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ANNUAL REPORT 2007-'08



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KERALA AGRICULTURAL UNIVERSITY
KAU (PO)-680 656, Thrissur

ANNUAL REPORT 2007-'08

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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 2007-2008 (1st April 2007 to 31st March 2008).

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.

Designation	Name	Period (from 1.4.07 to 31.3.2008)
Chancellor	His Excellency R.L. Bhatia Governor of Kerala	1-4-2007 to 31-3-2008
Pro- Chancellor	Mullakkara Retnakaran Hon'ble Minister for Agriculture	From 1-4-2007 to 31-3-2008
Vice Chancellor	K.R.Viswambharan	From 28.3.2007 continuing
Registrar	Dr.Jobi V.Paul	From 25.01.2007 continuing
Comptroller	V.Vijayan Dr.E.Nanu (i/c) Dr.U.Ramachandran Dr.E.Nanu	From 13.11.06 to 24.1.2008 From 25.1.08 to 2.4.08 From 8.4.08 to 30.4.08 From 1.5.08 continuing
Director of Research	Dr.D.Alexander	From 19.11.2005 continuing
Director of Extension	Dr.M.K.Sheela (i/c)	From 26.7.04 continuing
Director of Physical Plant	M.Pennamma Suresh Babu (i/c)	From 22.6.04 to 14.5.07 From 15.5.07 -- continuing
Director of Students Welfare	O.K.Paul (i/c) Dr.Jose John Chungath (i/c)	From 3.6.05 to 16.6.07 From 17.6.07 continuing
Director (Acad & PG Studies)	Dr.P.K.Asokan (i/c)	From 4.8.06 continuing
Deputy Director of Students Welfare	O.K.Paul (i/c) E.U.Rajan (i/c)	From 01.11.2001 to 16.6. 07 From 17.6.07 continuing
University Librarian	C.Abdul Razaack (i/c) K.P.Sathian (i/c)	From 31.5.04 to 30.4.07 From 30.4.07 continuing
Dean (Agriculture)	Dr.K.Harikrishnan Nair (i/c)	From 13.9.06 continuing
Dean (Veterinary)	Dr.E.Nanu (i/c) Regular appt.	1.4.2007 to 26.2.2008 27.2.2008 continuing
Dean (Fisheries)	Dr.K.Kerala Varma (i/c) Dr.D.Damodaran Nambudiri (i/c) Dr.K.S.Purushan (i/c) Dr. D.Damodaran Nambudiri (i/c)	1.4.07 to 19.5.2007 from 20.5.07 to 14.11.07 from 15.11.07 to 28.3.08 from 29.3.08 continuing
Dean (Agrl.Engg.)	Dr.M.Sivaswami (i/c) Dr.S.Ganesan (i/c)	From 8.2.07 to 2.3.08 From 3.3.08 continuing

Other Officers

Assoc. Dean (Horti.)	Dr.P.K.Rajeevan (i/c)	From 20.7.06 continuing
Assoc. Dean (Forestry)	Dr.N.K.Vijaya Kumar (i/c) Dr.P.K.Asokan (i/c)	From 28.4.06 to 29.9.07 From 29.9.07 continuing
Assoc. Dean (CCB&M)	Dr.U.Ramachandran (i/c)	From 7.2.06 continuing
Assoc. Dean (COA Padannakkad)	Dr.I.John Kutty (i/c)	From 29.11.05 continuing
Assoc. Dean (CV&AS) Pookot	Dr.P.P.Balakrishnan (i/c)	From 1.4.03 continuing
Assoc. Dean (CDS&T), Mannuthy	Dr.R.Rajendra Kumar (i/c)	From 7.2.06 continuing.

EDUCATION

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

Name of College	Course offered
College of Agriculture, Vellayani	B.Sc.(Ag), M.Sc (Ag.), M.Sc. (Hort) & Ph.D M.Sc (Home Sc.)
College of Horticulture, Vellanikkara	B.Sc.(Ag), M.Sc (Ag.), M.Sc. (Hort) & Ph.D M.Sc (Home Sc.) M.Sc.(Ag. Stat)
College of Agriculture, Padannakkad	B.Sc. (Ag)
College of Veterinary & Animal Sciences, Mannuthy	B.VSc & A.H., M.VSc & Ph.D
College of Fisheries, Panangad	B.F.Sc & M.F.Sc
Kelappaji College of Agri. Engineering & Technology, Tavanur	B.Tech (Agrl. Engineering) & M.Tech (Agrl. Engineering)
College of Co-operation, Banking and Management, Vellanikkara	B.Sc. (C & B) & M.Sc. (C & B)
College of Forestry, Vellanikkara	B.Sc. (Forestry) & M.Sc.(Forestry)
College of Dairy Science and Technology, Mannuthy	B.Tech (D.Sc. & Tech)
College of Veterinary & Animal Science, Pookode, Waynad	B.V.Sc & A.H.

Admission

Students were admitted to the U.G. courses of the University except B.Sc (C & B) on the basis of the rank obtained in the common entrance examination conducted by the Government of Kerala. In the absence of common entrance test for B.Sc (C & B), the admission was made based on the ranks obtained by students at Plus 2 level. For PG Courses, selections are made based on entrance examination conducted by the Kerala Agricultural University. Semester system of instruction continued in all the colleges.

The number of students admitted:

<i>A(i) UG Programme</i>	
B.Sc (Ag)	147
B.V.Sc & AH	106
B.Sc. (Forestry)	20
B.F.Sc	37
B.Sc (C & B)	40
B.Tech (Agrl. Engineering)	39
B.Tech (DSc & Tech)	21
Total	410

<i>A (ii) PG Programmes</i>		
Agronomy		3
Plant Pathology		3
Plant Breeding & Genetics		2
Agrl. Entomology		2
Soil Science & Agrl. Chemistry		1
Horticulture		6
Agrl. Economics		1
Forestry		3
Co-operation & Banking		5
Plant Biotechnology		6
Fisheries		6
Veterinary & Animal Science		39
Home Science		8
MBA Agrl. Business Management		30
Total		115
<i>A (iii) Ph.D Programmes</i>		
Agriculture		7
Veterinary & Animal Science		6
Fisheries		1
Total		14

Number of students passed out from 1.4.2007 to 31.3.2008

1.	B.Sc (Ag)	116
2.	B.V.Sc & AH	104
3.	B.F.Sc	41
4.	B.Sc (C & B)	48
5.	B.Tech (Agrl. Engineering)	16
6.	B.Sc. (Forestry)	21
7.	B.Tech (D.Sc & Tech)	19

Masters Degree Programme

1.	Agronomy	4
2.	Plant Pathology	9
3.	Plant Breeding & Genetics	4
4.	Agrl. Extension	7
5.	Agrl. Entomology	4
6.	Soil Science & Agrl. Chemistry	1
7.	Agrl. Economics	2
8.	Plant Physiology	2
9.	Forestry	4
10.	Plant Biotechnology	8
11.	Co-operation & Banking	4
12.	Fisheries	7
13.	Veterinary & Animal Science	33
14.	Agrl. Statistics	1
15.	Home Science	7
16.	Horticulture	13
17.	Agrl. Engineering	6
	Total	116

Doctoral Programme

1	Agriculture	13
2	Veterinary & Animal Science	6
	Total	19

Extra-curricular and co-curricular activities of the students were coordinated by the Director of Students Welfare through physical education and other teachers of 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

The Kerala Agricultural University is the exclusive organization in Kerala state for providing research, human resources, skills and technology required for the sustainable development of agriculture. Research initiatives undertaken by the University are targeted to increase the productivity of crops, livestock and fishery through manipulation of the genetic base, improving the management practices, controlling and managing pests, diseases and parasites, increasing the efficiency of biophysical and human resources, designing policies and programmes and introducing suitably designed machineries for Kerala agriculture.

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

Agro-ecological zone	Regional Agricultural Research Stations
High range Zone	RARS, Ambalavayal
Northern Zone	RARS, Pilicode
Central Zone	RARS, Pattambi
Special Zone of Problem Areas	RARS, Kumarakom
Onattukara region	RARS, Kayamkulam
Southern Zone	RARS, Vellayani

Dr. D. Alexander acted as the Director of Research and was also holding charge of ADR (Farms). The Associate Directors of Head Quarters were Dr. K.V. Athman (ADR, V&AS), Dr. S. Rajan (ADR, M&E, AR&T) and Officer on Special Duty (Seeds) and Dr. L. Rajamony (ADR, Planning).

Associate Directors of Research in charge of various zones:

High range Zone, Ambalavayal	Dr. V.K. Raju
Northern Zone, Pilicode	Dr. P.C. Balakrishnan
Central Zone, Pattambi	Dr. P.V. Balachandran
Special Zone of Problem Areas, Kumarakom	Dr. Joseph Philip
Onattukara region, Kayamkulam	Dr. Swerup John
Southern Zone, Vellayani	Dr. Arthur Jacob

Research support for sustainable development of agriculture sector in the state is rendered in close association with other research institutions of Indian Council of Agricultural Research, Commodity Boards and Development departments of the State and Central Governments.

Over 500 research projects are in operation in KAU, including 38 All India Co-ordinated Projects/Network Projects, 18 Ad-hoc Projects, 12 KSCSTE projects and 49 other externally aided projects funded by SHM, Western Ghat Cell, UGC and Cadbury India Ltd. Faculty Research Committee (FRC) constituted in all the four faculties vets the KAU research projects.

The 65th and 66th FRC meeting of the Faculty of Agriculture were held on 15-03-07 and 03-05-08 respectively. The 48th FRC meeting of the Veterinary & Animal Sciences Faculty was held on 25-03-08. Fisheries Faculty had its 23rd FRC meeting on 13-08-07.

During the period under report the Director of Research and ADRs of Head Quarters visited research stations of KAU and held review meetings of research projects. They attended high-level meetings of the University. In addition, they attended interactive sessions of QRT on Cashew, Biological control of Crop Pests, Water Technology and Ground Works Management, review meeting of Mega Seed Project, ZREAC of different zones, interactive sessions on Indian Seed Policy, Rice area expansion and Organic farming draft policy. New initiatives on establishment of network programme of seeds and planting materials, preparation of XI five-year plan proposal of KAU, NAIP for Kerala and Development of Orange and Vegetable Farm at Nelliampathy were mooted during the period.

Research Highlights

Rice and Rice based Cropping System

Culture C3-2KM + Makaram was identified as the best varietal combination for *Kootumundakkan* system.

Pure seed multiplication and morphological characterization of C3-2KM were taken up in kharif and rabi crops for the release of the culture as a variety suited for dry sowing in *virippu* season and also for PPV registration process.

Pureline selection of *makaram* variety for *Kootumundakan* along with C3-2 KM.

Cultures suitable for mechanised farming were evaluated and farm trials are in progress.

Pure seed multiplication and morphological characterization of *Swarnaprabha Sel 3-1* were taken up for release of the culture as an upland variety and also for PPV registration process.

Pure seed multiplication of all PTB varieties (1 – 58) released till now and navara lines.

SD 36, a short duration high yielding rice culture was found promising for Kuttanad and having higher Fe and Zn contents in their grain.

Karthika, Bharathy and SD 36 were recorded to contain comparatively higher Fe and Zn contents in their grain.

Evolved eight *mundakan* rice cultures for Onattukara region, which are under evaluation. Identified two promising cultures viz; culture-18 and cul-56 for *cherady* tract.

Two rice cultures OM-2 and OM-3 performed better in the farm trial conducted in the *Oorumundakan* area.

At Karumady, IR 50138 was found to be the best yielder followed by *Krishnanjana*. In Purakkad, Mo.16 (*Uma*) performed best followed by *Vyttila 2*. At Vaikom Kari, *Uma* performed best followed by CIRJ 7.

Moncompu varieties MO 5, MO 16, Njavara cultures 5 and 7 were found to have multiple resistance to sheath blight, sheath rot, neck blast, brown spot and bacterial blight diseases.

First high yielding, non lodging, awnless rice cultures suitable to salinity prone *Kaipad* paddy tracts of Northern Kerala were evolved.

High yielding wetland rice cultures suited for organic cultivation were developed- MK 157, JK 14.

Two cultures viz., JK 71 and MK 115 were evolved as flood tolerant cultures.

Rice culture C 26 T (b) is recommended for release. The culture is given for salinity tolerance test in kole lands.

Proved that proline content; peroxidase activity and superoxide dismutase activity in rice can be used as biochemical markers for salinity tolerance screening.

Semidwarf plants of VTL-3 could be evolved through mutation breeding programme.

Three promising cultures viz. cul.2625, cul.204 & cul.253 were selected from the national and international screening trials conducted at RRS, Vyttila.

Three rice varieties MRST-14, MRST-11 and MRST-16 were found to be moderately resistant to cyst nematode but susceptible to *M. graminicola*.

Rice varieties C3-2-49, *Athira*, *Jyothi*, *Aiswarya* and *Bharathy* were found to be highly weed competitive, whereas *Kanchana*, *Uma*, C-26 (T) and C-80 the least competitive. The varieties such as *pavizham*, *Gowri*, *Matta Triveni* and *Remanika* were to be moderately competitive.

Five different accessions possessing *Njavara* characters viz., Long awned Brown *Njavara*, Awnless Brown *Njavara*, Long awned Black *Njavara*, Partly awned Black *Njavara* and Awnless Yellow *Njavara* were identified.

Detailed molecular characterization of *Njavara* morphotypes with 10 random primers generated a total of 364 scorable amplified products, with 352 polymorphic and 12 monomorphic bands. RAPD amplification with OPE 6 primer generated a unique band of 1.37 kb in all *Njavara* morphotypes and this band was absent in check varieties studied. Sequence alignment with BLASTN (rice) revealed its homology with six genes including Bowman Brik Trypsin Inhibitor (BBI) gene reported to have uniqueness of *Njavara* as a medicinal cultivar.

Integrated nutrient management was established to be the best system for sustainable rice production and also for soil health in the case of Tall Indica rice variety.

Results of the Permanent Manurial Trial in rice conducted at Rice Research Station, Moncompu for the 20th year showed that there was no response to Potash in the intensive double crop rice in Kuttanad eco system, where straw recycling is practiced, whereas response to Nitrogen is 2 tonnes/ha. Skipping Phosphorous continuously reduced yields.

In upland rice, line sowing with furrow placement of fertilizer resulted in a saving of 50% of the recommended dose of fertilizers.

The application of FYM gave significantly higher yield during *kharif* and *rabi* seasons compared to incorporation of sesbania and non application of organic manure.

Conventional method of planting was found to be superior to SRI. This might be due to the higher number of productive tillers per square meter under conventional system.

Rice grain yield was the highest for conventional method of planting, which was on par with planting using dapog seedlings. The SRI method recorded the lowest grain yield significantly inferior to the other methods.

Nitrogen fertilization is a must for economic rice production in *Kuttanad* and there is no need for the higher dose of fertilizers than POP recommendation, which will only result in economic loss to the farmer.

The results of 24 years of Permanent Manurial Experiments indicated the necessity for a re-scheduling of existing practice of lime application. Instead of applying lime 50 – 50 at sowing and dismantling, the entire quantity applied at the time of sowing was more preferred in terms of reduction of toxins and better establishment.

Marginal increase in yield was obtained under situations of daily inflow and flushing due to tidal currents under pokkali conditions than under stagnant water conditions.

Use of commercially available biofertilisers had no significant positive influence on rice production under pokkali conditions.

Sowing sprouted seeds on ridges taken at 25 cm height and 40 cm apart were equally effective as the traditional method of mounds for pokkali rice.

Rice grain yield was significantly high in Bio-Intensive Pest Management (BIPM) plots. Hoppers, coccinellid and spider counts were significantly high in BIPM area.

Coccinellid count and spider count were significantly high in rice under organic farming. Grain yield was significantly high in conventional farming.

In rice there was 16.65 % yield loss due to *Meloidogyne graminicola*.

Most economic method of weed control in the wet sown rice fields of kole was found to be pre-emergence spraying of refit @ 0.45 kg ai/ha 3-4 DAS followed by one light hand weeding.

The herbicide PIH 2023 10% SC was found to be effective for controlling *Echinochloa*, sedges and broad leaved weeds in a single application in direct seeded rice during the Punched season.

The herbicide Penoxsulam 24 SC was found to be effective against grasses, sedges and broad leaved weeds in transplanted rice.

A survey was conducted in Thrissur and Ernakulam districts to collect water samples from ponds without *Cyrtobagous* on *Salvinia*. But the weevils were present in all the areas. Water samples were drawn from those areas and analysed.

Conducted the survey for the natural enemies of *Cyprus rotundus*, in Thrissur. But no natural enemies could be collected during the period. A mealy bug was collected from the roots of the weed and it was identified as *Geococcus citrinus*. It has been reported as a pest of banana in Kerala.

Continuous zero tillage in rice fields for three years reduced the weed growth and the flora was limited to mostly *Eleocharis* sp.

In a seven year study on continuous application of the same herbicide at the recommended dose for weed control in rice, no accumulation of butachlor residues was noticed in the grain, straw or soil.

Better control of *Echinochloa* sp. in the rice- rice system was achieved by the use of butachlor along with FYM.

Developed a simpler and less expensive common protocol for extraction and clean up of the residues of oxyfluorfen, butachlor and pretilachlor from the soil.

50- 60 % of the applied oxyfluorfen herbicide in upland rice was found dissipated from the soil by 10 DAS.

Studies on the Characterisation of leaching behaviour of butachlor, pretilachlor and oxyfluorfen in different soil types indicated that maximum quantity of applied herbicide remained in the upper 2 cm of the soil column. There was a gradual decrease in the concentration of residue with increasing depth of the soil. Among the three herbicides tested, butachlor recorded higher levels of residues in the leachate. Fine textured organic matter rich soil recorded lower residue levels in the leachate compared to the soil with coarse texture and poor organic matter.

SRI method produced lesser grain yields than the normal planting. Among the SRI treatments, modified SRI with herbicidal weed control yielded higher than the SRI with cono weeding.

Stale seedbed for 14 days resulted in significant reduction in the weed growth, compared to normal sowing and stale seedbed for seven days.

Coconut and Other Palms

Water stress tolerant coconut seedlings were developed through pollen selection and selective fertilization.

Among coconut hybrids (WCT x MYD, WCT x CGD and WCT x COD with check variety WCT), WCT x CGD ranked first in female flower production. WCT x COD recorded the highest yield of nuts /palm (60.9 nuts) followed by WCT x CGD (58.5 nuts)/palm. Root wilt disease incidence was low in WCT x CGD.

Coconut cultivars Kudat, Kerasagara and Philippines Lono and Andaman Ordinary were found superior in nut and copra yield/palm/year and found suitable to the region with lateritic soil.

In different locations such as IF-Vellanikkara, RARS-Kumarakom, NARP Special Station-Sadanandapuram, RRS-Kayamkulam and RARS Nileshwar, coconut hybrids released from RARS Pilicode were generally performing better than WCT in nut yield, flower production and number of leaves/ palm. The hybrid WCT x CGD ranked top and was on par with Kerasree and Kerasankara. Hybrids showed varying degrees of susceptibility for root wilt disease.

Continuous absence of potassium in the presence of N and P drastically reduced the growth leading to yield reduction and death of the palm necessitating the balanced application of NPK on a long term. The increased dose of N and K continuously for the past 43 years could sustain the yield of coconut in deep red loam soil of southern Kerala.

Establishment and operation of the coconut hybrid seedling production unit was started at Coconut Research Station, Balaramapuram under RKVY Project.

A modified index was developed for measuring yellowing in arecanut, which allowed precise quantification.

Developed management strategy to contain yellowing in arecanut in three toposequences, viz., converted paddy field, garden and terraced upland.

A detailed survey on Yellowing of Arecanut was conducted across the arecanut tracts of Kannur district covering high land, midland and low lands of Alakkode, Sreekandapuram and Naduvil Panchayats. The severity of the yellowing was noticed in both young and aged palms. The severity of yellowing was low in well-managed plots. The yellowing symptoms were noticed in both local and high yielding variety palms.

There was no incidence of coconut leaf caterpillar *Opisina arenosella* after release of natural enemies in the treatment-sequential release of *Cardiastethus exiguus* and *Goniozus nephantidis*.

The percentage reduction of coconut eriophyid mite population over untreated control was maximum in Dicofol treated palms followed by *Hirsutella Mycelia* + Glycerin and *Hirsutella Mycelia*+Conidia+Glycerin.

The entomofungal pathogen *Metarhizium anisopliae* was proved effective against the grubs of rhinoceros beetle and all the grubs were found diseased in the treated pits.

Vegetables

Nine three way cross hybrids of chilli were found promising for yield and resistance to *anthracnose*.

The variety Ca 13 which recorded the highest green chilli yield was identified as a genotype with high yield potential and tolerance to chilli thrips.

The varieties of tomato viz., EC-490125, EC-490127, EC-25772, EC-16790 and EC-3904 were found resistant to root knot nematode.

In okra, the varieties PB-236, Arya Dhan Lakshmi and Pusa savani were resistant to *M. incognita*.

Okra variety JOL-2K-19 recorded the lowest yellow vein mosaic incidence and the highest yield.

Among the 23 varieties of brinjal screened, the line IC-11023 was found highly resistant while nine lines viz. IC-285142, IC-249330, Round Br, IC-4672373, IC-136024, IC-249357, IC-24036, IC-90922 and IC-249387 were found promising.

One germplasm accession of snake gourd TA-19-1 was found very promising in the evaluation trials and it was proposed for farm trial.

Two accessions of ash gourd, BH 205 and BH 219 were found very high yielding and they will be proposed for farm trial.

In ash gourd varietal trial maximum yield was recorded in variety Indu.

Ash gourd variety *Indu* was evaluated in AICVIP trials and was found superior in four locations

In cowpea varietal trial *Swarna Haritha* yielded maximum.

XXVII ZREAC approved the proposal for conducting farm trial with two promising selections of ivy gourd

High yielding accessions of drumstick MO144 and AD4 were recommended for release.

Application of oil cakes reduced the nematode population in soil, improved the plant vigour and consequently the yield of bitter gourd.

Foliar application of Iron (100ppm) in the form of iron sulphate increased the yield in bitter gourd var. Preethi.

In both bittergourd and snakegourd, a spacing of 2 x 2 m was found ideal for riverine alluvium. With respect to fertilizer levels, NPK to the tune of 150-percent of the recommended-dose is optimum for snakegourd while the recommended quantity is sufficient in bittergourd.

The integrated nutrient management in brinjal – okra-cropping sequence has shown that application of FYM 10t/ha along with remaining quantity of NPK through chemical fertilizers gave significantly higher yield than other treatments.

The okra, grown as succeeding crop by applying recommended NPK alone gave the highest yield in the plot where pressmud was applied @10t/ha in the previous season.

Packing seeds of bitter melon, ash gourd, OP melon and okra in 700 gauge polythene or Aluminium foil combined with storage under refrigerated conditions and within packet desiccant improved the storage life of seeds.

Technology for cultivation of cool season vegetables like cauliflower and cabbage in the plains of Kerala was standardised.

Sugar and Tuber Crops

Spraying of ethrel at 500 ppm four months after planting was found to be effective in delaying/controlling flowering in sugarcane for staggered harvesting in madhuri variety.

Application of 75 % of the recommended dose of NPK as inorganic and 25 % as organic (FYM) in plant crop of sugarcane is found to be superior in cane yield and sugar yield compared to the other combinations of organics and inorganics.

Pre emergence application of the herbicide Metribuzine 1 kg a.i/ha along with hoeing 45 days after ratoon initiation is found to be effective in controlling weeds in sugarcane ratoon. The yield of the crop was also superior compared to the other herbicides tried.

Cultural practices like hoeings 1st, 4th and 7th week after ratoon initiation or thrash mulching in alternate rows along with hoeings at 1st and 6th week after ratoon initiation was superior in cane yield than herbicide application.

The present recommended dose of inorganic fertilizer to coleus can be reduced to half if applied with rock dust @ 10 t ha⁻¹. Hundred per cent substitution of chemical fertilizer with rock dust @10t ha⁻¹ and FYM 10 t ha⁻¹ can be recommended for coleus wherever both the inputs are locally available.

In coleus var. Nidhi, planting of tip cuttings at a closer spacing of 15 x 10cm and horizontal placing of vines at a row spacing of 15 cm improved the yield of tubers.

The rhizomes of West Indian arrowroot, (*Maranta arundinacea*) collected from different locations contained 70 – 75 % moisture, 20 – 28 % starch, 0.9 – 1.1 % crude protein and 0.4 – 1.8 % crude fibre on fresh weight basis. The indigenous practices of arrowroot cultivation, starch extraction and utilization are being documented.

Fruits

The photosynthetic area, chlorophyll content, stomatal conductance, mesophyll efficiency and total soluble protein which have direct bearing upon higher photosynthetic efficiency were found to be higher in Quintal banana, the highest yielder. This clone also showed higher epicuticular wax content and sunken type of stomata, indicative of higher stress tolerance and better water use efficiency.

The base temperature at which growth starts in Nendran banana is 14°C. Secondary corm formation is an integral part of the crop cycle in banana crop raised from suckers. The secondary corm carries the crop to maturity and the planted corm gradually becomes necrotic, deteriorates and falls off. The time of shooting is a factor of secondary corm development and the size of planted corm is related to secondary corm initiation and development.

In Both Nendran and Robusta, planting three suckers per pit at a spacing of 2 x 3 m was the best treatment in term of per hectare yield.

Accommodating three plants per pit at a spacing of 2m x 3m with 100 per cent recommended dose of fertilizers resulted in highest yield per hectare.

Irrigating at 80 ER at all growth stages was ideal for Nendran for maintaining proper growth and yield.

Turmeric proved to be the most profitable intercrop with rainfed Nendran.

Two species of root mealy bug of banana viz, *Geococus citrinus* and *Geococus Coffeae* have been observed as emerging pests on different banana cultivars causing root damage and subsequent weakening of the plant. Nendran plants grown in paddy field suffered maximum from the root mealy bug infestation.

Grubs of banana pseudo stem borer, rhizome weevil and slug caterpillars were found susceptible to the entomo pathogenic nematode *Heterorhabditis indica*.

In banana, combined infestation with *Radopholus similis*, *Helicotylenchus multicinctus*, *Tylenchorynchus* and *M. incognita* caused an yield reduction of 22 to 40 per cent.

Early profuse flowering could be induced in mango cultivars Moovandan and Priyoor by nitrate sprays (NH_4NO_3 – 0.25% and KNO_3 – 2%) alone or in combination with micronutrients during the month of December.

Five promising jack types were identified and promising clones from different regions viz, *Muttan varikka*, Gumless Jack and *Palur-1* are being evaluated.

A clonal variant of pineapple was found promising, which could be recommended as an alternative to Kew variety due to its shorter duration.

In passionfruit, one yellow type was found to be promising.

Soft wood grafting was standardised in bread fruit (*Artocarpus altilis*). Breadnut was found as the most promising rootstock. Suitable irrigation schedule was standardized along with mulching to minimize fruit drop in breadfruit. Identified suitable storage techniques to improve the shelf life of breadfruit.

Garcinia genotype GC 15/90 recorded the highest yield of dry fruit rind (30.3kg/tree) followed by GC 33/90 (11.54kg/tree).

Ten species of mistletoes of Loranthaceae and Viscaceae family were identified in Palakkad and Thrissur districts.

Floriculture

Seven varieties of *Anthurium andreanum* were recommended for release in the NARP Zonal workshop.

Survey conducted in Vellanikkara area showed that the major pests present in Polyhouses on Gerbera and Croton plants are aphids, mealy bugs, scales, mites and thrips. Gerbera plants were found severely affected by thrips (*Frankliniella* sp.). So the fungal pathogens were tried for the control of thrips on Gerbera. The lowest pest population of thrips was recorded in verticel.

Ornamental bananas like *Musa ornata*, *Musa laterita* and *Ensete ventricosum* could better be grown in pots under open condition than under shade.

The bromeliads, *Aechmea fasciata*, *Ananas bracteatus*, *Bromelia balansae* and *Dyckia brevifolia* could be grown under both open and 50 per cent shade.

Under indoor condition *Billbergia pyramidalis* performed better compared to *Pitcarnea flammea* and *Tillandsia stricta*. It could be kept as potted foliage plant for a period of 47 days.

The tall climbing monopodial orchids, *Aranthera* Lily Brook Red, *Aeridachnis* Apple Blossom, *Arachnis* Maggie Red Ribbon and *Aranthera* Anne Black could be recommended for commercial cultivation.

The intermediate climbing epiphytes (orchids), *Mokara* Chark Kuan Pink, *Mokara* Walter Oumae White and *Mokara* Calypso Pink have immense potential for use as cut flower.

The orchids *Ascocenda* Princess Milcasa Pink, *Vascostylis* Pine Rivers Red, *Vascostylis* Pine Rivers Pink, *Vascostylis* Pine Rivers Blue and *Phalaenopsis* varieties could be grown as excellent pot plants.

The orchids, Sonia, Sakura pink, Kasim whiter, Emma white and Caesar white were found to be profusely growing under saline environment.

Spices and Plantation Crops

In pepper, the intervarietal hybrid P6 x P 5 is found promising.

For the first time in the history of black pepper cultivation an inter specific hybrid partly fertile was developed through hybridization between *Piper nigrum* and *Piper colubrinum*. The promising hybrid designated as Culture P5PC -1 exhibited distinct anatomical and morphological characters. This hybrid has more number of spikes with few berries / reduced setting percentage.

The RAPD primers OPE 07 and OPG 08 were identified as hybrid specific molecular markers in pepper.

Two inter specific hybrids of pepper, viz., Culture UKPC-2 and Culture PAPM -1 were evolved and these were found resistant to *Phytophthora* foot rot disease.

North Eastern Fragrant pepper, a wild genotype of black pepper was identified as an alternative source for *Phytophthora* foot rot resistance in black pepper.

Pepper grafts on *Piper colubrinum* survived better than the rooted cuttings in the arecanut garden.

The non-traditional pepper standards like *Acacia auriculiformis* and *Artocarpus heterophyllus* were found to be better as compared to the traditional supports.

Application of neem cake twice @ 0.5 kg and 1.0 kg plant⁻¹ resulted in significantly more number of tillers, higher plant height and yield of cardamom capsules. Least damage of cardamom shoots by shoot and capsule borer larvae was also observed in neem cake treated plants.

Natural parasitization of cardamom shoot and capsule borer larvae by ichneumonids viz., *Agrypon* sp. and *Temeluchus* sp. ranged from 17.8% to 87.9%.

Cardamom root grub, *Basilpeta fulvicorne* was found to be naturally infected by *Metarhizium* sp. to a maximum of 16.5% under field conditions.

Combination of *H. indica* (100IJ/grub) and imidacloprid (0.006%) was found effective against cardamom root grub, *B. fulvicorne*.

Elite somaclones in ginger with high yield and tolerance to rhizome rot and bacterial wilt diseases were isolated.

The application of PGPR strain P6 and *Trichoderma* as individual and in combination was found to be the best treatment in combating the rhizome rot and bacterial wilt diseases and increasing the yield in ginger.

Fertilizer management could increase the general yield of intercropped clove in coconut garden.

Growth regulators NAA and Ethrel each at 100 ppm and GA 50 ppm favourably influenced fruit growth and vanillin content in cured beans of vanilla. The microclimate of the garden significantly influenced flowering and flavour principles in vanilla.

Two new cashew varieties (Hybrid H-8-6 and Anakkayam Sel. 990) from CRS, Anakkayam were proposed for release.

The cashew accession PLD -4 was found to be superior in yield and cumulative nut yield than PLD-3 at RARS, Pilicode.

High density planting of cashew during the third year of yielding indicated declining per tree yield, when the tree density was increased beyond 400 trees/ha.

In terms of per hectare nut yield (both annual and 7-year cumulative) high density planting systems was significantly superior to normal planting density.

In cashew, the nut yield per ha was significantly more in higher density of planting (5m x 4 m, 600 plants / ha.) and the yield per ha was significantly higher with lower dose of fertilizer (75 N, 25 P, 25 K₂O).

Tapioca is the most profitable crop that can be cultivated as intercrop in young cashew plantations. It recorded the highest net returns of Rs. 48766/ha and C: B ratio of 2.75 followed by colocasia with a net returns of Rs. 43290/- and C: B ratio of 2.32.

Pulses and Oil seeds

Two cowpea varieties Culture -3 and Culture -5 and a local variety CDM-1, performed better in the farm trial.

Identified 12 promising lines of vegetable cowpea with resistance/tolerance to cowpea aphid borne mosaic virus.

Among the green gram varieties in root-knot and reniform nematode infested area, the highest pod weight and dry weight of grains was obtained in SN-01-G3-06 variety. The root-knot index was also minimum in this variety.

The storage pests viz; *Triboleum spp*, *Oryzaephilus surinamensi* and *Rhizopertha dominica* were identified in stored groundnut.

Forage and Green manure Crops

Established a Gene Sanctuary for fodder crops at CBF, Thumburmuzhy under the RKVY Project.

The fodder production potential of Guinea grass was found to be much higher than that of Potha grass. However, Potha grass may be suitable as a soil conservation grass, as it has a shy flowering habit.

Riversdale guinea and Congo signal were found to be the most suitable species for growing under shaded conditions.

Concurrent growing of green manure crops in rice revealed that cowpea was the most suitable in supplying the required quantity of green manure with 25 % savings in N fertilizer and a substantial reduction in weed incidence.

Concurrent growing of daincha in wet seeded rice increased the profitability of the rice-rice cropping system.

Aromatic and Medicinal Plants

Evaluation of the selected eight genotypes of long pepper (*Piper longum*) and hybrid indicated that Accession No. 2 is superior to the existing variety *Viswam* for dry spike yield.

Accession-24 of *Plumbago rosea* from Pulppara Collected from Idukki district, Kerala recorded maximum fresh root weight with medium Plumbagin content. A tall plant with ovate type of leaves having dark green colour with maximum number of roots are the proposed plant architecture for higher root yield.

Accession No. 1- TCR 1 of Asoka performed comparatively better in terms of its growth exhibited by higher height, more number of leaves, higher girth and better tannin content. Throughout the year except September and October Asoka trees produced flowers with maximum during March followed by February. Maximum production of mature pods and seeds per pod were during February to April.

Brahmi plants having shorter inter node with fleshy bigger sized leaves contained more therapeutically important constituent Bacoside A. Accession 29 had higher biomass yield and Bacoside A content followed by Accession. No.14. Accessions received from coastal region have higher biomass and higher Bacoside content.

Combined application of organic manures (FYM, coirpith compost or vermi compost) and biofertilizers (Azospirillum and PSB) was found to be better for growth and drymatter production in *B.monniieri* than their individual application. The drymatter production was maximum with the application of coirpith compost @ equivalent to N of 5t/ha of FYM along with Azospirillum and PSB which was comparable with that of FYM @5t/ha along with Azospirillum and PSB.

Combined application of FYM @ 10 t/ha with Azospirillum and PSB @ 25 kg/ha was found to be the best combination of organic manures and biofertilisers for maximum root yield and plumbagin content in *P.rosea*.

Irrigation @ IW/CPE of 1.0 is found to be better for higher root yield and plumbagin content in *P. rosea*.

Spacing of 50x30 cm maintained optimum plant population for higher root yield and plumbagin content in *P.rosea*.

Six different types of phenols were present in Asoka bark. The phenols and tannins were seen mainly concentrated in bark and flower and very low quantity found in leaves.

On chemical fingerprinting, a significant difference was observed between Asoka & Polyalthia barks.

Sixteen different samples of bark sold as Asoka available from different places of Kerala were collected and tested for its truthfulness. None of the market sample was found to be the original Asoka bark.

Availability of the valuable medicinal herb, *Jeevakom (Seidenfia rheedii)* in Kerala forests was confirmed and its threat status ascertained. Domestication trial on *Jeevakom* gave positive results and adhoc package for domestication was formulated.

Neelamari required to have frequent irrigation and high doses of manure for realizing higher green leaf yield. In general, the yield under partial shade conditions was lower than the yield under open conditions.

To overexpress cytokinin synthesizing *ipt* gene in *Bacopa monnieri* through *Agrobacterium tumefaciens* mediated transformation and to regenerate the transformed plants through tissue culture for analyzing the influence of overexpression of *ipt* gene on growth, physiology and secondary metabolite production. Southern hybridization of PCR amplified products gave the evidence for the presence of *ipt* gene only in transformants but not in wild type. Transformants had higher cytokinin content than the wild type. Bacoside, the major secondary metabolite content in wild type and transformants were found to be on par.

Standardised the methods for the estimation of total antioxidant power, Ferric Reducing Antioxidant Power (FRAP), Trolox Equivalent Antioxidant Capacity (TEAC), DPPH assay, Superoxide scavenging capacity, hydrogen peroxide scavenging capacity and nitric oxide scavenging capacity of medicinal plants, crude drugs and herbal medicines.

Standardized protocol for in vivo anti- inflammatory studies (mouse ear erythema method) in acute inflammation model in medicinal plants.

Soils and Agronomy

The RSVY Soil fertility mapping project in which more than 53000 surface soil samples were analysed to provide location specific recommendations for nutrient management, covering 42 panchayaths was completed during September 2007. Agro ecological zone level NIV and nutrient management recommendations, panchayath level NIVs and nutrient management recommendations and recommendations for plots under each survey number had been provided. Soil fertility cards indicating nutrient requirements and application schedule for plots under each survey number had been distributed to Krishi bhavans. The data will soon be available in the KAU web site.

Surveyed the micronutrient stock of laterite soils of Kerala. In spite of the high total Fe content, its availability is low in southern districts of Kerala. Cu, B, and Zn were also found to be deficient in laterite soils. Deficiency is more in southern districts of Kerala than in northern districts.

An integrated farming system model has been established as a teaching cum demonstration tool at COA, Vellayani.

Organic farming techniques improved the soil health of Nendran banana, bhindi and cowpea.

Fifty-two agro advisory bulletins were prepared on the basis of the forecast prepared by the National Centre for Medium Range Weather Forecasting (NCMRWF). Each bulletin comprised weather experienced during the previous week, forecast of weather for the next four days, current

phenological stages of the major crops and the precautionary measures to be undertaken in case of the incidence of pests and diseases.

From April 2007, a new scheme was launched by India Meteorological Department in place of the earlier Agromet Advisory Services (AAS) and named it as Integrated Agromet Advisory Services. Thus the weather services provided by IMD and NCMRWF were integrated into a single window system for the efficient functioning.

The NCMRWF (National Centre for Medium Range Weather Forecasting, New Delhi), DST, Govt. of India 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 at RARS, Pilicode.

A sound database has been created on onset of monsoon and rainfall for the State of Kerala since 1871 onwards.

If the onset of monsoon is early (before 25th May), the monsoon rainfall is likely to be below normal.

A multiple linear regression equation has been developed to estimate total coconut production of State of Kerala seven months ahead. Such models are also developed in the case of cashew for estimating cashew production of the State before the crop harvest commences. They need further revalidation.

The quality of monsooned Malabar coffee appears to be better if the monsoon behaviour is favourable.

Agro-ecosystems along the highranges and coastal regions are likely to be under threat in a projected climate scenario over Kerala.

A regression equation has been developed to find out the discharge of water from the Peechi Dam during the Rabi season and made use of in agro advisory services for the benefit of the farmers.

The economic impact of Agromet Advisory Services (AAS) showed that there was a benefit in the case of AAS farmers when compared to non-AAS farmers. They need to be strengthened further at micro level for the benefit of the farming community.

A new criterion has been suggested based on night temperature for delineating hot spot areas of tea mosquito bug incidence in cashew along with the forewarning models.

The soil loss from 20 and 30 % slopes was well within the allowable erosion limits when zero tillage and strip tillage cultivation practices were adopted. The yield was maximum in the plots with conventional tillage or cover crop. With strip tillage the yield was within 80% of that in conventional tillage plots.

Plant Protection

The Rice Blue Beetle hitherto reported as a minor pest has assumed a major status in the rice growing tracts of Palakkad, Kannur Kasargod and Trivandrum districts. Hence, its biology, screening of varieties for resistance, seasonal incidence, alternative hosts and integrated management practices against rice blue beetle were studied and recommendations were made.

Insecticides Spinosad 45 % SC @ 45 g a.i./ha and Flubendiamide 480 SC @ 24 g a.i./ ha were found promising against stemborer, leaf folder and whorlmaggot and recommended for POP mini package.

Integrated management of rice root nematode in paddy revealed that application of carbofuran @ 0.3g a.i. / m² in the nursery + application of carbofuran @ 1 kg a.i. / ha in main field gave 13.46 % increase in grain yield.

Imidacloprid 0.005 per cent proved to be the safest chemical for the spiders and could be utilized for pest control when infestation is severe without harming the spider fauna in paddy fields.

The new fungicides Filia 52.5 SE @ 1.5 ml, 2.0 ml, 2.5 ml/lit, Nativo @ 0.4 g, Rhizocin @ 2.5 ml and Tilt 25 EC @ 1.0 ml/lit were effective against sheath blight incidence in rice.

The new fungicides Filia 52.5 SE @ 1.5 ml, 2.0 ml and 2.5 ml/litre and Nativo 0.4 g/litre were found effective against blast disease.

The biopesticides Trichozen -T @ 10 g, Biotos @ 2.5 ml/lit, Florezen P @ 2.5 g/lit, Ecomonas @ 10 g/lit were found effective in checking the sheath rot severity.

Result 25 EC @ 1.0 ml/lit, Kochide 2000 54 DF @ 3.0 g/litre were equally effective against false smut disease.

The combined spray of Sivic 75 WP @ 0.6 g + Caldan 50 SP @ 1.6 g, Sivic 75 WP @ 0.6 g + Indoxacarb @ 0.4 ml, Kitazin 48 EC @ 2 ml + Caldan 50 SP @ 1.6 g/lit and Kitazin 48 EC @ 2 ml + Indoxacarb @ 0.4 ml were found most effective in restricting the neck blast and stem borer incidence.

Fungicides, trifloxystrobin 25% + tebuconazol 50% (Nativo 75WG), Hexaconazole (Contaf 5 sc), Validamycin (Sheathmar 3 L) and thifluzamide (Spencer 24 SC) were found significantly effective in reducing the sheath blight disease severity and grain yield in rice.

Propineb (Antracol) was found highly effective in checking the brown spot infection and improving the grain yield in rice.

Biopesticide formulations, Biofer, defender, Florezen P, and Trichozen-T were found promising in checking the sheath blight and increasing the grain yield in rice.

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 significantly in rice.

The treatments of *Pseudomonas fluorescens* as seed+soil+foliar, seed+foliar and the botanicals Neem oil 3%, Achook @ 5 ml/lit were found to be effective for the sheath blight and blast diseases during Rabi 2006-07.

Depredatory and beneficial birds in the rice ecosystem were identified. Metalised reflective ribbons were evaluated to be effective in scaring birds in the vulnerable stages of crops.

Pod bugs in cowpea could be effectively managed through monitoring the population build up, mechanical destruction of eggs, nymphs and / or adults, wetting the crop canopy thoroughly during irrigation, removal of weed hosts *viz.*, *Cassia occidentalis*, *Panicum maximum* and *Synedrella nodiflora* in the vicinity, trash removal after harvest in cowpea, bhendi, chilli and application of Amrutneem 5 ml l⁻¹ / Nimbecidine 2 ml l⁻¹ / Neem Azal 2 ml l⁻¹ / imidacloprid 0.005 per cent / dimethoate 0.05 per cent / malathion 0.05 per cent / fenvalerate 0.03 per cent / lambda cyhalothrin 0.002 per cent / chlorpyrifos 0.03 per cent.

Chemical pesticide lambda cyhalothrin 0.002% was found effective against pod borer and imidacloprid 0.002% against pod bug in vegetable cowpea. Significant reduction in the population of pests and increase in yield were also observed in the plots treated with entomopathogenic bacteria (Delfin) and fungi treated plots. The residue of Lambda cyhalothrin, fenvalerate and chlorpyrifos were present in the fruit to the tune of 0.273, 0.1117 and 0.6395 ppm respectively.

In cucurbitaceous vegetables, foliar application of neem oil 2.0 per cent, imidacloprid 0.002 per cent and Malathion 0.2 per cent proved to be safer to pollinators and natural enemies than other chemical insecticides. Imidacloprid 0.002 per cent and Malathion 0.2 per cent significantly reduced pest infestation.

Slight reduction in nematode population in soil due to the cultivation of non-preferred host sweet potato variety Sree Bhadra when compared to preferred host okra.

Application of oil cakes improved the yield of bittergourd by reducing the nematode population in soil, improving the plant vigour and germination.

Seed treatment of okra for the management of nematode showed that yield increase ranged from 9.12% to 38.89%.

Triazole fungicide viz, hexaconazole and bettertanol were significantly superior in controlling the late leaf blight in groundnut and recorded maximum yield.

Among the biorationals evaluated, Neem Gold (0.5%) was found to be superior to Neem oil (0.5%) and Fish oil insecticidal soap (3.0%) in reducing the population of mussel scale insects on black pepper.

Potassium phosphonate @ 0.3% and *Trichoderma harzianum* @ 50 gm /vine was found to be effective in reducing foot rot incidence in black pepper.

Application of bioinoculants especially *Pseudomonas fluorescens* @ 20g per plant could effectively check nematode infestation in banana. The CB ratio of various treatments ranged from 1:1.5 to 1:1.9.

Management of major nematodes in banana using bio inoculants showed that all the treatments were better than carbofuran treatment. The CB ratio was maximum in *Pseudomonas fluorescens* application @ 20 g per plant. Yield increase (22.71%) was maximum in paring + hot water treatment + carbofuran @ 0.5g a.i. per plant + Neem cake @ 1 kg per plant.

Pongamia oil 2 per cent, azadirachtin 0.004 per cent and neem cake soil application @ 250 kg ha⁻¹ + NSKE five per cent were the most effective phytochemicals against the pests of tulsi.

Floor treatment with lindane 0.05 per cent before bedding was the most effective for the control of pests in mushroom, followed by dichlorvos 0.02 per cent and chlorpyrifos 0.02 per cent applied at fifteenth day after bed preparation.

Action Research on Mite Control was conducted in KAU campus on 200 palms. The palms have recovered from mite attack after the treatment. Scale of attack came down in both neem treatment and garlic treatment.

Application of triazophos during second spray completely suppressed the incidence of Tea Mosquito Bug (TMB) both in shoots and panicles while total control in the incidence of TMB on shoots and panicles was achieved through the application of profonophos during third spray.

Occurrence of Tea Mosquito Bug was the highest during March followed by February and January. Red ant, the important natural enemy of TMB, was also found to have the highest population during January to March.

Sigatoka leaf spot disease in banana could be effectively managed by spraying Propiconazole (Tilt 25 EC) 1 ml/l (0.1%) + spraying of *Pseudomonas fluorescens* @ 5 g/ litre three times.

In banana, two spp. of root mealy bugs were reported for the first time. Its biology, alternative hosts, population assessment and management practices were worked out.

The initial deposit of 0.59 and 1.23 mg/kg of propargite (Omite 57 EC) on brinjal fruits when applied at 570 and 1140 g / ha respectively, dissipated to non-detectable level on 10th day after application. In okra also, a similar level of initial residues (0.50 mg/kg and 1.29 mg/kg) dissipated to non-detectable level on the 10th day. A waiting period of seven days was recommended for propargite on brinjal and okra considering the tolerance of 0.1 mg/ kg recommended for other food crops.

No residues of flusilazole and carbendazim were present either on rice grains, husk, bran or in soil at the time of harvest (after 60 days after application), following application of Lusture 37.5 SE @960 and 1920ml /ha at 40 and 50 days after transplanting. Hence, Lusture 37.5 SE can be considered safe for application for disease control in rice up to 50th day after transplanting.

In cardamom, the waiting periods of chlorpyrifos (250g ai/ha) and lambda cyhalothrin (25g ai/ha) were fixed as 21 and 23 days respectively.

The recommended schedule of soil application of phorate 10 G in banana as per Package of Practices of KAU (25 g/plant at 20, 75 and 165 DAP) did not leave any residues of phorate, phorate sulfoxide or phorate sulfone in fruits, blossom stem and in blossom bud, indicating absolute safety of the schedule.

Late application of phorate @ 25 g/plant at 7 months after planting (1 month after flowering) showed the presence of the metabolite (phorate sulfone) in fruits, banana pulp and rind upto 14th day after application. However, translocation of the metabolite phorate sulfone to spindle leaf continued upto 28th day after application.

Application of chlorpyrifos @ 250g ai/ ha at 150 and 175 days after planting in banana did not leave any residue of chlorpyrifos in fruits, blossom stem and in blossom bud, when analysed at the normal harvest stage of each part, indicating absolute safety of the schedule.

The initial deposit of chlorpyrifos (0.05%) on fresh cardamom capsules was estimated, as 32.00ppm while that on dry capsules was 6.40 resulting in removal upto 80.0 percent of residues offering a processing factor of 0.20. The initial deposit of Lambda cyhalothrin (0.0025%) on fresh cardamom capsules were estimated as 2.20 mg/kg while that on dry capsules were 1.694 mg/kg resulting in removal upto 23.00 percent of residues offering a processing factor of 0.77.

The initial deposit of Chlorpyrifos (0.05%) on fresh pepper berries were estimated as 17.00 mg/kg while that on dry berries were 6.46 mg/kg resulting in removal upto 62.0 percent of residues offering a processing factor of 0.38. The initial deposit of Lambda cyhalothrin (0.0025%) on fresh pepper berries were estimated as 2.00 mg/kg while that on dry pepper berries were 1.14 mg/kg resulting in removal upto 43.00 percent of residues offering a processing factor of 0.57.

No significant reduction in the population of fungi, bacteria and actinomycetes in red loam soil was observed up to 28th day, following soil application of Bifenthrin @ 50, 100, 200 and 400 g ai/ha.

Among the five brands of cattle feed monitored for pesticide residues during October 2007, one brand was contaminated with methyl parathion and another with chlorpyrifos to the tune of 0.04 mg/kg and 0.008 mg/kg, respectively.

Biotechnology

Characterised resistant and susceptible genotypes of tomato for ToLCV & bacterial wilt diseases through various molecular markers like RAPD, AFLP, SSR & ISSR

Of the 130 Bt isolates from the Western Ghats of Kerala, 111 were found to have *cry1* gene effective against Lepidoptera and bioassay on pumpkin caterpillar revealed that 5 isolates produced 100% mortality on larvae. A novel *cry7* gene fragment (1.6kb) was amplified from a native isolate of Bt (KAU11).

16S rRNA sequencing of 2-pigmented bacteria from the Western Ghats revealed that these were *Chromobacterium violaceum* and *Serratia marscecens*. Purple and red pigments from the above isolates were extracted in methanol and characterized for stability at different temperature & pH.

Media combinations for callusing of embryo and plantlet regeneration of ginger seed were identified. Genetic variants in various parental combinations are being produced. In one cross-clonal population of progeny was established.

Inter specific hybrids between *V. planifolia* and *V. tahitensis* were produced by controlled crossing and embryo culture. Intra specific hybrids between superior clones of *V. planifolia* was produced and multiplied.

Seed dormancy of Kudampuli (*Garcinia gummi-gutta* var. *gummigutta*) can be reduced from 7-8 months to 7 days by inoculating ¾th mature seeds onto ½ MS media under *in vitro* condition.

Isozyme and RAPD analyses can detect the sex in the polygamodioecous species *Garcinia gummi-gutta var. gummigutta* within 7 -14 days of *in vitro* germination.

Designed lab model device for producing biogas from agar waste of tissue culture lab.

Predicted functionally important residues involved in Programmed Cell Death of plants.

Predicted insulin like proteins in plants like *Canavalia ensiformis*, *Bauhinia purpurea* and *Vigna unguiculata* using in silico approaches.

Studied inhibitors for Ferric dicitrate transport (FecA) protein of *Pseudomonas aeruginosa*.

Studied the antimicrobial properties of Ginger against Epstein-Barr virus, *Aspergillus flavus* and *Helicobacter pylori*.

Investigated the presence of anticancer properties in plants, *Ophiorrhiza*, *Thalictrum*, *Papaver*.

Studied the chitin degrading properties of Gram-negative soil bacteria *Serratia marcescens* that can be used as effective biocontrol agent for chitin degradation.

