Vacant - 1)
Veterinary Physiology	1.Dr. Gireesh Varma	(Vacant - 2)	3.Dr Babita* 4.Dr. Raji (Vacant - 1)
L.P.M.	(Vacant-1)	(Vacant - 4)	5.Dr. C. Balusamy 6. Dr. John Abraham* 7.Dr.Sacharia Ibrahim 8.Manju Sasidharan 9. Dr. Roshan Ann
Vety.Pharmacology	(Vacant - 1)	(Vacant - 2)	10.Dr. Sanis Juliet 11 Dr .Suresh N Nair 12. Dr.Suja Rani S 13.Dr. Sujith S
Vety. Microbiology	(Vacant - 1)	2. Dr. Koshi John (Vacant - 1)	14. Dr. Chintu Ravisankar*(Vacant 2)
Vety. Parasitology	(Vacant - 1)	(Vacant - 2)	15. Dr. Reghu Ravindran 16 Dr. Ajith Kumar KG 17. Dr. Shyamala 18.Dr. Priya M.N 19. Dr. Deepa C.N
Vety. Pathology	Vacant-1	3.Dr. Ajith Jacob George	20.Dr. Sajitha I.S 21. Dr. Prasanna 22. Dr. Pradeep
Animal Nutrition	Vacant-1	4.Dr. Syam Mohan Vacant - 2	23.Dr. Dildeep. V. 24.Dr.Biju Chacko 25. Dr.Senthil Murugan 26.Dr.Deepa Ananth 27. Dr. Sajith Purusothaman
Vety. PublicHealth & Hygiene	Vacant	Vacant-2	28.Dr. Prejit 29. Dr. Vinod V.K
L.P.T.	Dr. Gee Verghese. P.I	Vacant - 1)	30..Dr. Renuka Nair*
Animal Reproduction & Gynecology	Dr. Ramachandran	Vacant - 2	31..Dr. K. Pramod 32..Dr Jayakumar K 33. Dr. Amritha Aravind 34. Dr. Leeba Chacko 35.. Dr. Abdul Azeez
Vety. Surgery & Radiology	Vacant	5.Dr. Devanand	36..Dr. George Chandy 37.Dr.Dinesh P.T 38. Dr. Giggin 39. Dr. Surya Das
Vety. Medicine & Jurisprudence	Vacant	6.Dr. Usha Narayana Pillai	40.Dr. Vinu David 41. Dr Arun George
Animal Breeding &	Vacant -1	7.Dr. T.V. Raja	42.Dr. C.N. Dinesh*

Genetics			
Poultry Science	Dr. Jaludheen	-	43. Dr. Bindya Liz Abraham 44. Dr. Marrykutty Thomas
Animal Husbandry & Extension	Vacant	Vacant - 1	45. Dr. Sentilkumar
Vety. Biochemistry	Vacant	Vacant - 1)	46. Dr. Shynu. M.* (Vacant - 2)
Vety. Epidemiology & Preventive medicine	-		47. Dr. Deepa P.M. 48. Dr. Bipin K.C (Vacant - 1)
Dairy Science	-	Vacant	-
	Sanctioned post(Prof): 19 In position : 3 Vacan : 16	Sanctioned post (Assoc. Prof) : 32 In position : 7 Vacant : 25	Sanctioned post (Assist. Prof): 41 In position : 48 Vacant : 5

COLLEGE OF DIARY SCIENCE AND TECHNOLOGY, MANNUTHY

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Associate Dean	Dr. R. Rajendrakumar	01	01	Nil
Professor - Associate	Sri. VR Raghunandan	06	Nil	06
Professor	Dr. E. K. Kurien	07	02	05
Assistant Professor		Agricultural Engg. Faculty		
Professor	Dr. A. K. Beena	10	01	09

COLLEGE OF FISHERIES, PANANGAD

Faculty position:

S L N o	Cadre	Name of scientist	Sanctioned posts	In position	vacant
1	Dean	Dr. C. Mohanakumaran Nair, Professor (acting as in charge)	1	0	1
2. Department of Aquaculture					
	Professor		0	1	1
	Associate Professor	Dr. C. Mohanakumaran Nair	1	0	1
	Assistant Professor)		3	1	2
	Fishery Algology		1	0	1
	Fishery Breeding		1	0	1
	Fishery Pathology		1	0	1
	Fishery Aquaculture	Dr. Shyama S. Dr. Devika Pillai Sri K. Dinesh	5	3	2
3. Department of Fishery Biology					
	Professor		1	0	1

Dean - ✓
P - ✓
Asst P - ✓
No P - ✓

Associate Professor	1	Dr. K. V. Jayachandran	2	1	1
Assistant Professor(5+2)			2	1	1
Zoology		Dr. T. M. Jose	2	1	1
Ichthyology		Dr. J. Rajasekharan Nair	2	1	1
Fishery Biology		Dr. T. V. Anna Mercy	1	0	1
Genetics					
4. Department of Fish Processing Technology					
Professor			1	0	1
Associate Professor			1	0	1
Assistant Professor					
Biochemistry		Dr. P. M. Sherief	2	1	1
Microbiology			2	0	2
Processing		Dr. Sajan George	2	2	0
		Dr. S. Krishnakumar			
Food Science & Nutrition		Smt. Sofy Cheriyan	1	1	0
5. Department of Fishery hydrography					
Professor			1	0	1
Physical hydrography					
Associate professor					
Fishery Hydrography			1	0	1
Biological Oceanography			1	0	1
Assistant professor (5)					
Chemical Hydrography			1	0	1
Biological Oceanography			1	0	1
Marine Meteorology		N. N. Raman	1	1	0
Limnology			1	0	1
Chemistry			1	0	1
6. Department of Fishery Engineering					
Associate Professor			1	0	1
Assistant Professor					
Fishery Engineering		Sri. George Mathew	1	1	0
Farm Engineering			1	0	1
7. Department of Fishing Technology					
Associate Professor(Fishing Technology)			1	0	1
Assistant Professor					
Fishing Technology		Dr. B. Manojkumar	1	1	0
Gear Technology			1	0	1
8. Department of Management Studies					
Associate Professor		Smt. Alfy Korath (Asst. Prof. against the vacancy)	1	1	0
Fishery Statistics			1	0	1
Business Management		Dr. V. Ambilikumar	1	1	0
Business Economics		Dr. M. S. Raju	1	1	0
Business Statistics		Sri. Mathew Sebastian	1	1	0
Statistics		Smt. V. Malika	1	1	0
Commerce		Dr. K. M. Mathew	1	1	0
Fishery Extension		Smt. Daisy C. Kappen	1	1	0
9. Physical Education Cell					
Business Physical Education		Smt. Sucey V. John	1	1	0

KELAPPAJI COLLEGE OF AGRICULTURAL ENGINEERING & TECHNOLOGY, TAVANUR

Faculty position		Plan/Non Plan/EAP (Specify)				
Non-Plan	Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant	Remarks
	Dean	Dr. M. Sivaswami	1	1	0	
LWRCE						
	Professor		1	0	1	
	Assoc. Professor	Dr.V.M.Abdul Hakkim	2	2	0	
		Er. Renuka Kumari .J				
	Asst. Professor	Er. K.K. Sathian * Er. D. Sasikala* Er. Vishnu.B Er.K.P.Rema (Deputation for Ph.D)* Er. Priya G. Nair	6	5	1	* Re-designated as Assoc. Professor
IDE						
	Professor	Dr. E. K. Mathew	1	1	0	
	Assoc. Professor	Er. Alexander Seth Er. Asha Joseph	2	2	0	
	Asst. Professor	Er.K.V.Leven (Deputation for Ph.D)	5	1	4	
FPME						
	Professor		2	0	2	
	Assoc. Professor	Dr.Sathyajith Mathew(LWA for job at abroad) Dr. P.R. Jayan Dr. Geetha Susan Philip (LWA)	3	3	0	
	Asst. Professor	Er.P.S.Preman (Deputation for Ph.D)	5	1	4	
PHT & AP						
	Professor		1	0	1	
	Assoc. Professor	Dr. K. P. Sudheer Er.Prince.M.V(Deputation for Ph.D)	2	2	0	
	Asst. Professor		3	0	3	
SAC						
	Professor (Math.)		1	0	1	
	Asst. Professor (Math.)		2	0	2	
	Professor (Agronomy)		1	0	1	
	Asst. Professor (Agronomy)	Sri. Musthafa Kunnathadi	1	1	0	
	Associate Prof (Agrl. Chemistry)		1	0	1	
	Asst. Prof. (Agrl. Chemistry)		1	0	1	

D-1
P-1
Asp-
Asop-

Associate Prof (Physics)	Dr. K.M. Valsamma	1	1	0	
Asst. Prof. (Physics)		1	0	1	
Asst. Prof. (Plant Physiology)		1	0	1	
Asst. Prof. (Computer Science)	Smt. Josephina Paul	1	1	0	
Asst. Prof. (Farms)		1	0	1	
Asst. Prof. (Pharmacology)		1	0	1	
Asst. Prof. (Poultry Science)	Dr. D. Sukumar	1	1	0	
Asst. Prof. (Animal Breeding and Genetics)		1	0	1	
Asst. Prof. (Physical Edn.)	Sri. M. Velayudhan Kutty	1	1	0	
Asst. Prof. (Civil Engg.)		1	0	1	
Asst. Prof. (Ele. Engg.)		1	0	1	
Asst. Prof. (Mech. Engg.)		2	0	2	
EAP					
AICRP on Farm Implement & Machinery					
Associate Prof	Er. Sindhu Bhasker (Asst.Prof.)	1	1	0	
Precision Farming Development Centre					
Associate Prof		1	0	1	
Asst. Prof.	Er. Anu Varughese	2	2	0	
	Dr. Jalaja S. Menon				
AICRP on Post Harvest Technology					
Professor	Dr. Santhi Mary Mathew	1	0	1	
Asst. Prof.	Er. Rajesh G.K	3	1	2	

Staff Strength

Staff	Sanctioned	In position	Vaccant
Scientific	62	27	35
Administrative	110	42	68

P-7
D-1
Asst. - 13/10
1101 - 13/10

KAU HIGH SCHOOL, VELLANIKKARA

Staff Position

Designation	Name	Sanctioned Posts	In position	Vacant
Head Mistress	K.S. Indira Devi	1	1	--
HSA (Nat Science)	Leena. K.S *	1	1	--
HSA (Natural Sci.)	Latha Balaraman *	1	1	--
HSA (Maths)	Magy. T.J	1	1	--
HSA (Physical Sci.)	Najeema U	1	1	--
HSA (English)		1	--	Vacancies Filled through Employment Exchange
HSA (Social Science)		1	--	
HSA (Malayalam)		1	--	
HSA (Hindi)		1	--	
HSA (Maths)		1	--	
UPSA (Maths)		1	--	
UPSA (Social Science)		1	--	
UPSA ((Physical Science)		1	--	
UPSA (English)		1	--	
UPSA (Malayalam)		1	--	
UPSA (Hindi)		1	--	
Specialist Teacher (Drawing)		1	--	
Specialist Teacher (Physical Education)		1	--	
LPSA	Saritha R	1	1	--
LPSA	Aswathi.G	1	1	--
LPSA	Simi S. Backer	1	1	--
LPSA	Ramya Krishna.K	1	1	--
LPSA	Sabitha.P	1	1	--
LPSA	Uma.K.A	1	1	--
LPSA	Anil Roy .A.L	1	1	--
LPSA	Seby K. Varkey	1	1	--
School Asst Music)	Naseera. K	1	1	--
Nursery School Asst	Devika. P	4	2	2
Nursery School Asst	Sylaja. D.V			
Assistant Selection Grade	Brigit Kuruvilla	1	1	--
Typist Senior Grade	Saleem. A.K	1	1	--
Ayah	Sumithra. K.R	4	2	2
	K.K. Valsala *	* Permanent Labourer on working arrangement at KAU School from Central Nursery, Vellanikkara		
Class IV/ SCA	Sunil. S	3	2	1
		* Permanent Labourer on working arrangement at KAU School from CRS, Madakkathara		

TYPIST
 HM - 1
 HSA - 9
 UPSA - 6
 LPSA - 8
 NSA - 2
 AYAH - 4
 CLASS IV - 3

REGIONAL AGRICULTURAL RESEARCH STATION (SOUTHERN ZONE), VELLAYANI

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
NARP Phase I				
Associate Director	Dr. P. Sivaprasad, Prof.	1	1	-
Asso.Prof.(Agrl. Statistics)	VACANT	1	-	1
Ass.Prof. (Plant Breeding and Genetics)	Dr. K.M. Abdul Khader Prof.	1	1	-
Associate Professor (Soil Science and Agrl. Chemistry)	Dr. C.R. Sudharmaidevi, Prof	1	1	-
Ass.Prof.(Horticulture)	Dr. K. Vasanthakumar, Prof.	1	1	-
Ass.Prof.(Horticulture)	Dr. I. Sreelathakumary, Prof.	1	1	-
Assistant Professor (Soil Science and Agrl. Chemistry)	Dr. Usha Mathew, Prof.	1	1	-
Ass.Prof.(Agri.Entomology)	Dr. Hebsy Bai, Prof.	1	1	-
Assi.Prof(Agril Entomology)	Dr. N. Anitha, Prof.	1	1	-
Ass.Prof. (Plant Breeding and Genetics)	Dr. P. Manju, Prof.	1	1	-
Ass.Prof.(Computer Science)	Smt. Susan Thomas Asst. Professor (Sel. Gr.)	1	1	-
Assistant Professor (Agricultural Engineering)	Dr. M.S. Hajilal Professor	1	1	-
Ass.Prof.(Plant Pathology)	VACANT	1	-	1
Asst. Prof.(Agri.Ext.	VACANT	1	-	1