Post Harvest Technology

Surface sanitization with sodium hypochlorite (100ppm) for 15 minutes before minimal processing was found to be effective in reducing microbial population in the fresh cut products of vegetables coleus, elephant foot yam, cowpea and fruits pineapple, breadfruit and jackfruit. Washing with water containing mild soap could also reduce surface contamination of microbes in jackfruit and elephant foot yam. Prestorage treatments of these products with potassium metabisulphite (0.1%) or sodium benzoate (0.1%) in combination with ascorbic acid was found to enhance shelf life, reduce microbial load and improve appearance of fresh cut products. The shelf life of these products were extended following exposure to gamma radiation. The irradiated products of coleus, cowpea, jackfruit, and pineapple recorded a shelf life of 3 days and elephant foot yam and breadfruit 4 days under ambient conditions. The corresponding shelf life under low temperature storage was - pineapple (11 days), cowpea (12 days) coleus (13 days) elephant foot yam (17 days) breadfruit (11days) and jack fruit (11days).

Shelf life of minimally processed products was enhanced significantly by modified atmosphere packaging and low temperature storage. Maximum shelf life (11 – 13 days) under ambient and low temperature conditions of storage was for samples packed in polyethylene along with sachet of potassium metabisulphite (preservative). Packaging in polyethylene cover along with ethylene absorbent (KMnO₄) was also effective in enhancing shelf life of cut products of cowpea and coleus. In case of breadfruit, elephant foot yam and coleus vacuum packaging was found beneficial for preventing browning and enhancing shelf life. Shelf life of fresh cut products were prolonged to 8 – 9 days by packaging in polystyrene tray coupled with low temperature storage.

Modified atmosphere packaging in combination with cold storage was also effective in lowering the microbial load in fresh cut products. Packaging in Polyethylene cover along with potassium metabisulphite sachet could bring about a significant reduction in microbial load in all fresh cut products.

Snapmelon possessed high pulp recovery at the range of 62-90 percent.

Watermelon type sugar baby recorded the highest reducing (5.936%) non-reducing (2.28%) and total (8.21%) with average TSS 11.3^o Brix. The watermelon pulp was identified as good source of lycopene.

A process for extraction of lycopene colours from fresh watermelon pulp was standardized. Coloured milk powder was also developed through vacuum concentration and spray drying technique. The product would serve as a ready to use powder for ice cream, shake etc., the process and product are at the stage of filing for patent.

The following value added products were developed using different parts of coconut

Coconut water: Coconut water honey, lemonade, vinegar

Coconut kernel: Candy, Jam

Coconut milk: Toffee, sweetened, concentrated milk

The following value added products were developed from Watery Rose apple and Malaya apple

1. Quality pulp / juice: Osmo-dehydrated method was selected for production of quality pulp and juice from fruits.

2. Osmodehydrated products: Sliced fruits dipped in 60°C solution scored the highest in sensory evaluation.

3. Pickle: Pickle made from the fresh fruits slices of pink, white and Malaya apple was found to be the best.

4. Wine and pulp based products were standardized

5. Colour: Extraction of colour using 4% citric at 9 hours interval was found to be the best method as against the methanolic HCl as solvent.

Highest fibre recovery was for *Nendran*, followed by *Chenkadali* and *Palayankodan* (Mysore). The production techniques were standardized for many fibre products. The technique for production of cloth from banana fibre was also standardized.

Feasibility of preparing value added cosmetic products from turmeric were worked out.

Technology was developed for the preparation of vanilla powder from cured vanilla beans and the technology was submitted for patenting through KSCSTE. Storage capacity of the powder developed was tested with respect to appearance, vanillin content and moisture content. It has got a very good storage capacity.

Vanilla powder based products such as cakes, ice cream, pudding, chocolate, milk shake etc. have been prepared and evaluated the products using hedonic scale.

A new product "KAU Chocolate 4 U" developed from farm fresh cocoa beans as part of the Plan project was released in January 2008. In terms of quality and taste, this chocolate is on par with the international brands, that too without any preservatives.

Standardised the technology for production of quality jaggery from sugarcane in four different forms (solid, semisolid, powder and liquid form) under laboratory condition. A jaggery unit has been established at the Sugarcane Research Station Thiruvalla and developed technology for production of semisolid form. The product was released with the name "Madhuram". Action has been initiated for getting geographical indication registration for 'Thiruvalla sarkara' and for formation of a sugarcane farmers' cooperative society of Kottayam, Pathanamthitta, and Alapuzha districts.

Fruits obtained from the introduced Kokum trees were used for the preparation of Kokum syrup on experimental basis.

Economics, Extension and Statistics

The SWOT analysis was done and the broad development plans were suggested for the agro ecological units of Palakkad.

In all the four states viz. Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, granular urea application had a higher benefit cost ratio for the major crops like paddy, brinjal, banana and onion when compared to the control plot indicating higher advantage on the use of IFFCO fertilizers. The major advantage was that granular urea would be retained for more days and has a higher shelf life compared to other fertilizers. Difficulties in mixing granular urea with MOP as well as the bigger size of granules were the major constraints faced by the farmers.

The analysis of benefit cost ratio of organic farms in Wayanad district revealed that investment of one rupee yielded more than one rupee for all the classes. The major constraint faced by the farmers were lack of fixed price premium, lack of markets, scarcity of quality organic manures, lack of Government support, competition from fake products, lack of consumer awareness and pest and disease control.

A study conducted in Kannur district showed that out of the 71 Kisan Credit Card holders, who were having operational area more than 0.27 hectare, 42.3% had repaid the loan completely. Some suggestions for improvement of the scheme were also recommended like validity of card to be extended to a period exceeding five years, a passbook is to be provided to the farmers with transactions clearly recorded, periodical review of the utilization and repayment of the loan under the scheme and the credit card is to be linked with ATM facility.

A study was conducted on eco-friendly technologies in crop production in Thrissur district of Kerala state, on two major food crops (rice and banana) suggested programme for local production of organic inputs and scientific monitoring system for quality control of commercial organic inputs.

A documentary CD "*Jalasrothassukal Nalekkai*" has been prepared which contains the traditional water conservation and handling methods in Kuttichal Panchayat. CD highlights the need and importance of water in the present and future years. It also documents the interventions made by the research team in Kuttichal Panchayat.

The mother vermi compost production unit attached to College of Horticulture, Vellanikkara serves an excellent model of academic entrepreneurship in organic farming. The unit received a certificate of authorization for the manufacture of vermiproducts from the department of Agriculture, government of Kerala. With the help of anchor farmers and visitors to the units there is good popularization for the organic seeds.

Technical and financial support was given to rural women SHGs for establishing a production unit in their respective areas. Subsequently, 14 microenterprises have been formed as a result of the project and they are functioning successfully. These are serving as an income generation avenue for the rural women and also instills the spirit of entrepreneurship in them.

SHG had more market awareness, more frequent and effective use of information sources and high level of knowledge in crops and equipments compared to non-SHG.

Beneficial Organisms

Two promising high yielding isolates of *Pleurotus opuntiae* and *Pleurotus eous* were evolved for large-scale production and popularization. The cultivation technology indicated 85% biological efficiency in the case of *P. opuntiae* and 92% in the case of *P. eous*.

Cultivation technology of *Hypsizygus ulmarius*- The king oyster mushroom was standardized. It is a high yielding mushroom with 125% biological efficiency and a single mushroom weighed 200-250 g. Enhanced yield of mushroom *Pleurotus florida* and *P. sajor-caju* was obtained by spraying 0.1 per cent urea.

Blue oyster mushroom *Hypsizygus ulmarius* out yielded both *Pleurotus florida* and *P. sajor-caju*.

Reduction in mushroom yield was noticeable in beds where watering was excess and discoloration of fruiting bodies too was noticed in beds where excess moisture were retained.

Simple washing followed by sun drying and blanching followed by sun drying gave the best results with respect to preservation of colour and brittleness in Oyster mushroom *P. eous*.

Keeping quality was less for milky mushrooms when compared to Oyster mushroom.

Trichoderma viride was the most common contaminant in mushroom beds.

62 mushroom types were collected, which include rare mushrooms like *Geastrum triplex* (earth's star mushroom), *Daldinia concentrica*, *Dictyophora indusiata* and *Clavaria fragilis* (club fungi).

Seven isolates of milky mushrooms, *Calocybe indica* and one isolate of milky mushroom *Volvariella volvacea* were brought into cultivation.

Significant increase in yield of mushroom was obtained from beds sprayed with growth regulators Indole Acetic Acid 100 ppm and Gibberellic acid 50 ppm.

A new medium, coconut water supplemented by Potato Dextrose Agar was standardized for culturing the common mushroom fungi, which supported fast and efficient growth of the culture. Similarly a technique was standardized to reduce the sterilization time from 2 hours to 20 minutes by using an organic product named "Crop Protect"

A new edible mushroom "*Tricholoma* sp" was identified for the first time and its cultivation technology is also standardized.

Two native isolates of EPN (N1 and N2) were found potential for the management of banana pseudostem weevil *Odoiporus longicollis* Oliv. and rhizome weevil *Cosmopolites sordidus* Ger.

Feeding of turmeric *Curcuma longa* resulted in a steady decrease in the TSBV infection in colonies of Indian bee *A. cerana indica*, leading to recovery from the disease. Decrease in the intensity of infection was also observed in colonies treated with the extracts of *Mimosa pudica* and *Phyllanthus niruri*.

PGPR isolates from ginger were found not only to promote the growth and yield of ginger but also induce systemic resistance against bacterial wilt.

Eight promising biosurfactant bacteria were isolated from ten different hydrocarbon contaminated soil samples. Among them six isolates were identified as *Pseudomonas* sp. and the other two were identified as *Geobacillus kaustophilus* and *P. fluorescens*. All isolates showed high inhibition to soil borne pathogens where as all of them were compatible to *Trichoderma harzianum*.

The growth of *Azospirillum* sp. and *Pseudomonas fluorescens* were highly inhibited by copper oxychloride fungicide.

All isolation of PGPM viz. *Pseudomonas* sp., *Bacillus* sp. and *Trichoderma* sp. were found compatible with each other where as *Pseudomonas* sp. recorded as most efficient in the production of growth promoting substances like IAA and salicylic acid. The PGPM, *Bacillus* sp. recorded the maximum growth parameters of vanilla compared to the other two PGPM and their consortia.

Two bacterial diseases caused by *Pseudomonas* sp. and *Bacillus* sp. and fungal diseases caused by *Dactylium dendroides* and a *Penicillium* sp. were found important in milkly mushroom besides the contaminant fungi. Spraying with garlic extract on substrate after chemical sterilization was found most effective in preventing natural incidence of contaminant fungi and bacteria and also for obtaining maximum yield.

The endophytic bacteria EB-20, EB-22 and EB-43 were found most effective in promoting growth of amaranth and were also found equally efficient as bio-control agent, *P. fluorescens* whereas EB-22 and EB-43 were proved to be most efficient in the management of leaf blight of amaranth. Similarly EB-20 and EB-22 were recorded their efficiency in inducing systemic resistance of amaranth against leaf blight pathogen by increasing peroxidase, polyphenol oxidase and phenylalanine ammonia lyase activity.

Potential isolates of *Trichoderma* and bacterial antagonists were identified against the pathogens of rhizome rot and bacterial wilt of ginger. Identified the compatible isolates of *Trichoderma* and bacterial antagonists. Three consortial bioformulations were developed for the management of rhizome rot and bacterial wilt of ginger.

Potential *Trichoderma* and bacterial antagonists of *Phytophthora capsici* of black pepper, *P. meadii* of vanilla and *Ralstonia solanacearum* of chilli were identified. An endophytic antagonistic *Trichoderma* was identified against *P. capsici*. Developed a consortial formulation of different bioagents effective against all these major pathogens.

Thirty-two fungal isolates belong to the genera, *Trichoderma*, *Aspergillus* and *Penicillium* and 39 isolates of bacteria including 5 nitrogen fixing and 3 phosphorus solubilizing and 3 isolates of actinomycetes were isolated from the ABARD vermi compost unit. The most efficient nitrogen fixing and phosphate solubilizing bacteria were identified as *Azotobactor* sp. and *Pseudomonas* sp. respectively.

From the rhizosphere soil of ivy gourd and bittergourd, four isolates of arbuscular mycorrhizal fungus were isolated and were identified as *Glomus* spp.

A total of three phosphate solubilizing bacteria and one fungus were selected from ivy gourd rhizosphere soil and 4 PSB and 1 PSF were obtained from bitter melon rhizosphere soil. Similarly 4 isolates of *Azospirillum* spp. were obtained each from ivy gourd and bitter melon rhizosphere soil.

A total of 66 and 83 different isolates of PGPM were isolated and identified from vanilla and ginger growing areas of Kerala respectively. The consortium of bacteria x fungi combination, fungi x fungi combination and bacteria x bacteria combination with different types of fungi x bacteria were found most efficient in growth and establishment of vanilla and ginger.

Pathogenicity of EPN on different stages of rice bug, leaf roller, brown plant hopper, stem borer, rice hispa, grass hopper, white jassid and blue beetle were worked out in laboratory and in micro plot conditions.

About 80 nos. of isolates of *Azotobacter*, 50 isolates of *Azospirillum* and 40 no. of P solubilising microorganisms were obtained from soil samples of Western Ghats tract.

Trichoderma sp is the most efficient micro organism for accumulating the toxic elements iron, sulphur and aluminium in rice based wet land ecosystem of Kuttanad.

Agroforestry and Silviculture

Integrating MPTs and *kachalam* in coconut based production systems increased overall productivity and profitability with no adverse effect on the growth and yield of either the main crop or the component MPTs/field crop, although the tree-crop interactions might change over time.

Ailanthus triphysa was found to be a better candidate for agroforestry plantings on account of its lower lateral spread and deep-rooted nature. It could be recommended for widely spaced boundary planting and/or mixed species stands.

Developed an On-line (web enabled & CD) manual of timbers of Kerala which will provide accurate & up to date information using a click and query system. Emphasis is on timber identification, utilization & criteria based selection.

Homegardens offer food and nutritional security to the subsistence farmers, besides acting as a source of cash income. Often they function as the loci for experimentation with new tree species and cultivation techniques, and thus have the potential to contribute to the development of other agroforestry systems, and to extension efforts that seek alternatives for agricultural development.

Food Science and Nutrition

Anti bacterial activity of *L. acidophilus* against intestinal pathogens like *E. coli*, *salmonella enteritidis*, *bacillus cereus*, *staphylococcus aureus* and *sheigella flexneri* was studied. Zone of inhibition was maximum for *Salmonella enteritidis* (24mm) and minimum for *staphylococcus aureus* (15mm). No inhibition of *lacto bacillus* was found against *sheigella flexneri*

Standardisation of the 14 different combinations of probiotic food mixtures based on raw banana flour, defatted soya flour, green gram flour, tomato, papaya and mango were carried out.

Optimisation of conditions-25 g of food mixture inoculated with 300µl at pH 4.5 and incubated at 37°C for 24 hr was the best treatment for fermentation of food mixture.

Chapathi prepared by incorporating grain amaranth flour up to 30 % for wheat flour was found to be highly acceptable. Biscuits and *Puttu* prepared by incorporating up to 50% of amaranth flour for maida and rice flour respectively obtained high organoleptic scores. An increase in the nutritive value of recipes was also noticed with an increase in the quantity of grain amaranth flour.

A significant correlation was observed between smoking and total cholesterol and also alcoholism and total cholesterol, 42 per cent of the subjects used walking as the most popular exercise. A significant positive correlation (0.2396) was observed for stress and cholesterol. The study revealed that the lipid profile of population could be modified and cardiac diseases can be prevented through proper dietary counseling and food supplementation with functional foods such as flax seed, soya flour, oat bran and spirulina.

Veterinary & Animal Sciences

In quail layers from 7 to 26 weeks of age Cuttle fish waste silage could be used economically to replace 50% of crude protein from unsalted dried fish on protein basis without any adverse effect on overall performance.

Dietary supplementation of dried turmeric at three levels (0.2, 0.4 & 0.6%) in broiler chicken indicated that dressed yields of broilers were high in the first two treatment groups. Supplementation at 0.6% levels resulted in significant reduction of serum cholesterol while 0.4% resulted in reduced thigh meat cholesterol content.

Inclusion of esterified Glucomannan (E-GM) in the Aflatoxin B1 treated diet significantly counteracted the toxic effects of Aflatoxin and improved the performance of broiler chicken. The percent eviscerated, dressed and giblet yield was restored by supplementation of E-GM to Aflatoxin B1 treated feed.

Evolved and implemented on a trial basis the terminal sires system of breeding for production of three-breed combination with Duroc as terminal sire (i.e. Duroc as terminal sire and crosses of Desi, Large White Yorkshire and Land race).

Under the field condition swill feed was found to be equally effective compared to concentrate feed in producing growth of the fattener pigs.

A herd of Malabari goats with around 80 Does is being maintained under semi-intensive rearing system at RARS, Pilicode.

A comparison of performance of Malabari goats with goats in three other different regions have shown that performance of individuals in other regions are sometimes better than that of Malabari goats and selection within each population for traits of economic importance like body weight and milk production is the best method to improve the performance of goats of Kerala.

Micro satellite marker studies on 3 breeds Viz. Soviet Chinchilla, New Zealand White and Grey Giant was completed and the genetic distance between them was ascertained. This can be successfully used for charting out the breeding policy for rabbits.

Crossbred rabbits are more suited to the agro climatic conditions of Kerala with respect to resistance and growth rate.

A gene bank of 180 Indian Elephants has been established. A panel of five highly polymorphic microsatellite markers for elephants suitable for molecular genetic analysis has been identified.

Agricultural Engineering

Developed Optimal design of greenhouse suitable for Kerala condition. Cabbage and cauliflower could be cultivated successfully even in the summer season and tomato could be cultivated in the rainy season inside the greenhouse. A benefit cost ratio of 3.07 could be obtained by raising three crops of cabbage/ cauliflower under the greenhouse (optimal design of greenhouse) in a year. By cultivating two crops of tomato and one crop of cabbage/ cauliflower inside the greenhouse (optimal design of greenhouse) per year, a benefit cost ratio of 2.14 could be obtained.

Roof top water harvesting system constructed for the office building of PRC, Vellanikkara and for the office building of WMRU, Vellanikkara helped to increase the yield of wells during summer months.

Runoff diversion channels constructed/cleared off weeds helped to collect all the runoff from the farm and divert into an abandoned well at WMRU, Vellanikkara caused to increase the water level of the well.

Developed a simple and low cost transplanting finger.

Among the walk behind type Korean Kukje and Tong Yong transplanters, riding type 6 row 4 wheel Japanese Yanmar and Korean LG transplanters and Chinese single wheel- 8 row transplanter evaluated in farmers fields, Chinese Yanji transplanter was found suitable for the present conditions.

The rotary coconut husker was further improved.

Comparative evaluation of two types of coconut tree climbers is in progress.

Agria mini tiller and Asia mini tiller with ditcher, rotors, miracle rotor, reaper and hammer rotor tested in coconut and arecanut fields gave encouraging results. The imported Asia mini tiller has many advantages. The original petrol engine was replaced by a suitable diesel engine. It is found suitable even in moist hill slopes and can carry out many operations.

The rice-mill effluent and the domestic rubber-processing effluent were amenable to anaerobic digestion.

The agricultural by products coconut shells, rubber-seed outer-shells, and rubber-seed inner-shell were found suitable as a matrix in high-rate methane bioreactors.

A power-operated decorticator for producing white pepper from black pepper was developed and tested. The decorticating efficiency was 69.52% at 71 rpm and 17-hour soaking period. The capacity of the developed machine was 1.23 kg/h.

Tavanur village in Ponnani Taluk was identified as the best location for the establishment of an agro-processing centre.

Irrigation with one KAU micro sprinkler in the centre of the pit is recommended for Banana (Nendran) planted @ 3 suckers per pit at a spacing of 4m x 3m.

Fisheries

The relative abundance of *Chanos chanos* fry during the season indicated better prospects for brackishwater farming in Kerala.

Effective nursery management providing supplementary diet and adequate water exchange enabled to achieve optimum survival of post larvae and fry of *Chanos chanos* (Milk fish), *Mugil cephalus* (Grey mullet) and *Liza parsia* (Mullet)..

Etroplus suratensis was shown to be an ideal candidate species for culture in open water. Case fish production ranging from 9 -35k/m³ could be achieved. *Karimeen* was demonstrated to grow upto a size of around 250 rams in 7 months.

Mega Seed Project

Under ICAR, production and distribution of quality seeds and planting materials of different crops and fish seeds were achieved.

Finance

The university formulated the budget estimate for 2007-2008 showing Rs.11932 Lakhs as receipts and Rs.15539 Lakhs as expenditure in anticipation of Grant in aid for Rs.6771 Lakhs under Non Plan and Rs.2100 Lakhs under plan from the State Government. ICAR assistance of Rs. 1375 Lakhs, Rs.257 Lakhs from other Externally Aided Projects, Rs.1019 Lakhs from Internal resources and Rs.410 from Institutional Finance were also anticipated.

CHAPTER I

GENERAL ADMINISTRATION

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

The Main Campus of the University at Vellanikkara is 13 km east of 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 & Animal Sciences, Mannuthy, College of Fisheries, Panangad, College of Agriculture, Padannakkad, College of Agriculture, Vellayani, Kelappaji College of Agricultural Engineering and Technology, Tavanur, College of Dairy Science and Technology, Idukki (presently functioning at Mannuthy), College of Veterinary and Animal Sciences, Pookode. Development works related to the two Campuses, College of Veterinary and Animal Sciences, Pookode, Waynad and College of Dairy Science and Technology, Idukki are under progress. In addition to this the University has 30 major research stations distributed throughout the State. Some of the Stations are also recognised as centres for PG research of the University. When the NARP was implemented in the University, five of these stations were recognised as Regional Agricultural Research Stations. They are located at Pilicode, Ambalavayal, Patambi, Kumarakom and Vellayani. ORARS, Kayamkulam was started on 12.4.2000 so as to continue the works in root wilt disease of coconut and to implement a comprehensive coconut care programme.

The University received financial assistance mainly from the State Government and ICAR. Financial assistance was also received from outside agencies like NATP, Department of Science & Technology, DBT, Department of Atomic Energy, Spices Board, Coconut Development Board etc.

OFFICERS OF THE UNIVERSITY AND ADMINISTRATIVE SET UP

The Officers of the University are the Chancellor (Governor of Kerala), the Pro-Chancellor (Minister of Agriculture), the Vice-Chancellor who is the Chief Executive and Academic Officer of the University.

The Vice-Chancellor is also the ex-officio Chairman of the General Council, Executive Committee and Academic Council. The Vice-Chancellor is the principal executive and academic officer of the University who is assisted by the Registrar, the Comptroller, Deans of Faculties, the Directors of Research, Extension, Physical Plant, Students Welfare and the Librarian holding tenurial positions and recognised as the Officers of the University. 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 research activities in the University are vested with the Director of Research. The Director of Extension is responsible for the extension education and public relations. 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 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 lists of members of these bodies are appended.

participating in seminars, symposia, workshops etc., organised by different scientific agencies/ICAR institutes/SAUs.

Labour

Farm labourers constitute a major category of personnel in the University. Two categories of workers-casual and permanent exist in farms and research stations under the Kerala Agricultural University. In respect of service conditions and wages, generally the University follows Government orders applicable to the labourers of the Department of Agriculture and Animal Husbandry. Total labour strength in the report year is 1566 Permanent labourer – 971 and Casual labourer – 595.

ENGAGEMENTS/ACTIVITIES OF THE VICE-CHANCELLOR

Shri. K.R. Viswambharan joined as Vice Chancellor of KAU with effect from 28-03 2007

Visited the Hon'ble Chancellor His Excellency the Governor of Kerala on 10-04-07.

Visited Hon'ble Union Minister for Agriculture Shri Sharad Pawar at Ernakulam on 13-04-07.

Visited Prof. M.S. Swaminathan, MSSRF, Chennai on 16-04-07.

Attended meeting on Kerala State Higher Education Council at Trivandrum on 23-04-07.

Attended pre-workshop on ZREAC at RARS, Pattambi on 26-04-07.

Attended 50th Year Celebrations of Government of Kerala Thrissur on 02-05-07.

Attended the Seminar conducted by Coconut Development Board on 04-05-07.

Attended the Inaugural function of 3rd Kerala Environment Congress 2007 and the meeting of State Horticulture Mission, Kerala at Trivandrum on 08-05-07.

Attended the 5th meeting of State Council of KSCSTE at CM's Conference Hall, Trivandrum on 09-05-07

Attended the 50th anniversary of the first democratic Government of Kerala on 10-05-07 at RRS Moncompu, Alappuzha.

Attended the XI Scientific Advisory Committee at KVK, Pattambi on 15-05-07.

Attended the Farmer's Day at IF, Vellayani and also attended the Virtual University Managing Council at Secretariat, Thiruvananthapuram on 24-05-07

Felicitated the Agrl. Seminar conducted by Agro Service Centre, Aluva on 31-05-07.

Felicitated the inaugural function of the Administrative Block of Krishi Vignan Kendra, Thavanur, Malappuram on 02-06-07.

Inaugurated the tree planting in connection with World Environmental Day at Thiruvazhamkundu on 05-06-07.

Attended the the meeting of the Kerala State Higher Education Council, Thiruvananthapuram on 07-06-07.

Attended the meeting on presentation of Draft Report by Dr. M.S. Swaminathan on the Ecological and Livelihood Rehabilitation of Alappuzha District on 21-06-07

Attended the meeting of Co-ordination of TELK and NTPC in the presence of Chief Minister, Kerala at Angamaly on 23-06-07.

Attended the Interaction Workshop on "Wayanad District – A Comprehensive Multi-enterprise Project for Resolving the Agrarian Crisis" at RARS, Ambalavayal on 04-07-07.

Attended the Farmer's Meet (Njattuvela Chantha) conducted by Peringandoor Service Co-operative Bank, Athani on 14-07-07.

Visited the Director, KFRI, Peechi on 18-07-07.

Attended Press Conference – in connection with the “Farmers Meet” scheduled to be conducted at RARS, Pattambi on 10-08-07.

Attended the “*Karshakamela*” conducted by the Farmers Fourm, Thodupuzha on 09-08-07.

Attended the *Farmers Meet* at RARS, Pattambi and visited Livestock Research Station, Thiruvizhamkurinu on 10-08-07.

Felicitated the RAWE programme of the students of Forestry College, KAU, Vellanikkara on 15-08-07.

Attended the inaugural function of the Pesticide Residual Laboratory at College of Agriculture, KAU, Vellayani, Thiruvananthapuram on 22-08-07.

Attended the South Zone Conference of “Association of Indian Universities” at Cochin University of Science and Technology, Kochi for two days on 12-09-07 & 13-09-07.

Attended the inaugural function of “Karshaka Sangamam” conducting by the Meloor Panchayat and visit Agricultural Research Station, KAU, Chalakudy on 15-09-07.

Attended the “Southern Region Vice-Chancellors Conference” at Hyderabad for two days from 18-09-07 to 19-09-2007.

Attended the 7th meeting of the Managing Council of *Virtual University for Agricultural Trade* at Secretariat, Trivandrum on 24-09-07.

Inaugurated the programme “*Palathulli Peruvellam*” conducted by Malayala Manorama at Kodungalloor on 03-10-07.

Attended the celebration of 50th Anniversary of Peechi Dam (Golden Jubilee) on 04-10-07.

Attended the Workshop organized by the State Planning Board and the Planning Commission at Ernakulam for two days on 06-10-07 and 07-10-07.

Attended the National Conference on *Development of Higher Education* organized by the University Grants Commission in connection with the celebration of 150 years of Higher Education & Commemorating the Birth Centenary of D.S. Kothari in New Delhi on 10th and 11th October 2007.

Attended the High Level Discussion in connection with the recommendation of M.S.Swaminathan Research Foundation report *on the Measures to Mitigate Agrarian Distress in Alappuzha and Kuttanad Wetland Ecosystem* at Alappuzha on 15-10-07.

Attended the National Seminar on “*Saraca asoca*” (Asoka Tree) organized by Kerala Forest Research Institute (KFRI), Peechi on 16-10-07.

Attended the meeting on **Plan Discussion** at Panancherry Community Hall, Panancherry on 17-10-07.

Inaugurated the seminar on “*Jetropha cultivation and Bio-diesel*” conducted by Panancherry Panchayat, Panancherry on 18-10-07.

Attended the meeting scheduled by Hon’ble Chief Minister to discuss the *recommendation of M.S. Swaminathan Research Foundation Report on Kuttanad* at Chief Minister’s Conference Hall, Secretariat, Trivandrum on 24-10-07.

Attended the Second National Symposium “*Noni for Health and Wellness*” (Noni Search 2007) at Chennai on 26-10-07.

Participated the “*Pokkali Farmers Meet*” at Rice Research Station, Vyttila and *Farmers Seminar* at Cherthala with Hon’ble Minister for Agriculture 29-10-07.

Facilitated the inaugural function of the seminar on “*Rice*” conducted at RARS, Pattambi on 02-11-07.

Attended the function of 'Sake of Honour' award to Prof. M.S. Swaminathan, the renowned Agricultural Scientist – arranged at Kochi on 09-11-07.

Inaugurated the 7 (Kerala) Naval NCC Sub Unit at College of Fisheries, Panangad on 07-12-07.

Inaugurated the *Model training course on "Gender Concerns in Fisheries"* at College of Fisheries, Panangad on 11-12-07.

Inaugurated the orientation lecture on *Impact of climatic change on the Agricultural Sector in Tropical countries* at College of Fisheries, Panangad on 14-12-07.

Inaugurated the function of "*16th Agri-Horti-Industrial Exhibition 2007*" sponsored by the Alappuzha Zilla Agri-Horti. Society and also inaugurated the harvesting of *KSCSTE Cage Culture Project* organized by RARS, Kumarakom on 21-12-07.

Participated in the "*Prathibha Sangamam*" in connection with the Karshikamela, organized by the Gandhiji Study Centre, Thodupuzha and also attended the *Neyyattinkara Agri. Fair-2007* organized by the College of Agriculture, Kerala Agricultural University on 29-12-07.

Inaugurated the Training Programme on "*Ornamental fish culture for Kumbalam Panchayat*" organized by College of Fisheries, Panangad on 04-01-08.

Attended the first meeting of the State Level Sanctioning Committee of Rashtriya Krishi Vikas Yojana (RKVY) at Chief Secretary's Committee Room, Secretariat, Trivandrum on 08-01-08.

Attended the meeting of the "*Regional Committee No.VIII of Southern States and Union Territories*" scheduled to be held at CTCRI, Sreekaryam, Trivandrum on 11 & 12-01-08.

Participated the Vice Chancellor's Conference of Agricultural Universities at NASC Complex, Dev Prakash Shastri Marg, New Delhi on 19-01-08.

Attended the Farmers Science Congress at KVK, Kannur for two days on 4th & 5th Feb. 08.

Attended the National Workshop on "*Grower Industry Linkage for Promotion of Medicinal and Aromatic Plants Cultivation*" conducted at Aromatic and Medicinal Plants Research Station (AMPRS), Odakkali, Ernakulam on 12-02-08.

Participated the *Farm Fest 08* – organized by All India Radio and Changanassery Social Service Society at Changanassery on 14-02-08.

Attended the inaugural function of State Agri. Fair 2008 at Kochi from 20-24th Feb. 2008.

Attended the meeting at Thazhakkara Panchayat for the implementation of Rashtriya Krishi Vikas Yojana (RKVY) at Thazhakkara, Alappuzha on 25-02-08.

Attended the Agricultural Seminar organized by Cardamom Research Station, Pampadumpara on 28-02-08.

Inaugurated the Workshop conducted by Kerala State Biodiversity Board for NGOs at KILA, Mulankunnathukavu, Thrissur on 03-03-08

Attended the Workshop conducted by International Rice Research Institute (IRRI) regarding "*Stress tolerant rice for poor farmers of Africa and South Asia*" at New Delhi on 16-03-08.

Inaugurated the Seminar on Action Plan for "*The Ramsar Sites of Kerala*" at CUSAT, Kochi on 24-03-08.

Inaugurated the sales-cum-information centre at Rice Research Station, Moncompu and visited the paddy field at Kuttanad with the District Collector, Alleppey and other officials to assess the damage/loss to the farming community due to unprecedented heavy rainfall and to extend guidance and help to the farmers in resolving the problems on 29-03-08.

CHAPTER II

EDUCATION
FACULTY AGRICULTURE
COLLEGE OF AGRICULTURE, VELLAYANI

Name of Head of the Station : Dr. K. Harikrishnan Nair

Teaching / Academic Programme:-

Academic programmes (as per the Academic cell data)

Revised the UG Syllabus as per the IV Deans committee and implemented for 2007 UG Programme

Intake capacity & No. of students enrolled during 2007-08				Out turn of students during 2007-08			
	No. of students	Male	Female		Male	Female	Total
2007 UG	57	11	46				
2006 UG	37	11	26	2003 UG	5	32	37
2005 UG	61	17	44				
2004 UG	42	11	31				
2003 UG	47	9	38				
2002 UG	2	1	1				
2000 UG	1	1	-				
Study tour-1 2005 UG South India	61	17	44				
Study tour-2 2004 UG North India	42	11	31				

P.G. Programme (Academic cell PG section)

Details of students on roll as on 31.3.08

1. MSc : 34
2. PhD :27
3. Students passed out
 - MSc : 8
 - PhD :1

PG Syllabus (MSc and PhD was revised from 2007 admission onwards).
 and external evaluation introduced

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Plant Breeding & Genetics

Research programmes:

In the Ph.D. project on "Triallel analysis of yield and resistance to anthracnose in chilli" nine, three-way cross hybrids viz. JwalamukhixKidangoor localxJwalasakhi, Jwalamukhix Ujwalax Vellayani Athulya, JwalamukhixUjwalaxKidangoor local, Jwala SakhixVellayani AthulyaxKidangoor local, Samkranthi localxVellayani AthulyaxKidangoor local, Vellayani AthulyaxKidangoor local x Samkranthi local, Vellayani AthulyaxUjwalaxJwalamukhi and Kidangoor localxUjwalaxJwalasakhi were promising hybrids for yield and resistance to anthracnose.

The estimation of genetic components revealed the predominance of dominance x dominance gene effect for fruit yield per plant, number of branches per plant, number of fruits per plant, average fruit weight, fruit length, fruit girth, harvest index and capsaicin while days to first flowering, plant height, incidence of anthracnose, enzyme activity, phenol, oleoresin and vitamin C had additive x dominance type of epistatic effect.

In the M.Sc.(Ag.) project "Genetic variability for yield and resistance to chilli thrips (*Scirtothrips dorsalis* H.) and yellow mite (*Polyphagotarsonemus latus* Banks) in chilli (*Capsicum annum* L.) 50 genotypes and chilli were evaluated for yield and resistance to chilli thrips and yellow mite. Genetic diversity studies using Mahalanobis D² statistic indicated considerable diversity among the genotypes. The variety Ca 13 which recorded the highest green chilli yield of 292.88g/plant was identified as a genotype with high yield potential and tolerance to chilli thrips.

XXVII ZREAC approved the proposal for conducting farm trial with two promising selections of ivy gourd selected from the KSCSTE project "Collection, evaluation, morphological and molecular, characterization, cataloguing and genetic improvement of ivy gourd (*Coccinia grandis*)". The materials are in the multiplication stage. The farm trials will be conducted during 2008-09.

In the project 'Breeding leaf curl virus resistant chilli through interspecific hybridization' funded by 'Kerala State Council for Science, Technology and Environment' selfed seeds from 60 F₂ plants were raised in the field. These plants (F₃ plants) were screened for leaf curl virus providing all conditions for attracting the silver leaf white fly (*Bemisia tabaci*) in the same procedure (acquisition & inoculation access feeding and acquisition feeding & releasing the white flies in the field) as done in F₂ population. F₃ plants with high resistance to leaf curl virus were identified and they were selfed, and seeds collected. Selfed seeds (F₃ seeds) from 58 promising plants (in yield and leaf curl virus resistance) were collected, dried and stored for further evaluation.

In the project, "Breeding for Novel Varieties in Monopodial Orchids" in addition to the 18 commercial hybrid varieties established in the green house, 14 more top quality hybrids belonging to the genera *Vanda*, *Aranda*, *Aranthera* and *Mokara* were purchased and established. Morphological characterization of the varieties has been completed and diallel crossing is progressing. Majority of combinations attempted in the higher order multigeneries have succumbed to incompatibility. Successful combinations have resulted in capsules which are being harvested at 80 - 90% maturity and inoculated *in vitro*. Seeds germinated into protocorms which eventually differentiated shoot and root meristems in opposite directions. Need based sub-culturing was done and seedlings were deflasked at 3-4 leaf and 2-3 root stage. At present, seedlings from five combinations have regenerated into full fledged seedlings ready for de-flasking. More hybrid combinations are represented in the protocorm differentiation, seed germination and capsule maturation stages.

Molecular characterization work of 20 monopodial hybrids using 12 primers showing amplification is in progress.

In the evaluation of seedling variability in selected varieties of *Anthurium andreanum*, hybrids of more than 60 cross combinations and mother plants belonging to 20 varieties of anthurium are being maintained. About seven varieties were recommended for release in the NARP/Zonal workshop. Those varieties were under multiplication by top cuttings and sucker splitting. Genetic improvement of some of the promising hybrids were carried out by the way of back crossing to their parent varieties. Secondary crossing of several selected F₁ hybrids is in progress. Some of them have

flowered and their characters were stabilized. Detailed character evaluation of these hybrids is in progress.

Department of Entomology

a. Research highlights

- Nine species of pod-bugs viz., *Acrosternum graminea* (Fab.), *Clavigralla gibbosa* Spinola, *Cletus bipunctatus* Westw., *Coptosoma cribraria* Fab., *Homococerus* sp., *Nezara viridula* (L.) *Piezodorus rubrofasciatus* (Fab.), *Riptortus linearis* (Fab.) and *Riptorus? pedestris* Fab. were recorded from cowpea. Among the bugs, *R. pedestris* was predominant, followed by *N. viridula* and *R.? linearis*. *A. graminea*, *C. bipunctatus*, *Homococerus* sp., *P. rubrofasciatus*, and *R. linearis* are new reports from vegetable cowpea in India. Four species of preying mantids, one black ant, a reduviid bug, three species of spiders and one ectoparasitic mite were documented as natural enemies of the pod bugs. It was observed that the pest could be effectively managed through monitoring the population build up, mechanical destruction of eggs, nymphs and / or adults, wetting the crop canopy thoroughly during irrigation, removal of weeds trash removal after harvest in cowpea, bhendi, chilli and application of Amrutneem 5 ml l⁻¹ / Nimbecidine 2 ml l⁻¹ / Neem Azal 2 ml l⁻¹ / imidacloprid 0.005 per cent / dimethoate 0.05 per cent / malathion 0.05 per cent / fenvalerate 0.03 per cent / lambda cyhalothrin 0.002 per cent / chlorpyrifos 0.03 per cent.
- The springtails *Sira* sp., phorid flies *Megaselia* sp., sciarid flies, cucujoid beetle *Cyllodes* sp., staphylinid beetles viz., *Staphylinus* sp. and *Scaphisoma nigrofasciatum* Champ, noctuid moth, parasitic mite *Poecilochirus necrophori* Vitzthum, slugs and snails were identified as pests of mushroom. Of these, the occurrence of *Cyllodes* sp., *P. necrophori*, noctuid moth, slugs and snails in oyster mushroom were reported for the first time from Kerala. Correlation studies between the population and extent of damage with weather parameters revealed that *Seira* sp., *P. necrophori* and slugs had positive correlation with relative humidity and rainfall, while it showed negative correlation with maximum temperature. Population of *Megaselia* sp., *S. nigrofasciatum*, *Cyllodes* sp., *Staphylinus* sp. were positively correlated with maximum temperature and negatively correlated with relative humidity and rainfall. Among the various measures evaluated for the control of pests in mushroom, floor treatment with lindane 0.05 per cent before bedding was the most effective, followed by dichlorvos 0.02 per cent and chlorpyrifos 0.02 per cent applied at fifteenth day after bed preparation.
- Around 47 species of insects were recorded on cucurbitaceous vegetables in a survey conducted in Kalliyoor panchayath of Trivandrum district. Bees were the predominant insect pollinators identified. Among the four species recorded, *Apis cerana indica* Fab. was the most abundant in oriental pickling melon and snake gourd. *Trigona* sp. was abundant in bitter gourd. *Apis mellifera* L. least visited the cucurbit flowers. Among the three cucurbitaceous vegetables, the highest insect pollinators' activity was recorded in oriental pickling melon followed by bitter gourd and snake gourd. The peak period of activity of the pollinators was noted to be during 10 to 11 and 15 to 16. Maximum foraging activity of different insect pollinators was recorded during the seventh week after sowing in bitter gourd and snake gourd and sixth week after sowing in oriental pickling melon. The population of insect pollinators was more in summer than rainy season. The higher activity of insect pollinators was observed under pesticide free condition in the Instructional farm compared to farmer's field where insecticides were frequently applied. The dominant insect pests recorded were *Bactrocera cucubita* Coq. and *Aulacophora* spp. followed by *Aphis* spp., *Henosepilachna* sp., *Liriomyza trifolii* Burgess, *Diaphania indica* Saunders, *Anadevidia peponis* Fb. and thirteen other pests. Foliar application of neem oil 2.0 per cent, imidacloprid 0.002 per cent and malathion 0.2 per cent proved to be safer to pollinators and natural enemies than other chemical insecticides. Imidacloprid 0.002 per cent and malathion 0.2 per cent significantly reduced pest infestation.

- Ten native isolates of EPN were obtained from banana rhizosphere in a study taken up to identify native entomopathogenic nematodes. Among the isolates, two isolates (N1 and N2) were found potential for the management of banana pseudostem weevil (*Odoiporus longicollis* Oliv.) and rhizome weevil (*Cosmopolites sordidus* Ger.) The studies on the rate of multiplication of the native isolates along with standards revealed that an initial inoculum of 10⁷ and 25 infective juveniles of N1 and N2 respectively per *Galleria mellonella* larva recorded maximum emergence of infective juveniles of EPN. Maximum emergence of EPN was recorded 20 days after inoculation.
- The seasonal occurrence and the extent of damage caused by pests of tulusi were assessed in a survey conducted at monthly intervals for one year in five locations viz. Perumpazhuthoor, Parasuvaikkal, Poojapura, Peroorkada and Vellayani of Thiruvananthapuram district. The five major hemipteran pests recorded on tulusi were *Monanthia globulifera* W., *Aphis gossypii* Glover, *Cajanus cajani* Maskelli, *Phymatostetha dschampes* L. and *Icerya* spp. The lace wing bug, *M. globulifera* was present on the crop throughout the year. The population was at its peak during the summer months of March and April 2006. The giant mealy bugs, *Icerya aegyptiacum* (Dgl) and *Icerya seychellarum* (Westw.) are being reported for the first time on tulusi plants. The minor pests recorded were *Anchon pilosum* L., *Lygaeus* sp., *Agonoscelis* sp., *Leptocorisa acuta* (Thunb.), *Pseudococcus* sp., *Cyrtacanthacris* sp., *Syngamia abruptalis* Wlk., *Anisephyra ocularia* Fab., *Lasius* sp. and *Solenopsis* sp. A viral disease and a fungal leaf spot caused by *Colletotrichum gloeosporioides* Penz. were also recorded.
- During the survey, eight species of spiders viz., *Argiope* sp., *Chiracanthium* sp., *Hyllus semicupreus* (Simon), *Neoscona mukherjee* Tikader, *Oxyopes shwetha* Tikader, *Oxyopes birmanicus* Thorell, *Peucetia viridana* (Stoliczka), and *Tetragnatha* sp were found feeding on *A. gossypii*, *Icerya* spp. and larvae of *S. abruptalis*. Pongamia oil 2 per cent, azadirachtin 0.004 per cent and neem cake soil application @ 250 kg ha⁻¹ + NSKE five per cent were the most effective phytochemicals against the pests of tulusi.
- Field experiments were conducted to assess the effect of chemical pesticides in controlling the pests of vegetable cowpea. With respect to the percentage of fruits damaged by pod borer, the lowest incidence was in the synthetic pyrethroid lambda cyhalothrin 0.002% treated plots. Pod bug incidence was significantly lower in imidachloproid 0.002% treated plots. The yield was also highest in this treatment but it was on par with the yield obtained in lambda cyhalothrin 0.002%. Significant reduction in the population of pests and increase in yield was also observed in the plots treated with entomopathogenic bacteria (Delfin) and fungi treated plots. Further, the residues of insecticide present in the harvested fruits three days after spraying was determined. The residue of Lambda cyhalothrin, fenvalerate and chlorpyrifos were present in the fruit to the tune of 0.273, 0.1117 and 0.6395 ppm respectively.
- Sixty five species of spiders spread in eleven families and seven foraging guilds were identified from Thiruvananthapuram district in a survey conducted to document the population of aranea in the paddy fields. Seventeen species of spiders were reported for the first time from Kerala. The predominant species observed was *Tetragnatha mandibulata* Walckenaer. The other dominant species included *Tetragnatha maxillosa* Thorell, *Argiope anasuja* Thorell, *Neoscona rumpfi* Tikadar & Biswas, *Telamonia dimidiata* Simon, *Bianor carli* Reimoser, *Oxyopes javanus* Thorell, *Peucetia viridana* Stoliczka, *Pardosa pseudoannulata* Boesenberg & Strand and *Thomisus projectus* Tikader. The ten spiders showed a definite preference for the different hoppers, bugs and lepidopterans prevalent in the paddy fields. *A. anasuja* was the most potential predator and *P. viridana* was the spider with highest rate of hyper predation. Better recolonization of spiders was noticed in the neem product treated plots than the synthetic pesticides. Imidachloproid 0.005 per cent proved to be the safest chemical for the spiders and could be utilized for pest control when infestation is severe without harming the spider fauna.

AICRP on Honey Bees

- Trials on the efficacy of plant extracts for the management of TSBV infected colonies of Indian bee *A. cerana indica* showed that feeding of turmeric *Curcuma longa*, resulted in a steady decrease in the TSBV infection leading to the recovery of the colonies. Decrease in the intensity of infection was also observed in colonies treated with the extracts of *Mimosa pudica* and *Phyllanthus niruri*. *Azadirachta indica* and *Ocimum sanctum* treated colonies exhibited intermittent infection and recovery. Treatment with extracts of *Hemidesmus indicus*, *Adathoda vasica* and *Boerhavia diffusa* did not have much effect.

AICRP on Nematode Pests

- Hot spots of *Meloidogyne graminicola* in paddy, *Radopholus similis* in banana and *Meloidogyne incognita* in pepper, *kacholam*, *thippali* and *koduveli* were located in the state. Impact analysis in yield due to nematode attack indicated 16.65% yield loss in paddy due to the infestation of *M. graminicola*. While *M. incognita* in association with bacterial wilt resulted in complete crop failure in tomato, combined infestation of *R. similis*, *H. multincinctus*, *Tylenchorhynchous* and *M. incognita* caused 7.5 to 12.5 t reduction in yield per ha in banana.
- Three varieties of paddy, MRST-14, MRST-11 and MRST-16 emerged as moderately resistant to cyst nematode but were susceptible to *M. graminicola*. The varieties of tomato viz., EC-490125, EC-490127, EC-25772, EC-16790 and EC-3904 were resistant to root knot nematode. In okra, the varieties PB-236, Arya Dhan Lakshmi and Pusa savani were resistant to *M. incognita*. Among the 23 varieties of brinjal screened only varieties IC-11023 was found highly resistant while nine varieties viz. IC-285142, IC-249330, Round Br, IC-4672373, IC-136024, IC-249357, IC-24036, IC-90922 and IC-249387 were resistant. Among chilli varieties, CO-4 was highly resistant while Indira chilli and C-DCL-1 were resistant.
- Application of oil cakes reduced the nematode population in soil, improved the plant vigour and consequently the yield of bitter gourd. The increase in yield ranged from 24.8 to 29.71 per cent. Demonstration trial on the effect of seed treatment of okra for the management of nematode showed that the treatment resulted in 9.12 to 38.89% increase in yield in various locations. Application of bioinoculants especially *Pseudomonas fluorescens* @ 20g per plant could effectively check nematode infestation in banana. The CB ratio of various treatments ranged from 1:1.5 to 1:1.9.
- Pathogenicity of EPN on different stages of rice bug, leaf roller, brown plant hopper, stem borer, rice hispa, grass hopper, white jassid and blue beetle were worked out in laboratory and in micro plot conditions. The inoculum level required for getting 80 to 100 per cent mortality of the above pests ranged from 10 to 25 infective juveniles per insect. In micro plot studies, an inoculum level of 50,000 Ij/m² recorded 70, 60, 49 and 72% mortality in leaf roller, brown plant hopper, stem borer and rice hispa respectively. Two species of Rhabditis and Heterorhabditis indica were reported for the first time in pests of rice in Kerala. The in vitro and in vivo mass multiplication techniques were standardized.

AINP on Pesticide residues

- In the supervised trial conducted to study the persistence and degradation of propargite (Omite 57 EC) on brinjal fruits, the initial deposit of 0.59 and 1.23 mg/kg when applied at 570 and 1140 g / ha respectively, dissipated to non-detectable level on 10th day after application. In okra also, a similar level of initial residues (0.50 mg/kg and 1.29 mg/kg) dissipated to non detectable level on the 10th day. A waiting period of seven days was recommended for propargite on brinjal and okra considering the tolerance of 0.1 mg/ kg recommended for other food crops. (No MRL value available for vegetables).
- No residues of flusilazole and carbendazim was present either on rice grains, husk, bran or in soil at the time of harvest (after 60 days after application), following application of Lusture 37.5 SE @960 and 1920 ml /ha at 40 and 50 days after transplanting. Hence, Lusture 37.5 SE can be considered safe for application for disease control in rice up to the 50th day after transplanting.

- In a trial conducted at Cardamom Research Station, Pampadumpara to study the dissipation of chlorpyrifos (250g ai/ha) and lambda cyhalothrin (25g ai/ha) on cardamom pods, the waiting periods of chlorpyrifos and lambda cyhalothrin were fixed as 21 and 23 days respectively, in cardamom.
- Based on the experiments on dissipation of chlorpyrifos (250g ai/ha) and lambda cyhalothrin (25g ai/ha) conducted at the Instructional Farm Vellayani, the waiting period of chlorpyrifos and lambda cyhalothrin were fixed as 32 and 43 days, respectively.
- In an experiment on local importance, the recommended schedule of soil application of phorate 10 G in banana as per Package of Practices of KAU (25 g/plant at 20, 75 and 165 DAP) did not leave any residues of phorate, phorate sulfoxide or phorate sulfone in fruits, blossom stem and in blossom bud, indicating absolute safety of the schedule.
- Late application of phorate @ 25 g/plant at 7 months after planting (one month after flowering) showed the presence of the metabolite (phorate sulfone) in fruits (0.003-0.008 mg/kg in banana pulp and 0.003 to 0.01 mg/kg in rind) upto 14th day after application. However, translocation of the metabolite phorate sulfone to spindle leaf continued upto 28th day after application (0.007 to 0.22 mg/kg).
- Application of chlorpyrifos @ 250g ai/ ha at 150 and 175 days after planting in banana did not leave any residue of chlorpyrifos in fruits, blossom stem and in blossom bud, when analysed at the normal harvest stage of each part, indicating absolute safety of the schedule.
- The initial deposit of chlorpyrifos (0.05%) on fresh cardamom capsules was estimated as 32 ppm while that on dry capsules were 6.4 resulting in removal upto 80% of residues offering a processing factor of 0.20. The initial deposit of Lambda cyhalothrin (0.0025%) on fresh cardamom capsules were estimated as 2.20 mg/kg while that on dry capsules were 1.694 mg/kg resulting in removal upto 23.00 percent of residues offering a processing factor of 0.77
- The initial deposit of Chlorpyrifos(0.05%) on fresh pepper berries were estimated as 17.00 mg/kg while that on dry berries were 6.46 mg/kg resulting in removal upto 62.0 percent of residues offering a processing factor of 0.38. The initial deposit of Lambda cyhalothrin (0.0025%) on fresh pepper berries were estimated as 2 mg/kg while that on dry pepper berries were 1.14 mg/kg resulting in removal upto 43 % of residues offering a processing factor of 0.57
- No significant reduction in the population of fungi, bacteria and actinomycetes in red loam soil was observed up to 28th day, following soil application of Bifenthrin @ 50, 100, 200 and 400 g ai/ha .
- Among the five brands of cattle feed monitored for pesticide residues during October 2007, one was contaminated with methyl parathion and another with chlorpyrifos to the tune of 0.04 mg/kg and 0.008 mg/kg, respectively.