AICRP on Forage Crops				
Associate Professor (Plant Breeding and Genetics)	Dr. D. I. Suma Bai Professor	1	1	-
Assistant Professor (Agronomy)	Ms. S.R. Sharu Assistant Professor	1	1	-
AICRP on Nematodes				
Ass.Prof. (Agri Entomology)	Dr. M.S. Sheela Prof	1	1	-
Ass.Prof. (Agri Entomology)	Dr. T. Jiji Professor	1	1	-
Ass.Prof. (Agri Entomology)	Dr. K.D. Prathapan Ass Prof (Sr.	1	1	-
AICRP on Honey Bee				
Ass.Prof. (Agri Entomology)	Dr. S. Devanesan Professor	1	1	-
Ass.Prof. (Agri Entomology))	Dr. K. S. Premila Ass.Prof.	1	1	-
Ass.Prof. (Agri Entomology)))	Dr. V. S. Amritha Ass.Prof.	1	1	-
AICRP on Mushroom				
Assi.Prof(Plant Pathology)	Dr. D. Geetha Professor	1	1	-
IMD / DST Project on Integrated Agromet Advisory Services				
Ass.Prof. (Agri Entomology)	Sri. Ajith. K Assistant Professor	1	1	-

**TRAINING SERVICE SCHEME
COLLEGE OF AGRICULTURE, VELLAYANI**

Faculty position

: Non Plan

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr. G. Sobhana	Associate Professor (Agrl. Extension)	1	---
Professor	Dr. A.K. Sherief	Assistant Professor (Agrl. Extension)	1	---

**CROPPING SYSTEMS RESEARCH CENTRE
KARAMANA**

Faculty Position
Plan

Cadre	Name of the Scientist	Sanctioned Post	In position	Vacant
Professor	Dr. M. Vijayan	1	1	Nil

Non-Plan

Cadre	Name of the Scientist	Sanctioned Post	In position	Vacant
Professor	Dr. Kuruvilla Varughese	1	1	Nil
Associate Professor	Dr. B. Rani	1	1	Nil
Associate Professor	Dr. Jacob John	1	1	Nil

**FARMING SYSTEMS RESEARCH STATION
SADANANDAPURAM, KOTTARAKKARA**

Faculty position

Cadre	Sanctioned	In position	Vacant/ Remarks
Assoc. Professor (Hort)	1		Post shifted to CoH, Vellanikkara
Assoc. Prof. (SS&AC)	1	Dr. Aparna B	Transferred from KVK, Kumarakom on 26.07.08
Asst. Professors			
1. Pathology	1	Dr. Susha. S. Thara	Transferred from KVK Kottayam
2. Agrl. Economics	1		Vacant from 1.3.2011
3. Agronomy	1	Gr. Rajasree. G Asst. Professor (SS)	On deputation to State Planning Board, Trivandrum
4. Entomology	1	Vacant	Vacant from 20.12.2000
5. Agri. Engineering	1	Smt. Jayasree G. S Asst. Professor Sri. Manoj Mathew Assoc. Professor	On LWA from 15-12-08 Kuttanadu Package
6. Animal Management	1	Vacant	Vacant from 06.06.02
7. Soil & Water Conservation Engg	1	Dr. Bini Sam Assoc. Professor	Associate Professor & Head

Aut - 7
MOP - 2

Non-Teaching Staff

Cadre	Sanctioned Post	No. of Posted filled up	Vacant	Name of Person	Remarks
Farm Manager Gr II	2	2	Nil	1, Sri.S. Prabhakaran 2, Sri.M. Rajendran	Sri.M. Rajendran, retired on 31.03.2011
Technical Supervisor	1	1	Nil	1, Sri.A. Raju	
Farm Officer	1	1	Nil	Sri. Manu.M	
Farm Asst. (vety) Gr II	1	1	Nil	Smt.R. Sheela	
Lab Asst.	1	Nil	1		
Administrative Assistant	1	1	Nil	Sri.S. Anilkumar	
Asst. Seln Grade	1	1	Nil	Sri.S. Anitha	
Assistant Sr. Grade	1	1	Nil	Sri. Lijesh.R. Muraleedhar	
Typist Seln. Grade	1	1	Nil	Usha.R	
Peon	1	Nil	1		

SOIL CONSERVATION RESEARCH STATION, KONNI.

Faculty position :

Cadre	Name of the scientist	Sanctioned post	In position	Vacant
Associate Professor & Head	Dr Noble Abraham	Nil (Additional Charge to Prof. RARS, Kumarakom)	Nil	Nil

CASHEW RESEARCH STATION, MADAKKATHARA

Faculty position

Cadre	Name of the scientist	Sanctioned post	In position	Vacant
Prof. & Head (Agro)	Dr. Jose Mathew	1	1	Nil
Assoc. Prof. (Plant Breeding)	Sri. Gregory Zachariah	1	1	Nil
Professor (Hort)	Dr. A. Sobhana	1	1	Nil
Asst. Prof. (Ento.)	Dr. Gavas Ragesh	1	1	Nil

AGRONOMIC RESEARCH STATION, CHALAKUDY

Faculty position

Department and Designation	No. of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks
Non plan Entomology	1	1	Dr. Suma Paulose Prof.	-	Prof. and Head
Pl. Breeding Assoc. Professor	1	-	-	1	
Asst. Prof Agronomy	1	1	Dr. Mini Abraham Assoc. Professor	-	
ICAR					
Chief Scientist Professor of Agronomy/Soil Science/Ag. Engg	1	1	Dr. K.P. Prameela Professor	-	till 9/3/2011
			Dr. T.K. Bridgit Professor		from 9/3/2011
Agronomist Assoc. Professor (Agronomy)	1	1	Dr. T.K. Bridgit Professor	-	till 9/3/2011
			Dr. V. Geetha Asst. Professor		Joined on 9/3/2011
Junior Agronomist Asst. Professor	1	1	Dr. B Sudha Asst. Professor	-	
Agrl. Engg. Assoc. Professor	1	1	Dr. P. Suseela Assoc. Professor	-	till 6-9-2010
			Dr. E.B. Gilsha Bai Asst. Professor		joined on 6-9-2010
Soil Physics	1	-	-	1	

AROMATIC AND MEDICINAL PLANTS RESEARCH STATION, ODAKKLAI

Faculty position

Category / Designation	No. of posts sanctioned	No. in position	Name of the incumbent	No. vacant	Remarks
Non-Plan					
Asst. Prof (Ento)	1	1	Dr. Baby P. Skaria (Professor & Head)	-	
Asst. Professor (Agril. Chemistry)	1	1	Dr. Samuel Mathew (Professor)	-	
Associate Professor (Agronomy)	1	1	Dr. Gracy Mathew (Associate Professor)	-	
Asst. Professor (Horticulture)	1	1	Dr. Ancy Joseph (Associate Professor)	-	

PINEAPPLE RESEARCH STATION VAZHAKULAM

Faculty position :

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Associate Professor & Head	Dr. P.P Joy	1	1	-

BANANA RESEARCH STATION, KANNARA

Faculty position :

NON PLAN

Cadre	Name	Sanctioned post	In position	vacant
Teachers				
Professor & Head	Dr. K.C. Aipe	1	1	0
Professor (Horticulture) PRC, Vellanikkara	Dr. A. K. Babylatha	1	1	0
Associate Professor (Entomology)	-----	1	0	1
Total		3	2	1
Administrative				
Administrative Assistant	K.K. Valsa	1	1	0
Assistants	-----	2	0	2
Total		3	1	2
Technical				
Farm Superintendent	Sri. K. Vijayanarayanan	1	1	0
Farm Manager	Sri. C. Esarachandran	2	1	1
Total		3	2	1
Para Technical/Supporting				
Pump Operator	Sri. P.C. Jayakrishnan	1	1	0
Peon		1	0	1
L.D.V. Driver		1	0	1
Total		3	1	2
Sub Total		12	6	6

EAP-AICRP

Cadre	Name of the scientist	Sanctioned post	In position	vacant
Teachers				
Horticulturist (Assoc. Prof.)	Dr. Rema Menon, Professor (23-12-93 onwards)	1	1	0
Jr. Horticulturist (Asst. Prof.)	Dr. A. Suma, Professor (30-9-2000 onwards)	1	1	0
Jr. Entomologist (Asst. Professor)	Dr. Maicykutty P. Mathew Professor (6-7-06 onwards)	1	1	0
Jr. Plant Pathologist	Dr. Anita Cherian, K. Professor	1	1	0

(Asst. Prof.)	(1-4-98 onwards)			
Technical	Total	4	4	0
Technical Assistant	Sunny, K.M., Technical Officer (2-6-98 onwards)	1	1	0
Farm Officers / Farm Managers (Field man)	Biji. V.P, Farm Officer Gr. II	4	1	3
Administrative	Total	5	2	3
Typist Gr. II	Subash. V. K. Sr. Gr. Typist	1	1	0
Para Technical / Supporting	Total	1	1	0
Lab Assistant	---	1	0	1
Oil Engine Driver	Sri Kuttan	1	1	0
Mali		2	0	2
Peon	--	1	0	1
Watchman	--	1	0	1
	Total	6	1	5
	Sub total	16	8	8

**REGIONAL AGRICULTURAL RESEARCH STATION
AMBALAVAYAL, WAYANAD**

Faculty position :

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
NARP Phase I				
Associate Director of Research	Dr. Lila Mathew K.	1	1	0
Assoc. Prof. (Agronomy)	Dr. Babu Mathew P	1	1	0
Asst. Prof. (Agri. Economics)	-	1	0	1
Asst. Prof. (Plant Breeding & Genetics)	-	1	0	1
Asst. Prof. (Horticulture)	Dr. Saji Gomez	1	1	0
NARP Phase II				
Assoc. Prof. (Horticulture)	-	2	0	2
Assoc. Prof. (Farm Power Machinery & Energy)	-	1	0	1
Assoc. Prof. (Animal Management)	-	1	0	1
KAU Non-plan				
Assoc. Prof. (Entomology)	-	1	0	1
Asst. Prof. (Soil Science & Agril Chemistry)	Dr. A.K. Sreelatha, Asst. Professor	1	1	0
Asst. Prof. (Microbiology / Pathology)	-	1	0	1
Asst. Prof. (Microbiology)	-	1	0	1
DST on AAS				
Asst. Prof. (Agron/Agromet)	Dr. K.M. Sunil, Asst. Professor	1	1	0
Total		14	5	9

CARDAMOM RESEARCH STATION, PAMPADUMPARA

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
AICRP on Spices Associate Professor (Horticulture)	Dr. T Maya	1	1	-
Asst. Prof (Agrl. Entomology)	Dr. R. Narayana	1	1	--
Associate Professor (Plant Breeding & Genetics)	Dr. Biju S.	1	1	-
NARP (Non-Plan) Asst. Prof.(Agrl. Extension)	Vacant	1	--	1
Asst. Prof.((Pl. Br. & Genetics)	Vacant	1	-	1
KAU (Non-Plan) Asso.Prof.(Pl. Br. & Genetics)	Vacant	1	--	1
Asso.Prof. (Entomology)	Vacant	1	--	1
Asst. Prof.((Pl. Pathology)	Dr. Dhanya M. K.	1	1	--
Asst. Prof.((Horticulture)	Vacant	1	--	1
Asst. Prof.((Soil Science)	Sri. M. Murugan	1	1	
	Total	10	5	5

REGIONAL AGRL. RESEARCH STATION, KUMARAKOM

Faculty Position

Cadre	Name of Scientists	SP	IP	V	Remarks
Associate Director/ Prof.of Agronomy (upgraded)	Dr. K.G. Padmakumar	1	1	-	
Plan Scheme (Root wilt)					
Agronomy Assistant Professor	Dr. K. Geetha	1	1	-	Professor
Assistant Professor (Weed Science)	Mr. KC. Rajan / Dr. Vandana Venugopal	1	1	-	Assoc. Professor
AssitProf. (Agronomy)	Dr.N.K. Sashidharan	1	1	-	Assoc.Professor
Soil Science & Agrl.Chem. Assistant Professor	--	1	-	1	
Biochemistry Assistant Professor	--	1	-	1	
Extension Associate Professor	--	1	-	1	
Agrl. Economics Assistant Professor	--	1	-	1	

Horticulture Assistant Professor	Dr. Joseph Philip Dr. Amu. G. Krishnan	2	2	-	Professor
Horticulture Professor	Dr. Sajan Kurian	1	1	-	On working arrangement at KAU HQ
Entomology Associate Professor	Dr. Ambika Devi	1	1	-	Professor
Pl. Pathology Associate Professor	--	1	-	1	
Assistant Professor (Microbiology)	Dr. A.V. Mathew	2	1	1	
Pl. Breeding Asst. Professor (P.B.&G)	1. Alice Antony 2. Dr. K.A. Inasi	2	2	-	Assoc. Professor Assoc. Professor
Pl. Physiology Asst. Professor (Pl. Phy.)	--	1	-	1	
Agri. Engg. Associate Professor Assistant Professor	Dr. Noble Abraham* Er. Joby Bastin	1 1	1 1	- -	Asst. Professor (*Working arrangement at CRS, Konni) On deputation for higher studies
Agri. Statistics Assistant Professor		1	-	1	
Aquaculture Assistant Professor		2	-	2	Dr. KG. Padmakumar Now working as Associate Director Dr. Anuradhakrishnan, Assoc. Professor on leave
Animal Reproduction Assistant Professor	Dr. S. Harikumar	1	1	0	
Asst. Professor (Ento.)*		1*	-	1	Post shifted DOE.
Assistant Professor (Agromet)	Mr. Shajeesh Jan P	1	1	-	Newly created
Total	--	26	15	11	

SP - Sanctioned post, IP - In Position; V - Vacan

RICE RESEARCH STATION, MONCOMPU, ALAPPUZHA

Faculty position		Name of Scientist	Sanctioned strength	In position	Vacant
Name of Post	Discipline				
KAU NON PLAN					
Professor	Agronomy	Smt. Nimmy Jose Assistant Professor(SS)	2	1	1
AsstProf.	Entomology		1	-	1
AsstProf.	Soil Science		1	-	1
AsstProf.	Plant breeding	Dr. Devika	1	1	-
Jr Statistician			1	-	1

AsstProf.	Agri. Extension		1	0	1
Assistant Professor(Sel Gr)	Agri Engineering	Sri.Manoj Mathew Assistant Professor			
NARP NON PLAN					
Professor	Plant breeding		1	-	1
Asso.Prof.	Entomology		1	-	1
AsstProf.	Plant breeding		1	-	1
AsstProf.	Pl Pathology	Dr.Reeny Mary Zacharia Assistant Professor(SS)	1	1	0
AsstProf.	Soil Science	Dr. Annie Koruth Associate Professor (1.4.10 to 28.10.10)	1	1	0
AICRIP					
Asso.Prof	Plant breeding	Dr.S Leenakumari Professor	1	1	0
AsstProf.	Agronomy	Dr. Reena Mathew (Assoc. Professor) (1.4.10 to 9.3.11) Sheeja.K.Raj (Asst. Prof.) (10.3.11 till date)	1	1	0
AsstProf.	Entomology	Dr.Nisha.M.S.AsstProf.	1	1	0
AsstProf.	Pl pathology	Sri. M.Surendran Assistant Professor(SS)	1	1	0

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant	Remarks
Professor (Pl.Br)		1	0	1	
Asst. Prof. (Pl.Br)		2	1	1	
Assoc. Professor (Pl.Br)	Dr.R.Devika (Assoc. Professor)	1	1	0	
Professor (Agron)					
Asst.Professor (Agron)	Nimmy Jose (Asst.Professor(SS))	2	1	1	
	Dr. Reena Mathew (Assoc. Professor) (1.4.10 to 9.3.11)	1	1	0	
	Sheeja.K.Raj (Asst. Professor) (10.3.11 till date)				
Assoc. Professor (Ent.)					
Asst.Professor (Ent.)					
Asst. Professor (Pl .Path)	Dr.Nisha.M.S. (Asst. Professor)	1	0	1	
Asst. Professor (SS& Agrl. Chem)	Dr.Reeny Mary Zacharia(Asst. Professor(SS))	2	1	1	
Junior Statistician	Sri. M.Surendran (Asst.Professor(SS))	2	2	0	
Asst. Prof	Dr. Annie Koruth				

(Ag. Extn.)	(Associate Professor) (1.4.10 to 28.10.10)	2	1	1	
-	-	1	0	1	Sri Naveen Leno joined w.e.f. 28.4.11
-	-	1	0	1	

ONATTUKARA REGIONAL AGRICULTURAL RESEARCH STATION, KAYAMKULAM

Faculty Position

Cadre	Name of the scientist	Sanctioned	In position	Vacant
I. KAU – Non-Plan				
Professor (Pl.Path.)	Dr.T.N.Vilasini	2	1	1
Professor (Hort.)	--	1	Nil	1
Associate Professor (Plant Breeding)	Smt.Susamma P.George Dr.M.R.Bindu	2	1	1 Vacant from 1-8-2010
Asso. Prof.(Agrl.Ent.)	Dr.G.Suja	2	1	1
Asso. Prof. (Soil Science & Agrl.Chem.)	Dr.M.Indira	1	1	Nil
II. AICRP on Oil seeds				
Professor(Pl.Br.)	Dr.Sverup John	1	1	In charge of Project Director&Head up to 3-7-2010
	Dr.M.R.Bindu, Associate Professor			From 1-8-2010
Professor(Agronomy)	Dr.P.Sushamakumari	1	1	Nil

P-5
 Asst P-5
 MoP-5

AGRICULTURAL RESEARCH STATION, THIRUVALLA

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
I. ICAR				
Asst. Professor (Pl Breeding)	Dr. Beena Thomas	1	1	nil
Professor (Agronomy)	Dr. Abraham Varughese	1	1	nil
Asst. Professor (Pl Pathology)	Dr. Sajeena A	1	1	nil
2. NARP				
Professor (Hort.)	Dr. Jessy M. Kuriakose	1	1	nil
3. KAU				
Assoc. Professor(Pl breeding)	Dr. V.R. Shajan	1	1	nil
Assoc. Professor (Pl breeding)	-	1	0	1
Professor (Agron.)	Dr. T.M. Kurian	1	1	nil
Asst. Professor (Agron)	-	1	0	1
Professor(Biochemistry)	Dr. Sosamma Cherian	1	1	nil

P-13
 Asst P-3
 MoP-2

CENTRE FOR PIG PRODUCTION & RESEARCH, MANNUTHY

Faculty Position

Cadre	Name of the Scientists	Sanctioned Posts	In Position	Vacant	Remarks
AICRP on Pigs					
Assoc. Prof.	Dr. A.P. Usha Professor	1	1	-	
Asst. Prof.	Dr. R. Thirupathy Venkatachalapathy Associate Professor	1	1	-	Assoc. Prof posted
CPPR					
Assoc. Prof.	Vacant	1	-	1	
Asst. Prof.	Vacant	1	-	1	One Teaching assistant is working on daily wage

K A U DAIRY PLANT, MANNUTHY

Faculty position :

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr.C.T.Sathian	1	1	Nil
Associate Professor	Dr. S N Rajakumar	2	2	Nil
„	Dr.P.Sudheer Babu			
Assistant Professor		3	Nil	3

ALL INDIA CO-ORDINATED POULTRY IMPROVEMENT

Staff position during 2010-2011

Sl. No	Name	Designation	Pay scale	Present pay	Date of joining
SCIENTIFIC					
1	DR. K.	Senior Scientist	37400-67000	Rs. 55010	1.3.00
2	Dr. R. Richard	Farm Manager	10000 - 15200	Rs. 11300	18.5.06 - 4.8.10
3	Dr. Binoj Chacko	Farm Manager	15600 - 39100	Rs. 22920	4.8.10
4	Dr. Sakeer Hussain	Teaching Asst.	Consolidating pay	Rs. 12000	24.9.09 - 9.6.10
5	Dr. Jeevan. O.V	Teaching Asst.	Consolidating pay	Rs. 12000	7.9.09 - 22.7.10
6	Dr. Raihan Rahim	Teaching Asst.	Consolidating pay	Rs. 12000	30.7.10
TECHNICAL					
1	Sri. N.M. Surendran	Farm Supervisor Gr.	10790 - 18000	Rs. 15510	07.4.01 - 20.4.10
2	Sri. Shibu Thimothi	Farm Asst. Sel. Gr.	9590 - 16650	Rs. 10070	21.4.10
3	Sri. Shebin Lonappan	Farm Asst. on daily	Rs. 200/- per day		9.6.09
4	Sri. P. Reghunandanan	Driver on daily wage	Rs. 200/- per day		1.4.07
ADMINISTRATIVE					

1	Smt. K.K.Valsa	Section Officer (Hr.	11910 - 19350	Rs. 17100	28.5.04 - 20.4.10
2	Smt. C. Rajalakshmi	Section Officer (Hr.	11910 - 19350	Rs. 17550	21.4.10
3	Smt. Lathika P.T	Asst. on daily wage	Rs. 200/- per day		20.12.06
4	Smt. Smitha K.A	Asst. on daily wage	Rs. 200/- per day		1.5.10 - 31.10.10
5	Smt. Prabala M.P	Asst. on daily wage	Rs. 200/- per day		2.11.10 - 31.1.11
6	Sri. Kishore. T.V	Asst. on daily wage	Rs. 200/- per day		7.2.11
SUPPORTING STAFF					
1	Permanent Labourers	9 numbers	7320 x 9		

CENTRE FOR ADVANCED STUDIES IN POULTRY SCIENCE, MANNUTHY -

Faculty Position.

(a) Centre for Advanced Studies in Poultry Science

Cadre	Name of the Scientist	Sanctioned Post	In Position	Vacant
Director	-	1	0	1
Professor	Dr. P. A. Peethambaran	1	1*	0
Asst. Professor	-	1	0	1

* Professor i/c of Director.

(b) Department of Poultry Science.

Cadre	Name of the Scientist	Sanctioned Post	In Position	Vacant
Professor	Dr. A. Jalaludeen (transferred from COVAS, Pookot and joined on 20-01-2011)	2	1	2
Assoc. Prof	Dr. P. Anitha	2	1	1
Asst. Professor	Dr. D. Anish Dr. Binoj Chacko (transferred to AICRP on Poultry, Mannuthy on 05-08-2010)	4	2	2

LIVESTOCK RESEARCH STATION THIRUVAZHAMKUNNU,

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant	Remarks
Professor	-	1	0	1	
Associate Professor	-	2	0	2	
Assistant Professor	1. Dr. S. Biju 2. Dr. Ajith K.S	5	2	3	
Network Project on Buffalo Improvement					
Associate Professor	Dr. K Anilkumar	1	1	0	Head of Station
Assistant Professor	Dr. R.S. Abhilash	1	1	0	
AICRP on Agro Forestry					
Associate Professor	-	1	0	1	
Assistant Professor	1. V. Jamaludheen 2. Dr. Asha K. Raj	2	2	0	

CENTRE FOR ADVANCED STUDIES IN ANIMAL GENETICS & BREEDING, MANNUTHY

Faculty Position

(a) CENTRE FOR ADVANCED STUDIES IN ANIMAL GENETICS & BREEDING

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Director	Dr. K.V. Raghunandanan, Professor	1	1	Nil
Assoc. Professor	Dr. T.V. Aravindakshan, Prof.	1	1	0
Asst. Prof.	1. Vacant 2. Vacant	2	0	2

(b) DEPT. OF ANIMAL BREEDING & GENETICS

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Vacant	1	0	1
Assoc. Professor	Dr. K. A. Bindu	1	1	0
Assistant Professor	1. Dr. Radhika G. (on study leave) 2. Dr. Elizabeth Kurian 3. Vacant	3	2	1

(c) ICAR FIELD PROGENY TESTING SCHEME

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Assoc. Professor	Dr. Stephen Mathew, Professor	1	1	Nil

(d) AICRP ON GOAT IMPROVEMENT

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Assoc. Professor	Dr. K.C. Raghavan, Professor	1	1	Nil
Asst. Prof.	1. Dr. Naicy Thomas	1	1	0

VETERINARY COLLEGE HOSPITAL, COVAS, MANNUTHY

Faculty position

: Plan/Non Plan/FAP (specify)

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr. K. N. Aravinda Ghosh	1	1	Nil
Assit. Prof.		3	0	3

**REGIONAL CATTLE INFERTILITY RESEARCH CENTRE
VELLIMADUKUNNU, KOZHIKODE**

**Faculty position
a. Veterinary**

Cadre	Name of Scientist	Sanctioned post	In position	Vacant
Asso. Professor & Head	Dr. K. Ramachandran (Post Shi vide Uty Ord No.GA/C1/32969/1 30/10/2010)	1	--	1
Assistant Professor	(C.P.Abdul Azeez (1/6/2010 to 31/3/2011))	2	1	1

b. Fisheries

Cadre	Name of Scientist	Sanctioned post	In position	Vacant
Associate Professor	Dr. G. S. Narayanan(1/4/2010 to 31/3/2011)	1	1	Nil