II. PG projects

1. Population dynamics and management of erythrina gall wasp, *Quadrastichus erythrina* Kim.
2. Pests of vanilla (*Vanilla planifolia* Andr.) and their management.
3. Population dynamics and management of aphids in vegetable ecosystem.
4. Impact of pesticides on abiotic and biotic components in rice ecosystem of Kuttanadu.
5. Bio-efficacy and safety evaluation of biorational insecticides for the management of sucking pest complex of chilli (*Capsicum annuum* L.)
6. Evaluation of entomopathogenic fungi for the management of major coleopteran pests and characterization of pesticide tolerant strains.
7. Management of major sucking pests in cowpea *Vigna unguiculata* (L.) Walp with entomopathogen and plant defense inducing rhizobacteria.

Plant Physiology

An experiment was conducted to overexpress cytokinin synthesizing *ipt* gene in *Bacopa monnieri* through *Agrobacterium tumefaciens* mediated transformation and to regenerate the transformed plants through tissue culture for analyzing the influence of overexpression of *ipt* gene on growth, physiology and secondary metabolite production. *Escherichia coli* strain JM 109 was transformed independently with pBI B33 *ipt* and pBI SAG12 *ipt*. Triparental mating was done using *Agrobacterium tumefaciens* strain EHA 105, pRK 2013 and recombinant *E.coli*. Plasmids were isolated from recombinant *E.coli* and recombinant *Agrobacterium* cells to confirm the successful transformation of constructs. Both have showed the insertion release when double digested with restriction enzymes *EcoRI* and *HindIII*. Pre incubated leaf explants of *Bacopa monnieri* were co-cultivated with the recombinant *Agrobacterium* for two days and transferred to regeneration medium containing MS supplemented with 2 mg l⁻¹ BA, 15 mg l⁻¹ kanamycin and 300 mg l⁻¹ cefotaxime. Putative transformants were regenerated from co-cultivated explants when placed on the selection medium containing 15 mg/L kanamycin and 300 mg/L cefotaxime. Uninfected explants failed to regenerate in presence of kanamycin. Rooting was not found in the MS medium devoid of growth regulators. Subculturing of shootlets was done in MS medium supplemented with 1 ppm GA and 1 ppm IAA. Hardening was done to the fully rooted plants and were kept in five replications for further analysis. DNA was isolated from both wild type and transformants. PCR amplification for *nptII* and *ipt* gene specific primers showed presence of gene in transformants but not in the wild type. From the selected transformants, RNA was isolated and RT-PCR was done. RT-PCR analysis confirmed the expression of *ipt* and *nptII* gene in all the transformants, while there was no expression in the wild type. Expression of constitutively expressed plant gene –actin was used as loading control. Southern hybridization of PCR amplified products gave the evidence for the presence of *ipt* gene only in transformants but not in wild type.

Physiological and biometric observations were performed on both transformants and wild type which served as control over the transformants. Plant height was more in transformants compared to the wild. Both root length and relative water content was more in wild compared to the transformants. Other parameters like number of branches and number of leaves chlorophyll, soluble protein, stomatal frequency etc. were higher in the transformants than in the wild. Cytokinin content was estimated using ELISA. There was a significant variation in cytokinin, iPA concentration between wild type and transformants. Transformants had higher cytokinin content than the wild type. The transformant with B33 promoter had more cytokinin content than transformant with SAG promoter. Bacoside, the major secondary metabolite of the plant was estimated by HPLC and its content between the wild type and transformants were found to be on par.

Molecular and Physiological Analyses of Banana clones:

The physiological analysis of the different Nendran clones revealed tremendous variation among the clones. The parameters like photosynthetic area, chlorophyll content, stomatal conductance, mesophyll efficiency and total soluble protein which have direct bearing upon higher photosynthetic efficiency were found to be higher in Quintal banana, the highest yielder. This clone also showed higher epicuticular wax content and sunken type of stomata, indicative of higher stress tolerance and better water use efficiency.

Screening for water stress tolerance in coconut through pollen selection -Water stress tolerant coconut seedlings were developed through pollen selection and selective fertilization.

1. Media for coconut pollen germination and the method of incubation of pollen grains for germination was standardized .

Research projects in progress

In the study on the bioremediation of inorganic contaminants of rice based wet land ecosystem of Kuttanad, Kerala the efficiencies of microorganisms *Trichoderma* sp. and *Pseudomonas* sp. in accumulating iron, sulphur and aluminium were evaluated. The results showed that between these two, *Trichoderma* sp is the most efficient

Studies on the utilization of rock dust as a nutrient source for coleus proved that the present recommended dose of inorganic fertilizer to the crop can be reduced to half if applied with rock dust @ 10 t ha⁻¹. Hundred per cent substitution of chemical fertilizer with rock dust @10 t ha⁻¹ and FYM 10 t ha⁻¹ can be recommended for coleus wherever both the inputs are locally available .

The results of the investigations on standardization of organic farming techniques in crops like Nendran banana, bhindi and cowpea brought to light that organic farming techniques improved the soil health for all these crops.

The following instruments were purchased during the period for the Central Instruments Laboratory utilizing the share for the department from the ICAR Development Grant 2007-08

Electronic Balance

Lap top Computer

Handy cam

U P S (5 KV_a)

Micro wave digester

High speed refrigerated centrifuge

P C based double beam UV-VIS-

Spectrophotometer

Electronic stabilizer

Precision weighing balance (Platform type)

Air conditioner (1.5 T Window type)

Project on Integrated farming

As part of the project , an integrated farming system model has been established as a teaching cum demonstration purpose. An area of three cents is utilized as pond with a duck shed size of 4 x 2 m over the pond. thirty ducks and 100 fish fingerlings were introduced into the system. Around the pond crops like banana tuber crops were planted. The duck dropping were utilized by the plankton in the pond and the planktons were used as feed by the duck and fish. Annual silting will benefit the crops by way of organic matter from the silt.

Establishment of Research Centre for green technologies and Sustainable Agriculture

As part of this project under RKVY scheme an area 1 ha was selected for developing into a model unit. Following activities were initiated.

1. Fencing of the area
2. Land development works including irrigation facilities
3. Strengthening of existing Laboratory
4. Installation of ancillary unit such as cow goat etc.

Extension programmes

Crop museum

The Department of Agronomy is maintaining a crop museum which serves as a centre of knowledge not only for the staff and students of the college but also for the general public. A large number of crops of south India are cultivated in the crop museum

Activities of revolving fund

Various products like jams, squashes, and fermented beverages were produced and sold during the period under report.

Agrifair – Karshikolsavam (2007)

Several products were prepared and exhibited at the stall of the Home Science department during the Karshikolsavam- Agrifair 2007. Two hundred bottles of grape wine were prepared from the revolving fund and were sold in the Karshikolsavam 2007. Innovative and traditional food products

were prepared and displayed. Therapeutic and functional foods were also exhibited. Audio visual aids depicting various aspects of nutrition were displayed in the walls of the stall. Food pyramid model along with the fresh foods were kept. Published books on diet and diseases were also exhibited during the exhibition.

Olericulture

All the staff members participated in the Karshikolsavam '07 held between 24th to 30th December, 2007 at Neyyattinkara Govt. Boys Higher Secondary School.

Dr. M. Abdul Vahab, Dr. 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 22-11-07 to 29-11-07.

Dr. M. Abdul Vahab also took class on lay out of a kitchen garden to VHSE students of Thiruvallam and Parassala on 24-11-2007.

Dr. M. Abdul Vahab, Dr. V.A. Celine and Dr. I. Sreelathakumary took classes on budding, grafting and layering respectively to a group of unemployed youth at Instructional Farm Vellayani from 4-10-07 to 10-10-07.

Dr. M. Abdul Vahab took class on vegetable cultivation to farmers of VFPCCK on 18-3-08

Dr. V.A. Celine handled class on varieties and cultivation practices of vegetables in connection with women empowerment programme on 5-2-08.

Pomology

Dr.C.S.Jayachandran Nair prepared and submitted a Project for development of the Orange and Vegetable Farm, Nelliampathy.

Dr.C.S.Jayachandran Nair participated in the Agroclinic conducted at Mundela, Nedumangad on 17-10-07.

Dr.C.S.Jayachandran Nair and Dr. V.L. Sheela participated in the Karshikotsavam 2007 organized by the College of Agriculture, Vellayani from 27-12-07 to 31-12-07 at Neyyattinkara.

Dr. V.L. Sheela under took Cluster training classes for VHSE students

Dr Sabina George T. and Dr. V.L. Sheela under took classes as resource persons in two Vocational Training programmes on Plant propagation, Nursery techniques and Landscaping organized by the Training Service Scheme for educated unemployed youth of Thiruvananthapuram district from 03-10-07 to 30-01-8 and 22-02-08 to 20-03-08.

Dr.V.L.Sheela offered a guest lecture on commercial floriculture for the Botany students of Karamana NSS College

Dr.V.L.Sheela handled a training class on commercial floriculture for farmers at Extension Training Centre, Kottarakara

Farm advisory services(Pomology)

In person	Over telephone	Through letters
5	5	--

Dr. V.K..Girija is associated with the project Bioremediation of inorganic contaminants of rice based wetland eco-systems of Kuttanad for identification of microbes having capacity for biosorption of heavy metals Dr. V.K..Girija and Dr. C. Gokulapalan Co-edited the publication entitled Janakiya

Susthira Nelkrishi (2007)based on the results of the sustainable rice cultivation practices carried out during 2007-2008 at the Kalatharackal ela at Neyyatinkara, .

Scientists of the department visited farmer's field to tackle the following problems.

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

Plant Breeding & Genetics(2007-08)

Dr.K.M.Abdul Khader, Professor attended the XVI International Plant Protection Congress held between 15-18 October 2007 at Scottish Exhibition and Conference Centre, Glasgow, Scotland, UK and presented a research Paper.

The Green Orchid Developed by Dr. C. Lekha Rani, Associate Professor was covered by reporters from the Women's bimonthly – 'Snehitha'.

The Staff of the Plant Breeding department provided technical guidance to the Bala Shastra Congress conducted during May 2007. Dr.Babu Mathew acted as resource person for conducting training programmes at RATT, Trivandrum., Jilla Panchayath, NGO Thannel, and Kerala State Film Development Corporation.

Dr. Manju. P, Professor and Head functioned as Project Leader of Seed Production Village in Karakulam Panchayat of Trivandrum District from November 2007 to March 2008. Breeder seeds of five vegetable varieties were supplied to the farmers and technical support for the production of seeds was provided.

Agronomy

Dr.Prathapan and Dr.Sukumari were associated with GALASA Model programme in Trivandrum dist.

Dr.M.Meera bai participated in the discussion of food security and Empowerment held in connection with AIR at Neyyattinkara organized by AIR & NITS

Six different types of training programmes were carried out for the benefit of women entrepreneurs and housewives.

Technology for processing of Banana based weaning food was transferred to "Navania Industries" Malayinkeezh, Trivandrum and the above enterprise is progressing successfully.

Dr. Manju. P, Professor and Head functioned as Project Leader of Seed Production Village in Karakulam Panchayat of Trivandrum District from November 2007 to March 2008. Breeder seeds of five vegetable varieties were supplied to the farmers and technical support for the production of seeds was provided.

Farm advisory service was regularly rendered by the scientists during the period.

Dr. Sansamma George, Dr. Annamma George and Dr. Prathapan visited the wetlands in Kalliyoor Panchayat to assess the aquatic weed problem of *Cyperus pangori* (Payakora). They have prepared a project for its control and submitted it for Jilla Panchayat funding

Dr. K. Prathapan, Associate Professor attended discussion with the Director of Institute of Land Management on Water harvesting on 4th August,07. He has also attended a discussion on Course Curriculum on Project formulation, Evaluation and impact analysis with DGM, NABARD on 9th August.

Dr. Babu Mathew is acting as Agricultural consultant for Film Development Corporation and has supervised the turf renovation programme. He is rendering similar service to Kerala Sports Council also.

Training conducted

Dr. K. Prathapan, Associate Professor, conducted a training class on weed and water management in SRI practice for the rice farmers of Nallanad on 10th August, 07 and a class on Organic farming for the farmers and Kudumbasree members of Kudappanakunnu Krishibhavan on 17th August,07.

Dr. O.Kumari Swadija Professor is involved in the conduct of series of training programmes on terrace cultivation of vegetables among the residents of Thiruvananthapuram districts.

Dr . O. Kumari Swadija Professor conducted an awareness programme on the economic cultivation of arrow root at Pullampara Krishibhavan area on 22.1.08

Dr. S. Lekshmi Professor conducted an awareness programme on the homestead based fodder production systems for economic milk production in at Malayankeezhu Panchayat area on 26.2.08

Scientists of the Department participated in the Karshikolsavam 2007 under the various committees such as judging committee, competition and prize distribution committee, souveneir committee, Transport committee and Technical committee.

Department of Entomology

Scientists of the department visited farmers field to tackle the following problems.

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

Dr. T. Nalinakumari and Dr. C. Nandakumar served as members of the participatory action programme "GALASA' for sustainable rice farming" launched in Kollayil panchayat of Thiruvananthapuram District and successfully completed the programme in 19 ha area without application of any insecticide with an yield of 7 ton/ha. The details of the programme was presented in the Kerala Environment Congress 2007 organised by Centre for Environment Development and published as a book etitled "Janakeeya Susthira Nelkrishi" by the Thiruvananthapuram District Panchayath.

Taken a class on modern techniques in rice cultivation to the farmers of Navaikulam Panchayath.

Dr. K. Sudharama prepared question papers in Urban Entomology for TNAU.

Department of Soil Science and Agrl. Chemistry

Dr.N.Saifudeen served as member in the organizing committee of the 20th "Kerala Science Congress" held at Trivandrum from 28.1.2008 to 31.1.2008 by the Kerala State Council for Science Technology and Environment. Dr.M.Subramonia Iyer acted as chairman of the technical session on Agriculture, Fisheries and Veterinary Sciences on in Sciece Congress.

Dr.N.Saifudeen also served as member in the screening committee of the Kerala State Land Use Board for selecting the best Panchayath.

Dr. Sam T.Kurumthottical, Dr.M.Subramonia Iyer and Dr. Sumam George accompanieid the 2005 admission B.Sc (Ag) students on their South India Study tour (Ist phase from 20.5.2007 to 25.5.2007 and 2nd phase from 23.7.2007 to 7.8.2007)

Dr.M.Subramonia Iyer acted as faculty coordinator of the District Bala Sasthra Congress Organized by the Kerala Sasthra Sahithya Parishat at College of Agriculture, Vellayani on 12.5.2007 and 13.5.2007. He was assisted by Dr.C.R. Sudharmaidevi and research associates of the department.

Dr. Sam T.Kurumthottical continued to act as a member of the Task Force for the project "Macromanagement Scheme in Agriculture", a joint venture of the Dept. of Agriculture, Kerala and the Govt. of India for Kollam and Pathanamthitta.

The following teachers continued discharging duties as project co-ordinators of the following research groups

- | | | |
|-------------------------|---|-----------------------------|
| Dr.N.Saifudeen | - | Natural resource management |
| Dr.Sumam Susan Varghese | - | Soils and Agronomy |
| Dr. K.Ushakumari | - | Organic farming |

Dr.K.Ushakumari and Dr.Sumam Susan Varghese attended the occasional workshops convened at Directorate of Research, Kerala Agricultural University, Vellanikkara for evolving the adhoc package of practices on organic farming.

All staff of the department both teachers and ministerial participated in the organization of Karshikolsavam 2007, the Agricultural Fair organized by Kerala Agricultural University at Neyyattinkara from 23rd to 30th December 2007.

Radio talks/TV programmes/Audio-video cassettes (Department wise)

(a) Department of Soil Science and Agricultural Chemistry

Dr. N. Subramany Iyer	Live phone in programme	28.3.08
Dr. N. Saifudeen	Question answer session in A IR	January 2008
Dr. K. Ushakumari	Question answer session in A IR	Feb 2008
9.2 Department of Plant Breeding & Genetics		
Question answer in Karshakavedi	20.8.2007	Dr. P. Manju, Associate Professor and Head
(b) Agronomy <i>Teracile kaaykari krishi-Azhakinum</i> <i>Aarogyathinum</i> -Talk in Gramakeralam <i>Bhakshya</i> <i>Swayamparyapthathayum veetuvapallile krishiyum</i> -interview in Vayalum Veedum programme Question answer session AIR	June 2007 August 2007	Dr.Kumari.O.Swadija Dr. M. Meera Bai

(c) Department of Plant Pathology

Title	Name	Date
Disease of ginger and turmeric	Dr. P. Santhakumari	06.07.2007 (TV Programme)
Cardamom diseases	"	12.07.2007 (TV)
Biological control of diseases	"	9.8.2007 (TV)
Home made organic plant protection chemicals	"	09.10.2007 (TV)
Integrated disease management in vegetables	"	14.11.2007 (TV)
Disease of rubber	"	11.02.2008 (TV)
Diseases of betelvine	"	12.02.2008 (TV)
Coconut diseases	"	06.12.2007 (TV)

(d) Department of Agricultural Extension

Organic farming and bio dynamic fertilizer application	Dr. A.K. Sherief	27.08.07 (AIR)
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(e) Department of Agricultural Entomology

(a) Radio Talks

Name of Scientist	Topic	Date
S. Devanesan	Live phone-in programme on beekeeping	16-03-2007
S. Devanesan	Live phone-in programme on beekeeping	28-05-2007
S. Devanesan	Question and answer session	17-06-2007
S. Devanesan	Thenechavalarthalilae karma padhathkal	08-01-2008

(b). TV Programmes

Name of Scientist	Topic	Channel	Date
Dr. T. Nalinakumari	Management of storage pest	Kairali. People	27-07-2007
Dr. S. Devanesan	Live Phone-in-Programme	Kairali. People	28-05-2007
Dr. S. Devanesan	Live Phone-in-Programme	Kairali. People	12-06-2007.
Dr. S. Devanesan	Live Phone-in-Programme	Kairali. People	15-06-2007
Dr. S. Devanesan	Live-Phone-in - Programme on apiculture	Krishi darshan	Dec. 2007
Dr. S. Devanesan	Programme on Theneechavalathal	Krishi darshan	14-01-2008
Dr. S. Devanesan	Live-Phone-in-Programme on apiculture	Krishi darshan	15-02-2008
Dr. R. Krishnakumar	Sericulture Silk worm rearing	Kairali. People	13-11-2007 20.11.2007
Dr. C. Nandakumar	IPM 'in banana'	Kairali. People	

(f) Department of Olericulture

Phone in programme on Kitchen gardening	Dr. M. Abdul vahab (TV programme on 31.10.2007)
Question answers programme	Dr. M. Abdul vahab (AIR programme on 24.12.2007)

(g) Department of Home Science**(a) Radio talks**

Title	Scientist responsible	Date
Drumstick leaves Nature's gift	Dr. B. Prasannakumari	May'07
Importance of green leafy vegetables and salad	Dr. Suma Divakar	7/9/07

(h) Department of Agricultural Microbiology**Participation in Radio/TV/Krishidarshan programmes**

Sl.No	Date	Details of the Activities	Name	Remarks
1.	22.3.08	Krishidarshan programmes	Dr. P.Sivaprasad	
2.	10.07.07	Biocontrol agent for disease management	Dr. P. Sivaprasad	

List of publications**Pathology****Articles published****(a) Scientific**

Sl. No.	Title	Journal	Name of the author	Other details
1.	Biological control of Fusarium wilt caused by <i>Fusarium oxysporum</i> in Brinjal	Proceedings of International Symposium on Advances in Food Biotechnology and Nutrition – B10 Spectrum 2007	Dr. K.K. Sulochana R. Reshma V.R. Renjini	Organized by School of Biosciences Marathanacious College for Advanced Studies, Thiruvalla from 30 th November to December 1 st , 2007.

2.	Influence of biocontrol agents on the incidence of Fusarium wilt and growth improvement in tomato	Proceedings of International Symposium on Advances in Food Biotechnology and Nutrition – B10 Spectrum 2007	C.R. Rini Dr. K.K. Sulochana	As above
3.	Studies on the inhibitory character of pseudomonas against Rhizoctonia solani and <i>F. solani</i> in chilli	Proceedings of International Symposium on Advances in Food Biotechnology and Nutrition – B10 Spectrum 2007	C.R. Rini Dr. K.K. Sulochana	As above
4.	Use of fungal pathogens of <i>Chromolaena</i> (<i>C. odorata</i> L.) for biological control	Proceedings of XVI International Plant Protection Congress 2007 BCPC	Dr. A. Naseema N.S. Saritha A. Safeena Dr. K.K. Sulochana	From 17 to 18, October, 2007. Scottish exhibition and conference centre Glasgow, Scotland, UK.
5.	Mushroom a rich source of food and nutrition	Proceedings of International Symposium on Advances in Food Biotechnology and Nutrition – B10 Spectrum 2007	C.R. Rini Dr. K.K. Sulochana	Organized by School of Bioscience Mar Athanasios College for Advanced Studies, Thiruvalla from 30 th November to December 1 st , 2007.
6.	Usefulness of Trichoderma and <i>Pseudomonas</i> against <i>R. solani</i> and <i>F. oxysporum</i> infecting tomato	Journal of Tropical Agriculture	C.R. Rini Dr. K.K. Sulochana	Vol. 45 June-December, 2007 p. 21-28
7.	Substrate evaluation for multiplication of <i>Trichoderma</i>	Journal of Tropical Agriculture	C.R. Rini Dr. K.K. Sulochana	Vol.45 June-December 2007 p. 58-60
8.	Use of fungal pathogens of <i>Chromolaena</i> oris biological control	Proceedings of International Symposium on Advances in Food Biotechnology and Nutrition – B10 Spectrum 2007	Dr. K.K. Sulochana R. Reshma V.R. Renjini	Organized by School of Biosciences Mar Athanasios College for Advanced Studies, Thiruvalla from 30 th November to December 1 st , 2007.

9.	Biological control of water hyacinth with a myco,herbicide	Proceedings of XVI International Plant Protection Congress 2007 BCPC	Dr. A. Naseema Ancy .M. Salini. R. Praveena	From 17 to 18, October, 2007. Scohsa exhibition and conference centre Glasgow, Scotland, UK.
10.	Epidemiology of grey blight of coconut (Cocos nucifera L.)	Indian Coconut Journal	S. Subramonian Dr. P. Santhakumari	Vol. 38 No. 2 – June 2007 p. 10-12

b) Leaflets/Booklet/Brochures(Pathology)

Sl. No.	Title	Magazine/ News Paper	Author	Other details
1.	Palkoon	Leaflet	Dr. Luludas	FIB
2.	Kothiyoorum koon vibhavangal	-do-	Dr. Luludas	
3.	Anthurium royaniyanthrana margangal	Leaflet	Dr. C.A. Mary	FIB

c) Books(Pathology)

Sl. No.	Title	Magazine/ News Paper	Author	Other details
1.	Plant protection in anthurium and orchids	Poonam publishers, New Delhi	Dr. P. Santhakumari Dr. C.A. Mary	April 2007
2.	Sasyasamrakshanam anthurium orchidukalil	Kerala Language Institute, Tvm.	Dr. C.A.Mary Dr. P. Santhakumari	March 2007

Olericulture

2. Articles published

a) Scientific

Sl. No.	Title	Journal /Proc.	Name of the author	Other details
1.	Characterization and evaluation of vegetable amaranth for high yield, quality and resistance to <i>Rhizoctonia solani</i> .	Acta Horticulturae - 2007	Celine,V.A., Sujata Sathy Shankaran, S. Seema., S. N. Deepa, I. Sreelathakumary and M. Abdul Vahab	No. 752: 447 - 452
2.	Divergence studies in ashgourd (<i>Benincasa hispida</i> (Thunb.) Cogn.)	Proc. 20th Kerala Science Congress – 2008	Resmi, J. and I. Sreelathakumary.	174 -177

b) Popular Articles/ Other publications

Sl. No.	Title	Magazine/ News Paper	Author	Other details
1.	Components and uses of chilli	<i>Krishianganam</i> -Dec 2007	Dr.I. Sreelathakumary	13(1): 13-14
2.	Vegetable seed production and processing in cucurbitaceous vegetables	Kerala Karshakan 2007.	Dr.I. Sreelathakumary	53 (2) : 25-26

Pomology

Books: 'Flowers for trade' published by New India Publishing Agency by Dr.V.L.Sheela and edited by Dr.K.V.Peter

-Authored

Dept.of Physiology

- ✓ R.V.Manju, K.B.Soni, Heera.K.S., P.V.Bijila, Viji, M.M., Manju, R.V. and Roy Stephen, Vighnesha, Krishnaprasad B.T. & Viji, M.M., 2007. Role of stomatal characteristics and mesophyll capacity on yield variation in Nendran clones. *International Journal of Tropical Agriculture*. 25 (3): 402-405.

Animal Husbandry

Sl. No.	Title	Journal	Name of the author
1.	Perception of opportunities and threats by the members of women self help groups in goat farming	Journal of Dairying, Foods and Home Sciences pp183,Vol.26,No.3/4,2007	V.Kavitha and R.S.Jiji

Department of Soil Science & Agricultural Chemistry

Scenario of micro and secondary nutrient deficiencies in Tamil Nadu Kerala and Pondicherry and amelioration practices for increasing crop production and ensuring food security.V.Velu, Usha Mathew and A.Baskar-Invited paper presented in the national seminar on Micro and secondary nutrients for balanced fertilization and food security held at Anand Agrl.University, Anand on March 11-12, 2008 organised by IISS, Bhopal.

Mathew,J and Thampatti K.C.M (2007) >Effect of Phospho- gypsum and lime on nutrient availability and performance of cow pea in laterite soils.J urnal of Indian Society of Costal Agricultural Research 25 : 64-67

Mathew,J and Thampatti K.C.M (2007) Response of cowpea to phospho-gypsum application Legume Research 30: 271-274

Mathew,J and Thampatti K.C.M (2007). Suitability of phospho-gypsum as an a ameliorant for soil acidity in laterite soils. Journal of the Indian Society of Soil Science, 55: 313-317

Department of Home Science

Title	Journal	Period	Name of Student
Excellence of coconut oil	Aksharasree of SRC	Dec'07	Dr. Suma Divakar
Value education	'Teen club' of Child Development centre, Medical college	Jan'07	Dr. M. Rajani
"Akasha Kiranangal"	Aksharasree Students responsible	Jan'07	Dr. M. Rajani
"Copra Palatharam"	Kerala karshakan	Feb'07	Dr. Syamakumari

Department of Plant Breeding & Genetics(2007-08)

Scientific papers

1. Jayalekshmy.V.G., Priya Lawrence and Dhanya Jayaseelan – "An efficient and modified protocol for plant DNA extraction from Cashew (*Anacardium occidentale* L.) for random amplified polymorphic DNA (RAPD) analysis" Indian Science Congress 2007 December.

2. Reshmi Manohar and Jayalekshmy. V.G. Standardization of Inter Simple Sequence Repeats (ISSR) technique in rice (*Oryza sativa* L). Indian Science Congress 2007 December.
3. K.M. Abdul Khader, K. Anandhi, K. Umamaheshwaran and Vijayaraghava Kumar 2007. Response of bird pepper (*Capsicum frutescens* L) genotypes to leaf curl virus. In the proceedings of the XVI International Plant Protection Congress 2007 held at SECC, Glasgow, Scotland, UK from 15 to 18 October 2007 pp. 714-715.
4. P. Sindhumole and P. Manju. 2008. Genetic architecture of resistance to diseases in Okara (*Abelmoschus esculentus* (L.) Moench). In the proceedings of the 20th Kerala Science Congress 29-31 Jan., Thiruvananthapuram pp. 169-171.
5. P. Sindhumole and P. Manju. 2008. Association of okra yellow vein mosaic incidence with vector population. 20th Kerala Science Congress, 29-31 Jan., Thiruvananthapuram pp. 208-210.
6. D. Wilson and Nayar. N.K. (2007). Effect of gamma rays on *in vitro* rooting of micro shoots of rose cv. Folklore. Recent trends in Horticultural Biotechnology pp-375-378 Ed. R. Keshavachandran et al., New India Publishing Agency, New Delhi, India.
7. D. Wilson, Jiju, J.K.K. and Prabu. R (2008) Pooled analysis of selected clones of ivy gourd. In the proceedings of the 20th Kerala Science Congress pp. 238-240.
8. Anandhi. K. and Sunny K Oommen (2007). Variability and heritability of yield and related characters in cluster bean (*Cyamopsis tetragnoloba* (L.) Taub.) Legume Res. 30 (4): 297-298.
9. Anandhi. K. and Sunny K Oommen (2008). Genetic divergence in clusterbean. In proceedings of 20th Kerala Science Congress, 29-31 January 2008, Thiruvananthapuram, pp. 193-195.
10. G. Seeja, D. Chandramony and P. Saraswathi. Study of heterosis for yield & its component traits in tomato (*Lycopersicon esculentum* Mill). Research on Crops – Vol.8 No.1 April 2007.

(b) Popular Articles: 3 Nos.

Agri.Extension

(a) Scientific Articles

Anilkumar.A, K.Harikrishnan Nair and A.K.Sherief 2007 Utilization of enriched coir-pith-vermicompost in organic mediculture. Plant archives:17(2):617-620

Sakeer Husain.A., 2007 A scale to measure the worker's participation in management. Journal of Extension and Research

Swadija .O.K. and Padmanabhan .V.B. 2007 - Vermicompost in fertility enhancement of Kerala soils - Proceedings of the National Workshop on fertility evaluation for soil health enhancement pp.227-238

Sherief,A.K. – 2007 – Extent of adaptionm of organic farming techniques- Gandhigram University

Popular Articles

Title	Publications	Author
Organic farming Calendar	Karshakan	Dr. A.K. Sherief
'Veettuvalappilum Noorumeni'	Kerala Karshakan- October-2007	Dr. V.B. Padmanabhan Dr. O. Kumari Swadija

Library

Number of books added during April 2007-March 2008	371
Number of Indian Journals subscribed during April 2007 – March 2008	48
Number of Professional staff members working in the library	5
Working time of the library	8 am.to 5 pm.without break

Important visitors

Dr. R.P.Tewari, Director, NRCM, Solon, Himachal Pradesh visited Plant Pathology Department on 18-3-08.

Plant Breeding & Genetics

Dr. S.T. Mercy, Professor (Rtd.), Department of Plant Breeding & Genetics, College of Agriculture, Vellayani visited the Department in connection with the qualifying viva-voce examination of Kum.K. Anandhi (2006-21-108) on 05-02-2008.

Dr. Kavitha.K. Mydin, Senior Scientist (Crop Improvement) RRII, Kottayam visited the Department on 14.12.2007 as External Examiner for Ph.D Final viva-voce exam. of Sri. A. Haridass.

Dr. S.A.Faruqui, Project Co-ordinator, AICRP on Forage Crops visited the Vellayani Centre on 25th and 26th March, 2008.

Dept.of Plant Physiology

Dr. Sheshayee, Associate Professor , UAS, Bangalore

Dr.Nataraja Karaba, Assistant Professor, UAS, Bangalore

Dr. Purushothama, Senior Scientist, RGCB, Thiruvananthapuram

Dept.of Entomology

Dr. R.K. Lakra, Project Co-ordinator, AICRP on Honeybees and Pollinators.

Sri. V.P. Kunjappan, Joint Rubber Production Commissioner, Rubber Board.

Mr. Jom & Lyddia Geddes, Essex Beekeepers Association, U.K.

Mrs. Mary Canning, Cambridge, USA.

Details of Farm products

Animal Husbandry

(a) Cattle farm

i. Milk produced	-	32,665 litres
ii. Income from sale of milk	-	Rs.5,22640/-
iii. Dung produced	-	240 tonnes
iv. Income from sale of dung	-	Rs.1,20000
v. Income from sale of gunny bags	-	Rs.3172/-
vi. Income from sale of culled animals	-	Rs.46,702/-

(b) Poultry farm

i. Eggs produced	-	18619
ii. Income from sale of eggs	-	Rs.43,832/-
iii. Culled birds	-	252 (389.3 kg)
iv. Income from sale of culled birds	-	Rs.11,679/-
v. Manure produced	-	6500 kg
vi. Income from sale of manure	-	Rs.6500/-

(c) Pig farm

i. Culled animals	-	2 (adult)
ii. Income from sale of culled animals	-	Rs.4025/-
iii. Piglets sold	-	33
iv. Income from sale of piglets	-	Rs.28,730/-

(d) Goat farm

Goat farm comprising of two Malabari goats has been established recently.

Olericulture

Details of sale of seeds/planting materials/biocontrol agents etc.

Details of sales of planting material

1. Truthfully Labelled Vegetable seeds - 15 kg
2. Breeder seeds of released varieties viz; Vellayani Athulya, Vellayani Jyothika and Vellayani Vijay - 1 kg

Other activities

Department of Home Science

1. Dr. Mary Ukkuru and PG students attended the 'coconut festival' organized by the coconut development board in May'07. Ms. Lekshmi, PG student won the IInd prize for the cooking contest.
2. Smt. Rari John functioned as judge in the flower and fruit show organized by Agri horticultural Society.
3. Dr. S. Chellammal functioned as judge in the Youth festival organized by Rotary club of Trivandrum
4. Smt. Rari John functioned as External examiner for BSC course (IV) Semester for 'Costume and fashion designing' offered by Calicut University, in November'07 and February'08
5. Smt. Soffi Cherian was functioning as Asst warden of Ladies Hostel, College of Agriculture, Vellayani
6. All the staff members participated actively in various capacities at the Karshikolsavam'07 held in December'07
7. Dr. P. V. Nandini, functioned as external examiner for practical and viva voice examination for MSc Nutrition and Dietetics students of Calicut University on 14/11/07 and BSc (Ag) students of UAS Mandya in Dec'07
8. Dr. Syama Kumari, was involved in the competitions in connection with World Aids day. Gandhi Jayanthi was also celebrated. Blood donation camp was also arranged for students. In January'08 camps on eye testing and Diabetic reduction / prevention were held. A quiz competition and date were organized on 'Science day' (28/2/08)
9. Dr. Syama Kumari was the convener of the organizing committee for the National level training on 'Gender concerns in Agriculture' in Dec'07.
10. Dr. Beela G. K. presented a scientific talk on 'Agnitotra for Agriculture and Human development' on 23/2/08, CoA, Vellayani
11. Dr. Chellammal, participated in the symposium cum training programme for developing capacity building for the scientists for carrying out basic, clinical and operational research in the field of Nutrition from 9th to 12th March 2008 at Ujjaini, organized by ICMR. She chaired 2 sessions in the symposium
12. Dr. Syama Kumari, Dr. Suma Divakar & Dr. Beela. G. K attended the National Seminar organized by Department of Demography, Population Research Centre, Kerala University from 27/3/08 to 29/3/08. They presented the papers, 'Dietary profile and nutritional status of adolescents', 'Nutritional Status of women in Cashew industry' and 'Maternal prenatal stress on gestation period and neonatal reflexes' respectively
13. Dr. Mary Ukkuru and Dr. S. Chellammal participated in the workshop for framing MSc Course syllabus on Nutrition and Dietetics of Kerala University
14. Dr. B Prasanna Kumari, handled 2 sessions for AOs and farmers on 6/3/08 and 7/3/08 at Agmark lab

Department of Animal Husbandry

(a) Academic functions

Sl. No	Date	Details of the Activities
1.	12.09.07	Set question papers – Livestock and Poultry Management
2.		Revision of syllabi for UG and PG courses
3.	15/02/08 to 28/02/08	Imparting internship training to the students from COVAS, Mannuthy and Pookot.
4.	27/12/07 to 21/01/08	Imparting training in farm management to the students from COVAS, Mannuthy and Pookot.

(b). Other key functions

(e) Earn While You Learn Programme on broiler production

Project No. and Duration	No. of students	Amount spent (Rs)	Total Income (Rs)	Profit divided among students (Rs)
I 20/1/07 to 5/3/07	7	14750	26965	12215
II 18/9/07 to 2/11/07	8	14750	23520	8770
III 23/1/08 to 12/2/08	9	14750	24820	10070

(c) Clinical laboratory

Samples examined

i. Milk	-	68
ii. Urine	-	75
iii. Blood	-	8
iv. Faecal sample	-	15
v. Culture and sensitivity	-	18

(f) Veterinary Hospital

Cases attended	-	340
PD	-	80

Agronomy

1. Dr. V.L. Geethakumari is acting as member of the technical cell of the college
2. Dr. P. Babu Mathew is acting as in charge of Vehicles in the Institution
3. The department is maintaining the Crop museum which is of much benefit to the students and the public
4. Dr. R. Pushpakumari is serving as project coordinator (Tuber crops)
5. Dr. S. Lekshmi is serving as project coordinator (forage crops)
6. Dr. V. Jayakrishakumar is entrusted with compilation of annual report 2007- 08 of the college

Olericulture

Dr. M. Abdul vahab continued as project coordinator (vegetables)

Finance

Head	Expenditure	Receipts
Non Plan	6,95,72,603	21,84,565
Plan	80,36,516	0
ICAR	0	0
Other EAPs	1,26,076	0
Revolving Fund	0	0

COLLEGE OF HORTICULTURE, VELLANIKKARA

Name of Head of Station : Dr.P.K.Rajeevan

Deputation of Scientists for Seminars/ Workshops/ Symposia

Various Scientists were deputed for different Seminars/ Workshops/ Symposia during the year.

Academic programmes

Intake capacity & No. of students enrolled during 2007 – 08			Outturn of students during 2007 – 2008		
	Male	Female		Male	Female
UG	9	44	UG	11	38
<u>PG (discipline wise)</u>			<u>PG</u>		
M.Sc.(Stat.)	Nil	Nil	M.Sc.(Stat.)	Nil	Nil
M.Sc.(H.Sc.)	Nil	4	M.Sc.(H.Sc.)	Nil	1
M.Sc.(Hort.)	3	2	M.Sc.(Hort.)	3	5
M.Sc.(Ag.)	2	7	M.Sc.(Ag.)	Nil	21
<u>PhD (discipline wise)</u>			<u>PhD</u>		
H.Sc.					
Ag.	Nil	1	Ag.	1	5
Pl.Breed.	1	Nil	Ent.		
Ent.			Pl.Breed.		
Path.			Path.		
Hort.					

Study tours

All India Study tour was conducted for 2004 batch students for 21 days from 4-11-07 to 24-11-07.

The teachers accompanied were: Dr.K.Ajith Kumar, Dr. Arularasan, Dr.K.P. Prameela, Dr.B.Suma

The team covered important places like Gangtok, Darjeeling, New Delhi, Dehradun, Kalka, Simla, Manali, Ludhiana and Mathura.

South India Study tour was conducted for 2005 batch students as from 20-8-07 to 13-9-07

The teachers accompanied were: Dr.Jim Thomas, Dr. Nandini K., Dr.Prasanna K.P.

The team covered important places like Moncompu, Kayamkulam, Trivandrum, Kanyakumari, Kumily, Mattupetti, Rajamalai, Ambalavayal, Pilicode, Panniyoor, Kasaragod, Bijapur, Hyderabad, Mysore, Bangalore, Goa, Coorg etc.

Other activities

Students Union activities

The Students' Union election was held on 25th December 2006. Formal inauguration of the Union 2006-07 was on 17th of January 2007. The function was presided over by Avinash D., President of the Students' Union. The Secretary of the Students' Union extended the vote of thanks Shri. Anandapathmanabhan, famous Veena Player, inaugurated the Union and Shri. Priyanandan, famous movie director based in Thrissur, inaugurated the Arts Club.

Arts Club

The Arts Club functioned under the leadership of Mr. Arun Babu as Secretary and Dr. P. Sureshkumar as advisor. Its activities began with the film fest, CELLULOID- 2007, conducted on 17th, 18th and 19th of May 2007 at the Central Auditorium. Movies screened during the festival were of both artistic and cultural significance, entertaining.

The inter-class arts fest, Noopura-2007 was conducted from 17th to 28th of July. Sopanam 2005 emerged as the winners and Pegasus 2004 as the runners-up. S. Arun was awarded Kalaprabha and Anuja A.R., Kalathilakam. Arun E.K. and Ahmed Shahab S. were judged best actors.

Magazine Club

Arun Paul and Dr. V.S. Sujatha headed the magazine club and the Editorial Forum. The club conducted the inter-class literary contest from 16th to 19th of July 2007 in association with Noopura 2007. The magazine club also released a 'little magazine', *Kalika*.

Planning Forum

The Planning Forum started its activities, under the able leadership of S. Arun, Secretary, with a talk, "Making a first impression" by Pearly Jose, a personality trainer working with Junior Chambers (India). T. Unnikrishnan, MSc (Agri. Statistics) student of the college was felicitated for having found a conclusive proof to the Fermat's Last Theorem, for which he was personally, congratulated by H.E. the President of India, Dr. APJ Abdul Kalam. He delivered a lecture on the subject and threw light on the number theoretical approach to solve mathematical problems. The movie 'Water' by Deepa Mehta (an Oscar nominee for foreign language film category) was screened in association with Chetana Media Institute, Thrissur; Lectures on contemporary topics viz., 'Eugenics, *Survival of the Fittest or Unfittest?*' by Dr. P.J. Joy, Retd. Head Entomology, RARS Kumarakom; '*Meditation techniques and seeing one's inner self*' by Shri. P.J. Jose; '*Status of women in agriculture*' by Dr. P.S. Geethakutty, presently Joint Director at NIRD, Hyderabad; and, '*The Shrinking Universe*' by Prof. P. Gangadharan. Some talks were succeeded by screening of documentaries on relevant issues.

The Planning Forum also conducted the inter-university fest- *Cybele* with the central theme as 'More Crop per Drop' from 28th to 30th of May 2007. Quiz contest, essay-writing competition, poster-making competition, debate, collage-making were conducted as a part of *Cybele*. A movie was screened and a talk on 'Adolescence behavior re-engineering' by Dr. A. Sukumaran, Professor, CCBM, Vellanikkara was delivered. An orientation class for MBA aspirants was conducted by Dr. Joseph John from T.I.M.E., Thrissur on 02-08-2007.

Quiz Club

Headed by Vishnu R., Secretary, a quiz competition was conducted by the club in association with Planning Forum in course of *Cybele*. Justin George, Sarath Chandran and Rijo P. George won the 1st prize in the South Indian Agri-fest quiz competition. Sarath Chandran, Asha Eapen, Ashitha S.G. and Vinay B. came 2nd in the inter-university agricultural fest. S. Arun and Rijo P. George came 1st in the inter college quiz competition for Sr. Philomina rolling trophy. They also participated in the All Kerala Inter-college at St. Thomas College, Thrissur and bagged 2nd position.

Social Service League

The league was led by Sarah John, as the Secretary and Dr. D. Girija as the advisor. It's 1st programme was setting up a model for children's park with Dr. PK Rajeevan. There was also a talk on personality development by Manu Joy Mathew from Agasthya Bio-farm Inida Ltd. On the 7th of August 2007 preventive homeopathic medicine against Chikun-Gunya was distributed in the college.

Sports Club

Our college team participated in the inter college sports competition and emerged overall champions with the girls team winning 1st for basketball and volleyball. Inter-class volleyball, badminton, football competitions were also held. The inter-class athletic meet is to be conducted soon.

Other Activities

The Students' Union, besides the club activities also conducted a host of other programmes, *Onam* celebration (*Aavani-2006*), Crib competition, Fresher's Day, etc. to name a few.

Sopanam 2005 was declared 1st in the pookalm competition, Pegasus 2004, 2nd and Orion 2006, 3rd. The send-off for Sparkles 2003, *Ruksat*, was an emotional moment where teachers and students expressed their feelings for the out-going batch. The to-be graduates also spoke about their experiences.

PLACEMENT CELL

Officer i/c: Dr. N.K.Parameswaran, Associate Professor

The Placement Cell, served as a providing the latest information on employment, higher education in the field of Agriculture as well as in management studies. In collaboration with the 'TIME' management institute based at Thrissur, Placement Cell organized an interaction session availing the services of the faculty of the institute during May 2007.

Employment announcements and notification from different firms were brought to the prompt notice of students. A walk-in-interview was arranged for AHADS-Attappady Hill Area Development Society on 19/12/2007 and two persons were selected during the process as Technical Consultants. Facilitated in arranging telephonic interviews with the passed out graduates for the recruitment to the posts of Assistant Managers in Cochin Malabar Plantations Private Limited, Cochin; Marketing Executives in Mangalore Chemicals and Fertilizers Private Limited etc.

Extra – curricular activities

Sports and games

- (1) Conducted a coaching camp for Basket ball and Volley ball from 26/1/08 to 5/2/08. Forty students attended.
- (2) All India Inter University Sports and Games.

Devi Prasad represented the KAU in Cricket in the South Zone Inter Varsity Tournament.

NSS activities

Programme officers: Dr. P.R. Suresh, Associate Professor and Dr. A. Prema, Assistant Professor

There are two NSS units with a total strength of 196 volunteers, out of which 163 are female and 33 are male functioning in this college. As part of the tree-planting programme of the State Government, the volunteers planted saplings of 250 avenue trees and ornamental plants during August. Subsequently manuring and upkeep of the plants were done. Independence Day was celebrated at the University and campus cleaning activities were done. A farmer's day was organized on Chingam 1. When demonstration of modern farm implements was arranged for the farmers. Eighty farmers from nearby panchayats participated.

Five volunteers participated in State level camps and 25 members from the unit served as volunteers in the South Indian Fair organised by the University.

A class on AIDS awareness and a red ribbon club was formed.

Dr. A. Prema, NSS Programme Officer served as the Co coordinator of "Jeevamruthum", the State level NSS Training on Rain Water Harvesting and Water Resource Management organized

under the joint auspices of state NSS cell, NSS Regional Centre and Kerala Agricultural University at College of Co-operation, Banking and Management, Vellanikkara, Thrissur from January-4th to 8th, 2008. Ten volunteers donated blood to the needy persons.

Dr. P.R. Suresh, attended the Orientation and training for the NSS Programme officers at Rajagiri College, Kalamassery

Research Programmes

Major research achievements (highlights)

Department of Olericulture

High yielding accessions of drumstick MO144 and AD4 were recommended for release in the ZREAC meeting held at RARS, Pattambi on 15-05-07.

One germplasm accession of snake gourd TA-19-1 was found promising and it was proposed for farm trial along with two high yielding cowpea accessions VS1187, VS1182. The experiment is going on in four districts of central zone, namely Palakkad, Thrissur, Malappuram and Ernakulam.

Two accessions of ash gourd, BH-205 and BH-219 were found very high yielding and they will be proposed for farm trial in the ZREAC meeting during this year.

In the AICVIP experiments, the foliar application of Iron (100 ppm) in the form of iron sulphate increased the yield in bitter melon var. Preethi. The integrated nutrient management in brinjal – okra cropping sequence has shown that application of FYM 10t/ha along with remaining quantity of NPK through chemical fertilizers gave significantly higher yield than other treatments. The okra, grown as succeeding crop by applying recommended NPK alone gave highest yield in the plot where pressmud was applied @10t/ha in the previous season.

In ash gourd varietal trial maximum yield was in Indu and in cowpea varietal trial Swarna Haritha yielded maximum. In Okra yellow vein mosaic virus resistant trial, JOL-2K-19 recorded lowest disease incidence and highest yield.

Department of Agricultural Economics

Under the project 'Development plan for agroecological zones of Palakkad – a participatory approach' SWOT analysis of agro-ecological units/zones with regard to farm productive sector of Palakkad district was conducted, to identify the dominant farming systems in the AEZs and suggest broad development plans for the units covering the productive sectors. Participatory approaches were utilized to identify the strength, weakness, opportunity and threat in the general agricultural scenario of the identified agro-ecological regions. Rapid Rural Appraisal (RRA) and focused group interviews were used as the tools for gathering first hand information about the stakeholders' perception on the agricultural development in the zones.

A study on economics of granular urea application in selected crops of South Zone was undertaken with the objective of analyzing the comparative economics of granular urea application in selected crops as well as to identify the constraints in granular urea application. Primary data were collected from Kerala, Tamil Nadu, Karnataka and Andhra Pradesh from the demonstration plots in progressive farmers field and cross sectional data were collected from farmers in order to gather information on the cultivation practices, the cost incurred as well as the advantages and disadvantages of granular urea application. The analysis revealed that demonstration plots in all the four states had a higher benefit : cost ratio for the major crops like paddy, brinjal, banana and onion compared to the control plot indicating advantage in the use of IFFCO fertilizers. The lack of awareness about the IFFCO fertilizers and non-availability of IFFCO fertilizers in the right quantity and at the right time made the farmers to shift to application of other fertilizers. The per hectare consumption of fertilizer was found to be below the recommended level in the demonstration plots in all four states. The cross-sectional data from the farmers' field indicated that the per hectare consumption of fertilizer was higher than the recommended level. The analysis of the advantages and disadvantages of granular

urea application revealed that the major advantage was that granular urea would be retained for more days and has a higher shelf life compared to other fertilizers. Difficulty in mixing granular urea with MOP as well as the bigger size of granules were the major constraints faced by the farmers.

Organic farm produce in Kerala - An economic analysis

The study was undertaken in Wayanad district and from the district Poothadi and Panamaram panchayats were selected purposively. At the aggregate level gross income was found to be Rs. 77496, while the net income was Rs. 28379 per ha. The analysis of benefit cost ratio of organic farms revealed that investment of one rupee yielded more than one rupee for all the classes. On an average organic farm sustained a cost benefit ratio of 1:1.58 at Cost C₃ level. The higher cost benefit ratio in class III as compared to other classes pointed out a higher profitability of large organic farms. Indian Organic Producers Company working in collaboration with NGO Organic Wayanad was the major marketing agency working in the study area. The major constraint faced by the farmers were lack of fixed price premium, lack of markets, scarcity of quality organic manures, lack of Government support, competition from fake products, lack of consumer awareness and pest and disease control. A consumer survey was conducted in order to analyse the awareness among them with regard to the organic produce and their willing to pay premium (WTPP) for organic produce. About 53 per cent of the consumers were aware that organic produce was available in the market. On an average, the consumers were willing to pay Rs. 4.6, 7.4, 11.9, and 2.5 per kg as price premium for organic vegetables, fruits, spices and milk respectively.

Kisan Credit Card Scheme-An Economic Evaluation

The study was conducted in Kannur district. Two-stage random sampling was used for the selection of block and panchayath. In the first stage, Koothuparambu block was selected randomly and from Koothuparambu block, Vengadu Panchayath was selected randomly in the second stage. From this panchayath, three banks viz. Syndicate bank, North Malabar Gramin Bank (RRB) and Pathiyad service co-operative bank was selected for the study. From the list of Kisan Credit cardholders, 30 farmers were selected randomly from each of the three banks making the sample size 90. The survey was carried out during May-June 2007. As per the opinion survey, only 36.7% of the cardholders got adequate credit under the scheme. Taking into account the opinion survey and adequacy measure simultaneously, only 30 % of the sample cardholders from commercial bank got adequate credit under the scheme. For RRB, it was found to be 3.3% and for co-operative bank it was 6.7%. It was found from the study that 74.4% of the cardholders got timely credit under the scheme. Out of the total sample cardholders, 37.8% had completely repaid the loan amount. Results from the pooled data showed that out of the 71 cardholders, who were having operational area more than 0.27 ha, 42.3% had repaid the loan completely. Some suggestions for improvement of the scheme was also recommended like validity of card to be extended to a period exceeding five years, a passbook is to be provided to the farmers with transactions clearly recorded, periodical review of the utilization and repayment of the loan under the scheme and the credit card is to be linked with ATM facility.

Demand for Environmental Quality – The case of eco-friendly technologies in crop production

The study was conducted in Thrissur district of Kerala state, on two major food crops (rice and banana). The study came out with salient findings on the state of organic input markets in the state. The eco-friendly rice farmers applied organic manures at an average level of 2479 kg/ha, which is 57% higher than that of their counterparts. In banana it is higher by 88%. Cowdung is the major manure accounting for 61-74% of the total organic manure application, mainly from own sources. Biofertilizer application was not noticed in any of the farms. The nutrients supplied through chemical fertilizers were lower (up to 35% in sulphur in rice and 85% in phosphorus in banana) than the chemical based farms. Similarly the use of pest control chemicals was also comparatively less. The labour use in ecofriendly farms was found to be marginally higher (3%) with a 10-15% higher level of women labour use. The total cost of cultivation (cost C₁) of ecofriendly rice farms was 10% higher

at Rs. 17097/ha, realising only 7% higher net income (Rs.4541/ha). This leads to same BC ratio of 1.27 (at cost C_i level) in both types of farms. In banana, the cost is 37% (Rs. 60044/ha) less in ecofriendly farms, with a 27% fall in yield. The gain in net income is only 2%. Hence the BC ratio of ecofriendly farms is comparatively high at 3.0 than their counterpart farms (2.2). The supply side analysis of organic inputs shows the presence of six channels in the study area. Ten major firms (most of them certified) together were selling 135 tones of bio inputs in an year. However official quality testing data shows the presence of substandard samples in the market. The major factors that influence the farmer to follow eco-friendly farming method were identified with the analysis using a logit model. Area under the crop, perception of yield loss (1% level) and experience in farming (5% level) were found to have a negative influence while the training support (1% level) and mass media exposures (10% level) were observed to have a significant positive influence. The study suggests programme for local production of organic inputs and scientific monitoring system for quality control of commercial organic inputs. The market support programme for safe produce may be thought of to realise a higher price. The training and mass media may be used as an effective tool for awareness creation. Realistic information of yield performance in ecofriendly farms and its effective dissemination is important. Small farm owners are more likely to shift to eco friendly methods and hence they may be focused.

Department of Agronomy

A modified index was developed for measuring yellowing in arecanut, which allowed precise quantification. Field experiments laid out in the farmers' fields aided in developing management strategy to contain yellowing in three toposesquences, viz., converted paddy field, garden and terraced uplands. The three treatments included provision of deep drainage, application of organic manures, lime, sand, sodium silicate, magnesium sulphate, zinc sulphate, borax, ammonium sulphate, urea and three levels of potassium. In the converted paddy situation, provision of deep drainage and additional lime application resulted in the balanced uptake of nutrients. Application of fertilizers at 100:40:140 g N, P and K palm⁻¹, along with magnesium, sulphur and borax resulted in high yields. For palms growing in garden land, fertilizer @ 100:40:250 g N, P and K palm⁻¹ is recommended in two splits in February and September, along with 20 g borax. A similar practice is to be followed in arecanut growing in terraced uplands. Application of sulphur containing fertilizers is to be preferred. For arecanut growing in all three situations, 150 g lime, 10 kg organic manure and 60 g magnesium sulphate is to be applied per palm per year.

A comparison of the fodder production potential of Potha grass and Guinea grass *cv.* Mackueni under irrigated and rainfed conditions showed that growth characters like plant height, number of leaves, leaf weight and LAI were higher in the latter. Growth of grasses in rainfed and irrigated conditions were on par. Forty five days cutting interval favoured higher growth as compared to 30 and 60 days intervals. In general, the fodder production potential of Guinea grass be much higher than that of Potha grass. However, Potha grass may be suitable as a soil conservation grass, as it has a shy flowering habit. Being a fodder grass with good quality, it could be an alternative as a soil conservation grass for farmers who also raise livestock, instead of the usually recommended inedible vetiver.

Concurrent growing of green manure crops in rice revealed that cowpea was most suitable in supplying the required quantity of green manure with 25 % savings in N fertilizer and a substantial reduction in weed incidence. Incorporation using Cono weeder, by spraying 2,4 -D or by allowing self decomposition were found equally effective. Concurrent growing of cowpea along with dry seeded rice is a viable system as it resulted in increased productivity, profitability and sustainability. Concurrent growing of green manure crops was effective in increasing the yield of succeeding rice and sustaining soil fertility status compared to pure crop of rice, receiving 5 tonnes per hectare of FYM and 100 per cent of the recommended Nitrogen. But there was no saving of N fertilizer in the

succeeding transplanted rice as the highest yield of succeeding rice was achieved only when it received 100 per cent of the recommended Nitrogen.

In wet seeded rice, daincha was grown along with rice and incorporated at 20 and 30 days after sowing. Incorporation of 30 day old daincha employing any one of the three methods of incorporation was equally effective in increasing the productivity and profitability of wet seeded rice. Incorporation of daincha at 30 DAS could add about 14 t ha⁻¹ green matter with minimum investment and resulted in 70 per cent weed suppression. Concurrent growing of daincha receiving both 100 and 75 per cent of recommended N produced significantly higher yield than the pure crop of rice receiving 5 t ha⁻¹ of FYM and 100 per cent of the recommended N. The highest yield was obtained when 100 per cent of the recommended N was applied to the system. Concurrent growing of daincha and its incorporation at 30 DAS was effective in increasing the yield of the succeeding rice and sustaining soil fertility status compared to pure crop of rice receiving 5 t ha⁻¹ of FYM and 100 per cent of the recommended N. The highest yield of the succeeding rice was obtained when it received 100 per cent of the recommended N and hence there was no savings of N fertilizer in the succeeding transplanted rice crop. Concurrent growing of daincha in wet seeded rice increased the profitability of the rice-rice cropping system.

Department of Plant Pathology

Plant growth promoting rhizobacteria mediated induced systemic resistance against bacterial wilt in ginger

PGPR isolates from ginger were found not only promote the growth and yield of ginger but also induce systemic resistance against bacterial wilt. The activity of peroxidase (PO), polyphenol oxidases (PPO) and phenyl alanine ammonia lyase were more in PGPR treated plants than in untreated plants. More isoforms of PO and PPO were noticed in PGPR treated ones. The PGPR isolates were compatible to many fungicides except copper fungicides.

Biosurfactant producing bacteria from the selected soils of Kerala

Eight promising biosurfactant bacteria were isolated from ten different hydrocarbon contaminated soil samples. Among them six isolates were identified as *Pseudomonas* sp. and the other two were identified as *Geobacillus kaustophilus* and *P. fluorescens*. These isolates recorded a good xylene emulsification property and also lowered the surface tension values of the liquids viz., distilled water, glycerol, cyclohexane and methoxy ethanol monomethylether. The isolate KFSI recorded 71.29 per cent degradation of chlorpyrifos where as DTSC3 showed 28.44 per cent degradation of mancozeb in soil compared to control. All isolates showed high inhibition to soil borne pathogens where as all of them were compatible to *Trichoderma harzianum*.

Population dynamics of plant growth promoting rhizobacteria under the influence of agricultural chemicals

The growth of *Azospirillum* sp. and *Pseudomonas fluorescens* were highly inhibited by copper oxychloride fungicide. The fungicide mancozeb in combination with all herbicide and insecticides also inhibiting to *Azospirillum* sp. The fungicide carbendazim, all insecticides except carbaryl and all herbicides except paraquat were least inhibitory to all the test organism at their recommended doses. The combination of lindane, lamdacyhalothrin and chlorpyrifos with herbicide 2,4-D were found least inhibitory to these beneficial rhizobacteria. The result of the field evaluation revealed that the chemicals, carbendazim, chlorpyrifos and 2,4-D affected the bacterial population immediately after their application to soil. But these treatments had a positive influence on the growth parameters of rice plants. The panicle weight and nutrient content were maximum in treatments where all the beneficial rhizobacteria applied alone.

Induction of growth promotion in vanilla through plant growth promoting micro-organisms consortia

All isolation of PGPM viz. *Pseudomonas* sp., *Bacillus* sp. and *Trichoderma* sp. were found compatible with each other where as *Pseudomonas* sp. recorded as most efficient in the production of growth promoting substances like IAA and salicylic acid. All the selected fungicides and insecticides at all the concentrations were found to inhibit the growth of *Pseudomonas* sp., *Trichoderma* sp. and *Bacillus* sp. except carbaryl which was compatible with the isolates of *Bacillus* sp. viz. B₁, B₂ and B₃. The PGPM, *Bacillus* sp. recorded the maximum growth parameters of vanilla compared to the other two PGPM and their consortia.

Diseases of milky mushroom (*Calocybe India*) and their management.

Two bacterial diseases caused by *Pseudomonas* sp. and *Bacillus* sp. and fungal diseases caused by *Dactylium dendroides* and a *Penicillium* sp. were found important in milky mushroom besides the contaminant fungi. The weed fungi incidence in mushroom beds was maximum in June and minimum in April and among them *Rhizoctonia solani* recorded major infection, chemical sterilization with 0.2 per cent CaCO₃ was found as the best method for the sterilization of substrates. Spraying with garlic extract on substrate after chemical sterilization was found most effective in preventing natural incidence of contaminant fungi and bacteria and also for obtaining maximum yield.

Potentiality of endophytic micro-organisms in the management of leaf blight disease of amaranth

The endophytic bacteria EB-20, EB-22 and EB-43 were found most effective in promoting growth of amaranth and were also found equally efficient as bio-control agent, *P. fluorescens* whereas EB-22 and EB-43 were proved to be most efficient in the management of leaf blight of amaranth. Similarly EB-20 and EB-22 were recorded their efficiency in inducing systemic resistance of amaranth against leaf blight pathogen by increasing peroxidase, polyphenol oxidase and phenyl alanine ammonia lyase activity.

Development of bioagents consortia for plant disease management and commercial application

Potential isolates of *Trichoderma* and bacterial antagonists were identified against the pathogens of rhizome rot and bacterial wilt of ginger. Identified the compatible isolates of *Trichoderma* and bacterial antagonists. Tapioca dextrose broth can be used as a substitute to potato dextrose broth for mass multiplication of *Trichoderma* spp. and ragi was found as a good solid substrate for the large scale production of *Trichoderma* consortium. The nutritional supplements such as powder of rice, ragi and tapioca were found to enhance the sporulation of *Trichoderma* spp. Three consortial bioformulations were developed for the management of rhizome rot and bacterial wilt of ginger which provided good result in field experiments.

Biocontrol consortia for the management of bacterial wilt of chilli and *Phytophthora* rot of black pepper and vanilla

Potential *Trichoderma* and bacterial antagonists of *Phytophthora capsici* of black pepper, *P. meadii* of vanilla and *Ralstonia solanacearum* of chilli were identified. An endophytic antagonistic *Trichoderma* was identified against *P. capsici* Combined application of *Trichoderma* and bacterial antagonists for better management of *Phytophthora* rot of black pepper and vanilla and bacterial wilt of chilli was conducted. Developed a consortial formulation of different bioagents effective against all these major pathogens.

Role of microflora in the quality of vermi products in improving plant growth.

Thirty two fungal isolates belong to the genera, *Trichoderma*, *Aspergillus* and *Penicillium* and 39 isolates of bacteria including 5 nitrogen fixing and 3 phosphorus solubilizing and 3 isolates of actinomycetes were isolated from the ABARD vermi compost unit. The most efficient nitrogen fixing

and phosphate solubilizing bacteria were identified as *Azotobacter* sp. and *Pseudomonas* sp. respectively. The result of the pot culture experiment revealed that treatment with vermi compost, vermicast and fungal and bacterial consortium were equally efficient in improving the growth characters of amaranth. The lowest percent disease severity of leaf blight of amaranth caused by *Rhizoctonia solani* was recorded in the plants treated with fungal consortium which was followed by fungal and bacterial consortium. The N, P, K analysis of amaranth plants showed maximum nitrogen content in plants treated with sterilized vermicast, phosphorus content in vermicast and potassium content in sterilized vermi compost treated plants.

Isolation and screening of different AMF cultures for selected cucurbitaceous crops

From the rhizosphere soil of ivy gourd and bitter melon, four each isolates of arbuscular mycorrhizal fungus were isolated and were identified as *Glomus* spp. The screening of these isolates to evaluate its efficiency in enhancing the growth of these crops was in progress.

Characterization of phosphate solubilizing bacteria and *Azospirillum* from rhizosphere of cucurbitaceous vegetables in Kerala

A total of three phosphate solubilizing bacteria and one fungus were selected from ivy gourd rhizosphere soil and 4 PSB and 1 PSF were obtained from bitter melon rhizosphere soil. Similarly 4 isolates of *Azospirillum* spp. were obtained each from ivy gourd and bitter melon rhizosphere soil.

Development of plant growth promoting micro-organisms consortia technology for *ex vitro* establishment of micro-propagated vanilla (*Vanilla planifolia* ANDR) and ginger (*Zingiber officinale* Rosc.)

A total of 66 and 83 different isolates of PGPM were isolated and identified from vanilla and ginger growing areas of Kerala respectively. The consortium of bacteria x fungi combination, fungi x fungi combination and bacteria x bacteria combination with different types of fungi x bacteria were found most efficient in growth and establishment of vanilla and ginger.

CPBMB

Isolation and characterization of genes encoding disease resistance (ToLCV & Bacterial wilt)

Characterised resistant and susceptible genotypes of tomato for ToLCV & bacterial wilt diseases through various molecular markers like RAPD, AFLP, SSR & ISSR.

Exploration of the molecular diversity and insecticidal spectrum of *Bacillus thuringiensis* in the Western Ghats

Of the 130 Bt isolates from the western Ghats of Kerala, 111 were found to have *cryI* gene effective against Lepidoptera and bioassay on pumpkin caterpillar revealed that 5 isolates produced 100% mortality on larvae.

A novel *cry7* gene fragment (1.6kb) was amplified from a native isolate of Bt (KAU11).

Application of microorganisms in agriculture and allied sectors.

16S rRNA sequencing of 2 pigmented bacteria from the Western Ghats revealed that these were *Chromobacterium violaceum* and *Serratia marscecens*. Purple and red pigments from the above isolates were extracted in methanol and characterized for stability at different temperature & pH.

Induction of variability in Zingiberaceous crops (ginger, turmeric, kachalam) through *in vitro* fertilization

Media combinations for callusing of embryo and plantlet regeneration of ginger seed were identified. Genetic variants in various parental combinations are being produced. In one cross clonal population of progeny was established.

Induction of variability in *Vanilla planifolia* Andreus through intra/inter specific hybridization and embryo culture technique.

Inter specific hybrids between *V. planifolia* and *V. tahitensis* were produced by controlled crossing and embryo culture. Intra specific hybrids between superior clones of *V. planifolia* was produced and multiplied.

Project on Establishment of a Distributed Information Centre

Predicted functionally important residues involved in Programmed Cell Death of plants.

Predicted insulin like proteins in plants like *Canavalia ensiformis*, *Bauhinia purpurea* and *Vigna unguiculata* using *in silico* approaches.

Studied inhibitors for Ferric dicitrate transport (FecA) protein of *Pseudomonas aeruginosa*.

Studied the antimicrobial properties of Ginger against *Epstein-Barr virus*, *Aspergillus flavus* and *Helicobacter pylori*.

Investigated the presence of anticancer properties in the following plants: *Ophiorrhiza*, *Thalictrum*, *Papaver*

Studied the chitin degrading properties of Gram negative soil bacteria *Serratia marcescens* which can be used as effective biocontrol agent for chitin degradation.

PG project

Designed lab model device for producing biogas from agar waste of tissue culture lab

AICRP on Weed Control

- ❖ A survey was undertaken in the Palakkad and Thrissur districts of Kerala during the month of October to January when the parasites were in the flowering stage. Ten species of mistletoes of Loranthaceae and Viscaceae family were identified Among the parasitic plants *Helicanthus elastica* the common and virulent species in the plains was not seen in elevations above 600m. Species such as *Scurrula parasitica*, *Viscum articulatum*, *V. capitellatum*, *V. rammosissimum* and *V. monoicum* were observed in areas where the MSL was above 600m. *Taxillus tomentosus* was seen at a MSL of 850m and above. *Macrosolen parasiticus*, *V. orientale*, and *Dendrophthoe falcata* were seen both in the plains and the hilly region.
- ❖ Long term trial on tillage in rice-water fallow system of Kuttanad region revealed that the plots under continuous zero tillage for the last three years had the least weed growth, whereas in the conventional tillage a large number of weeds of typical rice fields emerged, where as in the zero tillage plots, the flora was limited to mostly *Eleocharis* sp. This seems to be due to the reduction in soil pH compared to the tilled plots where the pH was higher and towards neutral.
- ❖ Soil seed bank studies indicated that the chances of dormancy in both dicots and monocots seeds were almost similar.
- ❖ In a seven year study on continuous application of the same herbicide at the recommended doze for weed control in rice, no accumulation of butachlor residues was noticed in the grain, straw or soil.
- ❖ Better control of *Echinochloa* sp. in the rice- rice system was achieved by the use of butachlor along with FYM. The treatments viz., hand weeded control and butachlor application with FYM registered similar grain yields which were very much higher that of application of butachlor alone The results indicated that FYM improved the bioefficacy of the herbicide.
- ❖ Developed a simpler and less expensive common protocol for extraction and clean up of the residues of oxyfluorfen, butachlor and pretilachlor from the soil.

- ❖ Studies on oxyfluorfen residues from the Onfarm trial on “Weed management in upland rice” showed that 50- 60 % of the applied herbicide is dissipated from the soil by 10 DAS.
- ❖ Studies on the characterisation of leaching behaviour of butachlor, pretilachlor and oxyfluorfen in different soil types indicated that maximum quantity of applied herbicide is remained in the upper 2 cm of the soil column. There was a gradual decrease in the concentration of residue with increasing depth of the soil. Among the three herbicides tested, butachlor recorded higher levels of residues in the leachate. Fine textured organic matter rich soil recorded lower residue levels in the leachate compared to the soil with coarse texture and poor organic matter. It could be attributed to the high adsorptive power of the soil, especially at the top layers with high organic matter content.
- ❖ SRI method produced lesser grain yields than the normal planting. Among the SRI treatments, modified SRI with herbicidal weed control yielded higher than the SRI with cono weeding.
- ❖ Stale seed bed for 14 days resulted in significant reduction in the weed growth, compared to normal sowing and stale seed bed for seven days.
- ❖ Screening of popular rice varieties was conducted in rice fields where both high and low density of weeds were present. The data on grain and straw yields obtained for all the three years were similar indicating that C3-2-49, Athira, Jyothi, Aiswarya and Bharathy are highly competitive rice varieties. Kanchana, Uma, C-26 (T) and C-80 are the least competitive and the varieties such as pavizhum, Gowri, Matta Triveni and Remanika are moderately competitive

Pomology and Floriculture

Project entitled ‘Scheme for development of a biotechnology based self contained floriculture unit by rural women’ is continuing in the department. During this year, 200 rural women were trained in different aspects of commercial cut flower, loose flower and cut foliage production, propagation techniques, value addition and post harvest handling. The crops included were orchid, anthurium, heliconia, gerbera, jasmine and foliage plants. Trainees were imparted theoretical and practical knowledge on production technology with emphasis on organic practices.

Entrepreneurship development programmes were undertaken by imparting hands on training in flower production at the farmer’s field; follow up by regular visit, and supply of planting materials. The percentage of increase in income of entrepreneurs ranged from 30 to 80 per cent.

In the BARC project on ‘Crop improvement and extension of post harvest longevity of commercial flowers and foliage plants through the use of radiation’, irradiation was carried out in fifteen flowering plants, twenty five foliage plants, fourteen cut flowers and 100 *in vitro* cultures. Noticeable differences could be observed in tuberose, gerbera, coleus, aralia, philodendron and monstera. Evaluation of the performance of the plants in the field is in progress

The SHM project on ‘Product diversification in floriculture’ envisages imparting technical know how to rural women and unemployed youth in diversified floriculture activities like cut foliage and pot plant production, value addition and dry flower production. During the year, 100 rural women were trained in different aspects of floriculture Two demonstration units were established for cut foliage and pot plants and one for production of dry flowers / plants and floral craft for the purpose of demonstration of technology to beneficiaries / farmers and for conducting training programmes. The shrubs collected were propagated by cuttings

Bromeliads and ornamental bananas were evaluated under the project on ‘Introduction and evaluation of new ornamentals’. Ornamental bananas like *Musa ornata*, *Musa laterita* and *Ensete ventricosum* can better be grown in pots under open condition than under shade. Among the bromeliads, *Aechmea fasciata*, *Ananas bracteatus*, *Bromelia balansae* and *Dyckia brevifolia* can be grown under both open and 50 per cent shade. Under indoor condition *Billbergia pyramidalis*

performed better compared to *Pitcarnea flammea* and *Tillandsia stricta*. It can be kept as potted foliage plant for a period of 47 days. Evaluation of the collected aquatic plant species suitable for water gardening from different parts of Thrissur district is in progress.

Field performance of forty monopodial orchids of monogeneric and trigeneric origin were evaluated under warm humid conditions of Kerala. They were grouped as tall climbing types, intermediate climbing epiphytes and short stemmed epiphytes. Wide variation could be noticed with respect to vegetative and floral characters. Among the tall climbing orchids, *Aranthera* Lily Brook Red, *Aeridachnis* Apple Blossom, *Arachnis* Maggie Red Ribbon and *Aranthera* Anne Black can be recommended for commercial cultivation. In intermediate climbing epiphytes, considering the quantitative and qualitative characters *Mokara* Chark Kuan Pink, *Mokara* Walter Oumae White and *Mokara* Calypso Pink have immense potential for use as cut flower. *Ascocenda* Princess Milcasa Pink, *Vascostylis* Pine Rivers Red, *Vascostylis* Pine Rivers Pink, *Vascostylis* Pine Rivers Blue and *Phalaenopsis* varieties can be grown as excellent pot plants.

Ten cut flower varieties and ten pot plant varieties of anthurium were evaluated under two agroclimatic conditions, viz., at Vellanikkara (plains) and at Nelliampathy (1050 m above MSL) under the DST project on 'Micro climatic relations in the commercial production of cut flowers and foliage in the humid tropics'.

Location, varieties and their interaction showed significant difference with respect to vegetative and flower characters in cut flower. Plant height, petiole length, leaf size, spread and number of leaves was significantly higher at Nelliampathy compared to Vellanikkara in all the varieties. Number of flowers was significantly higher at Nelliampathy. Maximum number of flowers was for Esmeralda (2.88 per month) and Aymara (2.02 per month) and minimum for Akapana (1.06 per month) and Ceasar (1.14 per month). At Vellanikkara, highest number of flowers was recorded for Benicito (2.03 per month) and Titicaca (1.74 per month) and the lowest for Ceasar (1.11 per month) followed by Lucia (1.17 per month) and Aymara (1.20 per month). Spathe size was significantly larger at Nelliampathy.

In pot plant varieties Diablada and Bonina produced the maximum number of flowers under the two locations. Mia, Trampolino and Condor produced the minimum number of flowers. Spathe size was significantly higher at Nelliampathy. Location, varieties and their interaction showed significant difference with respect to spathe size. At Nelliampathy, Patino and Excellent had the highest spathe breadth and Bonina and Inti the lowest. At Vellanikkara, Condor had the highest spathe breadth and Inti and Bonina the lowest.

Among species and varieties of Heliconias evaluated, *Heliconia psittacorum* cv. 'Golden Torch' had the maximum number of flowers at Nelliampathy while *Heliconia rostrata* had the maximum number at Vellanikkara condition. Vase life varied from 8-10 days at Nelliampathy and 6-15 days at Vellanikkara.

Ten foliage plants evaluated at the above two locations showed significant difference in growth and leaf production.

Early profuse flowering could be induced in mango cultivars Moovandan and Priyur by nitrate sprays (NH_4NO_3 - 0.25% and KNO_3 - 2%) alone or in combination with micronutrients during the month of December. An increased growth rate and branching intensity of panicles and enhanced initial fruit set was also notable in the sprayed shoots. Treatments also reduced the pre mature fruit crop and recorded significant higher fruit yield than control.

Soft wood grafting was standardised in bread fruit (*Artocarpus altilis*). Bread nut was found as the most promising root stock. Suitable irrigation schedule was standardized along with mulching to minimize fruit drop in bread fruit. Identified suitable storage techniques to improve the shelf life of breadfruit.

Department of Processing Technology

Standardization of minimal processing techniques for selected fruits and vegetables

(KSCSTE Project)

The main objective of the project is to standardize the protocol for minimal processing of three vegetables coleus, elephant foot yam, cowpea and fruits pineapple, breadfruit and jackfruit. The protocol include identifying a sanitizing agent for surface sanitation, prestorage treatment with preservative, antioxidant and irradiation as well as suitable storage system for retaining quality and enhancing shelf life fresh cut fruits and vegetables. Study of the physiological and biochemical changes during storage of minimally processing products is also envisaged under the project.

To ensure microbiological safety of fresh cut products a disinfectant sanitization step was included as the first step in minimal processing. The influence of five treatments on surface decontamination of fresh cut products was studied. Surface sanitization with sodium hypochlorite (100ppm) for 15 minutes before minimal processing was found to be effective in reducing microbial population in all the fresh cut products included in the study. Washing with water containing mild soap could also reduce surface contamination of microbes in jackfruit and elephant foot yam.

Fresh cut products were subjected to prestorage treatments with chemicals to control decay, reduce browning and retain firmness. The comparative efficiency of eight treatments on shelf life and quality of fresh cut products were studied. Prestorage treatments of these products with potassium metabisulphite (0.1%) or sodium benzoate (0.1%) in combination with ascorbic acid was found to enhance shelf life, reduce microbial load and improve appearance of fresh cut products.

Irradiation is one of the novel methods of food preservation, which can be used to extend the shelf life of fresh cut products and to improve microbiological safety by eliminating several pathogens from it. Fresh cut products were subjected to irradiation at doses 50, 100, 150 and 200 Gy. The shelf life of these products were extended following exposure to gamma radiation. The non irradiated samples recorded a shelf life of 1 day in cowpea, jackfruit and pineapple, 2 days in coleus, bread fruit and 5 days in elephant foot yam under ambient conditions. The shelf life of control samples under refrigeration ranged from 4 to 6 days. The irradiated products of coleus, cowpea, jack fruit, and pineapple recorded a shelf life of 3 days and elephant foot yam and breadfruit 4 days under ambient conditions. The corresponding shelf life under low temperature storage was - pineapple (11 days), cowpea (12 days) coleus (13 days) elephant foot yam (17 days) bread fruit (11days) and jack fruit (11days).

The microbial population was significantly reduced following irradiation as compared to control. A gradual decrease in microbial population was observed with increasing dose of irradiation. Storage of irradiated products under refrigeration further reduced microbial load and extended shelf life of these products.

Precut packaged fruits and vegetables are subjected to many stress including deterioration reactions of wounded tissues, decay caused by the growth of microorganisms and water loss from the tissue and increase in respiration and ethylene production. Hence in this experiment the impact of modified atmosphere packaging coupled with low temperature storage and / or irradiation were investigated.

The unpacked samples of all the fruits and vegetables exhibited deterioration in visual quality 2- 4 days after storage. Browning, shriveling and softening were the problems encountered during storage of fresh cut products. Shriveling was severe in unpacked samples and least in fresh cut products packed in unventilated poly propylene / poly ethylene cover. The intensity of shriveling, softening, browning or other deterioration was less severe under refrigerated storage. The manifestation of these physical changes was also delayed by 4 – 7 days in packaged fresh cut products under refrigeration. Periderm formation was the first visible change in fresh cut elephant

foot yam, but this phenomenon was delayed in packaged material by 2-3 days under ambient conditions and 4 – 8 days under refrigeration.

Shelf life of minimally processed products was enhanced significantly by modified atmosphere packaging and low temperature storage. The shortest shelf life under ambient and low temperature conditions was for unpacked samples, followed by samples packed in areca sheath trays. Maximum shelf life (11 – 13 days) under both conditions of storage was for samples packed in poly ethylene along with sachet of potassium metabisulphite (preservative). Packaging in poly ethylene cover along with ethylene absorbent (KMnO_4) was also effective in enhancing shelf life of cut products of cowpea and coleus. In case of bread fruit, elephant foot yam and coleus vacuum packaging was found beneficial for preventing browning and enhancing shelf life. Vacuum packaging followed by flushing nitrogen gas did not have a beneficial effect on shelf life of jack fruit and pineapple. Shelf life of fresh cut products were prolonged to 8 – 9 days by packaging in polystyrene tray coupled with low temperature storage.

Modified atmosphere packaging in combination with cold storage was also effective in lowering the microbial load in fresh cut products. Packaging in Polyethylene cover along with potassium metabisulphite sachet (T6) could bring about a significant reduction in microbial load in all fresh cut products compared to other treatments. Microbial population in all the refrigerated fresh cut products was significantly lower than that under ambient conditions. Population of microbes was also low in samples stored in polystyrene tray wrapped with cling film and in polyethylene cover along with ethylene absorbent.

Process optimization for production of value added products from snapmelon and water melon (KSCSTE Projects)

Snapmelon accessions collected from hot spot areas of cultivation in Kerala were evaluated for their physio-chemical attributes. Snapmelon possess high pulp recovery at the range of 62-90 percent. Apart from this the placenta present in the fruits at the range of 9-37 percent can also be used for processing. The acidity of pulp is very low viz., 12-71 percent. The carbohydrate content in different accessions ranged between 10.86 to 26.18 percent. The complete mineral composition of snapmelon and watermelon pulp were evaluated.

Among the difference watermelon types analysed sugar baby recorded the highest reducing (5.936%) non-reducing (2.28%) and total (8.21%) with average TSS 11.3° Brix. The watermelon pulp was identified as good source of lycopene and ranged between 56%

A process for extraction of lycopene colours from fresh watermelon pulp was standardized coloured milk powder was also developed through vacuum concentration and spray drying technique. The product will serve as a ready to use powder for ice-cream, shake etc., the process avel product are at the stage of filing for patent.

Product diversification in coconut

The following value added products were developed using different parts of coconut

Coconut water: Coconut water honey, lemonade, vinegar

Coconut kernel: Candy, Jam

Coconut milk: Toffee, sweetened, concentrated milk

Influence of physical and biochemical factors of monsooned Malabar coffee

The influence of monsoon on quality inflect of Arabica and Robusta coffee was studied based on physical and biochemical characters.

Evaluation and value addition of watery rose apple and Malaya apple

Physical and chemical characters of the collected fruits were done

Production of quality pulp / juice: Osmo-dehydrated method was selected for production of quality pulp and juice from there type of fruits.

Standardization of value added products: Osmodehydrated products - sliced fruits dipped in 60⁰B solution scored the highest in sensory evaluation.

Pickle: Pickle made from the fresh fruits slices of pink, white and Malaya apple was found to be the best treatment.

Wine and pulp based products were standardized.

Extraction and utilization of color

Extraction done using 4% citric at 9 hours interval was found to be the best method as against the methanolic Hcl as solvent. This is true for color extracted from apple flower. In case of pink watery rose apple fruit, 5% citric acid at 9 hours incubation time was the best treatment.

Department of Soil Science & Agrl. Chemistry

DBT project on 'Vermitechnoogy for organic seed production and rural employment generation'

The DBT project was sanctioned on 13th February with a financial outlay of 7.68 lakhs for a period of three years on 20th July 2007, a period of extension was sanctioned upto 28th October 2007 with in the sanctioned cost.

The period aimed at proceeding technical advisory services to farm women on vermitechnology, documentation on traditional practices on vegetable seed production with the identification of anchor farmers, popularization of organic farming through intensive training programmes and finally setting up of on and off campus vermiunits with women entrepreneurs.

Based on the inventory on local / traditional knowledge of vegetable and production, promising practices were being tested comparison with the approved recommendations of Kerala Agrl. University. Various vermitechnology options are effectively utilized for setting up of small agro industrial unit in the revolving fund mode. Anchor farmer concept is being tested and formed to be successful for the substance of SAIU's out side the university. Altogether three on-campus and four off-campus which are being continued for the benefit of 32 farm women. In order to create additional employment opportunities, we have included small units for rearing cow, goat, rabbit, poultry and quail. By this way, the beneficiaries are being advised to enrich the vermicompost. So there is a good market for the products.

The mother unit attached to C.O.H Vellanikkara serves an excellent model of academic entrepreneurship in organic farming. The unit which started with a working capital of Rs. 50,000/- from the DBT fund, is non working as an annual turn over of Rs. 2.5 lakhs be siding caring an asset of Rs.2 lakhs in the form of infrastructure of machinery. The unit received a certificate of authorization for the manufacture of vermiproducs from the department of Agriculture, government of keraia. Regular analysis and quality control of the products are so strictly followed that all the other six units are attached to the mother unit for the sale of products. Each of the old and newly joined members of different units are setting a remuneration in the range of Rs.1000/- to Rs.3000/- per month. With the help of anchor farmers and visitors to the units there is good popularization for the organic seeds.

AICRIP on Soil Test Crop Response

Conducted complex experiments on brinjal (one regular and one ratoon crop) and chilli crop. The crop was harvested and analysis is going on. Conducted test crop verification experiments on turmeric at 4 locations and also one front line demonstration experiment (FLD) on cassava at different locations. An experiment for Ph.D programme on cucumber was carried out. The test crop has been completed. The field verification experiments are being continued at 4 different locations.

Department of Agri. Entomology

The study on Action Research on Mite Control in KAU campus was conducted on 200 palms in PRS, Vellanikkara. The palms have recovered from mite attack after the treatment. Scale of attack has come down in both neem treatment and garlic treatment. Photographs attached.

On banana two spp. of root mealy bugs were reported for the first time. Its biology, alternative hosts, population assessment and management practices were worked out.

The Rice Blue Beetle, hitherto reported as a minor pest has assumed a major status in the rice growing tracts of Palakkad, Kannur Kasargod and Trivandrum districts. Hence, its biology, screening of varieties for resistance, seasonal incidence, alternative hosts and integrated management practices against rice blue beetle were studied and recommendations were made.

Depredatory and beneficial birds in the rice ecosystem were identified. Metalised reflective ribbons were evaluated to be effective in scaring birds in the vulnerable stages of crops.

Plantation crops and Spices

Elite somaclones in ginger with high yield and tolerance to rhizome rot and bacterial wilt diseases were isolated.

Influence of growth regulators on flowering, fruit growth and quality in vanilla and influence of micro meteorological factors on flowering and quality of vanilla were assessed. The studies on flowering and quality of beans carried out indicated the favourable influence of growth regulators like NAA and Ethrel each at 100 ppm and GA 50 ppm for improving fruit growth and vanillin content in cured beans of vanilla. The microclimate of the garden significantly influenced flowering and flavour principles in vanilla.

Availability of the valuable medicinal herb, Jeevakom (*Seidenfia rheedii*) in Kerala forests was confirmed and its threat status ascertained. Domestication trial on jeevakom gave positive results and adhoc package for domestication was formulated.

Plant Breeding & Genetics

Njavara is a unique medicinal rice cultivar of Kerala widely used in Ayurved system of medicine. Detailed molecular characterization of Njavara morphotypes with 10 random primers generated a total of 364 scorable amplified products, with 352 polymorphic and 12 monomorphic bands. RAPD amplification with OPE 6 primer generated a unique band of 1.37 kb in all Njavara morphotypes and this band was absent in check varieties studied. Sequence alignment with BLASTN (rice) revealed its homology with six genes including Bowman Brik Trypsin Inhibitor (BBI) gene reported to have uniqueness of Njavara as a medicinal cultivar.

Home Science

Standardization and Quality Evaluation of Banana based Probiotic Fermented Food Mixtures

Probiotic characteristics of *Lactobacillus acidophilus* (MTCC 447) procured from IMTECH, Chandigarh was studied as detailed below.

High Acid tolerance - maximum growth was observed at pH 3.5

Bile tolerance - maximum growth in 1% bile salt concentration.

Anti bacterial activity of *L. acidophilus* against intestinal pathogens like *E. coli*, *salmonella enteritidis*, *bacillus cereus*, *staphylococcus aureus* and *sheigella flexneri* was studied. Zone of inhibition was maximum for salmonella enteritidis (24mm) and minimum for *staphylococcus aureus* (15mm). No inhibition of *lacto bacillus* was found against *sheigella flexneri*

Standardisation of the 14 different combinations of probiotic food mixtures based on raw banana flour, defatted soya flour, green gram flour, tomato, papaya and mango were carried out.

Optimisation of conditions-25 g of food mixture inoculated with 300 μ l at pH 4.5 and incubated at 37°C for 24 hr was the best treatment for fermentation of food mixture.

Fermented food mixtures were analysed with respect to the organoleptic qualities, chemical constituents (moisture, acidity, starch, TSS, reducing and total sugar, protein, crude fibre, beta carotene, calcium, iron and potassium) and viability of *L. acidophilus*. Based on the above criteria 6 food combinations were selected for further studies.

ii) P.G Programme completed (Highlights)

Standardization and quality evaluation of grain amaranth (*Amaranthus spp*) flour supplemented food products

Grain amaranth flour was found to be rich in protein, starch, fibre and minerals and low in anti nutritional factors like tannin and phytic acid. Nutritionally viable and organoleptically acceptable products like chapathi, biscuits, and puttu were prepared by incorporating grain amaranth flour at different proportions for wheat flour, maida and rice flour. Among the different combinations, chapathi prepared by incorporating amaranth flour up to 30 % for wheat flour was found to be highly acceptable. Biscuits and puttu prepared by incorporating up to 50% of amaranth flour for maida and rice flour respectively obtained high organoleptic scores. An increase in the nutritive value of recipes was also noticed with an increase in the quantity of grain amaranth flour.

Agricultural Statistics

Non linear models Viz. mono molecular, Logistic, Gomperts and Mixed Influence models were fitted for major crops of Kerala. viz., Coconut, Rubber, Paddy, Pepper, Tapioca, Cashew and Banana

The data sets were further explored to measure the carrying capacity achieved and intrinsic growth rate. By this the contracting features and devastating hazards crops faced with were clearly brought out.

Agricultural Meteorology

A database on onset of monsoon and rainfall for the State of Kerala since 1871 onwards. If the onset of monsoon is early (before 25th May), the monsoon rainfall is likely to be below normal.

A multiple linear regression equation has been developed to estimate total coconut production of State of Kerala seven months ahead. Such models are also developed in the case of cashew for estimating cashew production of the State before the crop harvest commences. They need further revalidation.

The quality of monsooned Malabar coffee appears to be better if the monsoon behaviour is favourable. Monsoon breaks like in 2002 adversely affected the quality of coffee to a greater extent. It reveals that continuous clouds with heavy rainfall and its better distribution, high atmospheric water vapour content, moderate air temperature and gentle sea breeze would lead to better moisture content in coffee beans if processed during the monsoon period. Better moisture content will lead to better sugars, having less acidity. Vapour pressure deficit and night temperature during the process of coffee beans could explain the variance of moisture content in coffee beans up to 87%.

Agro-ecosystems along the highranges and coastal regions are likely to be under threat in a projected climate scenario over Kerala.

A regression equation has been developed to find out the discharge of water from the Peechi Dam during the rabi season.

The economic impact of AAS showed that there was a benefit in the case of AAS farmers when compared to non-AAS farmers. They need to be strengthened further at micro level for the benefit of the farming community.

A new criteria has been suggested based on night temperature for delineating hot spot areas of tea mosquito bug incidence in cashew along with the forewarning models.

Agricultural Extension

Technology Dissemination and Capacity building for use of bioinputs in Agriculture

The project aimed at educating the rural women SHGS on the production and use of bioinputs. Through a district wide selection process 12 panchayats of the district were included under the scheme and selected women SHGS from each of these Panchayats were given training in the College of Horticulture. Then technical and financial support was given to them for establishing production units in their respective areas. Subsequently, 14 microenterprises have been formed as a result of the project and they are functioning successfully. They are serving as an income generation avenue for the rural women and also instilled the spirit of entrepreneurship in them.

Agricultural expert system-A participatory Assessment

The first phase of the research was conducted among the researchers from the agricultural research institutes all over India, who involved in developing AES and TOT. Second phase of the research was conducted among the extension personnel and farmers in the palakkad district of Kerala.

Kerala state has initiated many information and communication technology (ICT) projects to increase the application of information technology in all walks of life. Researchers, extension personnel and farmers were considered as the stake holders of developing and using AES. It has been observed that nearly half the researchers in ToT (45 %) expressed that they had medium level of awareness about AES. While 30 % of them had high and one-fourth of them had low level of awareness about AES. The results of study emphasize the need for conducting more explorations among the different categories of users separately regarding the performance of AES in providing knowledge solving problems and supporting decision making processes.

Reorienting the concept of agricultural development in the context of Kerala.

Out of the fourteen districts of Kerala, thiruvananthapuram was purposefully selected. Representative sample size of 120, equal number of respondents were selected from four categories, viz, progressive farmers, elected heads of local administrative bodies agricultural extension officers of the department and agricultural scientists of KAU. Thirty progressive farmers were chosen from randomly selected panchayats of the district. Agricultural officers, were selected from five random blocks. The responses obtained from opened questionnaire for perception of agricultural development is like this: scientist got 75%, agricultural officers 50%, panchayat presidents 41%, farmers 36.30%. Due to the divergence in perception of the concept of agricultural development, the planning, execution and monitoring of different need based agricultural development programmes fail considerably without having an agreed upon approach. The present study explored the perception gaps regarding the concept of agricultural development among progressive farmers, panchayat presidents agricultural officers and agricultural scientists.

Teamwork in agricultural organisations.

Palakkad district was purposively selected for this study from among the 14 districts of Kerala considering the efficient functioning of department of agriculture and more number of development blocks. A structured questionnaire was prepared for collecting data and it has been analyzed. Team role of agricultural officers and assistants has been creating a positive team atmosphere, clear view of the team objectives and checking the important details needed for task

achievement were of prime importance and given highest total scores. Finally in this study, teamwork of both the agricultural officers and the agricultural assistants in the krishibhavans was studied. In order to achieve a good teamwork, it is worthwhile to know the important factors contributing to team process, team development, and team roles and team effectiveness. Further, it was observed from the findings of the study that provided answers to queries.

Empowerment of vegetables farmers through market-led extension

Thrissur and Kasargod districts were purposively selected for the present study since they had the highest number of actively functioning SHGs in vegetable production and marketing. Farmers who are actively cultivating any of the vegetable on commercial basis were selected as one group of respondent's i.e. Non SHG group, and farmers who are engaged in commercial vegetable cultivation as a member of any SHG were selected as the second group of respondents. It has been mentioned that 49 % of the respondents of SHG group belonged to the age group of above 50years, while 53.3% of the non SHG group, belonged to this age group. Among the two respondent groups, 83-85% of the farmers had a traditional background in vegetable farming and only 15-17% of the SHG respondents were relatively new in this field 91.67% of the respondents could market the whole amount of their produce (marketable surplus) without much lossout of which marketable surplus 97.57 % was marketed (surplus) and only 2.43%was leftover amount of produce from all marketing channels. Finally the results highlights the fact that both SHG and non SHG group of respondents who had the same mode of social participation produced equal scores for personnel empowerment and this was taken as the empowerment threshold finally it was observed that the SHG respondents had more market awareness, more frequent and effectiveness use information sources and high level of knowledge in crops and equipments compared to non-SHG group

Extension programmes

Highlights of extension activities

Department of Agricultural Economics

Dr. P.Indira Devi served as the resource person for the diploma programme of IGNOU/KAU on fruit and vegetable processing

Dr. A. Prema served as the NSS Programme Officer of the college, participated in the KAU combined NSS camp Unarvu at Wynad from 7-11, May 2007 and was the co- convenor of "Jeevamruthum 2008" – the state level workshop on Rainwater harvesting and water resources management, Jan 4-8, 2008 organized by National Service Scheme, KAU. She served as the Chairperson of the Technical Advisory Group of the Watershed management working group of the Thrissur Corporation as part of Decentralized planning in the XI th Plan.

Department of Agronomy

Three women run fodder banks have been established in Nadathara, Kannara and Kallampara under the ongoing DBT funded project. Two 20 – day trainings were also conducted during the year.

Field trips were conducted in Thrissur, Ernakulam and Kottayam districts for evaluation of schemes under Macromanagement in Agriculture for 2006-2007. The final report has been prepared and submitted to the Department of Agriculture, Govt. of Kerala.

Under the DBT funded project "Technology Dissemination and Capacity Building among Women Groups for Use of Bio inputs in Agriculture", Trainings were conducted for four women groups and vermicomposting units were established by three groups in Nadathara, Avinissery and Varandarappilly.

Other activities:

The scientists of the Department are involved in various activities of the Department, College and University. At the department level, a Crop Museum consisting of various crops is being maintained. Tapioca is being cultivated in an area about 1.5 hectares from which rubber has been cleared. *Amorphophallus*, varietal collections of tapioca, yams and *Dioscorea* are also being maintained. A low lying area fit for growing paddy has been identified and will be developed during the current year so that students' paddy work experience can be carried out there in future.

Scientists of the Department participated in the one-day workshop on IPR held on 22-01-07 in the College of Horticulture. They also participated in the cashew day organized by the Cashew Research Station, Madakkathara, on 23-02-08. They involve actively in the RAWE programme of the Final year students. Under this programme, the 'Watershed Module' is handled by Dr. P. Pameela of the Department. A number of field tours are organized for the students by the Department staff. A visit to Kumarakom and high ranges was conducted to familiarize with various cropping and farming systems in vogue in the state. A trip to AHADS in Attappady was also organized to get first hand experience about soil and water conservation measures adopted there. Organic farming practices were understood by the students when a visit to an organic farmer's farm in Thiruvillvamala was organized.

The scientists also attended a number of meetings conducted by the Department of Agriculture, CADA, etc and also took classes on various topics for farmers, agricultural officers, college and school students, etc.

Dr. C.T. Abraham, Head of the Department, is Associate Patron of the Student's Union. Dr. P.S. John functions as Secretary of the College PTA.

Department of Plant Pathology

Dr. Sally K. Mathew, Professor participated in training programme as a resource person and took six classes on 'vegetable diseases and their management' and one class on 'cashew diseases' to the farmers. Dr. T.J. Rehumath Niza, Professor, as a resource person participated in the training programme conducted at Cashew Research Station, Madakkathara on 18-12-07 and took a class on biocontrol agents in vegetable cultivation. She also attended and acted as resource person in agroclinic conducted on 27-12-07 as a part of South Indian Agricultural Fair held at Mannuthy by KAU. Dr. Sally K. Mathew and Dr. S. Beena attended as a resource person for the agroclinic in 'Mango Fest 2007' held at Indoor Stadium, Thrissur on 4-6 May 07 organized by KAU.

Dr. Rehumath Niza and Dr. S. Beena participated in the SHM training conducted by ATIC-ABARD, Mannuthy on 27-11-07, 4-12-07 and 25-1-08 and taken classes on spawn production in mushroom and isolation and spawn production in mushroom respectively.

Dr. M.V. Rajendra Pillai, Professor attend agroclinic conducted as a part of RAWE programme at Edappal.

Dr. K. Surendra Gopal, Assoc. Professor took classes on biofertilizers production and use in organic farming to Agricultural Officers and Asst. Directors of Agriculture at KVK, Malappuram on 23-5-07, 8-6-07 and 19-6-07. He also took classes to PG Diploma course of IGNOU, New Delhi on Food Microbiology at COH, Vellanikkara on 11-9-07 and 13-9-07.

CPBMB

Classes and lab visits on tissue culture aspects and molecular biology aspects for farmers and students from various locations – 30 no.

Classes offered on medicinal plants to farmers at ETC - 5 Nos.

Classes offered to farmers at Cashew Research station Madakkathara on cashew apple processing - 2 Nos

Class on Biotechnology linked tender coconut village suited to Kerala-10nos

AICRP on Weed Control

Pomology & Floriculture

Operating an ABARD unit on horticulture nursery (unit III) with five members which envisage the production of quality fruit plants.

Agricultural Engineering

Took part in Agricultural Fair conducted at Vattakulam, Malappuram district and demonstrated some Agricultural machineries.

Exhibited some agricultural machineries at Thrissur Pooram Exhibition 2007.

Agricultural Meteorology

Weekly agro-advisory based on medium range weather forecasting is disseminated from the AMFU Centre

Agricultural Extension

The Department spearheads all the Extension activities of the college. As part of the RAWE program 2007, many agricultural seminars, training programs, farmer competitions and a mega agril. exhibition was conducted in Vattankulam Panchayat, Malappuram dist., during November 2007.

RTL

Acted as a member of Disaster Management Team visited to the site of landslide and building collapse near the banks of shanmukham Canal at padiyur Panchayath of Mukundapuram taluk and the sites of Kuttanad and Kole lands to submit report on the disaster.

CCRP

a) Participation in exhibitions: The technology for farm level secondary processing of cocoa was exhibited in agricultural and agro based industrial exhibitions held in Thrissur and neighbouring districts of Ernakulam. During the year, 1.65 lakh people visited the stalls established in three locations and the technology for farm level processing was transferred.

The small scale processing unit on cocoa established under the project, attracted the visitors to the main campus of the Kerala Agricultural University. During the year a total of 3000 persons visited the Unit, which included Scientists, Government employees, research scholars from various institutions, farm groups, farmers, school teachers, school children and entrepreneurs. The different aspects of farm level value addition have been explained to them in detail

AICRP on BCCP

Supplied biocontrol agents to farmers. Visited farmer's fields and suggested remedial measures for weed and pest problems.

Conducted study tours for the UG students

1. IV yr BSc (Ag) students to FCI Godowns at M.G.Kavu, Thrissur on 26-5-07
2. Conducted nature camp at Sient Valley by the Environmental club students
3. Accompanied UG students for South Indian Study Tour.

Pomology & Floriculture

Constructed two rain water harvesting structures (5 lakh l capacity) and an open well (6m dia) in the orchard for irrigation purpose

Processing Technology

IGNOU has identified the department of Processing Technology, College of Horticulture as a study centre for the diploma course in value added products from fruit and vegetables (DVAPFE)

Accordingly 12 students have joined for the course and completed during the year under report department staff and other staff members of the College have extended counseling classes for both theory and practicals and IGNOU has awarded diploma certificates for the successful candidates.

Dr. P. Jacob John, Professor - Coordinator of the Kerala Agricultural University P.G entrance examination 2007 held at College of Horticulture, Vellanikkara.

One of the members constituted for reviving the university livestock farm Thiruvazhamkundu by the University and submitted a detailed report before the Minister for Agriculture, Govt. of Kerala on 10th August 2007.

During 2007 the commercial processing unit attached to the Dept of Processing technology generated an amount of Rs. 50,000/- as revenue.

Department of Ag. Statistics

On the Average 60 hrs/month are spent for statistical data analysis work relating to the projects of other faculty staff and thesis work of all the students.

Statistical Advisory service: Statistical analysis work in respect of the Thesis works of PG and PhD students and Departmental projects are being helped by the faculty members of the department

Finance

Head	Expenditure (Rs)	Internal Receipts (Rs)
Non-plan	5,54,53,257	18,01,136
Plan	54,37,007	
ICAR	16,99,082	
Other EAPs	13,71,137	
Revolving Fund		

**COLLEGE OF AGRICULTURE
PADANNAKKAD**

Name of Head of station : Dr. I. John Kutty

Academic Programmes.

Intake capacity & No. of students enrolled during 2007-08			Out turn of students during 2007-08		
	Male	Female		Male	Female
UG	4	16	UG	3	18
PG (discipline-wise)	-	-	PG	-	-
Ph.D (Discipline-wise)	-	-	Ph.D	-	-

Intake capacity: 29

Study tours

- A. South India study tour for B.Sc.(Agri.) students of 2005 batch was conducted from 29.8.07 to 15.9.07
- B. North India Study tour for B.Sc.(Agri.) students of 2004 batch was conducted from 16.10.07 to 03.11.07.
- C. Students of 2003 & 2006 batch visited ICAR Research Complex & National Institute of Oceanography, Goa from 29-11-07 to 2-12-2007
- D. Students of 2004 batch visited to KFRI, Peechi, Biocontrol Lab, Mannuthy and AICRIP on Biocontrol of Crop Pests and Weeds unit at College of Horticulture, Vellanikkara on 28.03.08 as a part of the optional course "Integrated Pest Management-Principles and Practices" offered for 2004 admission students.
- E. As part of agronomy course work BSc (Ag) students of 2006 and 2007 batch visited University research stations.