FISHERIES STATION, PUDUVEYPU

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Asst. Prof. (Aqua)	Dr. M. M. Jose	Asst. Prof. (Aqua)	Prof. (Aqua)	Nil
Assoc. Prof. (Aqua)	--	Assoc. Prof. (Aqua)	Nil	Vacant
Asst. Prof. (Aqua)	--	Asst. Professor (Aqua)	Nil	Vacant

COMMUNICATION CENTRE, MANNUTHY

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
INFORMATION UNIT				
Professor (Extension)	Dr. R.M.Prasad	1	Relieved on 1.02.11 to join as ADE (CZ)	1
Asst Professor(Extension)		1	Nil	1
Assoc Professor(Extension)	Dr Bino P.Bonny	1	1	Nil
Assoc Professor(Extension)		1	Nil	1
EXHIBITION UNIT				
Assoc Professor(Extension)		1	Nil	1
Asst Professor(Extension)		1	Nil	1
PUBLICATION UNIT				
Assoc Professor(Extension)		1	Nil	1
Assoc Professor(Extension)	Dr.Sreevalsan J.Menon (Working at ATIC)	1	1	
Language Editor		1	Nil	1
FARM ADVISORY SERVICE				

Professor (Agron)		1	Nil	1
Asst Professor (Agron)		1	Nil	1
Professor (Plant Protection)		1	Nil	1
Professor (Entomology)	Dr. Jim Thomas	1	1	Nil
Professor (Plant Protection)	Dr.S.Estelitta	1	1	Nil
Asst.Professor (Plant Protection)		1	Nil	1
Professor(AH)		1	Nil	1
Assoc.Professor (AH)	Dr.P.Nandakumar	1	1	Nil
Assoc.Professor (Poultry)		1	Nil	1
Professor (Soil Science)	Dr.Jayasree Sankar	1	Transferred to ATIC	1
Assoc.Professor (Aquaculture)		1	Nil	1
Assoc Professor (Horticulture)	Smt.K.K.Santha	1	Retired on 11.03.11	1
Assoc.Professor(Horticulture)	Dr.Jyothi Bhaskar	1	1	Nil
Asst.Professor(Horticulture)		1	Nil	1
Assoc.Professor (Extension)	Dr.S.Helen	1	1	Nil
Asst.Professor(Extension)		1	Nil	1
Asst.Professor(Extension)		1	Nil	1
Professor (Ag. Engineering)	Dr. P. Suseela, Assoc. Professor	1	1	Nil

**AGRICULTURAL TECHNOLOGY INFORMATION CENTRE (ATIC),
MANNUTHY, THRISSUR – 680 651**

Faculty position

Cadre	Name of Scientist	Sanctioned post	In position	Vacant
Professor	Dr. Jayasree Sankar.S	1	1	Nil
Associate Professor	Dr. Sreevalsan J Menon	Nil	On working arrangement from Communication Centre	Nil

KAU PRESS, MANNUTHY

Staff Strength (as on 31st March 2011)

<i>Administrative staff</i>	<i>No. of posts</i>			<i>Remarks</i>
	<i>Sanctioned</i>	<i>In position</i>	<i>Vacant</i>	
Administrative Assistant	1	1	-	
Assistants	3	2	1	
Typist	1	1	-	
Peon	1	1	-	
Sweeper-cum-Attendant	1	-	-	
Technical Staff				
Press Manager	1	-	1	

General Foreman	1	-	1	
Senior Foreman	1	1	-	
Junior Foreman	1	1	-	Retired on 31.03.2011
Proof Reader	2	1	1	In charge of Press Manager
Copy Holder	2	-	2	
Computer	1	1	-	
Printer	8	-	8	Full vacant from 01-04-2010
Compositor	5	1	4	4 vacancies from 1-4-2010
Binder	10	2	8	8 vacancies from 1-4-2010
Helper	1	1	-	

CENTRAL TRAINING INSTITUTE, MANNUTHY

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Prof. of Extn.	Dr. Joy Mathew Dr. Alexander George	1	2 Assistant professor is promoted as Professor.	
Assistant Professor		2	1 professor is working against one post	1

PUBLIC RELATIONS OFFICE, MANNUTHY

Dr. T S Rajeev, Assistant Professor was holding the charge of Public Relations Officer from 01-04-2010 to 02.06.2010

Sri B. Ajithkumar, took over as Public Relations Officer from 02.06.2010.

KRISHI VIGYAN KENDRA, THRISSUR

Faculty position Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Programme Co-ordinator (Plant Pathology)	Dr. Koshy Abraham	Associate Professor	Professor	-
Subject Matter Specialist (Agronomy)	Dr. T.N. Jagadeesh kumar	Assistant Professor	Associate Professor	-
Subject Matter Specialist (Horticulture)	Dr. Sreelatha. U.	Assistant Professor	Associate Professor	-
Subject Matter Specialist (Agrl. Engineering)	Dr. Mary Regina. F.	Assistant Professor	Associate Professor	-
Subject Matter Specialist (LPM)	Dr. Geetha. N	Assistant Professor	Assistant Professor	-
Subject Matter Specialist (Home Science)	Dr. Suman K.T.	Assistant Professor	Assistant Professor	-
Subject Matter Specialist (Agrl. Extension)	Smt. Sangeetha K.G.	Assistant Professor	Associate Professor	-

**KRISHI VIGYAN KENDRA, PALAKKAD,
MELE PATTAMBI**

Faculty position

Cadre	Name of Scientist	Sanctioned post	In position	Vacant
Associate Professor	Dr. Shaji James, P	(1)	(1)	Nil
Assistant Professor	Smt. T. Premalatha	(6)	(5)	1
	Dr. M. Israel Thomas			
	Smt. C.K. Yamini Varma			
	Dr. M. Aameena			
	Dr. E.R. Aneena			

KRISHI VIGYAN KENDRA, MALAPPURAM

Faculty position

Cadre	Name of the scientist	Sanctioned posts	In position	Vacant
Programme Coordinator	Dr. Habeeburrahman P.V	1	1	nil
Subject matter Specialist(Horti)	Dr. Deepu Mathew	1	1	nil
Subject matter Specialist (Ag. Engg.)	Smt. Sajeena.S	1	1	nil
Subject matter Specialist (Home Science)	Smt. Seeja Thomachan	1	1	nil
Subject matter Specialist (Entomology)	Dr. Berin Pathrose	1	1	nil
Subject matter Specialist(LPM)	Dr. Deepak Mathew D.K	1	1	nil
Subject matter Specialist(Extm)	Vacant	1	nil	1

KRISHI VIGYAN KENDRA, KANNUR KANHIRANGAD

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Professor	K. Abdul Kareem	Programme Coordinator	1	
Asst. Prof.	Poornima Yadav.P.I	SMS (Agronomy)	1	
Asst. Prof.	Sharon.C.L	SMS (Home Science)	1	
Asst. Prof.	Lalu .K	SMS (Animal Husbandry)	1	
Asst. Prof.	Rafeekher.M	SMS (Horticulture)	1	
Asst. Prof.	Manu.C.R	SMS (Entomology)	1	
Asst. Prof.	Vacant	SMS (Soil Science)		1

KRISHI VIGYAN KENDRA, WAYANAD

Staff Position

Sl. No.	Sanctioned post	Name of the incumbent	Designation	Discipline	Highest Qualification	Basic pay ^a (Rs.)	Date of joining	Permanent / Temporary
1	Programme Coordinator	Dr. A. Radhamma Pillai	Programme Coordinator	Animal Husbandry	Ph.D.	65010	01.04.1994	Permanent
2	Subject Matter Specialist (SMS)	Dr. G. S. Arularasan	Agricultural Extension	Agricultural Extension	M. Sc. (Ag.)	29700	11.12.2006	Permanent
3	SMS	Dr. D. Dhalin	Agricultural Engineering	Agricultural Engineering	Ph.D.	26600	14.10.2005	Permanent
4	SMS	Smt. Mini V.	Soil Science	Soil Science	M. Sc. (Ag.)	22920	28.07.2008	Permanent
5	SMS	Dr. Mini Sankar	Horticulture	Horticulture	Ph. D.	25600	16.11.2009	Permanent
6	SMS	Dr. Anitha Chandran C.	Home Science	Home Science	Ph. D.	24850	03.02.2010	Permanent
7	SMS	Dr. Reshmy Vijayaraghavan	Plant Pathology	Plant Pathology	Ph. D.	24850	10.2.2010	Permanent
10	Prog. Asst. / Farm Manager	Sri. K.S. Rajamani	Farm Manager	Agriculture	B.Sc. (Ag.)	17550	18.12.1996	Permanent
	Sri. P. Moideen	Class IV	Not Applicable	8590	25.05.2005	Permanent		

KRISHI VIGYAN KENDRA, KUMARAKOM, KOTTAYAM

Faculty position

P
Asst P-1
Asst P-6

Sl. No.	Name of the Scientist	Sanctioned post	Cadre	In position	Vacant
	Dr. K. J. Joseph	Programme Co-ordinator	Professor	1	-
	Dr. K.R. Salin	Subject Matter Splst, (Aquaculture.)	Asst. Professor	1	-
	Dr. Sible George Varghese	Subject Matter Specialist (Plant Protection)	Asst. Professor	1	-
	Dr. M.S. Sailaja Kumari	Subject Matter Specialist (Soil Sc. & Ag Chemistry)	Asst. Professor	1	-
	Smt. Elizabeth Joseph	Subject Matter Specialist (Home Science)	Asst. Professor	1	-
	Dr. Bindhu B.	Subject Matter Spl.(Horti.)	Asst. Professor	1	-
	Smt. V.S.Devi	Subject Matter Specialist (Agronomy)	Asst. Professor	1	-

KRISHI VIGYAN KENDRA, KOLLAM, KERALA

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Asso. Prof. & head	Dr. Sheeba Rebecca Isaac	Programme Co-ordinator	1	
Asso. Prof.	Dr. S. Subaida Beevi	SMS Homescience-1	1	
Asst Prof.	Dr. Bindu Podikunju	SMS Agricultural Extn-1	1	
Asst Prof.	Dr. Ambily Paul	SMS Plant Protection-1	1	
Asst Prof.	Dr. Geetha Lekshmi P R	SMS Horticulture-1	1	
Asst Prof.	Vacant	SMS Animal Husbandry-1		1
Asst Prof.	Vacant	SMS Agricultural Engineering-1		1

Asst P - 5
Asso P - 2

ഡയറക്ടറേറ്റ് ഓഫ് സ്റ്റുഡന്റ്സ് വെൽഫെയറിന് 01.2.2011 മുതൽ 31.05.2011 വരെയുള്ള പ്രവർത്തന റിപ്പോർട്ട്

തസ്തികകൾ താഴെ പറയുന്നു.

അസിസ്റ്റന്റ്	3
ട്രൈനിസ്	1
ക്ലാസ്സ് IV	2
ഡ്രൈവർ	1
ബസ് അനന്തർ	1

APPENDIX IV

ONGOING PROJECTS UNDER
KERALA AGRICULTURAL UNIVERSITY

		<i>Ongoing Projects 2010-11</i>	
SL No	Title of the Project	Out lay	Duration
	Kerala State Council for science, Technology and Environment (KSCSTE) Projects		
1	Induction of invitro flowering of dendrobium	7.20	36
2	Demonstration studies on Jeevakom (Seidenfia reedi) Part II	6.87	36
3	Standardisation of planting material and regulation of flowering in bush jasmine (Jasminum sambac.L)	5.78	36
4	Investigation on the role of dogs in the transmission of brugian filarian infection to humans and molecular epidemiology of filarian infections	7.04	36
5	Investigations on anti-inflammatory properties of selected under exploited medicinal plants	10.98	36
6	Biology and management of root mealy bug of banana cultivars	3.68	36
7	An investigation on ergonomic evaluation and improvement of selected rice farming implements for women	9.98	36
8	Evaluation of phenologic growth pattern and phytochemistry of Loranthus Spp.	8.19	36
9	Diagnosis and recommendation of micro nutrient fertilization in Banana		36
10	Evaluation of resistance inducing substances for management of bitter gourd	6.82	36
11	Developing consortia of Bio Control agents for the management of capsule rot and clump rot disease of cardamom	7.64	36
12	Utilization of microbial enzymes of dairy origin for quality assurance in dairy industry	5.94	36
13	Generation and evaluation of vanilla hybrids through intraspecific and interspecific hybridisation and embryo culture	5.61	36
14	Impact of nutritional counseling and life style intervention on obese adults	3.59	36
15	Regulation of cropping in mango	4.45	36
16	Standardization of quality vegetable seed production technology for South Kerala and promotion through group approach	8.28	36
17	Developing seedless watermelon suitable to Kerala through polyploidy and mutation breeding	9.43	36
18	Homestead herbal farming and value addition in medicinal plants	5.58	36
19	Exploitation of bisexual variants for developing through yielding varieties in Piper longum	4.51	36
20	Studies on host plants of Nee beetles	8.94	36
21	Evaluation of microsprinkler developed by Avaran at KCAET Tavanur	2.65	18
22	Development of black gram varieties suitable for central zone of Kerala	7.73	36