Other activities

Students Union activities

1. Student Union was inaugurated by Former MP Kasaragod Sri. T.Govindan. on February 7th 2007. Arts club was inaugurated by Kum Tulsi, Kalaparthibha of Kannur University
2. Mosquito control program was organized by Science club and Social Forum during March 2007. Program included Seminar and release of the parasite against mosquito.
3. Mango fest and Kissan Mela 2007 was organised on 18th and 19th may 2007. Program included exhibition, Seminars and sales of mango fruits and its products, and mango grafts.
4. Art fest 'Olio' was conducted under arts club. Two day program included onstage and off stage competitions
5. Several debates were conducted under the Social forum. Topics were 'Reservation' 'Love marriage and arranged marriage' and Indo-US Nuclear deal'

6. New year was celebrated with gift exchange, film show and Cake cut by Associate Dean.
7. A trucking to Ranipuram and tour programs to historical places of Kannur district and Silent valley were conducted by the Nature club
8. Annual sports meet was conducted on 23rd February 2008. Students, teaching and non-teaching staff and farm laborours were participated.

Extra-curricular activities

NSS activities

9. NSS special camp was conducted from 3.3.08 to 8.3.08 at Koovatti Govt. High school of Kinnannoor Karindalam Gramapanchayat. During the camp students made garden in front of the school.
10. Tree saplings were planted as part of environmental day celebration

Sports and games

- III. Annual athletic meet of the College was conducted in a befitting manner on 23-2-08 with the participation of Students, staff and laborours
- III. Basket ball and Volley ball teams of this college participated in the Inter College tournament on 6th and 8th February 2008 at College of Agriculture Vellayani
- IV. iii. Four students of this College were selected for the Cricket team and participated in the south zone cricket tournament held at Madras from 15th to 18th of February 2008

Research Programmes

a. Major Research achievements (highlights)

1. A strain of Entomopathogenic fungus *Metarrhizium anisopliae* which is highly virulent on coconut rootgrub *Leucopholis coneophora* is isolated. Further studies are continued. Another Entomopathogenic fungus *Fusarium cocophilum* is found infecting on coconut rootgrub which is a new report.
2. Under the project on use of pheromones and Kairamones in different types of traps for the management of cucurbits fruit fly *Bactrocera cucurbitae*, low cost traps were designed and tested their efficacy. Results revealed that from a mixed population of fruit flies, pheromones along with the methyl eugenol can attract flies and thereby direct influence of insecticides on the produce can be avoided.
3. Various growth and physiological parameters were studied in eight varieties of black pepper subjected to different shade levels. Karimunda a shade tolerant type exhibited higher Net Assimilation Rate and lower carbon isotope discrimination than shade sensitive Panniyur-1 under very low light intensity. This work was part of the project on carbon isotope discrimination as a signature for shade tolerance in black pepper.
4. **Indigenous Technology Knowledge (ITK) project:** This project was implemented to collect the indigenous technical knowledge from farmers of Northern Kerala and validating the selected indigenous technical knowledge. Two district level workshop were conducted one each at Kannur and Kasaragod and about 100 new ITKs were collected. Validating the selected ITKs is in progress.
5. **Hariyali Watershed Developemnt Project:** Consultancy services for the preparation of project plan and monitoring of the Hariyali Watershed Development Project is done by the scientists of the College.

Completed Projects

<i>Name of Project</i>	<i>Funding Agency</i>	<i>Name of PI</i>	<i>Name of Co-PI</i>	<i>Outlay</i>
Induction of variability in vanilla through <i>invitro</i> culture and on farm evaluation of vanilla tissue culture plants in north Kerala	KSCSTE	Dr.T.Pradeepkumar	Dr.R. Sujatha Dr. Swapna Alex Sri. M. Joy	6.105
Utilization of Entomopathogenic fungi for the biological control of coconut root grub <i>Lucipholic coniafora</i> Burmeister	KSCSTE	Dr.K.M.Sreekumar	Mr.M.Joy Dr.D.V.Sairam Kumar	4.44
Establishment of nursery for Mushroom spawn production	KSHM	Dr. M. Govindan	Dr.Sible G Varghese	3.00

Extension Programmes

a) Highlights of extension activities

- Regular conduct of scientist – wise presentations about the summer/ winter schools/ trainings /workshops attended at the department/institution level for the effective dissemination of the knowledge acquired.
- Farmer's doubts on the cultivation of fruits, vegetables and medicinal plants were cleared as and when they visited
- Mushroom spawn, Trichoderma and Pseudomonas produced and distributed to farmers.
- Skill oriented practical training on grafting techniques for farmers of Nileshwar block was conducted in four batches covering 72 farmers
- Conducted 6 agroclinics as part of RAWE programme in Kasaragod and Kannur district.
- Regular Conduct of Krishi Darshan Programmes for the benefit of school students
- Mango fest 2007 was conducted on May 18th and 19th 2007 in which different mango varieties were exhibited and mango products were prepared and distributed. About 1200 farmers visited the exhibition of mango varieties and mango products. Technical session was conducted in which 30 extension functionaries Agriculture Directors, Agricultural officers and agricultural assistants were participated. Seminars on cultivation and plant protection aspects, processing and production of value added products of mango was conducted in which more than 300 farmers were participated.
- Farmer –Panchayat functionaries-Scientists interface was conducted thrice Kanhangad and Nileshwar block in which 20 farmers and 20 scientista were participated
- Tissue culture training was given for six PG students of Kannur University
- Two day training program on organic farming for the Agricultural Officers and Agricultural Assistants was conducted.

- Experts from the College participated in the videoconferencing face to face program of scientists and farmers conducted at CPCRI, Kasaragod

Radio talks/ TV Programmes/ Audio-Video Cassettes.

Topic	Date	Name of Scientist
Friendly insects	6.12.07	Dr. K.M.Sreekumar
Cultivation of medicinal plants	10-1-2008 at AIR,Kannur	Dr.A.Rajagopalan,
Cultivation of medicinal plants	6.12.07 AIR Kannur	Dr.A.Rajagopal
Diseases of Coconut	July 2007	Dr.M.Govindan
Neem and its importance	14.3.08	Dr. Allan Thomas
High yielding varieties	13.3.08	Dr.Usha C.Thomas

List of Publications

Scientific papers

1. Govindan, M., Anand, A. and Sible G.V. 2008 Interaction between *Azospirillum* and Cyanobacteria in the wet land rice system. Proc. Workshop on Current Trends in Algal Biodiversity and Biotechnology, February 6-8, 2008, Madras University, Chennai
2. Amritha, V. S. and Beevi, S. P. 2008. Occurrence of different varieties and types of *Hirsutella* spp. on coconut eriophyid mite (Accepted for publication)
3. Xuhong Yu, Dror Shalitin, Xuanming Liu, Maskit Maymon, John Klejnot, Hongyun Yang, Javier Lopez, Xiaoying Zhao, Krishnaprasad T Bendehakkalu and Chentao Lin (2007) Derepression of the NC80 motif is critical for the photoactivation of *Arabidopsis* CRY2. *PNAS USA* 17: 7789-7294
4. Xiaoying Zhao, Xuhong Yu, Eloise Foo, Gregory M. Symons, Javier Lopez, Krishnaprasad T. Bendehakkalu, Jing Xiang, James L. Weller, Xuanming Liu, James B. Reid, and Chentao Lin A study of Gibberellin homeostasis and cryptochromemediated blue light inhibition of hypocotyl elongation *Plant Physiology Preview*. Published on July 20, 2007, as DOI:10.1104/pp.107.099838
5. Brigit Joseph., Joseph K.J. Commercial agriculture in Kerala after WTO in south Asia. *Economic Journal* 6: 37-57
6. Gomez Saji and D.S. Khurdiya, 2007. Value addition in aonla through product diversification. Proceedings of the National Seminar on Nutrition and Life Style Diseases (pp.25-35). 15th April, 2007. Thrissur, Kerala
7. Mathew Deepu, T.Parimelazhagan, Saji Gomez and Z.Ahmed 2007. Characterization of seabuckthorn genetic resources in India using morphological descriptors. *Plant Genetic Resources Newsletter*, 149; 1-10
8. Saji Gomez and Z. Ahmed, 2008. Scope for value addition in apricot cultivars of Ladakh. *Indian Horticulture* (Accepted for publication)
9. Thomas, A., Bhaskaran, S., Kurien, S., Ajit, C.E. and Usha, C.T. 2008. 'Structural configuration of homegardens- an experience from South Kerala. Proceedings of 20th Kerala Science Congress. 28-31 January 2008. Thiruvananthapuram.
10. Thomas, A., Bhaskaran, S., Kurien, S., Ajit, C.E. and Usha, C.T. 2007. Diversity profile of homegarden systems in Kerala. *Ann. For.*, Dehra Dun, India. 15 (1): 71-80

11. Usha, C.T., Chandini, S. and Thomas, A. 2007. Betelvine (*Piper betel*) a highly remunerative intercrop for coconut garden. *Ind. Coc. J.* XXX 511 (11): 6-8.
12. Usha, C.T. and Thomas, A. 2007. Betelvine as intercrop in coconut garden. *Indian Nalikara Journal.* 36(3):4-5

Popular Articles

1. Govindan, M. and Jithish, P. 2008. Aarogyam Pradhanam Cheyyunna Pazhanjan Bhakshanangal. (KarshakaKeralam)
2. Amritha, V. S. and Varghese, S. 2007. Vazha ilayile ila theeni ochu. *Karshakasree* 9: 36

Books

1. Dr. K.M.Sreekumar, Dr. Jacob John, Joy, M., Dr. Umamaheswaran, K and Dr. Roy Stephen Handbook for Field level Diagnosis and Management of Diseases, Insect Pests and Nutritional Disorders in Coconut –based cropping systems- Both in Malayalam and English- 5 volumes: Coconut, Arecanut, Banana, Cocoa, Pepper Vanilla and Nutmeg.
2. Thomas, A and Johnkutty, I. 2007. *Kasargode agricultural resource inventory- a glimpse.* Kerala Agricultural University, College of Agriculture, Padannakkad, Kasargode. 42 P
3. Jessy KT and Johnkutty I 2008 Orientation lectures on International treaty on PGR and PPVR College of Agriculture Padannakkad Pg 58

No. of visitors to the Institution

Farmers 2000

School students: 25 groups

Finance

Head	Expenditure(Lakh Rs)	Receipts (Lakh Rs)
Non-Plan	-	-
Plan	196.50	8.86
ICAR	-	-
Other EAPs	9.28	
Revolving Fund	8.37	11.19

COLLEGE OF FORESTRY, VELLANIKKARA

Name of the Head of Station : Dr.P.K. Ashokan
Associate Dean

Research Programmes

Major research achievements

Department of Forest Management and Utilization

The growth performance of 50 tree species grown in the college farm was evaluated. Based on preliminary data, fast growing tree species were identified. Heartwood, sapwood, bark content etc. were estimated. Sp gravity and calorific values were also estimated.

Department of Wood Science

Developed an On-line (web enabled & CD) manual of timbers of Kerala Timbers of Kerala which will provide accurate & up todate information using a click and query system. Emphasis is on timber identification, utilization & criteria based selection.

Department of Silviculture and Agroforestry

A website (JTROPAG: <http://www.jtropag.in/index.php/ojs>) for hosting the Journal of Tropical Agriculture has been launched since October 2006 using "Open Journal Systems", a journal management and publishing system developed by the Public Knowledge Project—a partnership among the Faculty of Education at the University of British Columbia, the Simon Fraser University Library, and the Canadian Centre for Studies in Publishing at Simon Fraser University (<http://pkp.sfu.ca/>) on a LAMP (software bundle of Linux, Apache, MySQL, and PHP) platform. The site has provisions for Online Manuscript Submission, Review, Tracking, and Retrieval. All JTA volumes published since 2001 also have been uploaded and are freely available to the readers.

Niche Area Project on tropical homegardens: Development of Kerala homegardens coincided with the evolution of agriculture in this area, which in turn, started as the domestication of fruit trees around the settlements in the prehistoric era. Agricultural transformations brought by market economies in the recent past, including the incorporation of exotic trees such as rubber (*Hevea brasiliensis*), cacao (*Theobroma cacao*), and spices, however, has led to the decimation of some of these traditional gardens. Yet, the homegarden survived in Kerala and elsewhere, and today it is regarded as the epitome of sustainable land use in the tropics. Homegardens offer food and nutritional security to the subsistence farmers, besides acting as a source of cash income. Often they function as the loci for experimentation with new tree species and cultivation techniques, and thus have the potential to contribute to the development of other agroforestry systems, and to extension efforts that seek alternatives for agricultural development. Fruit trees are paramount in the homegardens of most areas including the peninsular India. Of the 38 native fruit and nut yielding tree taxa reported from Kerala homegardens, about 30 are underexploited and hitherto did not attract much scientific or managerial attention. Intraspecific variations also abound among the homegarden components as well as those in the natural habitat implying the potential for further improvement of indigenous fruit trees.

Farm advisory services

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

List of Publication

1. Dr. E. V. Anoop & Mareen Abraham " Practical manual in forest botany" published on 2007.
2. MOHAN KUMAR, B. 2008 (Tr.). Krishi Gita (Agricultural Verses) [A treatise on indigenous farming practices with special reference to Malayala desam (Kerala)]. Asian Agri-History Foundation (AAHF), 47 ICRISAT Colony-1, Brig. Sayeed Raod, Secunderabad 500 009, Andhra Pradesh, India, 111p.
3. Journal of Tropical Agriculture: Volume 45 (2007) [website: www.jtropag.in].

Important Visitors

1. A group of senior faculty and students of Forest and Research Institute, Mettupalayam visited the Seed Technology Museum and Laboratory.
2. Dr. A.K. Wahal DDG (Education) ICFRE and Dr.M. Surya Prakash, Director, IFGTB, Coimbatore visited the college museum on 16th of Feb, 08.
3. Mr. Unniyal, IFS, Project Director, AHADS on 18.8.07
4. ICFRE study team on 3.8.07
5. Prof. M. K. Prasad, Executive Director cum Chairman, Information Kerala Mission, on 31-5-2007

Details of sale of Seeds/ Planting materials/ Biocontrol agents etc.

Item	Quantity	Revenue
Forest seedlings	91280	2,21473/-

Finance

Head	Expenditure	Receipts
Nonplan	8610533	415864
Plan	3427397	-
ICAR	1612800	-
Other EAPs	1269645	-
Revolving Fund	417797	453262

COLLEGE OF CO-OPERATION, BANKING AND MANAGEMENT VELLANIKKARA

Name of Head of the Station : Dr. U. Ramachandran (since 7th Feb.2006)

Dr.A. Sukumaran, Professor, Dr. U. Ramachandran Associate Dean, Dr.K.N.Ushadevi Asst.Prof. (Sel.Gr.) Dr. E.K. Padmini Professor, Mr. M..Mohanan, Asst. Professor (Sel.Gr),Mr. Philip Sabu, Asst. Prof. (Sel.Gr.) were deputed for various for Seminars/ Workshops/ Symposia.

Thesis submitted during 06-07 (discipline –wise)

Discipline	Name of the Student	Major advisor	Title of the theses
Banking	Vijitha.V.N.	Dr.Molly Joseph	SHG-Bank Linkage Programme A study in Thrissur District

Other activities

a) Students Union Activities

Programme conducted drom 2006-2007

- 1 Union inaguration 15-02-2007
- 2 Farewell of 2002 batch : 26.3.2007
- 3 Interclass festival : 18,19,20 June,2007
- 4 Onam and Teachers day celebration : 5.9.2007
- 5 Freshers day celebration : 26.9.07
- 6 Seminar on information Act : 10.10.07
- 7 Seminar on personality development : 19.12.07
- 8 Film show : 22,23,24 –Jan 2008
- 9 Seminar on Time Management : October 2007
- 10 Tree planting : Januvary
- 11 Campus cleaning : January
- 12 Intercolliate Arts Festival : November
- 13 Agri-Festival : December

b) Extra curricular Activities

The students of the college were able to participate in a one day cleaning campaign held on 26th may, 2007, in the college, which was done in the Entire University by other colleges also.

c) NSS activities :

- 1 Attended Kerala Agricultural University combined NSS Camp at Thrikaipatta, Wayanad. NSS Programme Officer and 10 NSS Volunteers participated.
- 2 30 NSS Volunteers of our college attended various NSS National Level Campus organized in various districts of Kerala.
- 3 State Level NSS Camp on Rain Water Harvesting was hoisted by our college and the NSS Programme Co-ordinator Dr. M.K. Sheela appreciated the efforts and initiative taken by the NSS volunteees of our college to make the Programme a grant success.
- 4 As a part of massive afforestation Programme a tree planting programme was also launched in our college and inaugurated on World Enviornmental Day.
- 5 On farmers day, two documentary films related to the present day problems of farmers was shown to the invited farmers and NSS Volunteers.

- 6 An interactive session of teachers and students were arranged along with cultural programmes on teacher's day.
- 7 For the NSS Volunteers, various competitions were organized like essay writing on Men and Environmental Issues. Elocution on impact of mobile phones on youth and poster making competition.
- 8 A Red Ribbon Club and Blood Donor forum was formed in the college. As a part of the activity of Red-Ribbon club, a Seminar on Right of Aids Infected was under taken.
- 9 Personality cum orientation programme was organised for two days for the benefit of NSS Volunteers.
- 10 A lecture class on Rural Development and Educational level of tribals in India was arranged for the benefit of NSS Volunteers and the speaker was Kiran Maske, from Goa who visited various tribal people all over India by walk.

In addition to the above National days like Independence day, Republic day, and Sadbhavana day etc are celebrated in a befitting manner. Moreover 5 campus – cleaning programmes were also conducted.

Celebrated Independence Day on 15th August, 2007

Celebrated of Gandhi Jayandhi a 2nd October , 2007

Celebrated Republic Day on 26th January, 2007

Organized a campus cleaning programme.

Finance

Head	Expenditure	Receipts
Non-Plan	9431852	9501695
Plan	2677914	--
ICAR	2194911	2195000
Other EAPs	--	--
Revolving Fund	145934	249298

FACULTY OF COLLEGE OF VETERINARY AND ANIMAL SCIENCES

COLLEGE OF VETERINARY & ANIMAL SCIENCES, MANNUTHY

Name of Head of the Station : Dr. E. Nanu , Dean

Faculty improvement programme

a. Deputation of Scientists for Seminars/Workshops/Symposia

Many scientists were deputed for various seminars and workshops during the year under report.

b. Deputation of Scientists for training programmes/seminars/summer schools/winter school/short course.

Many scientists were deputed for various training programmes/ summer schools/winter school/short course. during the year under report.

c. Details of Seminars/workshops/symposia conducted at the station

Dr. M.R., Rajan, Professor, Dr. Syam Mohan ,Dr. Kannan.A. Associate Professors attended National Workshop on pig at College of Veterinary & Animal Sciences, Mannuthy on 28th and 29th June 2007

d. Awards/Scholarships to staff

1. Young Scientist Award:
K.B.Sumena and K.M. Lucy 2007 : In the National Symposium of IAVA on Recent Advances in Anatomy of the Domestic Animals with Special Reference to Developmental Anatomy.
2. Best Poster Award
S. Maya and J.J. Chughath 2007 : -do-
3. Best Poster Award
K.M. Lucy and K.R. Harshan 2008 : In the National Seminar on Role of Women Veterinarians in Augmenting Rural Economy through Animal Husbandry.

Academic Programme

	Total students	Male	Female
<i>UG Programme</i>			
BV.Sc & AH	426	207	219
MV.Sc.	83	29	54
Ph.D	7	2	5

Details of students pass out for the year 2007-2008

<i>UG Programme</i>			
BVSc. & AH	76	36	40
MVSc.	30	11	19
Ph.D	1	1	0

NSS activities

1. 30 NSS volunteers have participated in the Eravikulam Park in connection with census of "Nilgiri Thar".

2. In connection with the "world Environmental day, Nature Photography Exhibition was organized.
3. In connection with the NSS day, the volunteers visited Damian Institute for leprosy and distributed sweets and on January 30th a cultural programme was also organized.
4. Hundreds of NSS volunteers have participated in community Service programme a Kanimangalam Kole Land during April 9,10 and 11,2008.
5. 156 NSS Volunteers participated in Nature study camp in the Vazhachal Forest Division.

Sports and Games

1. Saju Mon.K. and Gopalakrishnan. participated in the South Zone Table Tennis tournament conducted at VIT Vellore 29th and 30th November 2007.
2. Renjith.B.L and Pramod. participated in the South Zone inter University Shuttle Badminton tournament held at Kolanchery from 3rd to 6th November 2007.
3. Nithin Peter participated in the Interuniversity athletic meet held at Annamalai from 15th to 17th January 2008.
4. Mohammed Fawar.P, Midhin.O.V., Shabeer Ahamed.K.K, Suresh.S., Tinu.E, Mathew, Kiran Babu.S. and Aswini.K.Aravind participated in the South Zone foot ball tournament held at Annamalai
5. Basil Paul and Vishnu.S. participated in the South Zone Inter.University Cricket tournament held at Chennai.
6. Vishnu.S.Shaji, Joseph Kallingal, Anoop.R., Jobin Jose Kattoor, Shameena.K.S. and Shalini Ashok, participated in the Inter University Agri Games and Sports held at Rahuri from 22nd to 25th February 2008
7. The following students participated in the All India Inter University Swing Championship held at Trivandrum .
 Sony Cyriac got the Bronze Medals in 50 mt.,100 mt,200 mt back stroke.
 Keerthi.A.J. Participation only.

Major Research Achievements:

1. Radiographic evaluation of pyometra in dogs and their surgical management were studied in which 12 dogs with the history and symptoms of pyometra were subjected to detailed clinical, hematological and biochemical investigations. The uterus was catheterized transcervically using three techniques, viz. using bitch urinary catheter, Scandinavian AI. Technique and modified proctoscope with illumination. Contrast material was infused into the uterus and hystero-graphs were made. The dogs were then grouped into three: Group I was treated with indwelling transcervical catheter; Group II with indwelling transcervical catheter and PGF 2 alpha @ 30 mcg/kg bid for five days and Group III with ovariohysterectomy and results were observed. Norwegian AT technique was found feasible over the other two for intrauterine catheterisation for hystero-graphy and placement of transcervical cannula. Ovariohysterectomy was found better over the uterine drainage techniques with regard to the survival rate of the dogs.
2. A treatment protocol was successfully evolved for the management of gastro - intestinal out flow disorders in dogs. Pre - operative evaluation of the patient and X- ray diagnosis confirmed most of the conditions. Early detection of the condition, proper pre - operative preparation of the patient, correction of fluid deficit before surgery, post operative fluid therapy with out oral feed intake for first 48 h of surgery, along with suitable antibiotics and supportive medicines favoured early successful outcome of surgery of puppies.

3. An anaesthetic protocol employing Midazolam with xylazine premedication for general anaesthesia with ketamine and isoflurane was clinically evaluated in dogs. Muscle relaxation was found adequate in Midazolam administered groups. Administration of inhalant anaesthetic Isoflurane given groups showed sufficient muscle relaxation and prolonged anaesthesia without much complications than with xylazine- ketamine groups.
4. Scleral approach for extra capsular cataract extraction was found superior to corneal approach since it produced no scar formation on the cornea. However intraoperative intraocular bleeding was found more in this technique. Care full handling of anterior chamber is required to avoid corneal endothelial damage and subsequent opacification of cornea.

b. Details of research projects

Completed Projects

Post graduate Projects- completed

Name of the student	Major Advisor	Title of the thesis
Dr. Jinesh kumar N.S.	Dr. T. Sarada Amma	Evaluation and Management of Gastrointestinal outflow disorders in dogs
Dr. Tessy Mathew.	Dr. John Martin ,K.D	Scleral approach for extra capsular cataract extraction in dogs
Dr. Soumya Ramankutty	Dr. K. Rajankutty	Clinical Evaluation of Propofol- isoflurane Anaesthesia with Xylazine premedication in Dogs.(Final examination to conduct during 7/08)
Ph.D		
Name of the student	Major Advisor	Title of the thesis
Dr. John Martin,K.D	Dr. T. Sarada Amma	Radiographic Evaluation of Pyometra and its Surgical Management in Dogs
Dr.M.K.Narayanan.	Dr. K. Rajankutty	Midazolam in combination with Glycopyrrolate and Xylazine as a preanaesthetic for general anaesthesia in dogs.

Chromium propionate was fed at 200 ppb to growing swine and the results indicated a significant reduction in blood total cholesterol level.

- ❖ Chromium propionate supplementation at 2 ppm to early lactating cows increased total milk production,
- ❖ improved the persistency of the milk production, reduced post partum heat period and reduced in the cost of milk production by Rs.1.8 per Kg. of milk produced.
- ❖ Combination of *Pleurotus ostreatus* with *Murraya konjii* and *Aegle marmelos* has the highest hypoglycemic and hypolipidemic effect than individual effect of *Murraya konjii* and *Aegle marmelos* suggesting synergistic effect of the three.
- ❖ Studies on nephroprotective effect of *Hygrophila spinosa* and *Mangifera indica* in albino rats validated the nephroprotective effect of these two plants for the management of renal disorders.
- ❖ Critical control points for both raw and pasteurized milk were evaluated and the risks identified. An HACCP module was developed based on risk assessment for milk processing plant.

Pasteurized milk under refrigeration showed an increase in TVC and psychotropic count throughout the period of storage. E.coli was detected in 20.8% and *staphylococcus aureus* from 6.9% of the samples. *Pseudomonas* was isolated from 22.2% of the raw milk samples. Rapid detection of the pathogens E.coli and *staphylococcus aureus* using PCR standardized. Critical gaps in clean milk production at the farmers and society levels were identified and remedial measures to plug the gaps and improve the quality of raw and pasteurized milk suggested through a work shop.

AICRP ON GOAT IMPROVEMENT

All India Coordinated Research Project on Malabari Goat Improvement was aimed at :

The objectives of the Project are

1. Characterization and evaluation of Malabari goats under field conditions.
2. Generation of baseline information on management practices, population trends, feeding system, disease pattern and mortality, socioeconomic and gene marker traits under village conditions.
3. To select the genetically superior males from the farmer's flocks and to establish an elite germplasm centre.
4. To use superior sires for improving the productivity of goat farmers' flock.
5. To evaluate the socio-economic status of goat breeders and the economics of goat production under village conditions and
6. Evaluation of performance under intensive, semi-intensive and extensive system of management.

The average birth weight was 2.26 ± 0.117 kg. Effect of sex, centre, year of birth

and type of birth were significant. Animals born in Tellicherry centre had lower birth weight than those reported for other centers. Male kids had higher birth weight than females. Though year of birth is a significant source of variation affecting birth weight there is no specific trend for this. But animals born in 2007 had highest average value. Single born kids had higher birth weight than twins and triplets.

The mean weight at 1,3,6,9 and 12 months of age respectively. 4.00 ± 0.285 , 9.70 ± 0.42 , 14.05 ± 0.86 , 19.74 ± 0.911 and 27.56 ± 1.42 kg respectively.

Effect of centre was a significant source of variation on body weight with animals from Tanur recording lower values at all ages.

A pronounced effect of season of birth on body weight at all ages was visible, but no predictable pattern was discernible seen.

Heritability of body weight at different ages is presented in Table 6. The values are 0.201 ± 0.182 , 0.356 ± 0.223 , 0.248 ± 0.187 , 0.126 ± 0.200 , 0.242 ± 0.363 and 0.132 ± 0.296 for birth, one, three, six, nine, and twelve months respectively.

Body measurements of Malabari goats at birth, 1,3,6,9 and 12 months of age are presented in Table 7. The overall mean heart girth were 32.36 ± 0.22 , 47.58 ± 0.25 , 56.63 ± 0.33 , 62.56 ± 0.44 and 67.06 ± 0.99 cm for birth, 1,3,6,9 and 12 months of age respectively. The corresponding values for body length were 30.69 ± 0.23 , 44.70 ± 0.20 , 53.1 ± 0.32 , 58.78 ± 0.43 and 58.47 ± 0.53 cm respectively.

The average peak yield was found to be 850.80 ± 62.91 ml. The effects of season and year of kidding and location centre were significant source of variation affecting average daily milk yield in Malabari goats.

The average gestation length, Age at first kidding and interkidding interval are 149.34 ± 1.49 , 381.36 ± 18.33 and 263 ± 15.62 days respectively. The kidding rate of Malbari goats was 1.75.

Genetic diversity of four geographically different goat populations in Trivandrum, Kottayam, and Thrissur were compared with Malbari goats of Kozhikode district for physical, biometrical traits and microsatellite markers.

Based on physical traits, the populations were not very distinct and uniformity was seen with respect to coat colour, horn pattern, presence or absence of tassels or beard and hair pattern. The animals were predominantly horned and short haired with coat colour of white or a combination of white with either black or brown. Majority of animals did not possess tassels or beard.

The Biometrical traits observed were body measurements, peak yield and prolificacy. Body weight of adult female goats was predicted using the regression equation based on the power function of chest girth. It was shown that the animals of Trivandrum district had higher values for almost all body measurements and predicted body weight, while the Thrissur population had lowest values for these growth traits. Animals of Kottayam and Kozhikode came in between. Percentage of multiple births was also higher in the Trivandrum population (68) compared to other populations indicating high prolificacy. Highest peak yield was recorded for Kottayam goat population.

Discriminant analysis based on morphometric measurements revealed that the most discriminative variables were head width and body length, followed by shin circumference and rump length. Mahalanobis distance calculated based on morphometric traits indicated that Thrissur and Trivandrum populations were more distant, while least distance was observed between Kottayam and Kozhikode. Discriminant analysis based on body weight, peak yield and prolificacy revealed that only body weight and peak yield variables have significant discriminative capacity. Trivandrum, Kottayam and Kozhikode populations were grouped together in one cluster based on the distance value. Thrissur population was distant from all other populations.

Microsatellite analysis revealed that all the five loci were highly polymorphic with five to nineteen alleles in different populations. The total number of alleles, the mean number of alleles per locus, mean heterozygosity and mean polymorphic information content were 51, 10.2, 0.8201 and 0.8104 respectively. The values indicate that the markers can be successfully used to study the variations existing in the populations. Based on Nei's genetic distance Thrissur and Trivandrum population were grouped together first and then with Kozhikode population, while the Kottayam population formed a unique branch in dendrogram.

Unrelated distance values produced by quantitative and molecular measures of variation may be attributed in part to the environmental influences and local selection pressures. Though use of more number of markers may possibly explain the variation encountered in these traits, the present investigation reveals that selection within each population for traits of economic importance like body weight and milk production is the best method to improve the performance of goats of Kerala.

Genetic Variability Analysis of Indian Elephants using Microsatellite markers

The project envisages to test the extent and character of molecular genetic variation using highly polymorphic microsatellite markers with the following objectives:

1. To establish a gene bank of elephants consisting of DNA samples from at least 300 Indian elephants belonging to different populations.
2. To characterize the different populations of elephants using microsatellite markers.

3. To estimate the allele and genotype frequencies at the polymorphic loci.
4. To analyse the genetic divergence/similarity among different populations of Indian elephants based on microsatellite polymorphisms.
5. To set up a panel of highly polymorphic microsatellite markers for elephants suitable for molecular genetic analysis.

So far blood samples were collected from 390 Indian elephants from different parts of the state as well as neighbouring states of Karnataka and Tamil Nadu. High molecular weight genomic DNA was extracted successfully from all the blood samples and the quality of the DNA samples were assessed by agarose gel electrophoresis. About 150 samples each have been typed using radioactive isotopes and autoradiography for eleven microsatellite loci selected from African/Indian Elephants, namely Lat05, Lat07, Lat08, Lat26, LA4, LafMS02, LafMS03, LafMS04, Lat02, Lat25 and EMXI. Two loci, namely Lat 07 and LafMS04 were found to be monomorphic. All other loci were polymorphic and the number of alleles, allele size range, and heterozygosity, Polymorphic Information Content and parentage exclusion probabilities were calculated for each such locus.

ICAR FIELD PROGENY TESTING SCHEME

Seven batches of bulls have been sampled since the inception of this project in 1992 and the use of the eighth batch is in progress. Lactation milk yield of progeny cows of the first three batches have been completed. The progeny cows born from the scheme are having 500 kg more milk than their contemporaries in the field in lactation. Out of the 4169 inseminations in the field 3679 were followed up and the conception rate of the bulls in the scheme was observed to be 44.9 percent.

KAU SCHEMES

Vechur cattle conservation project: Conservation of Vechur germplasm which was facing extinction was undertaken with remarkable success. This programme became a model for the germplasm conservation activities in our country. At present these valuable animals are maintained as a central germplasm unit in the Veterinary College, Mannuthy. Efforts are being made to multiply and propagate this breed to interested farmers. Farmers interested in "Vechur farming" were given special training on various farm techniques and the importance of native germplasm. 23 good vechur animals were supplied to farmers as seed material to establish a Vechur farm. A regular contact programme on technical aspects of farm and necessary semen for the cow were distributed to these farmers whenever necessary.

Research on Rabbit: The rabbit farm is functioning as a source of seed materials on various breeds of broiler rabbit. White Giant breed of rabbit was introduced to the farm stock last year. A total of 83 animals belonging New Zealand White, Soviet Chinchilla, Angora and White Giant were purchased from Sheep and Wool Research Station at Kodaikanal and Ooty and added to the farm stock. 735 Rabbits were supplied to various farmers and a regular contact programme arranged to clear their problem whenever required.

Micro satellite marker studies on 3 breeds, viz. Soviet Chinchilla, New Zealand White and Grey Giant was completed and the genetic distance between them was found and which can be successfully used for charting out the breeding policy for rabbits.

The immunopotency of two vaccines prepared from *P. Multocida* A: 1 strain viz. capsule enhanced bacteria and biofilm vaccine were compared with conventional bacteria vaccine in 1-month-old ducklings. Of the three, the biofilm vaccine was found to give persistently higher antibody titre and better protection. Vaccine prepared from capsule enhanced organism did not show any additional advantage over the conventional bacteria vaccine.

PCR has been standardized to detect *Leptospira* and *Mycoplasma* in bovine mastitis milk.

Comparative efficacy of RT-PCR, RNA-PAGE 7 AGID for diagnosis of bovine rotavirus infection in calves was tested. Among the three, RT-PCR was found to be the most sensitive method.

Bacterial organisms associated with respiratory infections in poultry were isolated and their antibiogram studied. A total of 31 bacterial isolates were obtained from the samples, out of which 12 were *Escherichia coli*, 4 *Pasteurella multocida* and 15 *Staphylococcus sp.* isolates.

Pasteurella multocida A: 1 strain was grown in iron sufficient and iron-restricted media and the OMPs were extracted. When analysed by SDS-PAGE, OMPs of organisms grown under both the conditions revealed 10 protein bands each of molecular weight ranging from 91.84-19.02 kDa. The OMPs of organisms grown under iron-restricted conditions showed an additional protein band with molecular weight of 97.8 kDa. Oil adjuvanted formalin inactivated OMP vaccines were prepared under both the conditions and their immunopotency in one-month-old ducklings was compared with that of the conventional vaccine. The OMP vaccine prepared under iron-restricted conditions, though provided a higher antibody titre, afforded lower preprotection percentage.

The pathogenicity and antigenic relationship of local isolates of *Salmonella gallinarum* were evaluated using SDS-PAGE & AGID. All the isolates were antigenically similar and all were pathogenic to day old chicks and layers.

Out of 52 suspected cases of Pasterurellosis, four isolates were obtained and biotyped as *Pasteurella multocida* subsp. *multocida*. Antibiogram results revealed all the isolates were resistant to the commonly used drug, Sulphadiazene and sensitive to cholamphenicol, cephalixin, ciprofloxacin and nitrofurantoin. OMP vaccine prepared under iron restricted condition afforded high antibody titre, but lower percentage of protection.

Extension Programmes

Department of Anatomy

Collection and preparation of specimens in the Anatomy museum and demonstration of the mounted specimens to visitors.

Department of Animal Reproduction

- 1) Managing 2 A. I. Centres, bull station and semen bank at campus and one A.I. Centre at Kokkalai.
- 2) Attending to Mobile Sexual Health Control Unit catering the need of farmers on call for A.I., Infertility and obstetrical cases.
- 3) Imparting gynaecological and A.I. works at Cherumkuzhy and Valakkavu milk societies through Veterinary Ambulatory Clinics.
- 4) Managing obstetrical and gynaecological cases at both Veterinary Hospitals at Mannuthy and Kokkalai.
- 5) Imparting obstetrical and gynaecological help to University Livestock Farms.
- 6) Treatment and inspection of animals at various KAU farms for gynaecological problems.
- 7) Attending to infertility camps and seminars being organized by Govt./organizations;
- 8) Participating in extension programmes by radio talk and T.V. Programmes.
- 9) Working as referral unit for referred cases of field veterinarians.
- 10) Managing 2 infertility units at Kokkalai and Mannuthy and maintaining a stationary infertility clinic at Mannuthy.

Department of Clinical Medicine

- a) Department of Extension
2. Participated in the following Exhibitions
 - 1) Thrissur Pooram Exhibition – Thrissur 2007 April 1 to May 22.

- 2) Kera Raksha Kerala Raksha Exhibition 2007 June 21, 22,23.
- 3) Suvarna Varsham Exhibition Bala – Kochi 2007 August 19, 20.
- 4) Karshika Mela Exhibition – Vattankulam 2007 December 13,14.
- 5) South Indian Agri. Fair, Mannuthy 2007 December 20 to 31.
- 6) Flower show, Thrissur 2008 January 19 to 23.
- 7) State Agri. Fair, Marine Drive, Kochi 2008 February 18 to 24.
- 8) Thrissur Pooram Exhibition, Thrissur 2008 march 18 to May 17.

Department of Parasitology

Collection and preparation of specimens in the Parasitology museum and demonstration of the mounted specimens to visitors.

Department of Pathology

Services rendered to farmers

Various diagnostic methods like post mortem diagnosis, examination of clinical materials, Rabies diagnosis and advice to farmers.

Post mortem conducted

Large animals	-	512
Birds	-	13057
Rabies diagnosis	-	237
Histopathology -		159
Clinical materials	-	18

Department of Poultry

Farm Advisory Services.

In Person	Over Telephone	Through Letters
160	200	50

Department of Preventive Medicine

Regular immunizations are being done against R.D. rabies, C.D.,I.C.H., Leptospirosis and Parvo at both University Veterinary Hospitals, Kokkalai and Mannuthy.

Antirabies vaccination camp at UVH, Mannuthy on 6th July 2007, Vaccinated 164 dogs in connection with World zoonosis day.

This Department is engaged with various immunization programmes of animals belonging to different KAU farms. Also these animals are being screened for Tuberculosis, Johne's disease, Brucellosis and Mastitis periodically.

Department of Veterinary Public Health

- 1) Interacted with the farmers in the field on improving the quality of the milk they produce and on the problems they face in improving the quality of the milk production.
- 2) Visited the milk societies in the Thrissur Ernakulam and Palakkad districts and interacted with the personnel's of these societies to improve the quality of the milk at their level.

Department of Pig Farm.

There was incidents of sudden deaths in the Centre and different parts of Kerala due to swine fever. The Centre had discussion with the field Veterinarians of Animal Husbandry Department of Government of Kerala and recommended to procure the vaccine against the swine fever from Animal Disease Control Programme of Government of Kerala.

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. During the last year there were 4365 telephone calls from farmers of Kerala and even various aspects of pig farming which were entertained by the unit. During the last year about 45,000 farmers & students from different states of India visited the farm.

The Centre for Pig Production and Research could establish 150 piggery units throughout the State of which sizable number of farmers took up this as a full time engagement and this unit is proud to report that it could provide a sustainable income for the farmers and many of them now totally depends on their pig farm as their regular income. The Centre gives technical advice in the preparation of project reports, establishment of field units of pigs and active involvement in people's campaign programmes in decentralized planning. Many progressive pig farmers have been participating and discussing the prospects and problems of pig rearing in Kerala and many of the pig farmers expressed their success stories. Self employment training was given to unemployed women from weaker section of the community for starting their own piggery units. Recently different units of Kudumbashree programme were undertaken for short-term training on piggery for their better livelihood.

With the collaboration of Kerala Live Stock Farmers Association, the Centre has organized farmers meet and discussed the constraints and limitations of the pig farming in the state and remedial measures were evolved and the same has been submitted to the state government for necessary action through the association. The Centre has been producing and distributing approximately 5000 quality piglets to the farmers of Kerala and all over India every year attaining an average body weight of 150 kg with lean meat at the market age.

List of publications

Department of Anatomy

Sl. No.	Authors and Year	Title of the paper	Name of the journal Vol., Issue, Page No.
1. Scientific Articles			
1.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2007)	Histochemical studies on the brain of foetal goats	Indian Vet. J. (84): 1079-1082
2.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2007)	Prenatal development of neuroglia in the brain of goats	Indian Vet. J. (84): 1176-1179
3.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2007)	Morphogenesis of basal nuclei in goat fetuses	Indian J. Anim. Sci. (77): 1251-1253.
4.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2007)	Histochemical changes in the spinal cord of goat foetuses	Indian J. Vet. Anat. 19 (1): 79-87
5.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2007)	Prenatal histological changes in the dorsal root ganglia of goats	Indian Vet. J. (84): 623-626
6.	S. Maya, J.J. Chungath,	Morphometry of spinal cord in	Indian Vet. J. (84):

	K.R. Harshan, and N. Ashok (2007)	goat foetuses	736-738
7.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2008)	Gross observations on the root emergence length in the foetal spinal cord segments in goat	Tamilnadu J. Vet. Anim. Sci. 3(6): 290-295
8.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2008)	Prenatal studies on the enlargements of spinal cord in goat.	Indian Vet. J. (85): 191-196
9.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2008)	Organization of dorsal gray horn in the spinal cord of goat fetuses	Indian J. Anim. Sci. 77(7): 710-714
10.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2008)	Morphogenesis of spinal cord in goat foetuses	Indian J. Anim. Sci. 77(7): 730-733
11.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2008)	Development of spinal meninges in goat foetuses	Indian Vet. J. (85): 299-304
12.	S. Maya, J.J. Chungath, K.R. Harshan, and N. Ashok (2008)	Histological features of cervical segments of spinal cord in goat foetuses	Indian J. Anim. Sci. 78: 468-471
13.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2008)	Early histomorphogenesis of mesencephalon in goats	Indian Vet. J. (84): 730-734
14.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2008)	Relationship between body weight and brain parameters in goat foetuses	Indian Vet. J. (84): 618-622
15.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2008)	Morphogenesis and histogenesis of olfactory bulb in goat foetuses	Indian J. Anim. Sci. (77): 706-709
16.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2008)	Relationship between age and brain parameters in goat foetuses	Indian J. Anim. Sci. (77): 734-737
17.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2008)	Relationship between skull parameters and brain parameters in goat fetuses	Tamilnadu J. Vet. Anim. Sci. 3(1): 29-38
18.	K.M. Lucy, K.R. Harshan, J.J. Chungath and N. Ashok (2008)	Prenatal development of cranial meninges in goats	Indian J. Anim. Res. 42(1): 23-28

Department of Animal Reproduction

Scientific Papers - 3

Popular Articles - 2

Department of Clinical Medicine

Popular Articles - 4

Department of Microbiology

A. Research Articles:			
Sl. No.	Authors and Year	Title of the paper	Name of the journal Vol., Issue, Page No.
1. Scientific Articles			
1.	Priya P.M. Nair, G.K., Mini, M. and Jayaprakasan V.(2007)	Diagnosis of EDS-76 infection by filter paper strip method.	Indian Vet. J. (84): 563-565

B. List of participation in seminars/ symposia/ conferences.	
1.	Koshy John G. Krishnan.Nair and M. Mini Recent advances in the differential diagnosis of PPR and Rinderpest. National Seminar on Advanced Techniques in Animal Disease Diagnosis and Control, held at Trivandrum, December 14-15, 2007. Compendium pp.26-43
2.	R. Ambily, M. Mini, G. Krishnan Nair and Koshy John. -- Diagnosis of Rotavirus infections in calves. National Seminar on Advanced Techniques in Animal Disease Diagnosis and Control, held at Trivandrum, December 14-15, 2007. Compendium pp.44-48
3.	A.R. Ranjini, G. Krishnan Nair, M. Mini, Outer membrane protein vaccine for pasteurellosis. National Seminar on Advanced Techniques in Animal Disease Diagnosis and Control, held at Trivandrum, December 14-15, 2007. Compendium pp.49-50
4.	Jesto George, G. Krishnan Nair, M. Mini, New generation Veterinary Vaccines. New Generation Veterinary Vaccines. National Seminar on Advanced Techniques in Animal Disease Diagnosis and Control, held at Trivandrum, December 14-15, 2007. Compendium pp.18-121.

Department of Pharmacology

1. Hypoglycaemic effect of elite and red flowered Lotus in partial panueatectomy model
Jayaamurgan M., Chandrasekharan NAIR, A.M. Presannakumari, K.I. and Gopakumar. N,
Compendium of 7th Annual Conference of ISVPT – 29 p.
2. Evaluation of Flypo glycemic effect of Nelumbo nucifera in alloxan induced type II diabetes in Sprague dauley rats. Jayamurugan, M. Kowslkraj, P. Binoy A.M., Chandrasekharan Nair, Aravindhakshan T.V. Presannakumari. K.T and Gopakumar N. Compendirum of 7th Annual Conference of ISVPT p 35
3. Neploroprotective effect of Hydrophila spinosa in albino rats.
Bibu John Karayil, Joy A.D, A.M.C. Nair,Midhun, M.V, Mammen J.Abraham, Mercy A.D.,
Compendium of 7th Annual Conference of ISVPT, p.41.
4. Neperotoxicosin Remedies from the nature Indu. K, Eliza Jose, Bibu Hb Karayil, A.M.C. Nair
Compendium of 7th Annual Conference of ISVPT p. 46.

Department of Physiology:

Scientific articles:

Sl. No.	Authors and Year	Title of the paper	Name of the Journal Vol., Issue, Page No.
1.	Dr. K.V. Ramnath, P.S. Rekha & K.S. Sujatha (2208)	Amelioration of heat stress induced disturbances of anti oxidant defence system in chicken by Brahma Rasa;yana.	Evidence Based Complimentary and Alternative Medicine 5(1): 77-84
2.	Karthiyayini. K. and Philomina, P.T.	Immunomodulatory effect of Vitamin C in broiler under overcrowding stress.	XIII Annual Convention of Indian Society for Veterinary Immunology and Biotechnology 2007.
3.	Karthiyayini. K. and	Adverse effect of	IX National technical

	Philomina, P.T.	Virginiamycin on haemogram of broiler chicken under overcrowding stress	seminar on Role of women veterinarians in augmenting rural economy through Animal Husbandry 2008. p 60
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Department of Poultry.

Popular Articles - A burden in Poultry Industry Dr. A Jalaludeen and Binoj Chacko., Poultry Punch Vol 24 (2) PP 45-46

Department of Statistics.

Scientific papers

- Scena T.X., Raghavan K.C. and Mercy K.A (2007). Fecundicity gene linked microsatellite markers in malabari goats. Proceedings of the 19th Kerala Science Congress pp. 602-603
- Ramnath V., Rekha P.S. and Sujatha K.S., (2007). Amelioration of heat stress induced disturbance of anti oxidant defense system in chicken by brahma rasayana. ECAM 2007 pp.1-8
- Raji James, M.R. Sasindranath K. Vijayakumar and K.S. Sujatha 2007. Immune response between two anti rabies vaccines in two different schedules in rabies exposed goats. Indian Veterinary Journal 84: 1128-1130.

Department of Extension Programmes:

Scientific Papers

1. Raji James, M.R. Saseendranath K. Vijayakumar and K.S. Sujatha (2007). Immune response between two antirabies vaccines in two different schedules in rabies exposed goats, Indian Vet. J. 84 (11) 1128.

Popular Articles

Tresamol P.V. and Usha Narayana Pillai(2007): Canine Ehrlichiosis Karshakashree, November 2007.

Department of Veterinary Public Health

Scientific Papers - 4
Popular Articles - 2

Department of Pig Farm:

Scientific Papers - 6

Department of Livestock Production Management

Scientific Papers - 2

Department of Surgery:

Scientific Papers - 5
Popular Articles - 13

Department of Animal Reproduction.

Details of Semen sale

Species	A.I. Centre, Mannuthy	A.I. Centre, Kokkalai	Ambulatory Clinic	Mobile Unit.
Cow	494	187	144	57
Buffaloes	49	35	Nil	Nil
Goats	506	577	73	Nil

Unit-wise revenue during the financial year ended on 31.03.2008

1. A.I. Centre, Mannuthy	-	Rs.19,890/-
2. Ambulatory Clinic	-	Rs. 6,135/-
3. Mobile Unit.	-	Rs. 2,373/-
4. A.I. Centre, Kokkalai	-	Rs. 7,540/-

Department of Nutrition:

Details of Sale of Seeds/ Planting materials/ Biocontrol agents etc.

Item	Quantity	Revenue (Rs)
Rat	2920	1413000
Mice	3424	85320
Rabbit	111	17320
Guinea Pig	12	1560
Hamster	296	20440
Feed	1173.5 kg	29289
Tax	8%	20554
Total		315783

Department of Poultry:

Details of Sale of Seeds/ Planting materials/ Biocontrol agents etc.:

From the revolving fund hatchery the following number of chicks were sold.

i. Gramalakshmi	:	30702
ii. Gramasree	:	60446
iii. Grama Priya	:	28531

Department of Pig Farm.

Details of Sale of Seeds/ Planting materials/ Biocontrol agents etc.

	Item	Quantity (No.)	Revenue (Rs. in Lakhs)
	CPPR & Scaling of Pigs	898	16.894
	AICRP on Pigs	150	1,920

Department of Surgery

Details of Sale of Seeds/ Planting materials/ Biocontrol agents etc.

Item	Quantity	Revenue (Rs.)
X- Ray charges collected		13030.00
Sale of practical manual		5405.00
Total		18435.00

Extension Programmes

Department of Extension

Details of activities

No. of visits

Problem Identified:- The high cost of feed, insufficient production, low knowledge in Animal

Husbandry and unavailability of good quality animals.

Recommendations :- Frequent field visit by the experts. Awareness campaign co-ordinating and collaborating agencies involved in critical input supply and service.

Microbiology

Farm advisory services – Microbiological examination of 456 biomaterials from field and farms.

Taking classes for field veterinarians/farmers

Dr.G.Krishnan Nair took classes for Veterinary officers on “Foot and mouth diseases of Zoo animals: Etio-pathological profile” during State Level Seminar on Animal husbandry Sector and the state economy and diseases of zoo animals at College of Veterinary and Animal Sciences, Mannuthy on 02-08-2007.

Field visits:

Sl.No.	Problem identified	Recommendations
1.	Death of Calves at Dairy unit KCAET, Tavanur-26-07-08	De-tick all the animals and premises using Amitraz Prompt attention and Medical treatment to the animals showing symptoms of disease. Deworming of the animals Veterinary services may be improved by utilizing a qualified veterinarian.
2.	Diagnosis of FMD in Zoo, Thiruvananthapuram 06-07-2007	All the affected animals are to be sacrificed and movement restriction to the affected area has to be made strict.

Radio talks/TV programmes/Audio-Video cassettes

Topic	Date	Name of Scientists
Panel discussion on “Diseases in domestic animals and precautions” at Doordarshan, Thrissur	24-10-07	Dr.G.Krishnan Nair

Parasitology

b. Details of activities – Examination of clinical samples received from veterinary hospitals and private owners

Faecal samples : 240

Blood smears : 60

Lymph node biopsy: 4

Others : 20

Pathology

Services rendered to farmers

Various diagnostic methods like post mortem diagnosis, examination of clinical materials, Rabies diagnosis and advice to farmers.

Post mortem conducted

Large animals	512
Birds	13057
Rabies diagnosis	237
Histopathology	159
Clinical materials	18

Poultry

(ii) Farm Advisory Services.