23	23	Development of low cost manually operated milking machine	3.79	12
24	24	Developing green environment and adaptive techniquet of horticulture therapy for challenged children	5.99	36
25	25	Coprolological survey on endoparasites causing gastroenteritis in cattle of Wayanad District of Kerala	0.80	12
26	26	Genetic analysis and marker assisted selection in malabari goats using micro satellite markers	7.62	36
27	27	Process standardisation for developing novel product based on select tropical fruits	6.02	36
28	28	Characterisation and identification of superiod genotypes of Thippali (Piper longum)	7.07	36
29	29	Osmotic dehydration of cashew apple for development of 'ready to eat' value added food, preserving with natural qualities.	9.71	36
30	30	Corrective breeding of rice variety Jyothi to incorporate moderate panicle shattering	9.16	36
31	31	Mass Production...Pseudomonas		
32	32	New revolving fund		
33	33	Screening for the drought adaptive wax biosynthesis cere gene in Nenthran banana clones	15.10	
34	34	Marker assisted transfer of thermo sensitive genic male sterile gene to red rice back ground for hybrid rice production	14.66	
35	35	Locating resistant gene donors to major pests and diseases in traditional rice varieties of Kerala using marker assisted selection	10.37	36
36	36	Investigation on agricultural spray charging leading to the development of an electrolytic charging attachment compatible to a knapsack mist blower	6.60	12
37	37	Panel Guard Rubber Tapping Tool	1.40	12
38	38	Development of Rotary banana slicer		
39	39	Identification of micro stellite ...traits in rice	16.37	36
40	40	Young Investigators programme in biotech	16.50	36
41	41	One day awareness programme Technological advances.....lives	28.00	
42	42	Utilization of microbial enzymes of dairy origin for quality assurance in dairy industry		
43	43	Utilisation of Red and Ant of Pest Management	7.70	36
			307.75	
		State Horticulture Mission (SHM)		
		College of Agriculture, Vellayani		
44	1	Establishment of a fullfledged seed processing unit and seed testing lab.	125	
45	2	Estt. of biocontrol lab and bio fertilizer production unit	80	
46	3	Estt. of Leaf Tissue Analytical Laboratory at Dept. of Agronomy, College of Agriculture, Vellayani.	20	
47	4	Imparting training for Horticulture production through horticulture therapy for physically and mentally challenged children	3.585	
48	5	Establishment of small nursery mango, College of Agriculture, Vellayani	18	

49	6	Establishment of small nursery - minor horticultural Crops - jack, College of Agriculture, Vellayani	18
50	7	Two days mushroom fair at kanakakkunnu palace	1
51	8	Training Farmers on Farm mechanisation in Horticulture	
52	9	Supervisors training pgm. for value addition ethnic fruits crops of Kerala	8.125
		C.o.A, Padannakkad	
53	1	Establishment of small nursery for medicinal plants	4
54	2	Strengthening of tissue culture lab for Micro Propagation of banana at College of Agriculture, Padannakkad.	8
55	3	Establishment of a model Mango nursery	18
56	4	Two days mushroom fair at kanakakkunnu palace	1
57	5	Est. of small nursery minor horti crops under public sector	3
		PPNMU, Vellanikkara	
58	1	Rehabilitation of existing tissue culture lab at Plant Propagation and Nursery Management Unit-PPNMU Vellanikkara	8
		C.o.H, Vellanikkara	
59	1	Setting up of a central laboratory for soil and leaf analysis laboratory	20
60	2	Establishment of Bio control laboratory at Biological Control of Crop Pests, CoH Vellanikkara,	50
61	3	Enhancement of productivity of horticultural crops through water harvesting and ground water recharging	10
62	4	Production of hybrid podds, hybrid seedlings and budded plants of cocoa	18
		ARS, Mannuthy	
63	1	Up gradation of tissue culture facilities for large scale production of quality planting materials	8
64	2	Demonstration of vermi compost production from coconut leaves	4.5
65	3	Estt. of a model nursery (mango) under public sector	18
		CBF THUMBURMUZHY	
66	1	Vegetable seed production programme	14.325
		BRS, Kannara	
67	1	Estt. Of model Banana nursery for large scale production of suckers at BRS Kannara	18
68	2	Establishment of plant health clinic	20
69	3	Establishment of Bio control laboratory for Mass Production of Bio control agents for pest & Disease Management in Banana	31.39
70	4	Conducting training programme for gardeners	15
71	5	Banana fibre extraction unit and utilization for income generation and women empowerment	10.35
		CRS, Pampadumpara	

72	1	Estt. of model floriculture unit at CRS, P'mpara	18
73	2	Estt. of Biocontrol lab	18
		CRS, Balaramapuram	
74	1	Establishment of small nursery – Mushroom spawn production unit at CRS, Balaramapuram	3
75	2	Establishment of small nursery Black Pepper at CRS, Balaramapuram –	3
76	3	Establishment of small nursery banana-CRS Balaramapuram	3
77	4	Establishment of coconut based compost unit-CRS Balaramapuram	0.6
		CRS, Anakkayam	
78	1	Establishment of a Model nursery for cashew at Cashew Research Station, Anakkayam.	18
79	2	Laying out a small for pepper at Cashew Research Station, Anakkayam	3
80	3	Setting up of a high-tech poly house at CRS, Anakkayam.	3.25
		R.A.R.S. Ambalavayal	
81	1	Estt. Of Biocontrol lab at Regional Agricultural Research Station, Ambalavayal	18
82	2	Rehabilitation of existing tissue culture lab	15
83	3	Setting up of Leaf/Tissue analytical lab	20
		KVK, Sadanandapuram	
84	1	Establishment of Plant Health Clinic at Krishi Vigyan Kendra, Sadanandapuram.	12.46
		R.A.R.S, Kumarakom	
85	1	Establishment of vermicompost Demonstration units in the problem zone of Kerala for effective recycling of aquatic weeds and crop residues-RRS Kumarakom	3
86	2	Estt. of organic pepper plots in idukki Dt.	4.25
87	3	Establishment of a Model nursery pepper at Regional Agricultural Research Station, Kumarakom.	18
88	4	Establishment of Pest and disease forecasting unit at RARS, Kumarakom	4
		R.A.R.S., Pattambi	
89	1	Establishment of Plant Health Clinic for Horticultural crops at Regional Agricultural Research Station, Pattambi.	12.12
90	2	Estt. of Leaf/tissue analysis and crop management advisory facility for Hort. Crops	20
		ORARS, Kayamkulam	
91	1	Establishment of Leaf/ Tissue analytical Laboratory at Onattukkara Regional Agricultural Research Station, Kayamkulam.	20
92	2	Rehabilitation of existing tissue culture lab	8
		AMPRS ODAKKALI	

93	✓	Augmenting tissue culture facilities for mass production of quality planting materials	15	
94	✓	Establishment of vermicompost unit	1.5	
95	3	Est. of high tech model medicinal plant nursery	20	
		ARS CHALAKUDY		
96	1	Establishment of small nursery Nutmeg	3	
97	✓	Establishment of vermicompost unit at ARS chalakudy	0.3	
98	✓	Mass hardening unit for orchids and gereberas	3	
99	4	Establishment of small nursery mangoes	3	
	✓	Demonstration Unit for Cool Season Vegetables under Protected Cultivation	5	
		PRS PANNIYUR		
100	✓	Model Nursery for Medicinal Plants	20	
101	2	Establishment of Pineapple Small Nursery	3	
		RRS, Vyttila		
102	J	Identification & Popularisation of Mushroom varieties -RRS Vyttila	5.1175	
103	✓	Strengthening of nursery facilities at RRS Vyttila for micropropagation of important horticultural crops of Ernakulam DT.	15	
		COLLABERATIVE PROGRAMME		
104	1	ISRO - KAU - CUSAT Collaborative project on "Integrated Agro - Materiological Advisory Service	70	
105	2	Dimensions of water conservation in paddy lands of Kerala	17.87	
106	3	cadbury cocoa co.op. research project	227.17	
		National Horticulture Mission		
107	✓	Spices & Aromatic Component	83.4	
		ICAR		
		All India Co-ordinated Projects		
		NARP SR, Vellayani		
108	1	AICRP on Mushroom	22.80	60
109	2	AICRP on Honey bee	35.25	120
110	3	AICRP on Nematode Pests		120
111	4	AICRP on pesticide residues	140.93	120
112	5	AICRP on forage crops	37.19	120

		College of Horticulture		
113	1	AICRP on Weed Control	35.25	120
114	2	AICRP on Soil test Crop response correlation	9.60	60
115	3	AINP on Agricultural Ornithology	26.16	12
116	4	AICRP on BCCP	26.37	12
117	5	AICRP on Agrometerology	24.96	60
118	6	AICRP on Medicinal & Aromatic Plants	29.71	120
119	7	AIC Vegetable Improvement Project	39.12	120
120	8	AIC Floriculture Improvement Project	40.14	120
121	9	AINP on Agricultural Acarology	26.16	60
		KCAE&T, Tavanur		
122	1	AICRP on post harvest technology	147.29	60
123	2	AICRP on Farm Implements & Machinery	30.53	120
		College of Vety. An. Sc., Mannuthy		
124	1	AINP on Haemorrhagic Septicaemia	51.34	60
125	2	AICRP on Poultry	86.53	60
126	3	AICRP on Goat Improvement	75.50	60
127	4	AICRP on improvement of feed resources and nutrient utilization for raising animal production	69.21	120
128	5	AICRP on Pigs	30.00	12
		ARS, Chalakudy		
129	1	AICRP on Water Management	89.75	120
		BRS, Kannara		
130	1	AICRP on tropical fruits (Banana)	20.26	60
		CRS, Madakkathara		
131	1	AICRP on Cashew (Madakkathara & Pilicode)	56.25	96
		CRS, Pampadumpara		
132	1	AICRP on Spices	40.58	120
		PRS, Panniyur		
133	1	AICRP on Spices	67.69	60
		RARS, Ambalavayal		
134	1	AICRP on Spices	45.39	60
		CSRC, Karamana		
135	1	AICRP - IFS-- Karamana & ECF Unit, Thiruvalla sub centre	47.05	60
		RARS, Pattambi		
136	1	AICRIP - Double Cropping Main Centre	37.28	120
137	2	AICRP on Arid Legumes (Guar)	28.40	120
138	3	AICRP on Long term fertilizer experiment	44.86	60

		Onattukara RARS, Kayamkulam			
139	1	AICRP on sesame and niger		5.72	12
		RRS, Moncompu			
140	1	AICRIP - Double Cropping Main Centre		23.85	60
		SRS, Thiruvalla			
141	1	AICRP on Sugarcane		36.95	12
		LRS, Thiruvazhamkunnu			
142	1	AICRP on Agroforestry (Functioning at LRS, Thiruvazhamkunnu)		78.52	120
143	2	NWP on Buffalo Improvement		175.00	60
		COVAS, Pookot			
144	1	Hands on Training under Vety polyimic & disease diagnostic centre		75.00	24
		ICAR RF			
		KAU Headquarters, Vellanikkara			
145	1	Seed production in agricultural crops and fisheries		23.38	24
		College of Horticulture, Vellanikkara			
146	1	Establishment of a centre for large scale production of vegetable seeds		16.00	84
		College of Vety. An. Sc., Mannuthy			
147	1	Establishment of a commercial broiler hatchery		25.00	84
		NAIP			
		College of Veterinary & A.S., Pookot			
148	1	Study of herbal acaricides as means to overcome the development of resistance in ticks to conventional acaricides		11.58	48
		RARS, Ambalavayal			
149	1	Multi Enterprise Farming Models to Address the Agrarian Crisis of Wayanad District of Kerala		117.91	60
		College of Horticulture, Vellanikkara			
150	1	Regional Market Intelligence centres		13.09	36
		Other ICAR projects			
151	1	Niche Area		30	60
152	2	Disaster Management-Contingency plan		1	12
153	3	Insect Biosystematics		6.68	24
154	4	Gender Issues of Rice Based Production system and Refinement of Selected Technologies in Women Perspective		2.50	48
155	5	Application of MAP in the storability of high value seed of vegetables		49.92	36
156	6	NWP on Under Utilised Vegetable Crops		11.80	36
157	7	Public Private Partnership on Gender, CGSAFED		2.495	24
158	8	GIS GPS based Fertility Mapping		9.95	24
159	9	NICRA		3.05	24
160	10	Front line demonstration of agricultural implements and machinery in selected regions of the country.		3.00	24