In person	Over telephone	Through letters
160	200	50

iv. Radio talks/TV programmes/Audio-Video cassettes - Nil

Topic	Date	Name of Scientist
How to get increased income from backyard poultry – interview	19-10-2007	Dr.A.Jalaludeen
How to tackle Avian Influenza – radio talk	25-1-2008	Dr.A.Jalaludeen

Preventive Medicine

Training Programmes/seminars attended

	Topic	No. of trainees	Category	Venue	Date	Name and designation of the scientist
1.	Emerging disease diseases of livestock	100	Veterinarians	Thrissur	13-3-2007	Dr.M.R.Saseendranath, Professor
2.	Animal Disease control	50	Farmers	Chalakudy	17-03-2007	Dr.M.R.Saseendranath, Professor
3.	Animal Disease control	50	Farmers	Avinnissery	07-06-2007	Dr.M.R.Saseendranath, Professor
4.	New approaches	100	Veterinarians	CV&AS,	02-08-2007	Dr.M.R.Saseendranath,

	in the Management of Zoo animals			Mannuthy		Professor
5.	Zoonotic diseases & their control	25	Medical college students	CV&AS, mannuthy	17-04-07	Dr.M.R.Saseendranath, Professor
6.	Animal Disease control	100	Farmers	CV&AS, Mannuthy	17-08-07	Dr.M.R.Saseendranath, Professor
7.	Animal Disease control	100	Farmers	Velangannur	27-09-07	Dr.M.R.Saseendranath, Professor
8.	Emerging diseases & their control	200	Farmers	Kottiyam, Kollam	2-01-08	Dr.M.R.Saseendranath, Professor
9.	Animal disease control	100	Farmers	Calicut	17-10-07	Dr.M.R.Saseendranath, Professor
10	Animal disease control	200	Farmers	StateAnimal Husbandry meet, Peringottukara	26-01-08	Dr.M.R.Saseendranath, Professor
11	Rabies control	100	Veterinarians	DVC, Kannur	November 2007	Dr.K.Vijayakumar, Associate Professor
12	Animal disease control	100	Veterinarians	Calicut	16-01-2008	Dr.K.Vijayakumar, Associate Professor
13	Control of Wildlife diseases	100	Veterinarians	CV&AS, Mannuthy	1-08-07	Dr.P.V.Tresamol, Assistant Professor
14	Prevention and control of Rabies in Kerala	100	Veterinarians	Thrissur	8-09-07	Dr.P.V.Tresamol, Assistant Professor
15	Zoonotic diseases & their control	25	Medical college students	CV&AS, Mannuthy	14-05-07	Dr.P.V.Tresamol, Assistant Professor

Farm advisory service rendered.

Staff of this department is attending both Veterinary hospitals at Kokkalai and Mannuthy and giving necessary advice to the farmers. Handling classes for farmers, veterinarians and medical college students on important infectious diseases of zoonotic importance.

iv. Radio talk/TV programmes/Audio Video cassettes.

Topic	Date	Name of Scientist
Prophylactic vaccinations in dogs	28-11-07	Dr.P.V.Tresamol

Veterinary Public Health

Conducted a state level workshop involving the farmers, societies, milk processing plants, and scientists of the state to evolve strategies for quality milk production in the state.

Topic	Number	Category	Venue	Date	Name of the scientist
Workshop on Clean milk	30	Farmers	COVAS, Mannuthy	21-1-2008	Dr.E.Nanu

production and Marketing in Kerala					Dr.B.Sunil
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Farm advisory service

In person	Over telephone	Through letters
33	12	NIL

Veterinary College Hospital, Mannuthy

Details of activities

Farm advisory services:

In person	Over telephone	Through letters
Regular farm advisory service through telephone, through letters and in person are being rendered from hospital every day.		

Field visit:

No. of visits	Problem identified	Recommendations
The doctors from this station makes regular visit to farmers home for rendering veterinary care and in treatment of sick animals.		

Radio talks/TV programmes/Audio-Video cassettes

Topic	Date	Name of Scientist
1. Control of Mastitis	April 2007	Dr.K.N.Aravinda Ghosh
2. Infertility management	July 2007	Dr.K.N.Aravinda Ghosh
3. Management of cattle	Jan 2008	Dr.K.N.Aravinda Ghosh

Pig Farm

Farm advisory service:

In person	Over telephone	Through letters
1320	4365	96

Field visits:

No. of visit	Problem identified	Recommendations
22	In efficient waste utilization, Lack of information regarding pig rearing	Recommended construction of biogas plant, educate people through media (eg.NECC), Protection to pig farmers by the state government

No. of visitors to the institution

Animal Reproduction

- a) 10 batches of VHSC students (about 40 students in each batch)
- b) 2 batches of Dairy Science students (about 20 students in each batch)

Clinical Medicine

Dr.S.R.Srinivasan, Professor & Head, Veterinary Medicine, Ethics & Jurisprudence, Madras Veterinary College.

Department of Extension

No. of visitors to the institution - 5400 Nos. (Farmer group/students)

Nutrition

1. Dr.M.R.Purushothaman, Professor, Department of Animal Nutrition, Veterinary College and Research institute, Namakkal
2. Gideon Gloridoss, Professor, Animal Nutrition Department, Veterinary College, Hebbal, Bangalore..

Pathology

Many batches of farmers and students visited the department .

Pharmacology

K.Jayakumar, Professor and Head, Veterinary College, HebbalA.Jagadeeswaran, Assistant Professor, TANUVAS, Namakkal, Arivachelvan.A, Assistant Professor, Selvasubramaniam, Professor, TANUVAS.

Veterinary College Hospital, Mannuthy

No. of visitors to the Institution (farmer group/students)

Farmers have regular visit to hospital

Hon.Animal Husbandry Minister Sri.C.Divakaran inaugurated Video endoscopy unit on 2nd Aug.2007 in which Sri.Rajaji Mathew Thomas, MLA presided in presence of Vice-Chancellor and Dean.

Pig Farm

No. of visitors to the Institution (farmer group/students)

Farmers group : 45

Students group : 56

1. Dr.K.M.Bujarbaruah, Dy Director General (AS) ICAR, Krishi Bhavan, New Delhi.
2. Dr.T.J.Rasool, Asst. Director General (AP&B), ICAR, Krishi Bhavan, New Delhi.
3. Dr.Anubrata Das, Director, NRC on Pig, Guwahati.
4. Dr.M.K.Tamuli, Principal Scientist, NRC on Pig, Guwahati.
5. Dr.Mohan, N.H., Scientists, NRC on Pig, Guwahati.
6. Dr.Dhireswar Kalita, Incharge AICRP on Pig, Assam Agrl University, Guwahati.
7. Dr.S.K.Singh, Incharge AICRP on Pigs, Birsar Agrl. University, Ranchi.
8. Dr.D.Srinivas Rao, Professor, Sri.Venketeswars Veterinary University, Tirupati.
9. Dr.E.B.Chakurkar, Incharge AICRP on Pig, ICAR Research Complex for Goa, Goa.
10. Dr.J.S.Arora, Incharge AICRP on Pig, Jawahar lal Nehru Krishi Veswavidyalay, Jabalpur, M.P.
11. Dr.A.K.Chabra, Incharge AICRP on Pig, IVRI, Izat Nagar, U.P.
12. Dr.Sivakumar, Incharge AICRP on Pig, Livestock Research Station, Kattupakkam.
13. Dr.S.C.Chopra, Rtd.ADG, Haryana.
14. Dr.Kishorekumar Barua, Dept. of Animal Nutrition, COVAS, Khanpara, Guwahati.

805419

15. Dr.Sulochana.S., Retd.Dean, COVAS, Mannuthy, Kerala

16. Dr.J.Abraham, Retd.Director, Meat Technology, Mannuthy,

Finance

Poultry

Head	Expenditure	Receipts
Revolving Fund	12385073/-	13862172/-

Veterinary Public Health

EAP on Evaluation of quality of market milk with special reference to Quality Assurance Programme in Kerala third year Rs.4,76,300/-

Pig Farm

Head	Expenditure(Rs. In lakhs)	Receipts(Rs. In lakhs)
Non-plan		
CPPR	26.367	16.894
Scaling up of piglet production	12.470	-
Plan		
AICRP on Pigs	25.549	1.920

Surgery

Head	Expenditure(Rs.)	Receipts
Non-plan	25799	-
Plan	20830	
ICAR	20090	
Other EAPs	69103	
Revolving Fund	Nil	

COLLEGE OF VETERINARY & ANIMAL SCIENCES, POOKOT

Name of the Head of the Station : P.P. Balakrishnan, M.V.Sc., Ph.D.,
Associate Dean

Academic programme

In take capacity & No. of Students enrolled during 2007-08				Out turn of students during 2007-08			
	Total	Male	Female		Total	Male	Female
UG (42)	34	14	20	UG	27	13	14
PG (discipline-wise)	-	-	-	PG	-	-	-
Ph. D (discipline-wise)	-	-	-	Ph. D	-	-	-

Thesis submitted during 2007-2008(discipline wise)

Discipline	Name of the Student	Major Advisor	Title of the thesis
Dept of Pharmacology and Toxicology(Professor & Head.D thesis)	Dr. Usha .P.T.A	Dr.N.Gopakumar	Identification of toxic fraction of Mucuna invasia(Anathottadi) and its toxicity in rabbits

Study tours

1. South India Study tour- April 2007 (2004 and earlier admission)
2. South India Study tour Dec – Jan 2008 (2005 and earlier admission)
3. All India Study tour – November- Dec 2007 (2003 & earlier Admission)
3. Study tour was conducted for the 2005 batch to Kalpetta slaughter house
4. Study tour was conducted for the 2005 batch to Mannuthy Meat plant
5. Out campus study trip for final year students to Bull station, Dhoni farm, Kerala Livestock Development Board to demonstrate the various advancements in the freezing protocol of bull semen during October 2007.

Other activities:

A. Student Union Activities

Interclass Arts festival Niswanam -07 was inaugurated by Sri Ali Askar Pasha A.D.M. Wayanad prizes was distributed by Dr. Ani.S.Das. K.L.D.B. Managing director. June 18th- Talk on "professional experience" an interactive session with Dr. Usha Pushkar Dr. Maria Liza August 15- Independence day was celebrated. October 2nd- Gandhi Jayanthi was celebrated and the social service league distributed cloths to Holly Infant may home at Vythiri On November 20th – A talk by Lt.Col. Dharmadheeran was organised in collabration with N.SS on the scopes in R.V.C and N.C.C.on November 20th and a talk by Dr. Jacob Cheeran elephant specialist, Retd. Professor and Head Pharmacology was organised on November 27th. A cultural night was organised in connection with the National Seminar on EthonoVeterinary and role of Nano technology in drug delivery system on November 28th Students Actively participated in the Inter collegiate Arts Fest November 5th to 9th 2007 at Central Auditorium Vellanikkara bagged second price (Over All) Organized the Onam celebrations , 2007 with a grand feast, athapookalam and other competitions involoving students, teaching and non teaching staffs Christmas tree and Crib making competitions were organised on December 21st- Freshers day "sprouts-08" was organised to welcome 1st year students .Republic Day was celebrated in grand manner on 26th January 2008. Send off function for the outgoing students of 2002 and earlier admission .

B. Extracurricular activities

1. Participated in the International Livestock & Dairy Expo poster competition at Pragati Maidan, New Delhi. Two students were nominated from this college.
2. Two students represented the University in the debating team deputed to participate in the competitions held at G. B. Pant University of Agriculture and Technology, Pantnagar, Uttaranchal from 19-01-08 to 20-01-08. Dr. Dildeep.V. was deputed as Manager, KAU.

C. Sports

1. All India Inter Agri University Sports and Games Meet at Mahatma Phule Krishi Vidya Peeth Rahuri, Maharashtra from 22nd to 25th February, 2008.
2. Participation in Inter Collegiate Tournaments, Inter University Volley Ball and Basket Ball tournament from 6-8th February, 2008 at College of Agriculture, Vellayani, Thiruvananthapuram. (12 students participated)
3. Inter Collegiate Football Tournament from 18-20th April 2008 at College of Agriculture, Padannakad. 14 students participated. Winners of the tournament.
4. Inter collegiate Cricket Tournament, from 13-17th May, 2008 at College of Fisheries, Panangad. Runners up in the tournament (13-05-07 to 17-05-07). College team participated (16 students).

D. Student's counselling Centre Activities

1. A talk on "Bovine hoof management and impact on production" by Dr. K. Muraleedharan Nair, District Veterinary Centre, Thiruvananthapuram was arranged on 24-7-07.
2. An interactive session on "Diabetes mellitus" with Dr. Gopan, Endocrinologist, Chicago, USA was arranged for students on 20-08-07.
3. A quiz programme on "Food & nutrition" was arranged for students of this College on 12-12-07 in collaboration with Association of Food Scientists & technologists (Trichur chapter).
4. Legal awareness classes for students were arranged on 30-10-07 in collaboration with District Legal Services Authority, Kalpetta. Resource persons were Adv. K.M. Thomas, Adv. V.M. Cicily and Adv. K. Sasikumar. 43 students attended the classes.
5. Question papers of previous Annual board examinations were made available to students for reference.

Research programmes

a. Major research achievements (highlights):

A) A cross sectional investigation on CCPP among goats of Wayanad district of Kerala was carried out using slide agglutination test (SAT). The overall antibody prevalence among the 446 goat sera tested was 28.92%. Males had lower prevalence (24.07%) than females (30.47%). Higher prevalence rate was noticed on advancement of age.

B) PCR based Detection of Haemoprotozoan and Haemorettsial Diseases of Cattle of Northern Kerala.

Haemoprotozoan and haemorettsial infections of cattle of Northern Kerala were studied using 150 blood samples and smears collected from five districts of Northern Kerala viz., Wayanad, Malapuram, Kozhikode, Palakkad and Kannur. The blood smears were stained with giemsa staining and acridine orange staining techniques. The blood samples were processed and were used for specific PCR. From the results of study following conclusions could be made.

1. Polymerase chain reaction technique is highly sensitive compared to staining of blood smears for detection of carrier animals.
2. *Theileria* and *Babesia* were the haemoprotozoans detected by staining techniques. *Anaplasma marginale* and *Ehrlichia bovis* were the haemorettsial organisms detected by staining techniques. Eventhough, trypanosomes were detected as the major protozoan

organisms using PCR, this organism could not be demonstrated by microscopy in any of the samples. *Anaplasma marginale* organisms could be detected in only 3 out of 150 smears while PCR detected 25 blood samples positive for the organisms.

3. Out of 150 blood samples from healthy cattle, 85 (56.7%) were found to be carriers for at least one of the haemoprotozoan or haemoreickettsial organism by using PCR while 65 (43.3 %) were found to be free from any of these organisms.
4. A theilerial organism which could be detected by staining technique and genus specific PCR is widely prevalent in Wayanad, Malappuram and Kozhikode districts. But, this theilerial organism is different from *Theileria annulata* and *T. orientalis* as the specific PCR for these protozoan organism failed to produce positive signal.
5. This uncharacterized theilerial organism needs to be studied urgently. The vector for this pathogenic, 'anemia inducing' protozoan organism has to be identified. The abundant tick vector in the hilly district of Wayanad, Kozhikode and Malappuram favor the disease transmission.
6. Another theileria like piroplasm which could be detected by microscopy after staining with giemsa, but revealing no positive PCR signal could be a small babesial organism. Further studies are needed to characterize this organism too.
7. Trypanosomosis is the major haemoprotozoan disease affecting cattle of Northern Kerala followed by theileriosis caused by a previously unreported and uncharacterized theilerial organism.
8. The major haemoprotozoan and haemoreickettsial disease affecting cattle of each District is ranked based on the per cent prevalence in corresponding district and the data is shown in table 1.

Table 1: Important haemoprotozoan and haemoreickettsial disease of five districts of northern Kerala

Rank	Wayanad	Malappuram	Kozhikode	Palakkad	Kannur
1	Anaplasmosis	Theileriosis	Trypanosomosis	Trypanosomosis	Trypanosomosis
2	Trypanosomosis	Anaplsmosis	Anaplsmosis	Anaplsmosis	Theileriosis
3	Theileriosis	Trypanosomosis	-----	Theileriosis	Anaplsmosis

9. Three most improtant haemoprotozoan and haemoreickettsial disease affecting cattle of Northern Kerala are ranked when total prevalence of the five districts is taken in to consideration. The top three important diseases are shown in table 2.

Table 2 : Important haemoprotozoan and hemoreickettsial disease of Northern Kerala

Rank	Northern Kerala
1	Trypanosomosis
2	Anaplasmosis
3	Theileriosis

10. Anaplasmosis occur at very high prevalence in this area and may contribute to jaundice and death in affected cattle.
11. Trypanosomosis and anaplasmosis are transmitted mechanically by biting flies. The high prevalence of carrier animals due to these diseases indicates the importance of these flies in disease transmission. Anaplasmosis is also transmitted biologically by ticks.
12. The study confirms for the first time the presence of *A. marginale* and *E. bovis* using molecular techniques.
13. Eventhough veterinarians report babesiosis as the major cause for haemoglobinuria in cattle, its prevalence in carrier animals were detected to a very small percentage compared to trypanosomosis and anaplasmosis in this area.

14. The study conclusively proved the absence of carriers due to theileriosis caused by *T. annulata* in Northern Kerala. This is very important information, as the nearby state, of Tamil Nadu has wide prevalence of the disease. This may be due to the absence or lower prevalence of the tick vector, *Hyalomma anatolicum anatolicum* in Kerala.

C) Molecular characterization of local pigs of Kerala using micro satellite markers

The genetic diversity among four indigenous genetic groups of pigs in Kerala was studied using 25 most polymorphic microsatellite markers selected from porcine genome map. The markers were studied for their polymorphic by employing PCR and denaturing PAGE techniques. Allelic frequency, Heterozygosity, polymorphic information content (PIC) and genetic distance were calculated by standard procedures. The genotypes of indigenous pigs of this study were compared with that of the genotypes generated from Large White Yorkshire. The genetic relationship of different populations of local pigs is being determined and phylogenetic analysis is in progress. The results in the study showed that variation existed among the indigenous populations and need more detailed study to investigate the same.

D) Genetic Evaluation of milk production & milk composition traits of crossbred cattle in Wayanad district

Meenangadi, Ambalavayal, Sulthan Batheri, Vythiri Ksheerolpadaka Sahakarana Sangam, Thrikkaipetta milk collection centre & College Of Veterinary And Animal Sciences, Pookot formed the places of study. 280 cows which calved during the month of June 2007 were selected for the study – 50 from Ambalavayal, 98 from Sulthan Bathery, 78 from Meenangadi, 30 from Mananthavady, 12 from Vythiri & 12 from Thrikkaipetta. Milk recording cards were printed & supplied for each animal. Milk recordings of these animals were taken first recording, 20 days from the date of calving & the data were entered in the cards provided. Milk recordings were again taken in morning and evening, at monthly intervals for a period of continuous ten months or till date of drying. Milk samples have to be tested for its composition i.e. fat & SNF, during early, middle & late lactation. Milk samples were collected from the field & brought to COVAS, Pookot. Milk fat was estimated using electronic Milk Fat Tester with frequent standardisation with Gerber™s method. SNF was estimated using lactometer with frequent calibration with gravimetric method for total solids estimation. Milk compositions of 235 cows were thus estimated during early, middle & late lactation. Collection of blood samples, Isolation of DNA & polymorphism studies are to be done during the second year of project work.

Extension programmes

1. Resource person from the college were deputed for technology transfer to tribals, various NGOs in tribal rehabilitated areas, women, Para-veterinarians and veterinarians. In association with the S.G.S.Y programme of Mananthavady, Sultan Bathery block panchayat classes were conducted for seven batches of women each on goat farming and meat processing. Technical knowledge of scientists of COVAS, Pookot, is contributed to rural development at block and district levels as part of Kerala development project.
2. Trainings are imparted to agricultural labourers, farmers, entrepreneurs, vocation higher secondary students, self help groups, livestock inspectors, veterinary officers
3. Attending daily O.P (Obstetrics & Gynaecology) at the clinical complex attached to College of Veterinary and Animal Sciences, Pookot. 189 Artificial inseminations in cattle, 7 A.I. in goats and a total of 320 gynaecological cases were attended.
4. Attending to gynaecological, infertile and obstetric cases of livestock attached to various livestock farms of the College of Veterinary & Animal Sciences, Pookot.
5. Attending Ambulatory clinic daily at Thrikkaipatta and 810 gynaecological cases were attended including 395 Artificial Inseminations during this period.
6. Attending various referred gynaecological cases from various Animal Husbandry centres of Wayanad district.
7. Organized various infertility camps at various centres attached to the Ambulatory clinic.

b) Farm Advisory services

Department	In person	Over telephone	Through letters
Livestock Production & management	23	21	30
Animal Nutrition	30	30	-
Dept of OG	24	numerous	-

Dr. C.T. Sathian is giving technical consultancy to Nature fresh milk project of State Poverty eradication mission (Kudumbasree) in different Districts.

c) Field Visit.

No. of Visits	Problem Identified	Recommendations
56	Different Problems in high altitude areas	As per package of practices
Routine out station visits	diagnosis and treatment of various infertility conditions on individual and farm basis and control of herd fertility.	

d) Radio talks/T.V.Programmes/ Audio-Vedio Cassettes.

- 1.Vedio Conferencing at Coffee Board office on 17/5/2008 By Dr. Anil. K.S
" Calf to Calf Programme.

List of publications

- 1.Jayamurugan,M.,ChandrasekharanNair,A.M.,Presannakumari,K.TandGopakumar,N.(2007) Hypoglycaemic effects of red and white flowered lotus in partial pancreatectomy model.7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.29
2. Sangeetha,S.,Anu,M.,Joy,A.D and Gopakumar.N.(2007)Ulcer healing activity of Azhadiracta indica on aspirin induced gastric ulcer in albino rats.7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.34
3. Jayamurugan,M.,Kowsikraj,P.,Binoy,M.,ChandrasekharanNair,A.M., Aravindhakshan,T.V.,Presannakumari,K.T and Gopakumar,N.(2007) Evaluation of hypoglycaemic effects of Nelumbo nucifera seeds in alloxan induced Type II diabetes insprague dawley rats.7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.35
4. Umesh,C.G., Ajay kumar., Nisha,A.R.,Gopakumar,N.,Sanis Juliet.,Chintu Ravisankar and Syed Alamdar Riswi .(2007)Analysis of in vitro antibacterial and antifungal activity of methanolic extracts of four medicinal plants.7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology P.50
5. Ajay kumar., Umesh ,C.G., Nisha,A.R., Gopakumar,N.,Sanis Juliet.,Chintu Ravisankar and Syed Alamdar Riswi .(2007) In vitro antimicrobial activity of aqueous extracts of five medicinal plants.7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P 49
6. Vikrama Chakravarthy., Gopakumar, N.and Chandrasekharan Nair, A.M (2007) Anti inflammatory and analgesic activity of red and White flowered lotus seeds in albino rats.7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.68
7. Irwin,A.J and Gopakumar,N (2007)Effecet of vitex negundo in carreegenin induced inflammation in albino rats.*Journal of Veterinary Pharmacol and Toxicol.*(5):47

8. Juliet, S., Chakraborty, A.K., Bhattacharyya, A. and Mandal T.K. Acute Dermal Toxicity Study Of Deltamethrin In Rabbits 7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.68
9. Juliet, S., Chakraborty, A.K., Bhattacharyya, A. and Mandal T.K. In-Vitro Stability Studies Of Deltamethrin In Blood And Rumens Liquor Of Black Bengal Goats 7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.68
10. Usha, P.T.A., Gopakumar, N., Chandrasekharan Nair, A.M., Joy, A.D. and Nair, N.D. KT Toxicity Studies Of *Mimosa Invisa* In Rabbits 7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.68.
11. Nair, S.N. Hepatoprotective effect of effect of alcoholic extract of *Leucas aspera* in rifampicin induced hepatotoxicity in rats XIX Kerala Science Congress 2008, 28-31 Jan 2007
12. Nair S.N: Ameliorative effect of alcoholic extract of *Phyllanthus niruri* in Gentamicin induced hepatotoxicity in rats, 7th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology.P.68.
13. Shynu M; Praveen K Gupta, Bhaskar Sharma and Mohini Saini(2007) Immunomodulatory potential of *Ocimum tenuiflorum* extracts in bovine peripheral blood mononuclear cells invitro J Immunopathol.Vol9(1&2) 31-35
14. Ambili V.S, Latha C, Nanu, E (2007) Prevalence and pathogenicity of *Aeromonas* spp. *Escherichia coli* and *Salmonella* spp. in fresh, chilled and frozen beef frankfurters.J. Food Sci. Technol.(accepted)
15. Prejit, Nanu. E & C. Latha (2007) Microbial quality assurance of raw milk produced in organized farm J. Food Sci. Technol 44 (5): 517-520
16. Latha, C.(2007) Nutritional significance of Designer milk Intas polivet Vol.8 No.I
17. Sadish, S., Kumar, A., Latha,C., Sathyan, C.T. and Renuka Nayar(2007) Microbiological quality of rabbit meat Compendium of National seminar on Safety assessment and consumer protection with reference to dairy and food industry.
18. Nikesh Kiran, Shimi Rajan, Sathian, C.T. and Deepa, S. (2007) Milk sample preservative-garlic (*Allium sativum*) An ideal choice. National Seminar on Safety assessment and consumer protection with reference to Dairy & food industry at Madras Veterinary College, Chennai . November 2007.
19. Renuka Nayar, Jayesh, V and Sathian, C.T. (2007) Unconventional meat. Souvenir of Veterinarian's annual convention, , December, 2007
20. Sathian, C.T. (2007) Milk quality and "The Vet" Souvenir of Veterinarian's Annual Convention, , December, 2007
21. Sathian, C.T., Deepa, S. and Renuka Nayar (2007) Impact of milk somatic cell count (SCC) on milk quality and human health. Workshop on clean milk production and marketing in Kerala. COVAS, Mannuthy January 2008
22. Renuka Nayar, Jenifer, P, Sathian, C.T. and Deepa Surendran (2008) Carcass characteristics of crossbred rabbits and chemical composition of meat. IXth National technical seminar on Role of women Veterinarians in augmenting rural economy through Animal husbandry at Veterinary College, Bangalore
22. Viswanathan T.V., Fontenot, J.P., Baker, S. M, and Meachem (2007) Effects of feeding Crab Processing waste and other protein supplements on growth and ruminal characteristics of steers fed high- roughage diets' The Professional Animal Scientist 23 (2007)
23. Viswanathan T. V., Sekhar M. and Syammohan K. M (2007) Effect of citric acid and phytase on nutrient utilization in large white yorkshire pigs'. Tamilnadu Journal of Veterinary and Animal Sciences 3 (2) 65-69.

24. Influence of different levels of dietary crude protein on early lactation in crossbred cows of kerala'. *Indian Journal of Animal Nutrition*, Vol. 25, March 2008.
25. Dildeep V and George Mathen (2008) Economics of meat production from malabari kids fed on three complete diets'. *The Indian Veterinary Journal*, Vol 85, No.6..
26. C. N. Dinesh, A.P. Usha., K. Anilkumar, G. Radhika, V. Dildeep., C. Ravishankar and P. P. Balakrishnan (2008)A report on the native cattle and buffaloes reared by the tribals of kurichiat in north kerala, India'.. Abstract paper published in National Symposium on 'Redifining role of Indigenous Animal Genetic Resources In Rural Development'
27. Viswanathan, .T. V Ally.K. and Dildeep.V (2008) Feeding strategies for dairy cattle JIVA, Vol 6 Issue (1).
27. Dildeep. V., Ally. K. and T. V. Viswanathan 'Regulating animal feeds and mineral mixtures- the need of the hour.
28. Dildeep.V and Babitha. V 'Theeta chilavu kurakkan chila nirdesangal'. A chapter in hand book for dairy farmers (Varu namukkum thudangam dairy farm).
29. John Abraham (2008) Development of a simple electrocautery for field veterinarians. *Indian Journal of Animal Sciences* 78 (1) 54-55, January 2008.
30. John Abraham Spencer Francis, N. D. Nair, S. Biju and Indu V. Raj (2007) Malignant mixed Mammary Sarcoma in a Bitch. *Indian Veterinary Journal September 2007; 967-968.*
31. John Abraham, S. Biju and Indu V. Raj (2007) Malignant Histiocytosis in a dog. *Indian Veterinary Journal December 2007; 84 : 1314.*
34. John Abraham, Indu. V. Raj, Bindu Lakshman, Biju. S. (2007) dlcephalic monstrosity in a heifer *Indian Journal of Animal Reproduction*. Vol 28, issue 2: December 2007 109-111.

Finance

Head	Expenditure (Rs) lakh	Receipts(Rs) lakh
Non plan		
Plan	584.67	399.10
ICAR	54.9	50.1
Other EAPs	13.295	10.35
Revolving Fund	Nil	Nil

**COLLEGE OF DAIRY SCIENCE AND TECHNOLOGY
MANNUTHY, THRISSUR**

Name of Head of the Station : Dr.R.Rajendrakumar, Associate Dean

Faculty improvement programme

a. Deputation Scientists for Seminars / Workshops / Symposia

Academic programmes

Intake capacity & No, of students enrolled during 2007-08			Out turn of students during 2006-07		
	Male	Female		Male	Female
UG (Total 24 nos).			UG	10	11
PG (discipline-wise)	Nil	Nil	PG		
Ph.D (Discipline-wise)	Nil	Nil	Ph.D		

Study tours:

1. South India Study Tour of 2005 batch students during the period from 13-11-07 - 25-11-07. The students could visit major dairy plants and food industries in Tamil Nadu, Karnataka and AndhraPradesh.
2. All India study tour of 2004 batch students during the period from 22-2-08 to 15-3-2008. The students could visit AMUL, Anand, Mother Dairy, New Delhi and other important dairy and food plants.
3. As part of the courses for B.Tech, the students visited Chandramala Tea factory at Nelliampathy, Aavin Dairy plant at Selam, Milma Dairy Plant Palakkad, Snow Cap Ice creams and K.S. dairy plant Thrissur.

a. Student's Union activities

- (i) Student's union 2006-07 started functioning with inauguration on 10th January 2007.
- (ii) Film festival *Z-Angles* was celebrated with screening popular and classical films.
- (iii) In the prestigious Thrissur Pooram exhibition pavilion of Kerala Agricultural University an exhibition of various Developments in the Dairy Sector was organized.
- (iv) A Book Festival with the active involvement of publishers of scientific books was arranged during 25-27 October 2007.
- (v) The students participated in the South Indian agricultural Fair held during 27-12-07 to 30-12-07 with a stall exhibiting Dairy sector Developments. Sale of dairy products and demonstration of products preparation was also arranged.
- (vi) Festivals of Onam and Christmas were celebrated in the campus

b. Extra-curricular activities

The booklet on Milk products preparation was widely circulated
Participated in Kerala agricultural University Inter collegiate Arts Festival

c. Sports and games

Participated in Kerala Agricultural University Inter Collegiate Volley Ball, Cricket and Athletic tournaments.

List of publications

Scientific papers - 3 nos.

Popular Articles - 1 no.

Important visitors

Sri. C. Divakaran Hon. Minister for Animal Husbandry

Sri. Rajaji Mathew Thomas M.L A and member, Executive Committee.

Sri. P.T. Gopalakurup. Chairman. KCMMF

Sri. Sanjeeb Patjoshi. I P S. M.D. MILMA

Finance

Head	Expenditure	Receipts
Non-plan	--	
Plan	Rs.53,72,633/-	Rs.46,00,000/-
ICAR	Rs.21,39,737/-	Rs.21,40,000/-
Other EAPs	Rs.14,905/-	-

FACULTY OF FISHERIES

COLLEGE OF FISHERIES, PANANGAD

Name of Head of the Station : Dr. D.D. Nambudiri, Dean

Academic programmes

Intake capacity & No. of students enrolled during 2006-07			Out turn of students during 2006-07		
	Male	Female		Male	Female
Dept: Fishery Biology					
UG 50	15	22	UG	13	14
PG (discipline-wise) 8	3	3	PG	1	6
Ph.D. 2 (discipline-wise)	--	1	Ph.D.	--	--
Dept: Fishery Hydrography					
UG			UG		
PG (discipline-wise)	1		PG	NIL	1
Ph.D. (discipline-wise)			Ph.D.	--	--

Study tour

All India Study Tour conducted for B.F.Sc. 2004 & South India
Study Tour for B.F.Sc. 2005

Other activities

Students Union activities:

1. Staff Editor – "JAALAKAM" released 2008
1. Inauguration & Valedictory function 20.3.2007
2. Send off 2002 batch 28.4.2007
3. Interbatch arts festival 13.07.2007
4. Film festival 18.09.07 to 20.9.07
5. Fresher's day & New year celebrations 10.01.2008
6. College day 27.03.2008
7. College Magazine - JAALAKAM released 2008
8. Send off 2003 batch

NSS activities

- 1) Eye Care Camp – 10th June 2007.

An eye care camp was organized by the NSS unit of the College in association with the Lions Club Cochin Metropolis, General Physicians Association Ernakulam and Mundempally Residents Association. A team doctors from the Kollenchery Medical Mission checked the patients. 191 people were checked for various eye problems and 20 of them were selected for free cataract surgery.

- 2) Earth Treatment Programme – On 7th May 2007 Mr.Gopinathan, an earth treatment volunteer gave a talk on the importance of natural treatment method in curing various illness.
- 3) "Unnarvu 2007" – Ten volunteers and programme officer participated in the KAU Joint NSS camp organized at Triikkaipetta, Wayanad 7th May to 11th May.

- 4) Shri Asfaq Akbar, NSS volunteer of the unit participated in the National Integration Camp (Bharateeyam) organized at New Delhi from 7th May 2007 to 11th May 2007
- 5) World Environment Day - 5th June 2007 was celebrated by planting 10 types of plant saplings in the campus. This programme was inaugurated by the Kumbalam Grama Panchayath President Shri. C.K.Padmanabhan
- 6) Independence Day Celebrations- 15th August 2007 was celebrated with activities such as flag hoisting and campus cleaning. A rally was organized on the occasion to spread awareness against use of plastic and plastic pollution.
- 7) "Karshakadhinam" was celebrated on 17th August 2007 with training programmes for farmers.
- 8) "Future 2007"- A personality development programme was organized in collaboration with Junior Chamber International (JCI) Vyttila chapter for the NSS volunteers 17th August 2007.
- 9) NSS volunteers actively participated in the world wide polling for the selection of the new 7 wonders of the world in favour of TAJ MAHAL..
- 10) Gandhi Jayanthi was celebrated with various programmes such as Gandhi Quiz and campus cleaning programme.
- 11) College Foundation Day 10th October 2007- NSS Volunteers rendered service in conducting the open house in the College.
- 12) Dr B.Manojkumar, Programme Officer participated in the State Level Training programme organized by the Kerala State Aids Control Society on 26th October 2007.
- 13) World Aids Day - 1st December 2007 was celebrated with Positive talk by a HIV+ person and film shows.
Shri Ankur Jamwal and Ms Amirta both NSS volunteers secured the first place in the District Level Inter Collegiate Quiz competition organized by the District Aids control Society.
- 14) Individual Development Programme for the NSS Volunteers on 24th January 2007
in collaboration with Junior Chamber International, Vyttila chapter
- 15) Republic Day Celebrations - January 26th was celebrated with flag hoisting and other cultural programmes by the volunteers.
- 16) International Aquashow 2008 - The NSS Volunteers of the College were involved in setting up and managing the Exhibition stall of the college and University from 31st January 2008 to 5th February 2008.

d.Sports and games

The College has participated in the Inter Collegiate Volleyball and Basketball tournament held at Mannuthy in May 2007. The matches were cancelled due to student violence.

ERNAKULAM DISTRICT LEAGUE MATCHES.

The college team has participated in the D Division of Ernakulam District Cricket League Matches

INTER UNIVERSITY PARTICIPATION

The following students represented the K.A.U. team in the Inter University Competition.

Naja Abookacker - KAU Table Tennis team

2004 batch - December 2007 - at Vellore Institute of Technology.

Anas 2006 batch - KAU FOOT BALL TEAM 2008.

Parmanand 2006 batch

Vishnu B. 2007 batch - KAU Cricket team - January 2008-Madras. The Inter Collegiate Volleyball & Basket Ball was conducted at Vellayani from 5th -8th Feb. 2008. The College team has participated both in the Man & Woman. The College Volleyball team (Man) bagged the First Place.

Research programmes

a. Major Research achievements (highlights)

1. Marine animals provide a rich source for important bioactive compounds antibacterial agent isolated from the accessory nidamental gland of the Cuttle fish, *Sepia* carotenoid complex and was found to be more effective against gram negative bacteria.
2. Peptidoglycan isolated and purified from the ink of *Sepia pharaonis* was found to have anticancer activity. A induced charges (indicating apoptosis).
3. The widely used weedicide in Kuttanad, paraquat, was found to cause mortality in grass carp and common carp at concentrations of 30ppm. Also raised the metabolic rate by five times in these fished.
4. The traditional ayurvedic preparation, "Murivenna" was found to be effective against the bacteria & fungi causing finrot and ulcer disease in ornamental fishes.
5. Cocoapod (a waste of cocoa processing) and *Iponia* (an aquatic plant) proved to be good sources of protein in the preparation of artificial feed for fresh water prawn.
Macrobrachium rosenbergii.
6. A study to understand evolution of the hydrography and currents in the South eastern Arabian Seas (SEAS) in relation to the Lakshadweep Warm pool, revealed that the low salinity at the surface layers of SEAS during winter was caused by the intension of low saline waters from bay of Bengal. The upwelling rear in the south west coastal waters from March onwards was not intense near the Lakshadweep islands. A positive relationship could be seen between sea surface temperature and sea surface height.
7. As a part of the project to develop Kumbalam Village (Kanayanoor Taluk, Ernakulam District) as an ornamental fish, a training programme was started with a target for training 250 farmers from the village to empower them for production of ornamental fished. This is with a view to improve the socio-economic condition of people.
8. Survey of the population of the much sought after indigenous ornamental fish, *Puntius demisonii*. (Popularly called Ms. Kerala) in rivers of Kerala revealed indiscriminate exploitation, destructive fishing methods, pollution and heavy post harvest mortality pointing towards the possibility of indigenous endangering the species. Work is in progress to develop captive breeding technology.
9. Seven species of fresh water prawn are identified for use in fresh water aquariums, namely *Macrobrachium lazimanus*, *M.idella*, *M.canarae*, *M.ornatis*, *M.rosenbergii*, *Carnidina ratarajam* and *C.jalihalli*.
10. Astaxanthine is a compound in great demand due to its antioxidant potential. A method has been developed to isolate astaxanthine from prawn processing waste. The product is shown to have antioxidant activity at nano gram levels in *in vitro studies*.
12. With a view to improve the socio economic status of tribal people in the Vazhachal forest area by increasing the fish wealth of the Chalakudy river by ranching training programmes and workshops conducted for tribal people. Hatchery is established to produce fish seed of selected fishes for ranching.
13. The pokkali field of central Kerala and the paddy fields of Kuttanad are two fragile wetland ecosystem. The multi institutional projects have been taken up and to study the environmental and socio-economic impacts of aquaculture in Pokkali fields of Kerala and the other to study the impact of one crop paddy one crop prawn rotational farming on environment and socio economic in Kuttanad. Various physical, chemical and biological parameters are being monitored.
14. A project to develop a detection kit for white tail disease of *Macrobrachium rosenbergii* by loop mediated isothermal amplification (LAMP) is progressing.
15. DNA barcoding of *Fenneropenaeus merguensis* – Genbank submission – NCBI No. EU430495 (gi:187936353)

16. Salient findings of the project entitled "Development of a detection kit for white tail disease of *Macrobrachium rosenbergii* by loop mediated isothermal amplification (LAMP)" *Macrobrachium rosenbergii* nodavirus, one of the two viruses responsible for white tail disease of *Macrobrachium rosenbergii* could be successfully detected by reverse transcriptase-loop mediated isothermal amplification (RT-LAMP) using a simple water bath at 63°/65°C. Positive reaction was detected in one hour by observing the formation of white precipitate of magnesium pyrophosphate. Preliminary results show that RT-LAMP is more sensitive than the existing detection methods.

Extension programmes

a) Highlights of extension activities

1. Delivered a lecture on "Taxonomy, Biodiversity & Conservation strategies of aquatic animals", University College, Trivandrum on 17.09.2007.
2. Participated in the "JAYAPADAM" programme of ATREE at YMCA Alleppey on October, 4th, 2007. It highlighted the importance of sustainable management of Vembanad Lake.
3. Participated in the Aquashow-2008 exhibition at Kallor Stadium, Cochin, during the period 04.02.2008-06.02.2008.
1. Participated and took a class on "climate change and environmental problems" on 29th March, 2008 at Sarvodaya Grndhasala, Alleppey.
2. Participated in the Southern Regional Agricultural Fair held at Mannuthy, Thrissur from 27.12.2007 to 30.12.2007.
3. Participated in the exhibition held at Kothamangalam from 02.01.2008 to 10.01.2008.
4. College participated in the International Aqua-show held at Kochi from 01.02.2008 to 05.02.2008 and won First place in the category of indigenous fishes and best community aquarium and a Special Prize to Aqua-terrarium.

Other Extension Activities:

1. As a regular feature of our extension activities we offer Consultancy Services and Technical information to the farmers who came to the College for advice and guidance and also provide necessary information over the telephone.
2. Scientists from this College visited various Colleges and Government Institutions and acted as Resource Persons in the field of Fresh Water Farming, Brackish water Farming, Ornamental Fish Farming, Fish diseases, etc.
3. Students from various Colleges and institution within and outside the State are visiting this College every year and we are organizing lecturers, demonstrations etc., to them.
4. Celebrated November 21st as Fishermen Day and organized various programmes for the fisher folk.
5. During the severe outbreak of white spot diseases the Scientists from this College visited the farms located in and around the College and provided advice and collected specimens for further studies.
6. During the International Aqua-show from 01.02.2008 to 05.02.2008, the college organized Aqua-clinic for the benefit of farmers.
7. Every year we are celebrating "Chingam-1" as Farmers' Day with various training programmes for their skill development.
8. In connection with the Silver jubilee Celebration of College of Fisheries, Panangad from 22.11.2004 to 27.11.2004, the College organized "Fish Farmers' Day".
9. College celebrating October 10th every year as Foundation Day. Students, staff and local people are visiting this Institution to see various activities of the College.

10. The PCR Laboratory of Department of Aquaculture, College of Fisheries established on 26.10.2004 is highly beneficial to fish/shrimp farmers for diagnosis of diseases at reasonable rate.
11. Technical advice for setting up *Macrobrachium* hatchery at Kumda, Karnataka were given by the Scientists of the Aquaculture department.
12. Technical advice were given to Matsyafed for establishing an indigenous Ornamental fish hatchery at Thennala.
13. Radio Talks by the Scientists from this Institution on various aspects of fisheries were broadcasted through A I R.
14. Fifty popular articles written by the Scientists of this Institution were published in various magazines including national and international magazines.

Details of activities

Farm Advisory Services

In person	Over telephone	Through letters
131	80	3

Radio talks/TV programmes/ Audio-video cassettes

Topic	Date	Name of scientist
Ornamental fishes – Economics	8.6.2007	AIR Thrissur

List of publications

Scientific papers

- Jayachandran, K. V. & Anitta Sebastian, 2007. Growth pattern and meristic studies of the Banded Estuarien prawn *Macrobrachium sulcatum* (Henderson and Matthai) of Vembanad Lake (Kerala). *Proc. Indian Natn. Sci. Acad.* 73 (4) : 227-229.
- Jayachandran, K. V., 2008. Biodiversity of marine prawns of the family Penaeidae Rafinesque, 1815 of Indian waters. *Glimpses of Biodiversity – Rajiv Gandhi Chair spi. Pub.*, 7 : 207-220.
- Jayachandran, K. V., 2008. Sustainable exploitation of freshwater prawn diversity of India for food and livelihood security with emphasis on planning. *National Academy of Sciences, Annual Conference* (Abstract)
- Jayachandran, K. V., 2008. Indian palaemonid decapod crustaceans : taxonomic status, research challenges and conservation needs. *National Bureau of Fish Genetic Resources, National seminar on aquatic biodiversity* (Abstract).
- Vineetha P. Nair, J.R. Nair and T.V.A. Mercy 2007. The individual and combined action acute bethal toxicity of selected biocides on the juveniles of rohu (*Labeo rohita*) under tropical conditions. *Indian J.Fish.* 54 (3) : 267-274
- Sajeevan, M.K., V.S. Somvanthi and J.R. Nair, 2007. Deep-sea teleostean species – diversity off the southwest coast of India (7 N^o – 10^oN Lat). 8th Asian Fisheries Forum. Kochi - *Abstract*
- Gomathi. P., P.M. Sherief, T.M. Josel. P. Devika and J.R. Nair, 2008. Structure and function of the accessory nidamental gland of the Indian squid, *Loligo duvanceli* Orbiguy. National Seminar on Bioactive compounds from Marine organisms. Cochin Univeristy of Science& Technology, Kochi, *Abstract P.23*

Technical Bulletins

Popular Articles

Dept. Fishery Hydrography : One (in the magazine of College of Fisheries, Panangad)

Core Banking - Transactions at Finger tips - Vikasan Jyothi, Nov. 2008 – Dr. K.M. Mathew, Professor, Commerce, Dept. Mgt: Studies

Books

Ornamental fishes of the Western Ghats of India by T.V. Anna Mercy. A. Gopalakrishnan. D., Kapoor & W.S. Lakra Published by National Bureau of Fish Genetic Resources, Lucknow. U.P. 2007.

Training Manual Prepared

Ornamental fish culture (in vernacular) for the training

No. of visitors to the Institution (farmer group/students)

Farmer Group / Students : 950 Nos

Important visitors

Sri. S.Sharma, Fisheries Minister, Sri. Rajaji MathewThomas, MLA, Mr. Dinesh Mani, MLA, M.G.K. Pillai – Director –CMFRI, Dr.C. Vasudevappa , VAS, Bangalore, Professor & Head, Inland Fisheries, Dr. P. Konda P. Reddy, Chairman, Aquareach foundation , A.X. Joseph, Managing Director, KITCO

Details of sale of seeds/ planting materials/ biocontrol agents etc.

Item	Quantity	Revenue
1. Carp Seed	64635	34669
2. Ornamental fish	2602	7153
3. Freshwater prawn	209990	18012.

Finance

Head	Expenditure	Receipts
Non-Plan	26871663.00	906189
Plan	4326074.00	--
ICAR		--
Other EAPs	1477489.00	--
Revolving Fund		59834.00

FACULTY OF AGRICULTURAL ENGINEERING AND TECHNOLOGY

KELAPPAJI COLLEGE OF AGRL. ENGG. & TECHNOLOGY, TAVANUR

Name of Head of the Station : Dr. V. Ganesan, Professor

Faculty improvement programme

Deputation of Scientists were for various for Seminars/ Workshops/ Symposia :

Scientists were deputed for various for Seminars/ Workshops/ Symposia.

Deputation of Scientists for Training Programmes/Seminars/Summer School/Winter School/ Short Course.

Scientists were deputed for various Training Programmes/Seminars/Summer School/Winter School/Short Course.

Research Programmes:

a. Major research achievements (highlights)

Highlights during the period :

Farm Power Machinery & Energy Dept.

- Developed a simple and low cost transplanting finger, adapting the crank and oscillating link four bar mechanism and using a unique spring supported inertia – sliding mass type seedling pusher and a friction type safety system. The unit was fabricated and evaluated in the field and was found 4.5% missing hills. The cost of the planting finger assembly can be reduced to 30 %.
- The walk behind type Korean Kukje and Tong Yong transplanters, riding type 6 row 4 wheel Japanese Yanmar and Korean LG transplanters and Chinese single wheel- 8 row transplanter were evaluated in farmers fields. It was found that Chinese Yanji transplanter is suitable for the present conditions. Extensive evaluation in farmer's fields revealed its acceptance by farmers. Several groups started undertaking transplanting work using Yanji transplanter on custom hiring basis.
- The rotary coconut husker was further improved and studies are in progress to increase the output.
- Comparative evaluation of two types of coconut tree climbers is in progress.
- Agria mini tiller and Asia mini tiller with ditcher, rotors, miracle rotor, reaper and hammer rotor were tested among coconut, arecanut fields with encouraging results. The imported Asia mini tiller has many advantages. The original petrol engine was replaced by a suitable diesel engine. It is found suitable even in moist hill slopes and can carry out many operations.
- Preliminary studies on anaerobic-digestion characteristics carried out on rice-mill effluent, domestic rubber-processing effluent, and the effluent from ammoniated rubber-latex processing-units indicated that the rice-mill effluent and the domestic rubber-processing effluent were amenable to anaerobic digestion. Studies on three different agricultural by products; viz. coconut shells, rubber-seed outer-shells, and rubber-seed inner-shell; indicated of their suitability as a matrix in high-rate methane bioreactors.

AICRP on Post Harvest Technology

- A power operated decorticator for producing white pepper from black pepper was developed and tested. Decortication was performed by compressive and shearing forces between the grinding surfaces. The decorticating efficiency was 69.52% at 71 rpm and 17 hour soaking period. The capacity of the developed machine was 1.23 kg/h.

Based on the preliminary survey on crops, cultivation practices, cultural aspects, occupation and linkages of the Panchayath with centre, Tavanur village in Ponnani Taluk was identified to be best suited for the establishment of an agro processing centre. Three areas of post harvest processing were identified based on the survey conducted and the discussion with the panchayath members.

Precision Farming Development Centre

- An experiment conducted at the Precision Farming Development Centre to find out the best irrigation method for a Crop Geometry (3 sucker per pit at a spacing of 4m x 3m) in Banana (Nendran) revealed that the KAU micro sprinkler has the maximum B-C ratio and also the initial investment of the KAU micro sprinkler is lowest. Hence the irrigation method with one KAU micro sprinkler in the centre of the pit is recommended.

Details of Research Projects

1. Completed Projects during 2007-08

Precision Farming Development Centre

Name of Project	Funding Agency	Name of PI	Name of Co- PI	Outlay
Comparative evaluation of different micro-irrigation systems for a Crop Geometry in Banana	NCPAH, New Delhi	Er.Jippu Jacob	NA	*

*Outlay cannot be given separately since this is only one experiment of the Precision farming Development Centre, and the outlay is given for all the experiments together.

Extension Programmes

a) Highlights of extension activities :

1. Farm Power Machinery and Energy Dept.

- A project on "Development and field testing of expert systems as an aid to agriculture extension work" was launched. The main objective was to develop software for identification of pests and diseases of nine major crops of Kerala: rice, coconut, banana, cashew, amaranthus, brinjal, bhindi and cucurbits. A software namely 'Diagnose 4.0' could be successfully developed.
- DSS-CROP-9 Home page of the software is prepared in such a way that all the features in the software shall be browsed from this page. 'Fertilizer recommendation system' allows the user to choose the location of the land through a series of options like 'Kind of Land/ Region'- 'Variety'- Type of Planting'- 'Nutrient management' etc. 'NRSR' will aid as a decision support system for calibrating the required dose of fertilizers and organic sources for a particular area of land and also the total expenditure to be incurred.
- A trial version of the software could be developed for wheat, maize and sorghum. It is working satisfactorily. This software was released.
- A detailed study on the various types of combine harvesters used in Kerala, Tamil Nadu, and Andhra Pradesh were studied. Data on the number of units available with individual owners, annual usage, field performance, maintenance problems, constrains to the drivers, owners and farmers were analyzed.
- A set of machinery for paddy cultivation like tractor operated dry paddy seeder, eight row pre-germinated paddy seeder, riding type eight row paddy transplanter, cono weeders, reapers and threshers were introduced and demonstrated in farm fields extensively. SHG's including women groups were trained to operate transplanters Tractor operated rotovator, diggers, basin listers, coconut and areca nut palm climbers and mini tillers with multiple attachments were demonstrated for plantation crops.

- Many trainings were organized for farmers, farm labourers, extension officials, peoples representatives, self help groups at Tavanur as well as at different farmers' locations on rotavator, seeders, transplanters, weeders, reapers, threshers, mini tillers, coconut climbers.etc. Participated in many seminars on farm mechanization and guided farmers and other interested people for effective use of farm machinery.

Precision Farming Development Centre :

- An experiment conducted at the Precision Farming Development Centre to find out the best irrigation method for a Crop Geometry (3 sucker per pit at a spacing of 4m x 3m) in Banana(Nendran) revealed that the KAU micro sprinkler has the maximum B-C ratio and also the initial investment of the KAU micro sprinkler is lowest. Hence the irrigation method with one KAU micro sprinkler in the centre of the pit is recommended.
- 1. Participated in the "South Indian Agri Fair-2007", organised by Kerala Agricultural University at Mannuthy, Thrissur from 27th to 30th December, with a stall demonstrating various plasticulture applications and a live demonstration on micro-irrigation.