161	11	NWP on Ethno Veterinary Medicine	12.50	36
162	12	Field Progeny Testing Scheme	28.65	60
163	13	NWP on Zoonotic Diseases	73.04	60
		Rashtriya Krishi Vikas Yojana (RKVY) Projects		
164	1	Establishing a biocontrol lab for crop pests management	50	
165	2	Setting a spawn production and commercial mushroom cultivation	20	
166	3	Establishing a research centre for green farming and sustainable agriculture	8	
167	4	Establishing a polyclonal progeny orchard	11.2	
168	5	Hybrid coconut seedling production unit	20	
169	6	Establishing planting material production unit	3	
170	7	Establishment of a goat unit	3	
171	8	Comprehensive coconut care programme for root wilt affected area at Onattukara	20	
172	9	Strengthening of rice cultivation in Onattukara	7	
173	10	Establishment of a sugarcane processing unit	10	
174	11	Centre for bio-waste recycling	15	
175	12	Developing Protocol for organic cultivation of cardamom	15	
176	13	Developing protocol for organic rice production in Pokkali tracts	25	
177	14	Establishing Hatchery Unit for brackish water fishes	20	
178	15	Establishment of an aquaculture	15	
179	16	Strengthening of analytical laboratory for quality testing and certification of produce of medicinal plants	22	
180	17	Field testing, training and service centre for agro machinery at Mannuthy	25	
181	18	Cashew apple processing unit at Madakkathara	22	
182	19	Centre for processing and product development in fruit crops	15	
183	20	Vermi compost production unit	10	
184	21	Establishing of gene sanctuary of fodder crops	20	
185	22	Establishing a progeny orchard for mass production of banana suckers	20	
186	23	Establishing of a polyclonal progeny orchard of cashew	20	
187	24	Strengthening of soil testing lab	20	
188	25	Establishing a Rural Bio Resource Complex	15	
189	26	Developing protocol for organic pepper cultivation	10	
190	27	Genetic improvement of desert mangoes of Malabar region	10	

191	28	Evolving hybrid coconut suitable for Kerala	10
192	29	Augmenting production and distribution of planting materials of elite varieties of selected crops of commercial importance	50
193	30	Centre for development of microbial inoculant technology for organic farming system	34.75
194	31	Establishment of the Centre for Organic Farming of Kerala Agricultural University at Vellayani, Typm.	20
195	32	Participatory Integrated Management of fruit flies infesting fruits and vegetables	13.5
196	33	A sustainable fodder production model for Kerala	6.7
197	34	Multidisciplinary diagnostic support to address field problems of farmers in southern district of Kerala	12.5
198	35	Refinement, validation and implementation of Integrated Pest Management in Paddy of Onattukara through farmers participatory approach	12
199	36	Breeding for High Yielding rice varieties having short duration, seed dormancy and resistance to biotic and abiotic stresses suitable for Kuttanad	16.72
200	37	Enhancing rice production in Kari lands of Northern Kuttanad	17.5
201	38	Boosting organic rice production of Kerala through marker assisted selection and high quality seed production programme	35.09
202	39	Eco friendly high yielding technologies for increased production from fresh water fish farming through farmer participatory approach	12.658
203	40	Research and extension strategies for self sufficiency in fodder production.	46.09
204	41	Enhancing rice production in Kerala and attaining partial self sufficiency	65
205	42	Controlled breeding in goats for increasing meat production potential at KVK, Malappuram	3.16
206	43	Increasing production and availability of quality seeds of high yielding and traditional varieties of paddy in Wayanad district	38.7
207	44	Introduction of Emu to Wayanad - as an alternate poultry for egg and meat production	7.51
208	45	Grassland development and establishment of fodder nursery for fodder security of Wayanad district	7.24
209	46	Production and distribution of coconut seedlings and other planting materials adopting seed village concept	26.2
210	47	Conservation, multiplication and distribution if Malabari breeds of goats	20.6
211	48	Women empowerment through organic cultivation of vegetables	17
212	49	Development of production units for hybrid coconut seedlings and other planting materials in three Southern districts of Kerala	130.02
213	50	Multidisciplinary diagnostic support to address field problems of farmers in the Southern districts of Kerala (Karshaka Santhwanam)	15
214	51	Establishment of a hybrid coconut seedling production unit at Coconut research Station, Balamapura,	16
215	52	Popularization of meliponiculture in Kerala	12
216	53	Developing protocol for organic rice production for pokkali tracts	25

217	(54)	Augmentation of vegetable production through technological intervention	450.25	
218	(55)	Food Security Army Service Centre Development Programme (FSASCDP) KERALAM	86.2	
219	(56)	Centre for e- learning in Agriculture	74	
		State Palnning Board Projects		
220	4	KAU- CDIT Joint proposal on Farming System Informatics	7.71	1
221	2	Validation of Indigenous Technical Knowledge and Farmer Innovation in Northern Kerala	10	1
222	3	ISRO- ANTARIKSH project on "Development of weather based agro-advisory in relation to cardamom and black pepper over the high ranges of Kerala"	5.5132	2
223	4	Assessment of crop-weather relations and formulation of crop weather advisories for the Southern Region of Kerala	27.5	4
224	5	Classification and characterization of farming systems in District Wise Agroecological Zones of Kerala	21.34	2
225	6	Development of crop weather information system and forewarning models for sheath blight and BPH in rice in the problem zone of Kerala	20	3
226	7	Exploration, identification and characterization of various livestock rearing systems and agriculture linkages in district wise agro ecological zones of Kerala	11.036	2
227	8	Soil based nutrient management plan for agro ecosystems of Kerala	249.51	2
		Hariyali projects		
228	1	Hariyali Watershed Development project of Pazhayannur Block Panchayat	3.3	3
229	2	Hariyali Watershed Development project of Nileswar Block Panchayat	16.37	
230	3	Hariyali Watershed Development project of Madappally Block Panchayat (East Watershed)	7.12	3
231	4	Hariyali Watershed Development project of Madappally Block Panchayat (West Watershed)	8.97	
232	5	Hariyali Watershed Development project of Veliyanadu Block Panchayat	2.934	3
233	6	Hariyali Watershed Development project of Eranaad Taluk	16.15	3
234	7	Hariyali Watershed Development project of Anchal Block Panchayat	11.387	3
		Other Projects		
235	1	One day work shop on " Attaining millennium development Goal Number -1-Eradicate extreme poverty on strategic planning for monitoring	2.39	12
236	2	Morphometry and phylogeography of honey bees and stingless bees in India	23.17	36
237	3	Development of agricultural decision support system software	17.62	36
238	4	Exploration into indigenous plant dyes of the western ghats with commercial potential as natural dyestuffs	10.18	36
239	5	Empowering farm women for enhancing quality of life through skill development and income generation by food processing	9.53	36
240	6	Development of INM package for commercially important plantation crops	15.16	36

241	7	Exploiting Western ghat Biodiversity for anti fungal metabolites for plant disease control	17.06	36
242	8	Strengthening of life supporting system of the poor and marginalized people through conservation and utilization of rare and endangered mango varieties /ecotypes in the forest ecosystem through participatory approach	10.11	36
243	9	RNAi approaches for validation of defense related genes from resistant wild pepper-piper colubrinum	20.06	36
244	10	Scheme for the development, testing and implementation of a farming system based cyber - extension model for Wayanad district of Kerala State	15.00	18
245	11	Entrepreneurship development and sustainable livelihoods for scheduled caste/tribe women through floriculture	32.86	36
246	12	Evaluation anti-cancer for properties of crystal proteins of <i>Bacillus Thuringiensis</i> isolates from the Western ghats.	32.07	36
247	13	National symposium on "waste management experiences and strategies	0.50	12
248	14	A supply side constrains in organic agricultural production- A supply of organic input markets of Kerala	15.96	36
249	15	Is farm labour compensated for the occupational risks, An attempt employing Hedonic wage model	3.23	24
250	16	UNESCO Programmes and activities -conducting a seminar on "conserving biodiversity tools and approaches"	1.40	12
251	17	Sustainable livelihood options for rural women by utilization of underexploited crop plants	12.58	36
252	18	Empowering tribal women through domestication of medicinal plants	4.90	36
253	19	Development and strengthening of infrastructure facilities for production and distribution of quality seeds	3.00	12
254	20	Forecasting agricultural output using space agrometeorology and land based observations(FASAL)	1.18	24
255	21	Collection and characterisation of cucurbit and legume vegetables	7.80	36
256	22	Gene pyramiding to develop cultivars with durable resistance to bacterial leaf blight through marker assisted selection	37.30	36
257	23	National Project on Management of Soil Health and fertility "setting up of soil testing laboratories"	150.00	24
258	24	Chemotyping and gene expression profiling in black pepper (<i>Piper nigrum</i> L.) with special reference to quality attributes.	47.80	36
259	25	Stock assessment and development of captive breeding technology of <i>PUNTIUS Denisonii</i>		
260	26	Ornamental fish culture for income and employment generation and to enhance socio-economic status of rural population of Kumbalam Panchayat, Kanayannur Taluk, Ernakulam district, Kerala State, India	20.00	36
261	27	Fish seed production and ranching in chalakudy river for improving the tribal livelihood of vazhachal forest division	15.33	36
262	28	Impact of one crop paddy - one crop prawn rotational farming on environment and socio economics in Kuttanad	5.06	24
263	29	Study and documentation of successful commercial dairy unit in kerala state and dissemination of their innovative practices for new entrepreneurs	3.37	12
264	30	DST-FIST Project	8.30	60
265	31	Evaluation of the efficacy of AC/CRP/11 as co-therapy in case of chronic respiratory disease(CRD)of chicken	0.74	6
266	32	Design fabrication and testing of low cost fluid milk processing system	9.90	12
267	33	Facilitation centre for medicinal plants	30.00	36
268	34	Preparation of Web based interactive packages for selected medicinal crops	8.90	24

269	Development of good agricultural practices and GAP monograph of bacopa monnieri	6.00	36
270	Study of selected adaptogenic plants and ayurvedic drugs with special reference to polyphenolic composition and antioxidant activity	30.00	36
271	KAU Rubbermark Collaborative Project Centre for Crop Nutrition	21.17	60
272	Farmers participatory approaches to assess the impact of integrated plant nutrient system on soil health & crop yield in a typical laterite soil of western ghats region	6.27	36
273	Bio-resource recycling for sustainable livelihood in rural areas	5.79	36
274	Impact assessment of land use practices and studies on sustainable development in western ghats of Kerala	5.50	36
275	Collection, identification, evaluation and popularization of edible/medicinal mushrooms of western ghats of Kerala	5.50	60
276	Strategies for eco friendly exploitation of arrow root in the western ghat region of Kerala for mini agri business	5.50	36
277	Analysis of homestead based fodder production system and intervention for economic milk production in Trivandrum district of the western ghat region of Kerala	5.10	36
278	Exploration of western ghat tract for diazotrophs of P solubilizers	5.20	36
279	Effect of micro gravity and high energy radiation at the outer space on growth, development and quality of crop plants	15.57	36
280	Development of Water stress tolerant coconut hybrids through selected fertilization	5.80	36
281	Source efficacy of organic manures and microbial inoculants for nutrient scheduling in vegetable based cropping systems of western ghats	7.00	36
282	Crop productivity enhancement through capacity building of members of farmers club in Thiruvananthapuram district.	4.13	24
283	Developing on participatory settlement based animal farming model to enhance the income and employment opportunity of tribal women folk of western ghat regions of Kerala	5.17	36
284	New Agronomy Field Unit (AMFU) at Kumarakom	3.40	36
285	FPARP project on system of rice intensification and micro irrigation technology	30.00	36
286	Promoting bio-resource based pilgrim need as a livelihood option by the rural women of Kerala	15.99	36
287	Improving awareness level in rural livestock community utilizing modern communication tools	3.80	12
288	Establishment and maintenance of a herbal garden	1.80	36
289	Characterisation of different stocks of Macrobrachium reserbergii and development of genetically improved strain through selective breeding	9.55	36
290	Bio-diversity of cultivable air breathing fishers in Kerala and development of appropriate culture strategies for Heteropneustes and claring SPP	20.78	36
291	Effective use of solid municipal and industrial waste as a compost of potting media for production of tree seedlings	7.808	36
292	Dimensions of water conservation in paddy lands of Kerala	17.87	
293	Food Safety through Crop Management - Developing a Management Plan	9.36	24