Participated in the Thrissur Pooram Exhibition -2008, with various plasticulture applications for a period of one month from 07.04.2008.

Finance

Head	Expenditure	Receipts (from Comptroller)
Non-Plan	2,02,04,339	
Plan	44,46,892	
ICAK	54,29,404	
Other EPS	20,13,377	2,59,39,000
Revolving Fund	-	
Total	3,20,94,012	2,59,39,000

KAU HIGH SCHOOL, VELLANIKKARA

Name of Head of the Station : Deborah Cyril, Head Mistress i/c

Academic Programme

Strength of students 2007-2008 : 1064 (Pre-Primary, LP, UP & HS)

SSLC Examination March 2007

Total candidates : 87
Candidates eligible for higher education : 86

Eight Students got 10A+, One got 9A+ and 1A, and four students got 8 A+ and 2 A in the 2008 S.S.L.C. examination. one student also got the Scout Rashtrapathi Puraskar.

Other Activities (Achievements)

Youth Festival

Thrissur Revenue District - Mimicry First Prize } Justin Paul
Kerala State - Mimicry 'A' Grade } (Std. 10 B)

Exhibition

KAU School Team won the Best Maths Club Award for 8th consecutive year and Overall First in the District Science Fair.

KAU School Team won First Prize for the District Science Drama Festival for the 6th consecutive year and 2nd Prize in Zonal Level Science Drama Festival

KAU School Selected as the Best Eco Club in the District and Nominated for the State Award

Manuscript Magazine : UP Section and HS Section won District First Prize, State A Grade

Finance

Head	Expenditure	Receipts
Non Plan 104-20-0005	48,41,560	9,52,746

CHAPTER III
RESEARCH
FACULTY OF AGRICULTURE
NARP (SOUTHERN ZONE), VELLAYANI

Name of Head of the Station : Dr. Arthur Jacob
Associate Director of Research i/c.

Awards / Scholarships to staff

Dr. Deepa S. Nair, Ph. D. scholar (Ad. No. 2001-22-04) received 'Jawaharlal Nehru Award' of the ICAR for 'Outstanding PG Research work in Horticulture for the year 2006'. The award carries a citation, a gold medal and a cash prize of Rs. 20,000/-. The award was presented at New Delhi on July 16th 2007 by Sri. Sharad Pawar, Union Minister for Agriculture. Dr. Deepa was guided by Dr. B.R. Reghunath, Professor.

Academic programmes :

Department of Plant Biotechnology

Details of thesis submitted

1. Anjana G. R (2004-11-34). Isolation and characterization of cDNA encoding chalcone synthase from orchid *Dendrobium* variety Sonia 17 (Degree awarded).
2. Luchmi R. S (2005-11-134). *Agrobacterium tumefaciens* mediated transfer of exogenous hydroxymethyl glutaryl coA (HMGCoA) reductase gene to *Centella asiatica* L. (Thesis submitted).
3. Smitha B. (2005-11-135) Molecular and morphological characterisation of the variants of *Piper nigrum* variety Panniyur 1 (Thesis submitted)

P. G. Programme

1. Vimarsh H. S. (2006-11-135). Molecular analysis of spike branching observed in black pepper (*Piper nigrum* L.) type from Idukki (Ongoing).
 2. Saritha V. S (2006-11-135) Isolation and characterisation of cDNA encoding dihydroflavanol-4-reductase gene from orchid *Dendrobium* variety Sonia 17 (Ongoing).
 3. Gilbert John M. S. (2006-11-35). *In vitro* flowering and growth of *Dendrobium* variety Sonia 17 as influenced by culture components and conditions. (Ongoing)
 4. Ponsubrya R. K (2006-11-12) Polymerase chain reaction based detection of Banana bunchy top virus (BBTV) and Banana streak virus (BSV) (Ongoing)
 5. Revathi Remanan. S. (2007-11-107) Molecular analysis of clonal variability of black pepper (*Piper nigrum* L.) variety Panniyur-1
 6. Arpitha Y. R. (2007-11-117). Effect of green leaves used in traditional food preparations on DNA repair
- Vighnesha Adiga (2004-11-08) Physiology and secondary metabolite production in genetically transformed brahmi (*Bacopa monnina* Wettst.) with cytokinin synthesizing isopentenyl transferase (*ipt*) gene.

Tulasi, T. (2005-11-145) "Integrated nutrient management in basmati rice (*Oryza sativa* L.) was submitted and degree awarded.

Study tours :

1. Visited Oil Palm India Factory at Bharathipuram, Anchal on 2nd June 2007 for UG course Hort.1202 Plantation Crops practicals.
1. Coconut Research station, Balaramapuram (UG course Hort.1202 Plantation Crops)
2. Dr. Usha Mathew, Associate Professor, Soil Science & Agrl. Chemistry has organised and conducted study tours to KVK,Panniyoor for the UG students of COA, Padannakkad

Other activities (brief outline only) :

Research programmes :

Major research achievements (highlights)

Rhizosphere modulation for commercial mediculture [Principal Investigator : Dr. A.S.Anilkumar]

The following experiments are in progress.

- i) *In situ* rain water harvest, conservation and utilization for biofencing with Kumizhu (*Gmelina arborea*)
- ii) Resource management for improving heart wood quality in sappan wood (*Caesalpinia sappan*)
- iii) Cost effective techniques for production and processing of brahmi (*Bacopa monnieri*) in homesteads
- iv) Root trainer technology for maximizing root yield in selected medicinal plants. viz, dapathiyan (*Holostemma ada-kodien*), sathavari (*Asparagus racemosus*) and naruneendi (*Hemidesmus indicus*)

Re-domestication and popularisation of true kashuri turmeric (*Curcuma aromatica* Salisb.) an endangered cosmetic cum medicinal plant [Principal Investigator : Dr. B.K. Jayachandran, Plantation Crops]

The project "Re- domestication and popularization of true kashuri turmeric (*Curcuma aromatica* Salisb.) an endangered cosmetic cum medicinal plant" commenced on 17.5.2006.

Survey was conducted for assessing the awareness and attitude of consumers towards kashuri turmeric and its products in Thiruvananthapuram and Kollam districts. Some of the customers knew about true kashuri turmeric in the form of dried chips as well as powdered form and were aware about the malpractice of selling zedoary as kashuri turmeric. Non-availability of the true kashuri turmeric is the problem faced by the customers. They are willing to cultivate it in their homesteads. Accordingly the seed materials have been supplied to more than 1600 customers in addition to the 12 front line/field demonstrations spread in two districts viz., Thiruvananthapuram and Kollam.

With regard to the survey on the attitude of farmers towards cultivation of kashuri turmeric and the socio-economic and technical reasons for endangerment of the crop, it is inferred that the cultivation of true kashuri turmeric is limited to a very few traditional ayurvedic doctors (*Vaidhyans*) and local farmers. In some cases, in the absence of regular cultivation, the crop survives as a perennial crop in a wild state year after year.

During the survey the farmers have expressed their willingness to start its cultivation if planting material is made available. Ignorance in identifying the real kashuri turmeric, its scarcity and dishonest business practices are the main reason for the present state of affairs in this regard. The need for growing real kashuri turmeric also vanished due to these reasons. Easy availability, cheapness of the substitute together with ignorance of the people culminated into the endangerment of the crop.

Middle men and merchants have a great role in the sale of zedoary as kashuri turmeric. The main reason is the easy availability of this inferior substitute which can be sold as kashuri

turmeric which fetches high price. Non-availability of the true kashuri turmeric aggravated the situation.

As lack of knowledge about the true kashuri turmeric and its values is the main bottleneck, it has to be overcome by various aspects of popularization of the crop. Lack of availability has to be solved by supplying initial planting materials to the farmers and customers who can take up the small scale cultivation in the homesteads. The initial success can finally lead to large scale cultivation.

The production of planting material for the front line demonstrations and for preparation of value added products continued. The production of Video film is progressing. Preparation of leaflets, booklets and folders is progressing. Development of value added products is also progressing.

AICRP ON NEMATODES [Dr. M.S. Sheela, Agricultural Entomology]

The impact analysis in yield due to major nematode was worked out in paddy, vegetables and banana. In paddy there was 16.65% yield loss due to *Meloidogyne graminicola*. In vegetable root-knot caused complete crop failure in association with bacterial wilt. In banana combined infestation with *Radopholus similis*, *Helicotylenchus multicinctus*, *Tylenchorynchus* and *M. incognita* caused a yield reduction of 7.5 to 12.5 t/ha (22 to 40 per cent).

Management trials were conducted in paddy, vegetables and fruit crops. Confirmation of resistance of paddy varieties due to cyst and root-knot nematode revealed that three varieties MRST-14, NRST-11 and MRST-16 were moderately resistant to cyst nematode but susceptible to *M. graminicola*.

Demonstration of integrated management of rice root nematode in paddy revealed that application of carbofuran @ 0.3g a.i. / m² in the nursery + application of carbofuran @ 1 kg a.i. / ha in main field gave 13.46 % increase in grain yield.

Screening and confirmation of resistance in varieties / lines of tomato revealed that the varieties EC-490125 was highly resistant while the varieties EC-490127, EC-25772, EC-16790 and EC-3904 were resistant. In okra, the varieties PB-236, Arya Dhan Lakshmi and Pusa savani were resistant to *M. incognita*. Among the 23 varieties of brinjal screened only varieties IC-11023 was found highly resistant while nine varieties viz. IC-285142, IC-249330, Round Br, IC-4672373, IC-13602, IC-249357, IC-24036, IC-90922 and IC-249387 were resistant. In chilli varieties CO-4 was highly resistant while Indira chilli and C-DCL-1 are resistant.

Management of root-knot nematode in vegetable by adopting various cropping systems prevalent in the area showed that there was slight reduction in nematode population in soil due to the non-preferred host, sweet potato variety Sree Bhadra when compared to preferred host okra followed by okra / brinjal / chilli. There were no statistically significant varieties in yield of okra, brinjal and chilli.

Management of nematode in bittergourd using various oil cakes revealed that all the oil cakes improved the yield of bittergourd by reducing the nematode population in soil, improving the plant vigour and germination. The increase in yield in various treatments ranged from 24.8 to 29.71 per cent.

Demonstration trial on the seed treatment of okra for the management of nematode showed that there were 38.81, 20.5 and 9.12 % increase in yield respectively in various locations.

Two trials were conducted for the field evaluation of green gram varieties in root-knot and reniform nematode infested area using a local susceptible variety. Among the varieties highest pod weight and dry weight of grains was obtained in SN-01-G3-06 variety. The root-knot index was also minimum in this variety (Root-knot index 1.1). While in other variety the root-knot index ranged from 1.1 to 1.9. In susceptible local variety the root-knot index was 2.0. The mean nematode population in soil at the time of harvest ranged from 85 to 92 per 200g. The demonstration trials are in progress in two locations.

Management of major nematodes in banana using bio inoculants reduced that all the treatments were better than carbofuran treatment alone. The CB ratio of various treatments ranged from 1:1.5 to 1: 1.9. Maximum was seen in *Pseudomonas fluorescens* application @ 20 g per plant. Regarding the yield increase (22.71%) maximum was noticed in paring + hot water treatment + carbofuran @ 0.5g a.i. per plant + Neem cake @ 1 kg per plant.

Revalidation of management of nematode complex on banana revealed that highest yield was recorded paring + hot water treatment + carbofuran + neem cake in two locations with 33.83 and 40.91 per cent increase in yield over untreated. While the increase yield in other treatment is 32.1 and 31.8 per cent over control.

Pest risk analysis was done in paddy and banana due *M. graminicola* and *R. similis* in four and one location respectively. In paddy, the yield loss ranged from 0.5 to 1 t / ha due to *M. graminicola* infestation having 122 – 275 nematode per 200 cc soil. In banana combined infestation of *R. similis* (122 per 200 g), *M. incognita* (43 per 200 g) and *Helicotylenchus multicinctus* (217 per 200g) reduced the yield of banana to a tune of 3 to 5 kg per plant accounting to 7.5 to 12.5 t / ha.

Impact of dietary counselling and food supplementation on the lipid status of population of Thiruvananthapuram [Principal Investigator : Dr. S. Chellammal, Home Science]

The project aimed at:

- i. assessing the lipid profile status of adult population of Thiruvananthapuram
- ii. identifying food supplements to reduce serum cholesterol level
- iii. imparting dietary counselling to improve the lipid profile status
- iv. incorporating food supplements in the diet of selected subjects and
- v. assessing the impact of dietary counselling and food supplement on the lipid profile status of population

A total of 800 subjects, 10 from each residents association, aged between 40-50 years who were willing to participate in the study and were preferably free from other degenerative diseases, were selected for the study.

The socioeconomic profile of the subjects revealed that the most of them were from nuclear families. Regarding the educational qualification, majority of them were graduates, followed by professionals, post graduates and doctorates. Occupational status showed that 45 per cent of the subjects were government employees. Monthly income ranged from Rs.4, 000 ID Rs.40, 000/-.

Smoking and alcoholism were observed among the males, A significant correlation was observed between smoking and total and cholesterol and also alcoholism and total cholesterol, 42 per cent of the subjects used walking as the most popular exercise.

Majority (61%) had stress either at work place or at home. A significant positive correlation (0.2396) was observed for stress and cholesterol.

Regarding relaxation, most of them watched TV, minority listened to music, practical yoga, meditation and art of living. 41 per cent had diet related disorders such as diabetes (22%), cardiac diseases (10%), hypertension (12%) and obesity (4%). Body mass index (BMI) revealed that none of them were under weight 15% were identified as over weight.

Dietary pattern of the subjects showed that majority were non vegetarians. Fish was the most preferred item. Mean intake of cereals, pulses, milk, vegetables and fruits were comparatively less than the ICMR recommendations. Consumption of fats and oils were at par with the RDA.

The lipid profile of the 800 subjects revealed that majority had high lipid levels. Total cholesterol, triglycerides and LDL values found to be high.

Dietary counseling was imparted to the subjects with detailed lecture in order to reduce the blood lipid levels. The pre and post test conducted revealed that the message has reached the participants positively.

A total of 140 subjects were selected for feeding trial - 40 subjects each in three experimental groups and 20 in the control groups. Group I received only dietary counseling, group II and III were provided with flax seed and spirulina supplements.

It was observed that the maximum reduction in total cholesterol TG and LDL was observed in group II (flax seed supplement) followed by group III (spirulina supplement). Reduction was also observed in group I (dietary counseling). Control group did not show any variation in the lipid profile after six months.

Three booklets such as diet for a healthy heart, dietary counseling for lipid profile modification (one in English and one in regional language Malayalam) were developed.

The study revealed that the lipid profile of population could be modified and cardiac diseases can be prevented through proper dietary counseling and food supplementation with functional foods such as flax seed, soya flour, oat bran and spirulina.

Consumption pattern of carbonated soft drinks of Indian population at different times of the year [Principal Investigator : Dr. S. Chellammal, Home Science]

To determine the quantity of consumption of carbonated soft drinks among all age groups and socioeconomic strata of four metropolitan cities four medium size cities of different regions and rural areas of these medium sized cities. Information will also be collected for consumption pattern of fruit juices and junk foods Thiruvananthapuram city and Kollam rural areas were selected for the study.

Thiruvananthapuram (Medium sized city)

Divided into various representative zones viz, East, West, South and Central.
House holds selected from all socio-economic classes from each zone.

Kollam (Rural area)

Kollam district, adjoining district of the medium sized city (Thiruvananthapuram) with maximum rural population was selected for data collection of rural data. The Thaluks selected from Kollam rural area were Karunagapally, Kunnathur, Pathanapuram, Kottarakara and Kollam.

Milk Consumption was almost the same in all the house holds except for some days during festivals, and anniversaries where they prepare kheer or payasams or consume milk shake, sharjah. But some house holds in the Low Income Groups does not have milk consumption at all and in some families consume only two to three days a week.

Most of the house holds especially in Low Income Group and slums lemon juice is used as fruit juice. Unorganized drinks and also Maggie noodles are popular as junk food.

Frequency of consumption of carbonated soft drinks was found to be less in all the 625 households.

During June and July the consumption of fruit juices and carbonated soft drinks in Thiruvananthapuram was less in most of the house holds. Some children in Low income groups and slums consumed unorganized drinks. Consumption pattern of junk foods was more.

During August, September, October and November the consumption pattern of fruit juices was high in all most all house holds. Especially in the month of October the consumption of fruit juices was high in muslim areas (Beemapally and Ambalathara) and the consumption of junk food was less in these areas. In the month of December consumption of fruit juice was low but junk was high especially conventional junk food.

In adjoining rural areas (Kollam) the consumption pattern of milk was almost the same in all the villages. In the Thrikaruva and Panayam villages consumption of carbonated drinks and junk foods were very low among the families.

In Elamballoor, the consumption of all the items were high during September and October since it is in Muslim dominated area and festive season.

Collection, Identification, Cultivation and Popularization of Edible/Medicinal Mushrooms of Western Ghats of Kerala [Principal Investigator : D. Geetha, Plant Pathology]

As part of the survey, 62 mushrooms were collected and morphological characters studied and identified at genus level.

The promising edible mushrooms isolated includes two isolates of pink oyster, *Pleurotus eous*, *P.opuntiae*, *P.tuberregium* and seven isolates of milky mushroom, *Calocybe indica*.

The cultivation trials indicated that *P.eous* and *P.opuntiae* outyielded the existing isolates which produced 92 and 85 per cent biological efficiency. Cultivation technology of *Hypsizygous ulmarius*- the king oyster mushroom was standardized. It is a high yielding mushroom with 125% biological efficiency and a single mushroom weighed 200-250 g.

Assessment of susceptibility of *A. cerana indica* to TSBV (tolerance / resistance) through virus inoculation [Principal Investigator : Dr. S. Devanesan, Entomology]

The incidence of TSBV infection in the colonies were recorded continuously for identifying resistant/tolerant strains of *A. cerana indica* and the resistant colonies identified were multiplied through selection.

All the colonies inoculated with virus showed symptoms of the disease. Larvae inoculated with TSBV different ages (one, two and three days old larvae) showed 50% mortality within three days. In four days old larvae, the mortality commenced from third day after inoculation, the number of dead larvae were comparatively lower (11-12% only) and on fourth day it ranged from 30-36% and death continued upto fifth day. Since the mortality commenced only on the third day of inoculation *ie.*, 7 days after hatching, the cells of diseased larvae were found normally capped by the worker bees and later those cells accommodating dying larvae were seen bitten by the worker bees and opened up.

Management strategies for TSBV infected bee colonies by using different plant extracts [Principal Investigator : Dr. S. Devanesan, Entomology]

To assess the efficacy of plant extracts for the management of TSBV infected colonies, The following plants were selected.

Scientific name	Common name	Family
<i>Phyllanthus niruri</i>	Phyllanthus	Euphorbiaceae
<i>Curcuma longa</i>	Turmeric	Zingiberaceae
<i>Mimosa pudica</i>	Touch- me- not	Mimosaceae
<i>Vinca rosea</i>	Periwinkle	Apocynaceae
<i>Azadirachta indica</i>	Neem	Meliaceae
<i>Boerhavia diffusa</i>	Hogweed	Nyctaginaceae
<i>Ocimum sanctum</i>	Holy basil	Labiatae
<i>Hemidesmus indicus</i>	Indian sarsaparilla	Asclepiadaceae
<i>Adathoda vasica</i>	Malabar nut	Acanthaceae

Fresh plants were collected and cut into pieces and extracts prepared from 25g of each plant, ground in a blender with 100 ml of water. Each extract was tested in three TSBV infected colonies each mixed with sugar syrup at weekly intervals. Treatments were repeated in colonies with virus infection at different stages with different doses.

The efficacy of plant extracts for the management of TSBV infected colonies of Indian bee *A. cerana indica* showed that feeding of turmeric *Curcuma longa*, resulted in a steady decrease in the TSBV infection leading to the recovery of the colonies. Decrease in the intensity of infection was also observed in colonies treated with the extract of *Mimosa pudica* and *Phyllanthus niruri*. The colonies treated with *Mimosa pudica* and *Phyllanthus niruri* showed reduction in the incidence of TSBV infection in new young larvae and later on the colony has been recovered from infection and the population increased significantly. *Azadirachta indica* and *Ocimum sanctum* treated colonies exhibited intermittent infection and recovery. *Hemidesmus indicus*, *Adathoda vasica* and *Boerhavia diffusa* did not have much effect. The results indicated the possibility of exploiting herbal extracts for controlling the TSBV disease in bee colonies.

KSCSTE - Project "Breeding for Novel Varieties in Monopodial Orchids" [Principal Investigator : Dr. C. Lekha Rani, Plant Breeding]

In addition to the 18 commercial hybrid varieties established in the greenhouse, 14 more top quality hybrids belonging to the genera *Vanda*, *Aranda*, *Aranthera* and *Mokara* were purchased and established. Morphological characterization of the varieties was completed and diallel crossing is going on. Majority of combinations attempted in the higher order multigenetics has succumbed to incompatibility. Successful combinations have resulted in capsules which are being harvested at 80-90% maturity and inoculated *in vitro*. Seeds germinate into protocorms which eventually differentiate shoot and root meristems in opposite directions. Needbased sub-culturing is done and seedlings are deflasked at 3-4 leaf and 2-3 root stage. At present, seedlings from five combinations have regenerated into full fledged seedlings ready for de-flasking. More hybrid combinations are represented in the protocorm differentiation, seed germination and capsule maturation stages.

Molecular characterization work of twenty monopodial hybrids using twelve primers showing amplification is in progress.

AICRP ON MUSHROOMS [Dr. C. Lulu Das, Plant Pathology]

Survey was conducted in and around Thiruvananthapuram district, Kottayam district, Pathanamthitta and Wayanad districts of Kerala. Around 72 wild specimens including *Auricularia*, *P. eous*, *P. squarrosulus*, *Schizophyllum commune*, *Boletus*, *Ganoderma*, *Colybia*, *Trametes*, *Mycena*, *Tuber* and *Ternitomyces* were collected. *Auricularia* sp. has been domesticated and is coming up well under Kerala conditions. Several unidentified species were also collected. Majority of species were collected in rainy season during the South-West monsoon.

The collections obtained are preserved after isolation in the mushroom museum. A large collection of *Boletus* has been got from Thiruvananthapuram district and all have been preserved in the Mushroom museum attached to the center.

Five strains of *Calocybe* were used for the study. Ci-6 repeatedly gave the highest yield followed by Ci-8 and Ci-5. Time taken for first harvest was lowest for Ci-6. The average fruiting body varied in all the five different strains ranging from 20.8 to 86.0 g.

A maximum of 71.5% biological efficiency could be obtained with the strains. Some of the local strains were found to yield better than the strains from Solan.

Five different strains were evaluated. Pf-05 gave the maximum yield. Though mycelium run was completed early on Pf-01, the yield was lowest. Pf-05 took more than twenty days for completion of mycelial run and the yield was maximum in all

replications of Pf-05. There was no disease incidence in any of the five strains of *Pleurotus florida*.

PSc-02 and PSc-03 gave the maximum yield. The mycelial run was completed first in PSc-04 but the maximum yield was observed in PSc-02 and PSc-03 which were on par. PSc-01 took only 18 days for full harvest when compared to other strains. All the strains were completely free of any disease or pest. The trials were repeated thrice. The PSc strains can withstand a higher temperature than the Pf strains.

The strain Vv12 received late could only be laid out once. But it seems to be promising. The compact round bed yield more than the square beds. Excepting Vv9 and Vv12 all were poor yielders. The experiment has been repeated for the third time.

Enhanced yield of *P. florida* was obtained by spraying 0.1% urea. There was no significant effect for di-potassium hydrogen phosphate. The experiment with *P. sajor-caju* also revealed enhanced yield by spraying 0.1% urea. Out of 15 bags for each treatment 10 per cent bacterial infection was detected for *P. florida* treated with K_2HPO_4 and 20 per cent of bags treated with urea were infected with *Trichoderma* alone. *Aspergillus* contamination was almost nil in these treatments.

Evaluation of yield potential of blue oyster mushroom *Hypsizygus ulmarius* was compared with the two standard species of *Pleurotus* namely *P. florida* and *P. sajor-caju*. The yield potential of blue oyster mushroom out-yielded the other two varieties. The average time taken for spawn run was comparatively higher for blue oyster mushroom but the individual fruiting body weight was much higher leading to tremendous yield of this mushroom. This abnormally large size of individual fruiting body and white colour have attracted the farmers to opt this mushroom. A very high biological efficiency of 101% was obtained compared to 85% in *Pleurotus florida* and 88% in *Pleurotus sajor-caju*.

The experiment Cultivation of paddy straw mushrooms by the poly bag method was laid out as per the poly bag method of cultivation. Very poor yield was obtained in all the strains. The experiment has been repeated with cotton hulls mixed into the paddy straw and better results are awaited. The spawn run is not easily visible due to the purplish colour of mycelium.

More or less uniform sized fruiting bodies could be obtained in C_1APK_2 . The post casing period was lesser for C_1APK_2 than the strains of C_1 . The average size of fruiting body was 40.87 g. Maximum yield of 78 kg/100 kg substrate could be obtained with the variety C_1APK_2 . Reduction in yield was noticeable in beds where watering was excess and discoloration of fruiting bodies too was noticed in such beds.

In the case of oyster mushrooms, drying trials were conducted with *P. eous*. 100 g each of oyster mushrooms were used for the study. Simple washing followed by sun drying and blanching followed by sun drying gave the best results with respect to preservation of colour and brittleness. Though the microflora count was less in chemical treated samples, the colour faded gradually in a month turning to almost black. The sun-dried samples retained a golden colour. Upto three months the washed sun dried samples were completely free of any pest or microflora infestation. The brittleness was not lost. It was then powdered and value added products prepared from the samples. No insect attack or off flavour were noticed. From 4th month onwards slight mite attack noticed. The value added products prepared were cookies, cakes, candies, pickles etc. Cabinet drying at 40°C was better than 60°C because the samples were too brittle at 60°C with loss of colour.

Value added products were also prepared with *Auricularia* sp. *Auricularia* soup, *Auricularia* scramble, *Auricularia* flitters etc. were tried.

Drying trials with *Calocybe* revealed that keeping quality was less for milky mushrooms compared to oyster mushroom. After a months storage, insect attack could be noted in all the samples. The whiteness was lost immediately after drying and there was off

flavour for the samples and could not be used for preparation of value added products. The brittleness was more in *Calocybe* samples.

A total of 500 beds were observed in experiments and in local growers mushroom houses. *Trichoderma viride* was the most common contaminant in mushroom beds. Some of the beds in a growers plot were infected with a virus causing abnormal shape for the fruiting bodies. The *Calocybe* beds were mostly infected with *Coprinus*. No *Trichoderma* or *Aspergillus* could be detected in any of the milky mushroom beds. Damage by insects was negligible. Sciarid flies was the only insect noticed. Use of yellow traps, thin X-ray films coated with gingelly oil and observing strict hygiene was very useful to ward off diseases and pests from the experimental rooms.

KSCSTE project - Assessment of micronutrients in soils of Kerala [Dr. Usha Mathew, Soil Science & Agricultural Chemistry]

Surveyed the micronutrient stock of laterite soils of Kerala. Identified common extractants for available micronutrients. The most suitable common extractants identified were Fe and Mn and Mehlich No.3 for Zn, Cu, B and Mo. Micronutrient contents in the index part of banana and cassava in Thiruvananthapuram district were far below critical level of sufficiency. Total reserve of all micronutrients except Fe is not sufficient to sustain availability. In spite of the high total Fe content, its availability is low in southern districts of Kerala. Cu, B, and Zn were also found to be deficient in laterite soils. Deficiency is more in southern districts of Kerala than in northern districts.

World Bank Project : Capacity building project on street food [Dr. Mary Ukkuru, Home Science]

Trainings to improve quality of food products were under taken and the third phase of the project

DBT Project : Empowering farm women for enhancing quality of life through skill development and income generation by food processing [Dr. Mary Ukkuru, Home Science]

Beneficiary list of Kalliyoor and Balaramapuram was finalized after interview and Standardization and sensory evaluation of lovilovi, rose apple and bilimbi products were taken up. Products prepared for Karshikolsavam, besides conducting motivation / orientation camps were held

Nutritional Horticulture Board Project - Redomestication and popularization of turmeric from endangered cosmetic Cum medicinal plants [Dr. Beela. G.K., Home Science]

Feasibility of preparing value added cosmetic products were worked out.

WGDP project "Strategies for eco-friendly exploitation of arrowroot in the Western Ghat region of Kerala for mini-agri-business" [Dr. Kumari O. Swadija, Agronomy]

West Indian arrowroot, *Maranta arundinacea*, is found growing / cultivated on a limited scale in the Western Ghat region of Thiruvananthapuram district. The rhizomes collected from different locations contained 70 --75 % moisture, 20 – 28 % starch, 0.9 – 1.1 % crude protein and 0.4 – 1.8 % crude fibre on fresh weight basis. The indigenous practices of arrowroot cultivation, starch extraction and utilization are being documented. Field trials have been laid out in the identified homesteads in Parassala, Pallichal, Kattakada, Poovachal and Pullampara panchayats in Thiruvananthapuram district for deriving an organic nutrient schedule for sustained yield of arrowroot. Action has been taken to fabricate a machinery for starch extraction from arrowroot. Important markets have been identified and surveyed to assess the marketing channel and price spread. With a view to encourage arrowroot cultivation, one day awareness programme on 'Profitable arrowroot cultivation' has been conducted at Pullampara

Gramapanchayat on 22-02-2008 which has been covered by AIR, Thiruvananthapuram and Kissan Krishi Deepam of IITMK (through Asianet channel). The most important constraint identified was the unavailability of planting material of arrowroot. Accordingly, 500kg of quality planting material of arrowroot has been procured and distributed to 25 selected farmers on 10-03-2008 with necessary instructions for arrowroot cultivation.

WGDP project "Source efficacy of organic manures and microbial inoculants for nutrient scheduling in vegetable based cropping systems of Western ghats" [Dr. Sajitha Rani, Agronomy]

Cowpea was raised as first crop during kharif season in cropping systems I and II and little gourd as perennial crop in cropping system III. In both cropping systems I and II vermicompost application with bio inoculants viz. pseudomonas and trichoderma recorded maximum yield. Observations are being recorded from cropping system III.

A Heuristic Community Participatory Action Programme for Rational Water Resource Conservation and Utilisation in the Drought prone areas of Western Ghat [Dr. Kumari Sushama, Agricultural Extension]

As part of the project, water samples from well, spring and Ferro Cement tank are to be tested for three seasons namely, during monsoon, pre-monsoon, and post monsoon. Forty five water samples from wells, springs and Ferro cement tanks were collected from selected three wards of Kuttichal Panchayat as part of the "during monsoon" water quality testing. Fourteen samples from the respective wards were again collected for water quality testing for post and pre monsoon seasons. The collected samples were tested in the Government Analytical Lab Thiruvananthapuram. 100 ml water samples were selected for biological testing.

The samples taken from wells when analysed revealed that 80.4 % of the samples only were safe to drink with nil bacterial count. More than 60% of the samples had above 200 counts. In the case of spring water, no samples were found to be safe for drinking (nil bacterial count) and 83.3% of them were found to have 200 bacterial counts. The three samples taken from Ferro cement tanks when analysed were found to have an alarming count of coli form bacteria.(1800+).

The Research team collected information from PHC regarding the water-borne diseases and transmitting diseases. An assessment of the water-borne and transmitting diseases revealed that there is high incidence of diarrhoea, cholera and jaundice in the study area. water-borne All these observations pin points to the urgent need of water purification measures and conscientization of public in this regard

An awareness campaign was conducted at Kuttichal Panchayat hall on water conservation and utilization On 7th November. On Rain water harvesting, Water borne diseases and their remedial measures, Need and importance of water". More than 122 people participated in the programme.

The awareness programme helped the people to get some knowledge about water conservation and utilization methods, water borne diseases, and the precautionary measures to be taken.

As part of the project a documentary CD "Jalasrothassuka! Nalekkai" has been prepared. In this we could document the traditional water conservation and handling methods in Kuttichal Panchayat. CD highlights the need and importance of water in the present and future years. It also documents the interventions made by the research team in Kuttichal Panchayat.

As part of the project we plan to construct a ferro cement tank, renovation of an existing well and development of a spring in selected wards of Kuttichal Panchayat. A meeting ws conducted with Panchayat officials regarding this matter.

WGDC - Exploration of Western Ghat tract for Diazotrophs and P solubilizers
[Dr. K.S. Meenakumari, Microbiology]

Extensive collection of soil samples from Western Ghat tract was undertaken. About 80 nos. of isolates of *Azotobacter*, 50 isolates of *Azospirillum* and 40 no. of P solubilising microorganisms were obtained. Studies on *in vitro* N₂ fixation and P solubilization of the isolates are in progress.

DBT - Management of foot rot and bacterial leaf spot of betel vine (*Piper betle*) with microbial inoculants [Dr. K.S. Meenakumari, Microbiology]

Work has been initiated to identify efficient fungal antagonists and PGPR capable of suppressing foot rot and bacterial leaf spot of betel vine. Experiments have been laid out at Pathanamthitta and Thiruvananthapuram district to test the effect of existing available cultures of *Pseudomonas fluorescens* on *Phytophthora* and *Xanthomonas betlicola*. *In vitro* evaluation of bacterial and fungal antagonist against in the target pathogen such as *Phytophthora*, *Xanthomonas betlicola* and *Colletotrichum* in progress

AHADS Project - Adoption of microbial inoculant technology in the farming system of tribal populations of Attappady [Dr. K.S. Meenakumari, Microbiology]

Biofertilizers such as *Azospirillum*, *Azotobacter*, P Solubilizers and AMF were supplied to the tribal farmers of Attappady. These cultures were also applied at different experimental plots at Attappady in crops like cashew, gooseberry, maize and sorghum. Significant growth enhancement was recorded and growth parameters are being recorded at monthly intervals. Simultaneously, collection of soil samples from undisturbed forest tract for isolation of N₂ fixers and P Solubilizers is in progress. Work has been initiated to set up a Biofertilizer production unit at AHADS for the supply of biofertilizers to tribal farmers of Attappady. As per the schedule two training programmes on Biofertilizer have been conducted for farmers and officers of Attappady.

WGDP on Analysis of homestead based fodder production and interventions for economic milk production in Trivandrum district of Western Ghat region of Kerala [Dr.S.Lakshmi, Professor, Agronomy]

The project started on 27.6.2007. A random survey was conducted in the seven wards of Anapad watershed area to assess the availability of fodder in the project area, to collect the indigenous plants used for feeding animals and to work out the economics of milk production. Planting materials of newly released fodder crops were multiplied and distributed to the dairy farmers. Field experiments to evaluate the suitability of different fodder crops in the homesteads were laid out in 4 locations at Govindamangalam, Block office and Aruvacode wards.

Development of Decision Support System Software for Cereals, Millets, Pulses and Tuber crops & Establishment of Agricultural Digital Information centre
[Dr. J. Ganeshan, Agricultural Engineering]

A demonstration on AGRI EXPERT was done at an exhibition conducted by KAU at Neyyatinkara. The PI conducted discussion with software companies for the development of the new software and one firm has expressed their interest in development of the software.

A literatures survey on all identified ten crops was conducted based on which five fields were identified - crop protection system, cultivation practices, water management, fertilizer recommendation system and implement selection for cereals, millets, pulses and tuber crops. The literatures on the four pulse crops were prepared in the form of web pages / word documents for easy data entry. Flow charts for the cereals, millets and pulses were also prepared. The demo version of the software for wheat was prepared. Malayalam version of the software for tuber crops was developed.

Developing a participatory settlement based animal farming model to enhance the income and employment opportunity of tribal women folk of Western Ghat region of Kerala
 [Dr. R. Vijayan, Animal Husbandary]

The project aims at

1. documenting animal management practices followed by the tribes of Western Ghat
2. assessing the scientific validity of animal management practices followed by the tribes.
3. training the tribal women on livestock management and first aid practices
4. preparing and implementing a settlement based participatory plan for animal management and developing a sustainable participatory animal farming model. The Preliminary survey, we have selected Cheruppani tribal settlement as our locale for developing animal farming model. The preliminary survey noted diversity in animal farming Reasonably good animal population increased interest on animal farming, availability of fodder and scope for fodder cultivation and scope for marketing of animal products

As part of the survey a full fledged questionnaire was developed and the research activities for the documentation of animal management practices followed by the tribes of cheruppani settlement are in progress.

EXTENSION PROGRAMMES :

Agrometeorological Advisory Services, Vellayani Centre

As a part of the National programme on agrometeorological forecasts project on issuing agrometeorological advisory bulletins, a project on experimental agrometeorological advisory services, funded by the Department of Science and Technology, is in operation at Vellayani. Bulletins are prepared on the basis of the forecast prepared by the National Centre for Medium Range Weather Forecasting (NCMRWF). Each bulletin comprises the weather experienced during the previous week, forecast of weather for the next four days, current phenological stages of the major crops and the precautionary measures to be undertaken in case of the incidence of pests and diseases.

The basic input for the agro-dvisory is the medium range weather forecast. Local corrections are applied based on the long period climatic data and the past week's weather data observed, so as to achieve a reasonable and realistic weather forecast. These forecasts are then translated in terms of the most suitable management practices and plant protection measures to be adopted by the farmers. The weather parameters for which the NCMRWF issues the forecast include cloud cover, wind speed, wind direction, maximum temperature and minimum temperature.

a. Highlights of extension activities

Scientists associated with the *Balasastra* Congress -2007 conducted at the College of Agriculture on 11th and 12th May 2007.

Farm Advisory Services :

Dr. M.S. Hajilal rendered advisory service over telephone and in person to needy farmers on agricultural engineering aspects and vanilla cultivation.

Dr. Lulu Das rendered advisory services over telephone and in person about mushroom cultivation.

Dr. S. Lakshmi has visited homesteads of 100 dairy farmers and suggested steps to be adopted for fodder cultivation.

Scientist	In Person	Over phone	Through Letters
Dr. Arthur Jacob			
Dr. S. Devanesan	More than 100	More than 300	More than 50
Dr. Lulu Das	29	46	30
Dr. B.K. Javachandran	5	23	-

Field Visit

Dr. Roy Stephen - Regular visits to farmers fields for identifying nutritional problem.

As part of the EAP "Re-domestication and popularisation of true kashuri turmeric (*Curcuma aromatica* Salisb.) an endangered cosmetic cum medicinal plant" Dr. B.K. Jayachandran made field visits in farmers field in Thiruvananthapuram and Kollam Districts are undertaken as part of the front line demonstrations.

Celine, V.A., Sujata Sathy Shankaran, S. Seema., S. N. Deepa, I. Sreelathakumary and M. Abdul Vahab. 2007. Characterization and evaluation of vegetable amaranth for high yield, quality and resistance to *Rhizoctonia solani*. *Acta Horticulturae* – 2007. No. 752: 447 – 452

Resmi, J. and I. Sreelathakumary. 2008. Divergence studies in ashgourd (*Benincasa hispida* (Thunb.) Cogn.). *Proc. 20th Kerala Science Congress – 2008*. 174 – 177

S.Devanesan, K.K. Shailaja and Premila. K.S (2007). Ecotypes of the Asian honeybee *Apis cerana indica* Fab. in different ecological niche in Kerala, India. *Proc. 40th Apimondia 2007 International Apicultural Congress held on 9-14 Sept. 2007 at Melbourne Australia* p. 125

K.S. Premila, S. Devanesan, J. Arthur Jacob and K. K. Shailaja (2007). Foraging plants of stingless bee, *Trigona iridipennis* Smith and physico-chemical characteristics of its honey. *Proc. 40th Apimondia 2007 International Apicultural Congress held on 9-14 Sept. 2007 at Melbourne Australia* p. 129

Hebsy bai, S. Devanesan, K. K. Shailaja and Ajitha. S. (2007). Potential of herbal extracts in the control of the Thai Sacbrood Virus disease of the Asian Honeybee *Apis cerana indica* Fab. *Proc. 40th Apimondia 2007. International Apicultural Congress held on 9-14 Sept. 2007 at Melbourne Australia* p. 152

A.S.Anilkumar, K.Harikrishnan Nair, M.Suharban, P. Sivaprasad and M.S.Hajilal. 2008. Sustainability Pathway to Organic Mediculture in the Humid Tropics. National Workshop on "Grower _ Industry Linkage for Promotion of Medicinal and Aromatic Plants Cultivation", 12-13 February 2008, Cochin.

Geetha. D, Suharban. M and Minimol. K. Effect of growth regulators on the yield of oyster mushroom, *Pleurotus florida* (Fr.) Singer. *Proc. 20th Kerala Science Congress, 28-31, Jan. 2008, Thiruvananthapuram*, pp 187-189

Jessykutty, P.C. Jayachandran, B.K. and Balakrishnan Asan. 2008. Influence of Oil Palm shade on Biochemical characters of Galanga (*Kaempferia Galanga* L.). *Proc. 20th Kerala Science Congress. Thiruvananthapuram*.

Meerabai, M., Jayakrishnan, V. Geetha, V., Malar, D., Simi, S. Mini, G. and Jayachandran, B.K. 2008. Intensive cropping in coconut for soil moisture conservation, nutrient recycling and high profitability. *Proc. 12th Kerala Science Congress, Thiruvananthapuram*.

Nirmalatha, J.D. and G.R. Sulekha. 2007. Quality standards in medicinal plants. Abstract 6th National seminar on medicinal plants. p.15

Nirmalatha, J.D., Sulekha, G.R. and B.K. Jayachandran 2008. Potential of *Curcuma* spp. in global trade. National workshop on production and processing of spices and aromatic plants, Uttar Banga Krishi Viswavidyalayapundibari, Cooch Behar, West Bengal

Nar. D.S. and B.R. Reghunath 2007. Effective use of encapsulation dehydration technique in cryopreserving somatic embryos of butterfly pea (*Clitoria ternatea* L.) *J. Herbs, Spices and Medicinal plants*. 13(3): 83-95

Reshmi, C.R. and B.R. Reghunath. 2007. Effect of shaded and open condition on pod yield of butterfly pea (*Clitoria ternatea* L.). *Proc. 19th Kerala Science Congress, Thiruvananthapuram*. p. 404 – 405

Sarada, S. and B.R. Reghunath. 2008. Performance of *Indigofera tinctoria* L. accessions. Under open and shaded condition. *J. Medicinal and Aromatic Plant Sci.* 30:105-108

Sheela, M.S. 2007. Ecofriendly Management of Nematodes in Banana, XVI International Plant protection Congress. Pp: 738-739.

Sheela, M. S. 2007. Nematode Management in Plantation Crops, Paper presented in Natl.Symp. On Nematology in 21st century; Emerging paradigms at A.A.U, Jorhat on 22nd and 23rd November, 2007. Pp: 12-13.

Siji, G.V, Jayaprakash, C.A, Sheela, M.S and Mohandas, C. 2007. Efficacy of *Chromola odorata* against *Meloidogyne incognita* infestation of okra, Paper presented in Natl.symp. On Nematology in 21st century; Emerging paradigms at A.A.U, Jorhat on 22nd and 23rd November, 2007. Pp: 75-76

Nisha, M.S and Sheela, M.S. Integrated Management of root-knot nematode, *M.incognita* in coleus solinostemon rotundifolius Paper presented in Natl.symp. On Nematology in 21st century; Emerging paradigms at A.A.U, Jorhat on 22nd and 23rd November, 2007. Pp: 86-87.

Meenakumari. K.S. 2008. Dual inoculation of AMF and *Pseudomonas fluorescens* for the management of bacterial wilt of chilli (Current Biotica) (2008 Vol. 1)

Meenakumari. K.S. 2008. Azadirachtin as a protectant in Microbial inoculant formulation (Neem Conference).

Lakshmi.S., Sumabai,D.I.,Salini,G.S. 2007. Effect of phosphorus on yield and quality of fodder cowpea (*Vigna unguiculata*) cultivars. Abstracts of Natgional Symposium on :A new vista to forage crop research: at BCKV, Kalyani from September, 10-11th 2007: 67

Popular articles

I. Sreelathakumary. Components and uses of chilli. *Krishianganam* - Dec 2007. 13(1): 13-14

Dr.l. Sreelathakumary. Vegetable seed production and processing in cucurbitaceous vegetables. Kerala Karshakan 2007. 53 (2) : 25-26

S. Devanesan, K.S. Premila and K.K. Shailaja (2007) : Ranivalarathi colony vibhagikkam. Karshakashree (December 2007)

S. Devanesan, K.S. Premila and K.K. Shailaja (2008): Vasantham varavayi, thene edukkanalundo. Karshakan February, 2008) p. 6-8

S. Devanesan, (2008): Munnorukkam nannayal Moonniratti thene. Karshakan. February, 2008); p.9

S. Devanesan, K.S. Premila and K.K. Shailaja (2008): Thene prakruthiyudae aushadham. Karshakan (February, 2008) p. 10-12

S. Devanesan, K.S. Premila and K.K. Shailaja (2008): Thene Seelamakkoo. Karshakan February, 2008) p. 21-22

P.C.Jessykutty. 2008. Rambhayila oru sugandhavila. Keralakarshakan 53(9): 52-53

Lulu Das 2007. Prospects and possibilities of Mushroom Cultivation in Kerala, India. Souvenir released in connection with Karshikotsavam 2007 at Neyyartinkara. pp. 83-84

Chapters in Books :

Rajmohan K, Sadheeshnakumari S, Uma Maheshwari R, and Swapna A. An improved protocol for the *in vitro* propagation of medicinally important plant, *Baccopa monnieri* (Linn.). Recent Trends in Horticultural Biotechnology, New India Publishing Agency, New Delhi. 2007.249-52.

Priya L, Anita S., Rajmohan K, and Swapna A. *In vitro* propagation of *Ipomea mauritiana* Linn Recent Trends in Horticultural Biotechnology New India Publishing Agency, New Delhi. 2007. 291-293.

Sadheeshnakumari S, Rajmohan K and Swapna A. *In vitro* propagation of *Smilax zeylanica* L.. Recent Trends in Horticultural Biotechnology New India Publishing Agency, New Delhi. 2007. 295-297.

Technical Bulletins

Anilkumar, A.S., Sajitha Rani, T. and Suharban, M. 2007. Jaivakrishi (Malayalam). Ed. R. Ajithkumar, Farm Information Bureau, Thiruvananthapuram

Jayachandran, B.K., J.N. Sajana and M. Meerabai. 2007. Fertility management of the Plantations of Kerala. 2007. Proceedings of the National Workshop on Fertility evaluation for soil health enhancement 11-13th September 2007 Organised by the Soil Survey Organisation and Agriculture (S.C.Unit) Department p. 173-182

M. Meerabai, M., Geetha, V. and Jayachandran, B.K. 2007. Organic farming in vegetables- A boon for better human health and soil health. Proceedings of the National Workshop on Fertility evaluation for soil health enhancement 11-13th September 2007 Organised by the Soil Survey Organisation and Agriculture (S.C.Unit) Department p. 209-216

Meenakumari, K.S. Attappadi Manninte punarujeevanathinu jeevanuvalangal.

Leaflets : Lulu Das. 2007. "Koon Krishi – Arogyathinum, Aadayathinum". Malayalam brochure released from the AICRP on Mushroom, Vellayani Centre

Lulu Das. 2007. "Chakirichor compost". Malayalam brochure released from the Farm Information Bureau, Govt. of Kerala, Thiruvananthapuram

Lulu Das. 2007. "Paal Koon". Malayalam brochure released from the AICRP on Mushroom, Vellayani Centre

Lulu Das. 2007. "Kothiyoorum Koon Vibhavangal". Malayalam brochure released from the AICRP on Mushroom, Vellayani Centre

Visitors

a. Farmer group / students

Students from various colleges and schools visited Biotechnology Laboratory.

Students from various institutions and farmers and unemployed youths visited AICMIP to see the mushroom cultivation and clearing doubts.

b. Important visitors

Dr. Sheshayee, Associate Professor, UAS, Bangalore has visited the Plant Physiology Department.

Dr. Purushothama, Senior Scientist, RGCB, Thiruvananthapuram has visited the Plant Physiology Department.

Dr. S.A, Faruqui, Project coordinator, AICRP on Forage Crops, Jhansi, visited on 26.3.08

OTHER ACTIVITIES

Dr. Arthur Jacob, Associate Director is the member of Co-ordination groups on Coconut and Coconut based cropping systems and fruits.

Dr. M.S. Hajilal, Associate Professor (Agricultural Engineering) engaged with :

- Co-ordinated the exhibition of flowering plants of IF in the flower show 2008 (1/2/2008 to 10/2/2008) at Observatory Hills, Thiruvananthapuram.
- Participated in the Agrifest 2007 held at Neyyattinkara during the month of December 2007
- Inspection of Vehicles in the N.A.R.P (SR), Vellayani.
- Supervision and maintenance of irrigation and drainage system in the farm.
- Supervision and maintenance of farm machinery and equipment.
- Dr. M. Abdul Vahab, Associate Professor (Olericulture) continued as the Project Coordinator (Vegetables) in the University

Details of sale of seeds / planting materials / biocontrol agents etc.

Item	Quantity	Revenue
Farm Revenue		Rs. 49876/-

Finance

Head	Expenditure	Receipts
Non-Plan	8412458	10155000
Plan	952702	1198000
ICAR	8270190	7802100
Other EAPs	5079115	2662730
Total	22714465	45782420

INSTRUCTIONAL FARM, COLLEGE OF AGRICULTURE, VELLAYANI

Name of Head of the Station : Dr.M.Suharban

Research programmes

a. Major research achievements (highlights)

In the EAP "Collection, identification, cultivation and popularization of edible / medicinal mushrooms of western Ghats of Kerala' 62 mushrooms were collected, morphological characters studied and identified at genus level. The collection includes rare mushrooms like *Geastrum triplex* (earth's star mushroom), *Daldinia concentrica*, *Dictyophora indusiata* and *Clavaria fragilis* (club fungi).

Isolation, spawn production, and cultivation trials were conducted on the collected mushrooms and two promising high yielding isolates of *Pleurotus opuntiae* and *Pleurotus eous* were evolved for large scale production and popularization. The cultivation technology indicated 85 % biological efficiency in the case of *P. opuntiae* and 92 % in the case of *P. eous*.

Seven isolates of milky mushrooms, *Calocybe indica* and one isolate of milky mushroom *Voloariella volvacea* were brought into cultivation, which were obtained as part of the survey.

Experiments were conducted on the performance of growth regulators on the mycelial growth and mushroom production indicated significant increase in yield of beds sprayed with 100 ppm Indole Acetic Acid and 50 ppm Gibberellic acid.

The cultivation technology of *Hypsizygous ulmarius* (King Pleurotus) was standardized. It is a high yielding mushroom with 125 % biological efficiency and a single mushroom weighs 250 to 300 g.

Farm Advisory Services

In person	Over telephone	Through letters
5000	5974	200

Field visit

No. of visits	Scientists	Problem identified	Recommendations
Ten	Dr.M.S.Hajilal, Professor	Agricultural engineering aspects and vanilla cultivation. Visited vanilla gardens at Ramamangalam	Scientific scheduling of irrigation, manuring, pollination and harvesting
Three	Dr.Kamala Nayar, Professor	Bacterial leaf spot of betel vine due to heavy doze of fertilizer application and heavy mulching	Cleaning followed by drenching and spraying with 1 % Bordeaux mixture. Incorporation of a mixture of neem cake, fluorescent pseudomonads and dry cowdung and spraying with flurescent pseudomonads at monthly intervals.