294	60	Design & Development of new farm machines and tools	3	12
295	61	Development of mechanical Pneumatic hoist for the management Dower Cows	0.25	6
296	62	Pilot study on nutrient status		
297	63	Investigation on the role of anthelmintic treatment in enhancing milk production in the dairy cattle	1.98	12
298	64	Strengthening VHSE in Agriculture in Kerala	2.652	12
299	65	" An Assessment of Human Resource Requirement and Career Planning of Vocational Higher Secondary Education Certificate holders (Agriculture) in Agri-based and Other Rural Enterprises in Kerala	4	12
300	66	Finishing school for VHSC Certificate holders (Agri) to enhance employability	10	12
301	67	A perspective of challenges and problems faced by Adivasi Women	0.5	5
302	68	Development of innovative farm mechanization package for Kerala	300	36
303	69	SUGANDHI - Intergrated Pepper Development project for Wayanad District	150	12
304	70	Inter and Intra provenance variatin in wood quality of acacias grown in Kerala	4.18	36
305	71	Establishment of gene sanctuary for jack in Kerala	14.92	36
306	72	Survey of Mammals of Chimney wild life sanctuary with particular emphasis on the less known mammals	2.42	24
307	73	Wood quality evaluation of tree species raised in research trails of Keral Forest department at various localities	4.95	24
308	74	Socio-economic impact of eco-tourism initiative in Periyar Tiger reserve and Thenmala	2.95	12
309	75	Preparation of Bio-diversity conservation Plan for Kole Wet Land	2.035	4
310	76	Rapid Biodiversity Assessment of Peechi-Vazhani Wildlife Sanctuary	1	4
311	77	Faunal Biodiversity Assessment of Silent Valley Nation Park	1	4
312	78	Rapid Biodiversity assessment of Chimmy Wildlife Sanctuary	1	4
313	79	Management of Tea-mosquito bug in cashew using red ants	6	36
314	80	Developing Gardening tools of Horticulture Therapy for physically Challenged Children	1	12
315	81	Landscaping and establishment of an arboretum of endangered species in the proposed Planetarium campus at Ramavarmapuram	3.56	24
316	82	Large scale production and distribution of annual drumstick (Moringa) seedlings	20	
317	83	Aid to government approved/registered private coconut nurseries	0.91	
318	84	Sustainable Management of proven technology on control of insect pests& disease in coconut and establishment of demonstration cum seed prouction technology.	25	36
319	85	Survey & identification of Rootwilt Disease free plams in Coconut & evolution of tolerant genotypes through selection & hybridisation	34.87	60
320	86	Demonstration - cum - seminar at Vazhakulam & Pookode	3	

321	87	Refinement of Technological innovations in vegetable production through experiments in cultivators fields for attaining food security	15	12
322	88	New project on production and distribution of elite seeds and planing materials.	50	12
323	89			
324	90	R&D Project on Germplasm collection, evaluation & stadardization of nursery development of Jatropha & Karanjis.	9.762	36
325	91	Network Project on production and distribution of quality planting materials Tissue culture Plants.	50	
326	92	Sustainable agricultural development through decentralized planning: A study on the initiatives of local self government institutions for watershed development and conservation of natural resources	0.5	
		Plan Projects		
		Coconut Research Station, Balaramapuram		
327	1	Providing Infrastructural facilities		
328	2	Action Research on Mandari Menace		
329	3	Permanent Manurial Trial on Coconut		
330	4	Works DPP		
331	5	Production of high value coconut products		
332	6	Identifiction, production and distribution of market oriented coconut varieties		
		College of Agriculture, Vellayani		
333	1	Revamping of Instructional Farm		
334	2	Strengthening of UG Programme		
335	3	Strengthening of P.G. Programme		
336	4	Development of Library		
337	5	Strengthening of Computer Centre (Plan)		
338	6	Strengthening & Development of Education by Dean(Plan)		
339	7	Strengthening Dept. of Home Science for IGNOU Study Centre(Plan)		
340	8	Starting New PG Courses(Plan)		
341	9	Starting New Diploma Courses(Plan)		
342	10	Faculty Improvement Programme (Plan)		
343	11	Strengthening of Departments(Plan)		
344	12	Starting of Integrated course on Bio-Technology(Plan)		
345	13	Sports, Games, Student Amenities (Plan)		

346	14	National Seminars/Symposium etc. supported by ICAR(Plan)		
347	15	Works DPP (Plan)		
348	16	Project on Introduction of new crops in Fruits and Flowers		
349	17	Training Programme in Agriculture		
350	18	Village adoption programme		
		NARP (SR), College of Agriculture, Vellayani		
351	1	Research on export oriented vegetables and cut flowers		
352	2	Providing Information Base for the region		
353	3	Research on Organic Farming		
354	4	Developing an Integrated Farming System model at Vellayani		
355	5	Plant Molecular Biology and Biotechnology Centre		
356	6	Strengthening of Research on Biofertilizers and Biocontrol Agents		
357	7	Biocontrol of pests of vegetable cowpea		
358	8	Management of banana pseudostem weevil using entomopathogenic fungi		
359	9	Botanical pesticides for the management of pests of vegetables		
360	10	Biological control for the management of pests of vegetables using entomopathogenic fungi		
361	11	Exploitation of under utilized tuber crops for food and nutritional security		
362	12	Establishment of a Centre for Bioinformatics		
363	13	Protocol for preservation of tender coconut water		
364	14	Seedling variability in selected varieties of Anthurium		
365	15	Development of high yielding leaf curl virus resistant varieties in chilli from segregating generations of interspecific crosses		
366	16	Evaluation of cashew hybrids for yield and export quality		
367	17	Development of mutant varieties in Neelayamari from segregating generations		
368	18	Management of new invasive Species of mealybugs in different crops		
		Instructional Farm, Vellayani		
369	1	Revamping of Instructional Farm, Vellayani		
370	2	Intensive vegetable seed production programme		
371	3	Information cum sales centre		
		Cropping Systems Research Centre, Karamana		
372	1	Towards a model terrace garden in urban homesteads.		

373	2	Comparative efficacy of vermi compost and other organic amendments on vegetables and its influence on soil health
		Farming Systems Research Station, Sadanandapuram, Kottarakkara
374	1	Seed and Nursery Programme
375	2	Providing infrastructure facilities
376	3	Organic recycling for vegetable cultivation in homestead
377	4	Developing tree crops models for homestead
378	5	Integrated Farming Systems Analysis
379	6	Nutritional management on vegetable under homestead situation
380	7	Nutrient management in banana under homestead situation
381	8	Screening medicinal plants under homesteads
382	9	Research on pepper for homestead situation (both irrigated and non-irrigated)
		Onattukara Regional Agricultural Research Station, Kayamkulam
383	1	Strengthening Pulses and Oilseeds research
384	2	Nutritional status of rice soils including Orumundakan of Onattukara
385	3	Revamping of Research Station
386	4	Providing Information Base for the Region
387	5	Integrated Pest Management in Pulses & Oil seeds
388	6	Integrated farming system analysis
389	7	Works DPP
390	8	Organic farming models for coconut and rice
391	9	Strengthening rice cultivation in Onattukara
392	10	Standardizing agro techniques for upland rice cultivation
393	11	Income generation in homestead using tuber crops
394	12	Development of homestead models for Onattukara
395	13	Farm trials/adaptive trials
		Rice Research Station, Moncompu
396	1	Seed & Nursery Programme
397	2	Providing Infrastructural Facilities
398	3	Integrated pest and disease management
399	4	Biological control of Rice stem borer in Kuttanad

400	5	Surveillance of forecasting of inc. of rice pest and disease		
401	6	Research on medicinal rice & Hybrid rice (Adhoc Sanction)		
402	7	Evolving multiple disease and pest resistant rice varieties for second crop		
403	8	Farm trials/ Adaptive trials		
404	9	Genetic improvement of rice for resistance to biotic and abiotic stresses		
405	10	Integrated crop. mgmt. of direct seeded rice under puddled conditions		
		Agricultural Research Station, Thiruvalla		
406	1	Seed and Nursery programme		
407	2	Strengthening Res. on Cucurbitaceous Vegetables		
408	3	Establishment of vermicompost unit		
409	4	Product diversification in sugarcane		
410	5	Organic vegetable cultivation		
411	6	Res. On sugarcane		
412	7	Works-DPP		
413	8	Development of sugarcane jaggery based products with locally available raw materials		
414	9	Efficiency of organic nutrient sources for bitter gourd cultivation in the riverine alluvium of South Kerala		
		Regional Agricultural Research Station, Kumarakom		
415	1	Seed and Nursery Programme		
416	2	Providing infrastructural facilities		
417	3	Providing information base for the region		
418	4	Management of coconut root wilt disease		
419	5	Research on integrated farming		
420	6	Reclamation and management of problem soils		
421	7	Tree planting programme		
422	8	Quality planting material production in banana		
423	9	Paddy seed production programme		
424	10	Vermi composting of coconut waste		
425	11	Bio energy resource development programme		
426	12	Faculty improvement programme		

427	13	Breeding for mosaic resistance in vegetable cow pea		
428	14	Developing and standardizing processing technology in under exploited fruits		
429	15	Establishment of aquarium		
430	16	Information cum sales centre		
431	17	Establishment or regional museum		
		College of Fisheries, Panangad		
432	1	Utilization of Pokkali area of College of Fisheries, Panangad		
433	2	Strengthening of UG Programme		
434	3	Strengthening of PG Programme		
435	4	Development of Library		
436	5	Strengthening of Computer Centre		
437	6	Campus Development Programme		
438	7	Establishment of Biotechnology Unit		
439	8	Strengthening of Departments		
440	9	Sports, Games, Student amenities		
441	10	Participation of teachers in National Seminars		
		Rice research Station, Vyttila		
442	1	Evaluation of rice varieties suitable for the pokkali tracts		
443	2	Nutrient balance studies and developing organic farming		
444	3	Seed and nursery programme		
445	4	Integrated Rice - Fish Culture		
446	5	Research on export oriented vegetables and cutflowers		
447	6	Micro-propagation unit for Banana, Orchids and Anthurium		
448	7	Research on organic rice production		
		Aromatic and Medicinal Plants Research Station, Odakkali		
449	1	Seed & Nursery Programme		
450	2	Providing Infrastructure Facilities		
451	3	Providing Information Base for the region (Database System)		
452	4	Strengthening Research on Aromatic Plants with special reference to post harvest technology		

453	5	Establishment of pilot plant for fractional distillation of aromatic oils		
454	6	Information-cum- Sales Centre		
455	7	Farm power supply unit		
456	8	Establishment and maintenance of germplasm of medicinal and aromatic plants		
457	9	Works (DPP)		
458	10	Standardization of agro techniques for medicinal plants		
459	11	Processing and value addition		
460	12	Protocol for organic cultivation of medicinal and aromatic plants		
461	13	Farm trials/ Adaptive trials		
462	14	Development of biocides from medicinal/aromatic plants		
463	15	Strengthening research on natural dyes and flavours		
		Pineapple Research Station, Vazhakkulam		
464	1	Research on Pineapple		
465	2	Breeding for yield and quality in Pineapple		
466	3	NAPC-KAU Cooperative Project on Passion fruit		
467	4	Research in Passion fruit		
		Cardamom Research Station, Pampadumpara		
468	1	Seed and nursery programme		
469	2	Strengthening black pepper research		
470	3	Providing information for the region		
471	4	Establishment of a herbal garden		
472	5	Farm trial/ adaptive trial		
473	6	Research on cardamom		
474	7	Works DPP		
		Agronomic Research Station, Chalakkudy		
475	1	Seed and nursery programme		
476	2	Water management studies on horticultural crops		
477	3	Performance evaluation of ground water recharging system		
478	4	Micronutrient fertilization in horticultural crops		

479	5	Farmer participatory research		
480	6	Integrated nutrient management-rice based farming system		
481	7	Evaluation of different levels-under bubbler irrigation system		
482	8	Centre for Hybrid Seed Production in Vegetables		
483	9	Micronutrient fertilization in banana and pineapple		
484	10	Evaluation of selected vegetables under protected cultivation		
		Agricultural Research Station, Mannuthy		
485	1	Seed & Nursery programme		
486	2	Providing infrastructure facilities		
487	3	Providing information base for the region		
488	4	Breeding rice varieties and standardization of management practices		
489	5	Evolving varieties of cucurbitaceous vegetables for summer rice fallows		
490	6	Rainwater harvesting system		
491	7	Ecotourism & Organic farming		
492	8	Training on Nursery Mgt. on payment basis		
493	9	Development of F1 hybrids in vegetables		
494	10	Adaptive research on rice mechanization		
495	11	Farm trials/Adaptive trials		
496	12	Kole land research		
497	13	Evolution of cow pea varieties resistant to pulse beetle		
498	14	Close house technology for veg and ornamentals		
499	15	Agro Machinery Operations Service Centre (AMOSC)		
500	16	Establishment of Agro Research Centre for Jack		
501	17	Development of model rice vegetable organic farming system for paddy		
502	18	High tech nursery for production of premium quality seeds		
		College of Horticulture, Vellanikkara		
503	1	Additional support for landscaping		
504	2	Technologies for tropical fruit crops		
505	3	Introduction and evaluation of new ornamentals		

506	4	Strengthening research on floriculture	
507	5	Strengthening research on fruits	
508	6	Establishment of Mango Research Centre	
509	7	Rain shelter cultivation of vegetables	
510	8	Intensification of vegetable research (Plan)	
511	9	Collection, evaluation and multiplication of under-exploited vegetables	
512	10	Development of F1 hybrids in vegetables	
513	11	On Farm First Exploratory Research (OFFER) of stem remedies against root wilt- leaf rot syndrome and coconut eriophyid mite	
514	12	Value addition in annual spices under resource management	
515	13	Evaluation of ecotypes of long pepper	
516	14	Organic production of ornamental plants of therapeutic value	
517	15	Rapid cloning of pineapple hybrid 'Amrutha' for large scale multiplication	
518	16	Testing organic farming and value addition concepts in ornamental gardens	
519	17	Establishment of a Centre for Climate Change	
520	18	Centre for plant disease identification and documentation	
521	19	Establishment of Agricultural Microbiology Unit	
522	20	Potassium requirement of coleus in laterite soils	
523	21	Standardization of agro techniques and commercialization of value added products of selected medicinal plants	
524	22	Development of precision farming technique in bitter gourd and tomato	
525	23	Establishment of Fungal Culture Collection Centre	
526	24	Induction of multiple fungicide tolerant strains of Trichoderma spp. for soil borne disease management	
527	25	Hybridization of mango varieties of Kerala	
528	26	Development of male sterile lines in sesame through mutation and interspecific hybridization	
529	27	Breeding for resistance to Phytophthora foot rot in black pepper	
530	28	Centre for Land Resources Research and Management	
531	29	Management of Pappaya mealybug, Pracoccus marginatus	
		AICRP on Medicinal, Aromatic Plants & Betelvine, College of Horticulture,	
532	1	Development protocol on Good Agricultural Practices of Medicinal Plants	
533	2	Campus Development	

		College of Forestry, Vellanikkara	
534	1	Centre for Study on Wildlife: DNA fingerprinting/ bar coding- A tool for wild life forensic analysis	
535	2	Establishment of Seed Research Centre	
		Centre for Plant Biotechnology and Molecular Biology, Vellanikkara	
536	1	Biotechnology and Molecular Biology Centre	
537	2	Centre for Agricultural Biotechnology	
538	3	Plant Molecular Biology and Biotechnology Centre	
		Cadbury- KAU Cooperative Cocoa Research Project, Vellanikkara	
539	1	Post harvest handling & value addition of cocoa	
		College of Co-operation Banking and Management, Vellanikkara	
540	1	Strengthening of UG Programme	
541	2	Strengthening of Computer Centre	
542	3	Strengthening & Development of Education by Dean	
543	4	MBA in Agr. Business Management (RF)	
544	5	Strengthening of Departments	
545	6	Establishment of new Departments/Courses	
546	7	Sports, Games, Student amenities	
547	8	National Seminars/Symposium	
548	9	Works DPP	
549	10	Human Resource Development for Non- Academic Staff	
550	11	Centre for Agricultural Business Management	
		Cashew Research Station, Madakkathara	
551	1	Growth and yield characters of cashew as influenced by chemical retardants	
552	2	Evaluation of promising Madakkathara accessions and hybrids for yield and resistance for biotic stress	
553	3	Model demonstration unit on the processing of cashew nut and apple (Adhoc Sanction)	
554	4	IPM for tea mosquito bug in cashew using rationales (Adhoc Sanction)	
		Banana Research Station, Kannara	
555	1	Research on banana and pineapple based homestead farming	
556	2	Conservation of germplasm collected under world bank BIP	

557	3	Breeding pineapple for yield and quality		
558	4	Intensive Vegetable seed production programme		
559	5	Developing ecofriendly management practice for Kokkan(Braet mosaic) and Bacterial wilt		
560	6	Works DPP (Plan)		
		University Livestock Farm, Mannuthy		
561	1	Revamping of Instructional Farm		
562	2	Campus Development Programme		
		College of Veterinary and Animal Sciences, Mannuthy		
563	1	Forecasting the price of live stock products in Kerala		
564	2	Establishment of a separate Rabies diagnosis and research cell		
		Dairy Plant, Mannuthy		
565	1	A comprehensive study of Dairy Entrepreneurship in Kerala		
		Centre for Pig Production and Research, Mannuthy		
566	1	Scaling up production of piglets		
		Agricultural Technology Information Centre, Mannuthy		
567	1	Information cum Sales Centre		
568	2	Training programme on bio fertilizer production, bio pesticide, vermicompost		
		Plant Propagation & Nursery Management Unit, Vellanikkara		
569	1	Campus Development		
570	2	Development of Botanical Garden and Arboratum		
571	3	Intensive vegetable seed production programme		
		Centre for Gender Studies in Agriculture and Farm Entrepreneurship Development, Vellanikkara		
572	1	Strengthening Centre for Gender Studies in Agriculture and Farm Entrepreneurship Development		
		AICRP on Poultry for Eggs, Mannuthy		
573	1	AICRP on Poultry for Eggs		
		Cashew Research Station, Anakkayam		
574	1	Strengthening research in Cashew		
575	2	P-oviding information Base for the region		
576	3	Seed and nursery programme		

		Livestock Research Station, Thiruvazhamkunnu		
577	1	AINP on Buffaloes		
578	2	Seed and Nursery Programme		
579	3	Establishment of Goat Unit: Performance evaluation of Attappady Black Goat in semi-intensive rearing		
		Regional Agricultural Research Station, Pattambi		
580	1	Organic farming for sustainable rice production		
581	2	Integrated nutrient management – Rice based farming system		
582	3	Intensification of research on horticultural crops		
583	4	Rain shelter cultivation of vegetables		
584	5	Hybrid seed production in vegetables		
585	6	Development of Library		
586	7	Establishment of Seed Research Centre		
587	8	Integrated pest management in rice		
588	9	Seed Technology Unit		
589	10	Intensification of research on rice genetics and breeding		
590	11	Strengthening rice research increasing productivity		
591	12	Biotechnological interventions and opportunities towards enhancing crop production in Kerala		
592	13	Research on management aspect related to mechanized farming		
593	14	Intensification of research for increasing productivity of pulses		
594	15	Providing Infrastructural facilities		
595	16	Providing Information base for the region (Data base System)		
596	17	Techno economic feasibility of renewable sources of energy for small farmer		
597	18	Faculty Improvement programme		
598	19	Participation of Teachers in the International Seminars/Symposia		
599	20	Farm trials and Adaptive trials		
		Pepper Research Station, Pannlyur		
600	1	Seed & Nursery		
601	2	Tree planting		
602	3	Evaluation of high yielding rice varieties suitable to Pokkali tracts of Northern Kerala through farmers' participatory breeding approach		

603	4	Strengthening research on pepper	
604	5	Efficiency of micronutrients in managing biotic and abiotic stresses of black pepper	
605	6	Efficiency of micronutrients for the sustained production of healthy planting materials in black pepper	
		Regional Agricultural Research Station, Ambalavayal	
606	1	Development of Library	
607	2	Seed & Nursery Programme	
608	3	Providing Infrastructural Facilities	
609	4	Providing Information for the Region(Database System	
610	5	Water Management Studies on Horticultural Crops	
611	6	Research on Pepper on High Ranges	
612	7	Research on Coffee based Cropping Pattern	
613	8	Tree Planting Programme	
614	9	Faculty Improvement Programme	
615	10	Biotechnology Centre	
616	11	Research on Cool Season Vegetables	
617	12	Research on Scented Rice	
618	13	Adaptive Trials on Management of Pepper	
619	14	Research on Medicinal Plants	
620	15	Research on Ginger /Turmeric	
621	16	Research on Cut flowers/Ornamental Flowers	
622	17	Research on Tree Spices	
623	18	Works-DPP	
624	19	Hybrid seed production in vegetables	
625	20	Research on Comprehensive Crop Care Programme	
626	21	Developing protocol for production of scented rice	
		Regional Agricultural Research Station, Pillicode	
627	1	Strengthening research on evaluation of coconut hybrids etc	
628	2	Large scale production of coconut hybrids	
629	3	Research on Cashew	

630	4	Coconut product diversification		
631	5	Establishment of model organic coconut farm		
632	6	Developing dwarf and semi dwarf cultivars of coconut		
633	7	Providing Information base for the region		
634	8	Centre for laterite studies		
635	9	Development of Library		
636	10	Agro meteorology Research on Drought Management		
637	11	Studies on yellowing of arecanut in Kannur District		
638	12	Techno-Economic feasibility of renewable sources of energy for small farmers		
639	13	Tree planting programme		
640	14	Research on fertilizers & vermicompost		
641	15	Farm trials & Adaptive trials		
642	16	Integrated farming in coconut based farming system		
643	17	Works - DPP		
644	18	Estt. of Veterinay Hospital		
645	19	Management of Malabari goats		
646	20	Estt. of RTC for farmers / Kudumbasree/ Development Officers		
647	21	Estt.of Subramaniyam Thirumumpu Memorial Agrl.Museum		
648	22	Information-cum-Sales Centre		
649	23	Estt.of coconut hybridization training programme		
650	24	Value addition and product diversification in coconut		
		College of Agriculture, Padannakkad		
651	1	Revamping of Instructional Farm		
652	2	Strengthening of UG Programme		
653	3	Development of Library		
654	4	Strengthening of Computer Center		
655	5	Strengthening & Devt. of Edn. by Deans		
656	6	Faculty Improvement Programme		
657	7	Strengthening of Departments		

658	8	Sports, Games, Student amenities		
659	9	Estt. of Farm Machinery/Test		
660	10	National Seminars/Sympo.. Etc. ICAR		
661	11	Strengthening of College,Phase		
662	12	Works-DPP		
663	13	Management of root grub in coconut		
664	14	Database on ITK		
665	15	Campus Development Programme		
		Directorate of Extension, Mannuthy		
666	1	Esst. of Museum		
667	2	Streg. of Communication Centre		
668	3	KAU Res. Extension Interface		
669	4	Innovation Extn. Programme		
670	5	Estt. Of Market led extension & Market Intelligence cell		
671	6	Agrl. Eco tourism		
672	7	Seminar on Paddy		
673	8	Seminar on coconut		
674	9	Agrl. Mela at three centres		
675	10	KAU News Bulletin		
676	11	Streg. of DOE		
677	12	Kalpadhenu		
		Kalpadhenu		



4x4m) can be adopted for producing quality saw logs. Stem taper in general increased with decreasing planting densities.

- Preliminary results of the compatibility trial of different fodder tree-grass combinations in a silvo-pastoral system showed that *Gmelina arborea* showed better growth performance after two years of planting. Among the fodder grass HBN performed better in the early stages of tree growth.
- Scientific articles were published including some in the well-known international journals such as Forest Ecology and Management, Agroforestry systems, Plant and Soil, International Tree Crops Journal and Indian Journal of Agroforestry.
- The technologies developed at this centre have been made available to the public through Package of Practices Recommendations of KAU. POP recommendations for teak, ailanthus, and bamboo both under nonspecific as well as mixed species systems were formulated.

Performance evaluation of Attappady black goat in semi intensive rearing.

- Production performance of the native Attapady black goat evaluated based on fortnightly weight and other body measurement recordings of the kids.
- Breeding performance evaluation of Attapady black bucks in the unit and selection of superior bucks.
- Reproductive performance of the breeding does evaluated based on selected reproductive parameters.

Crossbred cattle

- The performance of crossbred cattle through the years was evaluated and found that the milk production is getting reduced over the period.
- A Station project on Performance of male calves for meat is under progress.
- A method to detect early pregnancy in cows from 25 day post insemination was evolved.

Extension Programmes

a) Highlights of extension activities

1. Dr. K.Anil Kumar took Class on Projects in Animal Husbandry Sector in a seminar organized by District Panchayath Palakkad on 15/6/2010.
2. Dr.R.S.Abhilash took class on "Infertility in cattle at Continuing Veterinary Education program conducted by Veterinarians club Mannarkkad on 18/6/2010
- 3) Dr.Ajith.K.S. took class on "Problems faced by dairy farmers" at "Ksheerasangamam" organized by Dairy Development Department on 2/7/2010
- 4) Dr.Ajith.K.S. took class on "Zoonotic diseases" to dairy farmers at a seminar conducted by Animal Husbandry Department under the auspices of ASCAD project on 5/9/2010
- 5) Dr.K.Anil Kumar took class on "Broiler Rabbit farming" at Kulakkallur,Idukki District on 29/9/2010
- 6) Dr.K.Anil Kumar took class on "Broiler Rabbit farming" at a training programme conducted by LMTC Kudappanakunnu ,Trivandrum on 8/7/2010.
- 7) Celebrated chingam 1 by conducting a farmers seminar at veterinary dispensary kottopadam. Dr.R.S.Abhilash took class on bovine infertility and Dr.Asha.K.Raj took class on fodder production. Fodder slips were also distributed to the farmers
- 8) Dr.K.Anil Kumar took class on Animal Husbandry scenario in Kerala at VPC Mannarkkad on 20/10/2010 under the auspices of Department of Animal Husbandry.
- 9) Dr.Ajith.K.S and Dr.Asha.K.Raj took class on Poultry production in a farmers seminar conducted by District Library Council Palakkad on 15/1/2011.
- 10) Dr.K.Anil Kumar took class for farmers on Kissan Ghosti conducted at VPC Mannarkkad on 7/3/2011.
- 11) Dr.R.S.Abhilash took class for farmers on Farmers school conducted at Mannarkkad 29/3/2011.