Two	Dr.Kamala Nayar, Professor	Bacterial blight of Anthurium	Spraying with Streptocycline in acute cases followed by monthly spraying with 2 % fluorescent pseudomonads
Twenty two	Dr.D.Geetha, Professor	Attack of pests (Phorids, mites and bugs) in mushroom houses	Neem oil – garlic – soap mixture
		Attack of green mould in mushroom beds	Application of 0.05 % Bavistin
		Leaf rot of coconuts	Contaf application (2 ml in 300 ml of water)

List of publications

Scientific papers

Anilkumar,A.S., Harikrishnan Nair,K., Suharban,M., Sivaprasad,P. and Hajilal,M.S. 2008. Sustainability pathway to organic mediculture in the humid tropics. National workshop on 'Grower – industry linkage for promotion of medicinal and aromatic plants cultivation'. 12th – 13th Feb 2008, AMPRS, Kerala Agricultural University, Cochin

Geetha,D., Suharban,M. and Minimol. 2008. Effect of growth regulators on the performance of oyster mushroom, *Pleurotus florida*. Proceedings of the 20th Kerala Science Congress. 2008 : 187 - 189

Latif,P.H and Wahab,K.2007.Effect of integrated crop management on weed density, weed dry matter production and grain yield of wet seeded rice in Kuttanad, Kerala. Plant Archives, 7 (2) : 725 - 727

Latif,P.H and Wahab,K.2007.Effect of integrated crop management on growth attributes and grain yield of of wet seeded rice in Kuttanad, Kerala. Bull. Agri.Sci., 5 (2) : 117 – 121

Finance

Head	Expenditure (Rs)	Receipts (Rs)
Non-Plan	284,41,794	31,73,072
Plan	19,36,859	-
ICAR	-	-
Other EAPs	-	-
Revolving Fund	4,04,999	27,36,159
Total	307,83,652	59,09,231

**TRAINING SERVICE SCHEME
COLLEGE OF AGRICULTURE VELLAYANI**

Name of Head of the Station : Dr. A.K. Sherief

Research programmes

As Associate/ Co-principal Investigator

Sl. No.	Title	Name	Activities
1.	Rhizosphere modulation for commercial mediculture	Dr.A.S.Anil Kumar (PI) Dr. A.K. Sherief	Data collection

Radio talks/TV programmes/ Audio-video cassettes

Topic	Date	Name of scientist
Organic farming & biodynamic fertilizer application	27/06/07	Dr .A.K. Sherief

Other Important activities

Sl. No.	Date	Details of the Activities	Name of Scientist	Remarks
1.	May 07	A session on operation of AV Digital equipments	Dr.A.K.Sherief	For the scientists of College of Agriculture, Vellayani
2	07.07.07	A seession on Rural Development in India	A. Sakeer Husain	Organised by Indian Agricultural Association for B.Sc. (Ag.) Graduates
3	11.09.07 - 12.09.07	Organic Farming Policy formulation workshop at Bio-diversity Board, Trivandrum	Dr. C. Bhaskaran Dr. A.K. Sherief	
4	18.10.07 & 23.10.07	ATMA- conducting PRA in Anchal Panchyat	Dr. A. K. Sherief	For the Department of Agriculture
5.	23.12.07 to 30.12.07	KARSHIKOLSAVAM - 07	Dr. A.K. Sherief A. Sakeer Husain	Active involvement
6.	28.02.08	Conducted quiz programme on climate change at CoA, Vellayani	Dr. A.K. Sherief	

Popular Articles

Sl. No.	Title	Magazine/ News Paper	Author
1.	Organic Farming Calendar	Karshakan	Dr. A.K. Sherief
2	Organic farming	Kerala Karshakan	Dr. A.K. Sherief
3	Biodynamic calendar for the month	Karshakan	Dr. A.K. Sherief
4	Agricultural Expert System	Kurukshetra	P. J. Boniface & A. Sakeer Husain

Finance

Head	Expenditure	Receipts
Non-Plan	18,63,184	2,65,100
Plan	--	--
ICAR	--	--
Other EAPs	--	--
Revolving Fund	--	--

CROPPING SYSTEMS RESEARCH CENTRE KARAMANA, TRIVANDRUM

Name of head of the Station : Dr. Kuruvilla Varughese

Research Programmes

a. Major Research Activities (Highlights)

Performance of different crops in rice based cropping system: The growth characters, grain and straw yields of rice were on par in all treatments during both kharif and rabi. However, during rabi coleus and tapioca performed reasonably well. During summer, the different crops raised gave good yield. The rice-rice-amaranthus system resulted in maximum system rice equivalent yield, followed by rice-rice-sweet potato.

Permanent plot experiment on integrated nutrient supply system for cereal based sequence: The results clearly revealed that substitution of either 25 % or 50 % RDF as organics during kharif season is beneficial for sequential cropping of rice. By giving 75 %RDF as fertilizers during kharif and rabi and 25 %RDF substituted as organics during kharif alone resulted in comparable system productivity and a savings of 25 %fertilizers as compared to 50 and 100 %substitution of RDF respectively in kharif and rabi.

Long range effect of continuous cropping and manuring on soil fertility and crop productivity: The results revealed that skipping phosphorus continuously for years significantly reduced crop growth and yield in rice, causes delayed flowering and prolongs days to maturity by about two weeks. Skipping phosphorus also results in poor crop stand, reduced plant height, decrease tillering, ultimately resulting in poor yield. The P uptake by the crop also shows a significant reduction in the treatments receiving no phosphorus.

Development of organic package for system based high value crops: The experiment aimed to evaluate organic farming vis-a-vis farming with integrated nutrient management on the growth, yield, quality and pest management in high value cropping sequence rice-vegetable-vegetable (rice-cucumber-bhindi). The fourth year sequence was completed during the period under report. In general, an enhancement in yield of all the crops in the sequence was noticed as compared to the first and the second year. The organic treatments were slightly better than absolute inorganic treatments in all the three crops in the system.

Site Specific Nutrient Management in hybrid rice: Increased yields were obtained for the treatments receiving nitrogen along with P and K in the presence of sulphur and zinc.

The treatments did not influence straw yield though No and farmers' practice recorded comparatively lower values. The system productivity of the different treatments showed that the treatments receiving sulphur and zinc along with medium levels of P in the presence of K irrespective of its levels gave the highest values.

Integrated weed management in rice based cropping systems: The study was initiated from kharif season 2001 and has now concluded. In rice-rice cropping sequence a third crop of bhindi or green manure is possible and depending on the length of growing season a short duration cassava can also be taken. The subsequent rice yield was higher in treatments with a summer crop than fallow. The summer cropping has resulted in a shift in major weed species *Echinochloa crusgalli* from the field. The other weed species was more in the plot that received liberal application of FYM. The weed control treatments viz., chemical, cultural and combination of the two methods recorded lower weed intensity and higher grain yield of rice as compared to control.

ECF Experiments

i. *Response of nutrients in cropping systems on farmers' field*

In the farmers field N, NP, NK and NPK treatments exerted significant impact on grain yield as compared to the control. The response of NPK was 20.63, 14.06 and 20.13 and 18.30, 18.12 and 23.17 kg/ nutrient applied during kharif and rabi seasons respectively.

ii. *Intensification and or diversification of the existing cropping system.*

Intensifying the existing cropping system of rice- rice- fallow with a third crop of vegetable enhanced the cost of production to the tune of 3 to 4 times with a net return of 8 to 9 times in the zone.

iii. *Agronomic management practices for increased production of cropping system*

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.

iv. *Front line demonstration on oil seeds*

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 increased to 23.4% it gave higher net income to the tune of 59.3% and B: C ratios in all the locations.

Extension programmes

a. *Highlights of extension activities*

1. Agri consultancy Services: Consultancy services in crop production and plant protection were provided to farmers in need by conducting in house discussion and field visits.
2. Classes were conducted to school students visiting the station as part of curriculum
3. A one day training programme on mushroom cultivation was carried out in the station.

b. *Details of activities (wherever applicable)*

1. Training programmes organized

Cultivation Technology

Technical Bulletins

Published a brochure on the station highlighting the objectives, research projects and major achievements. The brochure was released by the Director of Research (Kerala Agricultural University) during the training programme on 29th February 2008. It was distributed to all the Research Stations and among the Scientist/participants of the ZREAC 2008 meeting of NARP(SR).

Popular Articles:

Books : Hand book for field level Diagnosis and Management of Disease, Insect, pests and Nutritional Disorders in coconut based cropping systems.(Malayalam & English)

(Jacob John, Joy, M, Sreekumar, K.M, Umamaheswaran, K, Roy Stephen)

Vol.I : Coconut Vol.2 : Arecanut Vol.3 : Banana Vol.4: Cocoa Vol.5: Pepper, Vanila and Nutmeg.

Finance

Head	Expenditure	Receipts
Non-Plan	29,55,492	2,49,382
Plan	1,08,684	
ICAR	23,44,698	
Other EAPs	29,42,952	
Revolving Fund	1,40,326	2,04,332

COCONUT RESEARCH STATION, BALARAMAPURAM

Name of Head of the station : Dr.K.Viswambharan

Research programmes.

a. Major Research Achievements (Highlights)

NPK Fertilizer Experiment Starting from Seedling stage:

Continuous absence of potassium in the presence of N and K drastically reduced the growth leading to yield reduction and death of the palm necessitating the balanced application of NPK on a long term. The increased dose of N and K continuously for the past 43 years could sustain the yield of coconut in deep red loam soil of southern Kerala.

Spacing - cum - Manurial trial:

In this study, closer planting with out fertilizer application drastically affected the growth and yield of palms. Closer spacing will induce the tendency of leaning of palms in search of light with higher vegetative growth at the expense of nut production. Maximum yield (58 nuts/palm/year) was obtained in 5 x 5m and 10x 10m spacing with second level of manuring,

Nutritional Management of Clove intercropped in the coconut gardens of Southern Kerala:

Fertilizer management could increase the general yield of intercropped clove in coconut garden. Due to the erratic behaviour of flowering meaningful scrutiny of data could be done after stabilization of yield. However higher clove yield was obtained when 125% of recommended NPK is applied.

KSCSTE Project on "Evaluation of antagonistic microbial mixture formulation for integrated disease management of rhizome rot and bacterial wilt diseases of ginger".

Application of PGPR strain P6 and *Trichoderma* as individual and in combination was found to be best treatment in combating the diseases and increasing the yield in ginger.

Observational trial on new varieties of banana in coconut farmstead: The variety *Big-ebenga* performed well with good yield and shade tolerance in coconut. This variety was also found to susceptible to Kokkan disease.

RKVY Project on "Establishment and operation of the coconut hybrid seedling production unit" at Coconut Research Station, Balaramapuram.

The project was started on 19-3-2008 and it is in progress.

b. Details of research projects

i. Completed projects during 2007-2008

Name of project	Funding agency	Name of PI	Name of Co-PI	Outlay
Evolving an antagonistic microbial mixture formulation for the integrated management of multiple diseases in ginger	KSCSTE, Gov't of Kerala, Kerala	Dr.N.V.Radhakrishnan	Dr.K.N.Anith	Rs. 3.68Lakh

ii. Ongoing projects

Name of project	Funding agency	Name of PI	Name of Co-PI	Outlay Rs. in lakh
<i>NPK Fertilizer Experiment Starting from Seedling stage</i>	KAU Non-Plan	Dr.K.Viswambahran	Dr.N.V.Radhakrishnan	0.5 lakh
<i>Spacing –cum- manurial trial</i>	KAU non-Plan	Dr.N.V.Radhakrishnan	Dr.K.Viswambahran	0.3 lakh
Nutritional Management of Clove intercropped in the coconut gardens of Southern Kerala	KAU Non-Plan	Dr.K.Viswambharan	Dr.N.V.Radhakrishnan	0.2 lakh
Permanent Manurial trial on Coconut	KAU-Plan	Dr.K.Viswambahran	Dr.N.V.Radhakrishnan	0.3 lakh
RKVY Project on “Establishment and operation of the coconut hybrid seedling production unit” at Coconut Research Station, Balaramapuram	Gov't of Kerala.	Dr.K.Viswambharan	Dr.N.V.Radhakrishnan	20.0 lakh

Extension programme

a. Highlights of extension activities:

Sri. S.M.Shahul Hameed , Associate Prof. of Agronomy Head, Dr.K.Viswambahran, Assoc. Professor of Agronomy and Dr.N.V.Radhakrishnan. Asst. Prof. (Plant Pathology) have arranged the KAU Stall at Cocofest 2007 at Suryagandhi Auditorium, Kanakakunnu palace, Trivandrum during 3 to 6th, May, 2007. Dr.K.Viswambharan, Professor of Agronomy and Head, Dr.N.V.Radhakrishnan, Asst. Professor of Plant Pathology visited the places of root(wilt) affected gardens at Poovar krishibhavan area and gave recommendations.

ii. Farm Advisory Services

In person	Over telephone	Through letters
390	875	7

iii. Field visit

No. of visits	Problem identified	Recommendations
35	Bud rot in coconut, Coconut yellowing, Nut fall, stem bleeding, Root wilt of coconut, Boron deficiency Leaf rot in coconut	As per KAU Recommendations

List of publications

Scientific papers

Jayaraj, J and Radhakrishnan, N.V. 2008. Enhanced activity of introduced biocontrol agents 5 in solarized soils and its implications on the integrated control of tomato damping-off caused by *Pythium* spp. *Plant and Soil*.

Radhakrishnan N.V., Anith, K.N., Priyanka, S., Suja, S.P. 2008, Studies on the effect of combined application of biocontrol agents against rhizome rot and bacterial wilt diseases of ginger. 20th Kerala Science Congress, Jan, 25-30, 2008, Trivandrum.

I. No. of visitors to the Institution (farmer group/students)

Farmer groups : 24

Students : 45

II. Important Visitors

Name and Address	Date of visit	Purpose of visit
Sri. Hareendranath Exe. Committee Member, KAU Sri. CheriyanKavanad Exe. Committee Member, KAU Dr.F.M.H. Kaleel Assoc. Prof. of Agrl. Extension Exe. Committee Member, KAU	18-02-2008	Budget Monitoring and Evaluation committee meeting

Finance

Head of A/c	Expenditure(Rs.)	Station receipts(Rs.)
Non plan	38,32,247	6,30,670
Plan	1,87,568	-
ICAR	-	-
Other EAPs	70,233	-
Revolving Fund	-	3,71,915

**FARMING SYSTEMS RESEARCH STATION
SADANANDAPURAM, KOTTARAKKARA**

Name of Head of the Station : Dr. S. Regeena.

Deputation of Scientists were deputed for various for Seminars/ Workshops/ Symposia :
Scientists were deputed for various for Seminars/ Workshops/ Symposia :

Extension programmes

- a) Highlights of extension activities
- b) Details of activities (wherever applicable)

Training programmes organized /classes handled:

Various Training programmes /classes were organized during the year.

Farm Advisory Service

In person	Over telephone	Through letters
112	354	13

Field visit

No. of visits	Problem identified	Recommendations
12	IPM, INM & Water management	Recommendations were given depending on the problems identified as per POP.

Scientific papers :

- Bini Sam. Occupational Hazards related to implements in Agriculture- a case study, ECO-CHRONICLE, Vol.2, No.1 March 2007, 11-16
- Regeena S., Ravi S. and G. S. Jayasree. 2007. Alternate Land Use Strategies for Income Maximization of Tropical Homegardens. Indian Journal of Agroforestry, Vol.9 No.2: 87-92(2007).
- Bini Sam, K. Kathirvel, R. Manian, L. P. Gite.2007. Effect of whole body vibration of riding type power tiller. AMA Vol38(3):28-32.
- Bini Sam, K. Kathirvel. R. Manian, and C: R. Mehta. Influence of forward speed and terrain condition on hand transmitted vibration of power tiller. AMA Vol 38(3) : 79 – 83.
- Regeena, S. 2007. An economic analysis of live stock production in the homestead farms of Kerala. Indian Farming 57(7): 26-28.
- Bini Sam, K. Kathirvel. 2008. Assessment of postural discomfort during power tiller operation. AMA, Vol 39(1), March 2008.

i) No. of visitors to the Institution (farmer group/students) :

Farmers	:	3400
Students	:	1200

Finance

Head	Expenditure	Receipts
Non-Plan	4385666	456999
Plan	1497766	--
Other EAPs	214739	--
Revolving Fund	287964*	299543

(* Rs. 119500/- has been transferred to The Comptroller)

ECF UNIT, SADANANDAPURAM

Name of Head of Station : Dr. Thomas Mathew

Research Programmes

a. Major Research Achievements (highlights)

- 1) Balanced nutrition with major nutrients is highly required for maintaining the productivity of rice and soil health. NPK application at 90:45:45 kg ha-1 is found to be ideal for getting maximum grain & straw yield for medium duration varieties.
- 2) The most important constraint in the productivity of rice was found to be the optimum plant density and it was followed by application of FYM at 5tha-1.
- 3) The rice fallows in summer season can be diversified and intensified with vegetables where there is assured irrigation. Among the vegetables evaluated Rice-Rice-Yard long bean had recorded maximum gross income and net returns to the tune of five to six times than Rice-Rice-fallow double cropping system.
- 4) Popularization of sesamum varieties released from O.R.A.R.S. through FLD trials conducted on oilseeds.

Field Visit

Acting as the member of Agri. Export Zone Pathanamthitta, Department of Agriculture, Government of Kerala.

List of Publications

Scientific papers

Thomas Mathew and Kuruvilla Varghese, 2007. Effect of various nutrients on Physico-chemical and Biological Properties of soils in Sugarcane Agro-eco system. Sugar tech 9 (2&3) p.147-151

- i) No. of visitors to the Institution (farmer group/students)
- ii) Important Visitors

1. The Chief Agronomist CSRC, Karamana visited the unit before the commencement of the experimental work in each season.

Finance 2007 -2008

Head	Expenditure	Receipts
Non Plan	-	-
Plan	-	-
ICAR – 318-31-6639	24,40,458	Nil
Revolving Fund	Nil	Nil

SOIL CONSERVATION RESEARCH STATION, KONNI

Name of Head of the Station : Madhusudan Nair

Research Programmes

Major Research achievements (highlights)

Soil and water conservation aspect of zero tillage cultivation practices on hillslopes of humid tropics funded by STEC

Experiments were conducted in nine research plots each with 20% and 30% slopes. During the first year of the study, soil was not disturbed and natural vegetation allowed to grow in the plots. Runoff, soil loss, soil moisture content and soil temperature were measured. Meteorological observations were also recorded. During the second year all these plots except two control plots (natural vegetation) were cultivated with banana under different zero tillage practices. The selected cultivation practices were, Conventional tillage, Cover crop, Strip tillage, Zero tillage, Cutting the weeds and mulching at regular interval and Natural vegetation.

The soil loss and runoff etc. corresponding to these treatments were compared with that of the preceding year in the same plots. The yield under different treatments were also compared with the objective of selecting the most appropriate zero tillage cultivation practice in terms of natural resources conservation, agricultural production and environmental protection. It was found that the soil loss from 20 and 30 % were well within the allowable erosion limits when zero tillage and strip tillage cultivation practices were adopted. The yield were maximum in the plots with conventional tillage or cover crop. With strip tillage the yield was within 80% of that in conventional tillage plots. The rainfall interception and stem flow were also analysed to evaluate the impact of crop parameters on soil detachment and movement. It was observed that the rain fall interception pattern and stem flow influence the runoff generation and soil loss from slopes.

Extension Programmes

Highlights of extension activities

Details of activities (wherever applicable)

List of Publications

Scientific papers

Noble Abraham, Priya. G. Nair and Sajomon Joseph 2008 Soil and water conservation aspects under zero tillage cultivation practices on hill slopes in humid tropics submitted to Journal of Sustainable Agriculture The Haworth Press Inc, New York

Important visitors : ADR, NARP (S R)

Finance 2007 - 08

Head	Expenditure	Receipts
Non-Plan		
Plan	Rs2545864/-	Rs219594/-
Other EAPs	Rs262463/-	

CENTRAL ZONE

REGIONAL AGRICULTURAL RESEARCH STATION, PATTAMBI

Name of Head of the Station : Dr.P.V.Balachandran

Research Programmes

a. Major Research achievements (highlights)

Plant Breeding and Genetics

Highlights:

- Release of Anashwara (Pt 58), a promising photo-period sensitive, semi-tall rice mutant suitable for rabi season and pure seed multiplication of Anashwara. Front line demonstration of Anashwara in the farmer's field at different districts.
- Culture C3-2KM + Makaram was identified as the best varietal combination for Kootumundakkan system in farm trials.
- Pure seed multiplication and morphological characterization of C3-2KM was taken up in kharif and rabi crops for the release of this culture as a variety suited for dry sowing in virippu season and also for PPV registration process.
- Pureline selection of Makaram variety (long awned, short awned and awnless) for yield trials in kootumundakan along with C3-2 KM.
- Cultures suitable for mechanised framing were evaluated and seed production undertaken to conduct farm trials in 2008.
- Pure seed multiplication and morphological characterization of Swarnaprabha Sel 3-1 in large-scale for release of this culture as an upland variety and also for PPV registration process.
- Pure seed multiplication of all PTB varieties (1 – 58) released till now and Navara lines.
- Breeder seed of 7 tonnes of high yielding rice varieties were produced.
- 50 tonnes of quality seeds produced through farmers' participatory seed production under ICAR Mega Seed project were procured, processed and distributed to farmers in the Revolving fund mode.
- Infrastructure development of seed complex including processing unit under the ICAR Mega Seed Project.
- Quality of 431 seed samples were analysed in seed testing laboratory during 2007 - 2008.

Agronomy

Cultural management practices for enhancing upland rice yields

- There was no significant difference with respect to yield under different treatments. However when line sowing is done with furrow placement of fertilizer there is a saving of 50% of the recommended dose of fertilizer.

Nitrogen response trials on selected AVT-2 rice cultures under high and low input management

- IET 18940 recorded significantly higher yield over all other cultures except IET 19308 and local check. The grain yield differences among IET18940, IET19308 and local were non significant. Graded levels of Nitrogen increased yield significantly up to 105 kg N /ha.

Integrated nutrient management in rice based cropping system

- Application of FYM gave significantly higher yield during kharif season compared to incorporation of sesbania and non application of organic manure. Among the four fertilizer levels tested, NPK dose gave significantly higher yield. In the rabi season also, FYM applied plots registered significantly higher yield.

Evaluation of different crop establishment methods for increasing yield in Transplanted rice

- Among the different method tried the conventional method of planting was found to be superior to SRI. This may be due to the higher number of productive tillers per square meter under conventional system.

Agricultural Entomology

- The entry KAU 9412-13 sent to the Directorate of Rice Research, Hyderabad for testing nationally against brown plant hoppers was promoted to MRST trial.
- The Insecticides Spinosad 45 % SC @ 45 g a.i./ha and Flubendiamide 480 SC @ 24 g a.i./ ha were found promising against stem borer, leaf folder and whorl maggot have completed farm trials and recommended for POP mini package.

a.) Screening experiments

- 1.) *National screening nursery*: During the period 583 entries were screened for resistance for major rice pests. Among them 11 entries exhibited complete resistance to gallmidge, 54 entries to stemborer, 32 entries to rice leaffolder. Entries IET 20243, IET 20249, IET 20270, IET 20278, IET 20347, IET 20552 and IET 20568 exhibited multiple resistances to both stem borer and leaf folder.
- 2.) *Gallmidge screening nursery*: For gallmidge 115 entries were screened for resistance against gallmidge. Among them ten entries viz., RGL 21349, RP 4680-1-3-31, RP 4616-8-1-619, RP 4684-35-1-735, RP 4685-42-6-841, RP 4685-44-1-920, RP 4685-44-1-921, RP 4685-45-1-924 and RP 4688-53-2-1255 exhibited complete resistance to gallmidge.
- 3.) *Gallmidge biotype studies*: In the study 14 entries were tested under four set of differentials the gallmidge biotype exhibited different reaction of 30.95, 54.23, 10.43 and 75 per cent silver shoots which was slightly deviating from the normal reaction of R-R-S-S pattern.
- 4.) *Bt formulation trial (BFT)*: During the period, new trail involving a Bt product developed by Directorate of oil seed Research, Hyderabad were evaluated under four different doses viz., 1, 1.5, 2, and 2.5 kg / ha against leaffolder with monocrotophos as check with an untreated control. The result showed that all the doses were equally effective with monocrotophos against both leaf damage and larvae. The grain yields were superior over control.
- 5.) *Insecticides Evaluation trial*: During the period three new chemicals viz., Bifenthrin 10 EC @ 50 g a.i./ha, combination products Flubendiamide 36 % + Fipronil 30% @ 33 g a.i./ha, Imidacloprid 40% + Ethiprole 40% @ 100 g a.i./ha with monocrotophos @ 500 g a.i./ha as check and untreated control. The results showed the all the new insecticides were equally effective against gallmidge, whorlmaggot and leaffolder. None of them were found promising against stem borer and caseworm. Highest grain yield was obtained from bifenthrin and Flubendiamide 36 % + Fipronil 30% treated plots.
- 6.) *Pesticides compatibility trial*: In this trial, new insecticides flubendiamide 20 WDG @ 0.25 g /litre, spinosad 45 SC @ 0.25 g /litre and two fungicides Isoprothiolane @ 1.5 ml/litre and carpropamid @ 1ml/litre alone as well as in combination were evaluated against major rice pests and blast of rice. The results showed insecticides alone as well

as in combination with the fungicides were found effective against leaffolder and for gallmidge. Insecticides as alone and combination of both insecticides with isoprothiolane were found effective against gallmidge. For stem borer no significant results were obtained. Highest grain yield was obtained in spinosad treated plots. The scoring of blast couldn't be done due to low incidence of the disease.

- 7.) *Influence of Agronomic practices on rice pest management (IRCP)*: A new trial involving both normal system of cultivation (NSC) and SRI involving a normal rice variety (Jyothi) and a hybrid (KRH 1) were evaluated for occurrence of insect pests in both the systems conducted in *Rabi*'2007. The results showed the stem borer incidence was significantly lower in SRI plots (2.70 and 2.20 % DH at 50 and 70 DAT), compared to NSC (9.0 and 16.10 % DH at 50 and 70 DAT). Similarly, whorlmaggot (7.1 % DL) and caseworm (0.0 % DL) damage was also lower in SRI than in NSC. There were no significant differences in blue beetle infestation between SRI and NSC, but hybrid (21.80 % DL) showed higher infestation than the normal variety (13.70 % DL).
- 8.) *On-farm integrated pest management (OIPM)*: In this trial four modules viz., IPM (1): Need based application of chemical insecticides, IPM (2): Biological involving EPN (entomopathogenic nematodes) and neem oil with six release of *Tricogramma japonicum* against stem borer and *T. chilonis* against leaffolder, IPM (3): Botanicals and chemical insecticides and three releases of *T. chilonis* against leaffolder and IPM (4): farmers practice was evaluated with local variety Kanchana at farmers plot at Karakkad, ongallur during *Rabi*'2007. The results showed that IPM (2) showed least damage of whorlmaggot (1.40 to 5.80%), IPM (1) showed low caseworm incidence (1.70 %) and lowest GLH population (9.50 to 14.70 hoppers / 10 hills) recorded in all IPM modules in comparison to farmers plot. The IPM modules showed higher grain yield of 4666 to 5733 kg/ha than farmers plot of 4133 kg/ha. The IPM modules also showed superior cost benefit ratios (1:2.9 to 3.6) than farmers plot (1:1.8).
- 9.) *Light trap data collection*: The light trap data were recorded from the period of January 2007 to December 2007. The results showed that yellow stem borers and white stem borers catches recorded highest in first week of January with 179 and 51 no's respectively. Green leaf hoppers both *N. virescens* (4251) and *N. nigropictus* (7767) and BPH (381) recorded in moderate numbers with highest catch prevalent during fourth week of December characterized by moderate max. temp. (29.8 C), low min. temp. (18.7 C), high RH (94.8 %) and bright sunshine (8.9 SSH). Low population of gallmidge (18) and leaffolder (26) registered their peak activity during first week of January and third week of March respectively.
- 10.) *Monitoring of stem borer composition trial*: The trial was conducted in *Rabi*'2007 and same trend was noticed that the major species yellow stem borer, *Scirphophaga incertulas* was dominating during the early tillering and maximum tillering phase while pink borer, *Sesamia inferens* was dominating in reproductive phase of the crop. The white stem borer, *Scirphophaga innotata* was maintaining its low status during all the stages of crop growth.
- 11.) *Monitoring of leaffolder composition trial*: The trial was conducted during *Rabi*'2007 to find out dominance of different species of leaffolder during the stages of crop growth. The results showed the common species, *Cnaphalocrocis medinalis* was dominating the early tillering and maximum tillering phase while another species *Marasmia patnalis* was dominating during the reproductive stage of the crop.
- 12.) *Monitoring of gudhi bug composition trial*: The trial was conducted during *Rabi*'2007 to find out the dominance of rice bug species in rice fields of Pattambi. The results showed that the major species dominating is *Leptocorisa oratorius* and other species found were *L. acuta* and a small sized bug (Identity yet to be established).

- 13.) *Farm trial on Spinosad 45 % SC and Flubendiamide 480 SC on major rice pests:* Farm trial was conducted in three districts including Palakkad, Mallapuram and Thirissur districts of Kerala.. The pooled results of all the tested locations showed that both the new chemicals viz., Spinosad 45 % SC and Flubendiamide 480 SC were effective in reducing the damage of stem borer, whorlmaggot and case worm and with increased grain yield.

Horticulture Division

KAU projects

Breeding for mosaic resistant cultures of ash gourd

- CYT I was conducted with the selected accessions with Indu and KAU local as check. Ash gourd variety Indu was evaluated in AICVIP trials and was found superior in four locations

Breeding for mosaic resistant varieties in chillies

- CYT I with eight selections from crosses between resistant/tolerant chilli and commercial varieties was conducted with Anugraha and Ujwala as check varieties.

Rain shelter cultivation of vegetables

- Evaluation of performance of solanaceous and cucurbitaceous vegetables is being continued. One more rain shelter was constructed during 2007.

Standardisation of packaging and storage conditions for vegetable crop seeds

- Storage studies on seeds of bitter gourd, ash gourd, OP melon and okra in four types of packing and two storage temperatures is being continued. During the last two years, it was found that packing in 700 gauge polythene or aluminium foil combined with storage under refrigerated conditions and with in packet desiccant improved the storage life of vegetable seeds studied.

Collection characterisation and evaluation of pickling type mangoes

- 74 types planted in 2004 were evaluated. All the accessions are in juvenile stage.

Seed production in coleus variety Nidhi.

- 655 kg of seed tubers of var. Nidhi were distributed during the year. Observational trials were conducted on spacing and types of cuttings for planting in the seed production plots. It was found that closer spacing of 15 x 10cm for tip cuttings and horizontal placing of vines at a row spacing of 15 cm improved the yield of tubers.

Externally aided projects:

Establishment of Model Unit for Production of Pineapple Planting Materials (SHM)

Tissue culture production was undertaken in varieties Kew Mauritius and Amrutha.. The plantlets of Kew and Mauritius variety are in hardening stage and variety Amrutha is in proliferation stage. Fruits were sold for an amount of Rs. 45,000/-. 3000 suckers of variety Mauritius were sold. TC plants will be ready for sale by Dec., 2008

Rehabilitation of Tissue culture lab for banana (SHM)

Modification of laboratory and works envisaged under the programme was completed. 2000 TC plants were sold during 2007-08.

Tissue Analysis and Crop Management Advisory Facility for Horticultural Crops at Regional Agricultural Research Station, Pattambi (SHM)

Purchase of equipments completed. Laboratory modification work is being done. The total out lay is 20 lakhs for 2007-2009

RSVY Soil fertility mapping

The project in which more than 53000 surface soil samples were analysed to provide location specific recommendations for nutrient management, covering 42 panchayaths was completed during september 2007. Agroecologic zone level NIV and nutrient management recommendations, panchayath level NIVs and nutrient management recommendations and recommendations for plots under each survey number had been provided. Soil fertility cards indicating nutrient requirements and application schedule for plots under each survey number had been distributed to Krishi bhavans. The data will soon be available in the KAU web site.

Recommendations

1. The eastern tracts which are generally fertile do not require corrective measures for soil reaction through liming. Application of zinc, boron, and sulphur forms an essential component of the recommendations for these areas.
2. At regional level, 125% of the present recommendation for nitrogen should be adopted in eastern and central region. Standard recommendation can be continued in western region
3. Phosphorus levels can be maintained by continuing the standard recommendations in all the regions.
4. Rate of potassium application should be enhanced to 125% of the present recommendation in all the regions
6. Organic manure @ 5 t/ha must be applied in all the regions
7. Results of the adaptive trials endorse the validity of soil test based nutrient management practices. However a critical evaluation of the results of adaptive trials points to the inherent soil related inhibitory factors in the lateritic belt (western region) which prevent the farmers from realizing the potential yields especially in rice. Detailed studies are required on the nutrient dynamics, its relation with soil characters, moisture regimes and soil plant interactions.
8. The database generated can be used as an effective tool for nutrient management at micro level and resource management at macro level
9. The database generated has to be updated at periodic intervals for continuous monitoring and modification of management strategies.
10. The modified recommendations based on soil analysis information have to be incorporated to the package of practices recommended by Kerala Agricultural University.

Pathology

Screening for sheath blight resistance

- In National Screening Nursery I (NSN1), 168 entries were screened for sheath blight resistance. 50 entries showed resistance reaction to sheath blight 82 entries showed moderately resistance reaction to sheath blight. The National Screening Nursery II consisted of 577 entries of which 163 entries showed resistance reaction, 225 entries showed moderately resistance reaction to sheath blight. Out of the 88 entries tested in National Hybrid Screening Nursery, 15 entries showed resistance reaction, 46 entries showed moderately resistance reaction.

The reaction of Ptb cultures against sheath blight

- 21 cultures were screened for sheath blight resistance. Among these cultures, culture 9409-14, 9490-3 sln-3, 96-30-3, S.F.3-1, KAU-6661-(w), C3-2-49-2-H-25 and C3-2-492-0-34 showed moderate resistance to sheath blight with a score of 3. The culture C3-2-(km) recorded a score of 1.

The reaction of Kaipad cultures against sheath blight

- Cultures suitable for Kaipad area were screened for resistance against sheath blight including a local variety. Among these, Wcyt 2, Wcyt6, Kcyt-1, Kcyt-12, Kcyt-16 and Kuthiru (local variety) showed a score of 1. All the remaining six varieties showed a score of 3. (Wcyt-1, Wcyt-8, Kcyt-10, Kcyt-11, Kcyt-14 and Kcyt-19)

Evaluation of new fungicidal formulations for sheath blight control

- A new formulation, viz trifloxystrobin 25% + tebuconazol 50% (Nativo 75WG) which was evaluated in *kharif* 2006 was again evaluated in *kharif* 2007 against sheath blight. Hexaconazole (Contaf 5 sc), Validamycin (Sheathmar 3 L) and thifluzamide (Spencer 24 SC) were the three commercially available formulations used as standard check fungicides for comparison. All the three test fungicides were found significantly effective over the untreated plots in reducing the disease severity and grain yield.

Evaluation of fungicides against brown spot

- Commonly available fungicides having broad spectrum of action were tested for their efficacy against brown spot of rice. Two fungicidal sprays were given a couple of days later after observing the symptoms and again after 13 days when the brown spot incidence was 20 and 35%, respectively, in the untreated check plots. Propineb (Antracol) was found highly effective in checking the brown spot infection and improving the grain yield.

Evaluation of biopesticides against sheath blight of rice

- Biopesticide formulations, Biofer, defender, Florezen,P, and Trichozen-T were tested against sheath blight. All the biopesticides were found promising and on par with the standard check fungicides used in the trail (Carbendazim) in checking the sheath blight and increasing the grain yield.

PLAN SCHEMES

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 significantly and were statistically on par with the check fungicide propiconazole. The present study reveals the potential of using plant oils and bio agents for the management of sheath blight

Bioinoculants production Unit (Revolving Fund –ICAR)

- In the unit the biocontrol agents, *Pseudomonas fluorescens*, Trichoderma, Trichogramma, vermicompost and earthworms are available to the farmers.

Soil science & Agril.chemistry

Permanent Manurial Trial (Tall indica & dwarf indica)

- The results of this trial proves that integrated nutrient management is the best for sustainable rice production and also for soil health in the case of Tall Indica variety

AICRP on Long Term Fertiliser Experiment

- Proves that integrated nutrient management is the best for sustainable rice production and also for soil health and in situ green manuring is on par to INM, but more economic.

Details of Research Projects

Extension Programmes

- a) Highlights of extension activities

Horticulture

- Designed and prepared Soil Fertility Cards for providing soil test based nutrient management recommendations for plots under each survey number in 42 panchayaths of Palakkad district. Prepared 53000 soil fertility cards and distributed to respective Krishi bhavans. Prepared data for up linking the soil test information in KAU web site
- Conducted farmers meetings to introduce Soil Fertility Cards prepared under RSVY project on Soil Fertility Mapping and Nutrient Management Plan for Rice Soils of Palakkad
- Participated in district level Research Extension Interface as resource persons in Palakkad, Malappuram and Kozhikode districts.
- Participated in farmers' meetings/seminars and discussed various topics of relevance.
- Evaluated selected farms in Malappuram and Palakkad districts under the Karshaka Awards programme
- Scrutinised various projects under State Horticulture Mission and Peoples Planning Programme at district level.

Scientific papers--13

- Jayan, P.R., Kutty, N.M.C., Susan, D. 2008. Modification and performance of conventional seed drills and zero tilldrills for dry sowing of paddy. Paper presented at the National Conference of Farm Mechanisation at CMERI, Durgapur. February 26-27 2008.
- Modification and Performance Study of Conventional Seed Drill and Zero Till Drill for Dry Sowing of Paddy , Jayan,P.R., Narayanakutty and Deepthi
- Susan P.E, paper published in the Proce. of NCFM-2008
- Karthikeyan . K. Jacob.S and Purushothaman S.M..2007. Effectiveness of cartap hydrochloride against rice stem borer and leaf folder and its safety to natural enemies. *J. Biol. Control* . 21 (1) : 145-148
- Purushothaman, S.M. Anitha, S, Sreenivasan and Karthikeyan, K. 2007. Management of antracnose in cowpea, *J. Arid Legumes* 4(1) : 52-53
- Purushothaman, S.M. Anitha, S, Sreenivasan and Karthikeyan, K. 2007. Management of root rot of cowpea and organic ameaddments, *J. Arid Legumes* 4(2) : 82-84
- Karthikeyan . K. Jacob.S and Purushothaman S.M..2007. Field Evaluation of egg parasitoids *Trichogramma japonicum* Ashmead and *T. chilonis* Ishii against rice stem borer and leaf folder. *J. Biol. Control* . 21 (2) :261-265
- Karthikeyan. K., Sosamma Jacob, Purushothaman. S.M. and Smitha Revi. 2007 Efficacy of plant products and synthetic insecticides against rice blue beetle, *Leptispa pygmaea* Baly (Chrysomelidae: Coleoptera). *Indian J. Crop Science* 2 (2) : 443-445
- Karthikeyan, K and Sosamma Jacob. 2007 Performance of rice varieties against the rice blue beetle, *Leptispa pygmaea* (Chrysomelidae: Coleoptera). *Oryza* 44 (4): 355-358.
- Raji,P. and Vimi Louis . 2007. Isoprothiolane, a new fungicide for the management of rice blast. *Oryza*. 44:363-364
- Balachandran, P.V., Raji,P., Kartikeyan, K. and Prema.A. 2008. Organic farming in rice- Potential and Limitation. Lead paper presented in the 'Workshop on Environmental Impact Assesment of Pollution from Agriculture held at CRRI, Cuttack from April 8-11, 2008 p.21

Beena.C . 2007. Varietal effect of the callus formation of rice(*Oryza sativa*L.) *Crop Research* .33(1,2&3) P: 167-169.

Purushothaman,S.M.,Anitha,S.,Beena,C.,Karthikeyan,K.K,andBalachandran.P.V.2008. Effect of various manurial applications on the incidence of brown spot of rice . The Andhra Agricultural Journal .

Smitha Revi., Suma Paulose., Jaikumaran, U. and Karthikeyan.K. 2007. Influence of different organic manures on growth and yield parameters of rice . Proceedings of the 20th Kerala Science Congress held at Trivandrum from Jan. 28-31, 2008. p 250-253

Smitha Revi., Suma Paulose., Jaikumaran, U. and Karthikeyan.K. 2007. Influence of different organic manures on the incidence of brown spot and sheath rot in rice (*Oryza sativa*.L). Paper presented in the 17th Swadeshi Science Congress held Trivandrum. P. 40-41

Karthikeyan. K., Smitha Revi., Balachandran, P.V., Shanmugasundaram, B. and Purushothaman. S.M. 2007. Influence of SRI cultivation on the incidence of major pests of Rice. Paper presented in the 2nd symposium on System of Rice Intensification in India-Progress and Prospects held at Agartala, Tripura from Oct. 3- 5, 2007. p 96-97

Beena,C and Balachandran,P.V.2008. Induction of Resistance in rice against blast disease through in vitro culture method using pathogen culture filtrate. Proceedings of International Conference on Sustainable Agriculture at CMS College ,Kottayam, 28.

Beena,C and Balachandran,P.V.2008.Induction of resistance in rice against sheath Blight through in vitro culture method. *Proceedings of 20 th Kerala Science Congress* .P:58-60 .

Popular articles:2

1. Adayam nedan koorka krishi” M.L. Jyothi, M.C. Narayannakutty : 15-16 2007 Aug – Sept., Krishiyankanam Pub., VFPCCK

2.Balachandran,P.V. Raji,P. 2007. Jaiva nelkrishi.. *Gramasree* , 11(7):21-23

Technical Bulletins:2

1. A Technical Book (Malayalam) on “Souropakaranangal” by Dr.P.R.Jayan

2. A bulletin on Nutrient Management Plan for Soils of Palakkad published by KAU in 2008 - prepared by RSVY SFM Project team .

Books : 2

1. Handbook on ‘IPM in Rice’ both in English and Malayalam authored by Dr.K.Karthikeyan, Dr.Sosamma Jacob, Dr.P.V.Balachandran and Smitha Revi published by KAU press.

2.Book on “Rice Fish Intergration through Organic Farming” Edited by P.V.Balachandran , Vimi Louis and K.G Padmakumar , published by Agrotech publishers,Udaipur.2007.

Book chapter-1

M.S.Iyer, C.Beena and Dr.Sailajakumari.2007. Experience with the Permanent manurial experiments and Long Term Fertilizer experiments at Regional Agricultural Research Station ,Pattambi-sharing experiences and lessons learnt: In the Book “Rice Fish Intergration through Organic Farming” Edited by P.V.Balachandran , Vimi Louis and K.G Padmakumar , published by Agrotech publishers,Udaipur.p.243-260, 2007.

Contribution in -Soils of 12 panchayaths of Palakkad District - Published by NBSS & LUP Bangalore,KAU and SSO of Kerala. 2007.

1. No. of visitors to the Institution (farmer group/ students) :Farmers,School students as well as College students from all over Kerala for Station visit

Finance

Head	Expenditure	Receipts
Non-plan	16301550	1240673
Plan	1263667	NIL
ICAR	6322414	NIL
Other EAPs	2371708	NIL
REVOLVING FUND		
Farm Machinery	229242	284607
Bio-control	225329	76645
NSP-BSP	672503	477343
Bio-tech	21008	30923
Seed Project	828199	272377

CASHEW RESEARCH STATION, ANAKKAYAM

Name of Head of the Station : Dr. P. Rajendran

Research Programmes

a. Major Research achievements (highlights) (Attached photographs of salient findings)

1. Proposed for release of two new cashew varieties (Hybrid H-8-6 and Anakkayam Sel. 990) during the year under report.
2. Two new species of wild orchids were collected from the forests of Wayanad as a part of work under the externally funded project entitled "Collection, conservation and management of biodiversity in commercially important ornamental plants available in Western Ghats and developing a livelihood for the tribal population in Wayanad district" funded by the Western Ghat Cell, Govt of Kerala. One of the species (*Cirrhopetalum sp*) has not been reported so far from anywhere in India. The second species is an entirely new species (*Heteria genus*) which has not been reported so far.

Training programmes organized

1. Started a Six month's Stipendiary Training Programme to VHSE passouts. The training to the first batch commenced on 1-2-2008 and will be completed on 31-7-08. Selection of candidates for the second batch of trainees is in progress and the training will commence on 1-8-2008.

Farm Advisory Services

In Person	Over Telephone	Through Letters
45	100	7

Field Visit

No. of Visits	Problem identified	Recommendations
1. Dr. P. Rajendran - 27	1. Tea mosquito bug in cashew ,	Smoking, clean cultivation and light pruning followed by application of Rogor (0.02%)
	2. Bud rot of coconut	Field sanitation, spraying Bordeaux mixture (1%)
	3. Mahali of arecanut	Field sanitation, spraying bordeaux mixture (1%)
	4. Quick wilt of pepper	Field sanitation, spraying Bordeaux mixture (1%)

List of Publications

1. Scientific papers

- Rajendran, P. & Ajitkumar, K. 2008 "The unknown orchids of western ghats of Kerala" Proceedings of the National Conference on ORCHIDS: SCIENCE AND SOCIETY at Bangalore on 10-12, -4-2008 and the paper was also accepted for publication in the Journal of Orchid Society, India

Text Book series (3 books) entitled "Flora of Western Ghats" comprising three volumes (under preparation) – sanction for publication has been accorded vide references No.269/WGC1/05/Plg dated 31 - 05 - 06 from the Western Ghat Cell and Extn(4) 86909/07 dated 10-9-07 of the Director of Extension, Kerala Agricultural University.

Training manual "Plant Propagation and Nursery Management" (in English as well as in Malayalam) sanctioned vide references No. Extn (4)85459 dated 8-5-08 of the Director of Extension and the process is underway.

Chapters in book - Useful genes for plant genetic engineering (2007) in "Plant Biotechnology" edited by R. Kesavachandran and K.V. Peter; pp189 -200, Universities Press.

Important visitors

1. Sri. Rajaji Mathew Thomas, MLA and Hon. Executive Committee Member
2. Adv. V.S. Hareendrannath, Hon. Member, Executive Committee
3. Adv. Cheriyan Kavanal, Hon. Member, Executive Committee
4. Sri. Suresh Mayiladumpara, Hon. Member, Executive Committee
5. Dr. Jose Joseph, Hon. Member, Executive Committee and PRO, KAU
6. Dr. P.V. Balachandran, Associate Director of Research, RARS, Pattambi.
7. Dr. K.V. Atman, Associate Director of Research, HQ, Vellanikkara

Details of Sale of Seeds/ Planting materials/ Biocontrol agents etc.

Item	Quantity	Revenue (Rs)
Planting materials	19825	396,500
1. Cashew grafts	3362	117670
2. Coconut seedlings	3390	84750
3. Mago grafts	773	1933
4. Pepper Panniyur 1	106	530
5. Chamba	250	2500
6. Mahagani seedlings		
Seeds		
7. Cowpea seed	41.48 kg	33184
8. Pumpkin	1.5 kg	1560
9. Snake gourd	1.5 kg	1800
Total		640427

Finance

Head	Expenditure	Receipts
Non-Plan	3229442	-
Plan	1093572	499126
ICAR	-	-
Other EAPs	93391	-
Revolving Fund	610465	848894

AGRICULTURAL RESEARCH STATION , MANNUTHY

Name of Head of the Station : Dr. U.Jaikumaran

Research Programmes

a) Major research achievements

- Technology for cultivation of cool season vegetables like cauliflower and cabbage in the plains of Kerala standardised.
- F1 Hybrids developed in Bitter gourd.
- Under the project on "*Evolution of rice varieties having high grain and straw yield from interracial crosses of diverse origin*" C 26 T (b) recommended for variety release. The culture is given for salinity tolerance test in kole lands.
- Hybridisation was carried out between selected rice varieties like ADT 43, ADT 36, Jayathi, Ptb 10, Ptb 28 , MO 12 and MO 16 in the project on "Identification and development of rice genotypes suitable for mechanised rice farming".
- As a part of developing technology for protected cultivation of vegetables " Standardisation of fertigation schedule for polyhouse production of bittergourd" was studied.
- Under "Seed and Nursery programme" infrastructure facilities , for augmenting planting material production and planting new progeny orchards developed
- Under the study on "Adaptability testing of high yielding rice varieties in kole land" 23 varieties including cultures were evaluated for yield and yield related characters.
- In the project on development of Super rice the F1 hybrids were evaluated.
- The weed management study in the wet sown rice fields of kole lands was done as a part of the project on "Standardisation of optimum management practices for rice in the different rice growing ecosystems". Most economic method of weed control in the wet sown rice fields of kole was found to be pre-emergent spraying of refit @ 0.45 kg ai/ha 3-4 DAS followed by one light hand weeding.
- In a trial on "Development of short duration rice varieties for drought resistance/ tolerance" evaluation of 17 short duration entries was carried out in kole lands of Trichur .
- Under the project on "Breeding for value addition in rice (*Oryza sativa* L.)" funded by KSCSTE, 23 varieties were evaluated for various quality parameters, suitability in the preparation of different products, biochemical characters contributing to quality etc. and varieties suitable for different preparations were identified. Hybridisation works to combine different quality parameters and yield are also in progress. Thirty six hybrid combinations were evaluated.
- As a part of the project on "Evolution of cowpea varieties resistant to pulse beetle", six different hybrid combinations of cowpea were evaluated along with their parents. They are in the F5stage

Extension programme

a) Highlights of extension activities :

1) Dr. U. Jaikumaran Professor & Head

- Two women SHGs of eight members each; Konnappoo and Kerasree Agri Horti Societies are trained in the Station. Konnappoo is entrusted with eco tourism activities and Kerasree in the maintenance of coconut garden and its product diversification on profit sharing basis through MOU.

- Two women SHGroups established after training 1)Avarampoo Agri HortiSociety comprising members to run vegetable seed products and 2) Avanippoo Agri HortiSociety to run Model Organic Farm on profit sharing basis through MOU
 - Member ATMA Governing Committee and the District and Team Member of SREP .Preparation of kole land AEZ and its execution.
- 2.) Dr.C.A Rosamma Professor (Plant Breeding & Genetics)
- Flower Show 2008, 23rd to 28th January , 2008 at Thekkinkadu Maidan , Thrissur Participated and arranged stall of Agricultural Research Station, Mannuthy
- 3) Dr. M.T.Kanakamany Professor (Plant Breeding & Genetics)
- Farm Day 2007 of Agricultural Research Station, Mannuthy Mannuthy on 16th and 17th of November 2007
- 4) Dr.C.Narayanankutty
- Resource Person in the training programme on *Protected cultivation of vegetables at Seed processing Plant, Alathur on 05.07.07* sponsored by VFPCCK
 - Resource Person in the training programme on *Garden plants – Trees- shrubs & Climbers at KVK, Trichur on 13.07.07* sponsored by SHM , Tvm& KVK, Trichur
 - Resource Person in the training programme on *Lawn – Preparation & care by KVK, Trichur on 17.07.07* sponsored by SHM , Tvm& KVK, Trichur
 - Resource Person in the training programme on *Plant Propagation – seed propagation – Production of planting materials in coconut, arecanut & pepper by KVK, Trichur on 20.07.07* sponsored by SHM , Tvm& KVK, Trichur
 - Resource Person in the training programme on *Vegetative Propagation – cutting, layering, Budding & grafting at KVK, Trichur on 24.07.07* sponsored by SHM , Tvm& KVK, Trichur
 - Resource Person in the training programme on *Vegetable cultivation with special emphasis on protected cultivation at VFPCCK, Trichur on 18.09.07* sponsored by VFPCCK, Kochi
 - Resource Person in the training programme on *Budding and Grafting Techniques in fruit plants at KVK, Trichur on 17.03.08* sponsored by KVK, Trichur
 - Co- Convener of Mango fest -- 2007 , 4-6. May, 2007 at Indoor Stadium, Trichur
 - General Convener South Indian Agricultural Fair – 2007 26 – 30 December, 2007 atCOVAS, Mannuthy
 - Attended the agro-clinic organised in connection with the Trichur Flower show – 2008 on 24.01.08

Field visit

No.of visits	Problen identified	Recommendations
More than 75	Several field problems in rice like deficiency symptoms, incidence of pests like leaf roller, leaf folder , BPH, stem borer and diseases like blast. In coconut , vegetables, ornamentals and fruit plants deficiency and incidence of pest and disease attack was noticed.	Recommendations were given as per Package of Practices recommendations of Kerala Agricultural University

iv Radio talks / TV programmes/ Audio –video cassettes:

1.Dr.U.Jaikumaran Professor & Head

1. *Paddy land preparation* May 2007 AIR Ramavarmapuram
2. *Protected cultivation of vegetables* Amrita TV February 2008

List of publications

a) Research articles

1. Sreelatha, U., Baburaj, T.S., Miniraj, N., Narayanankutty, C. and Suma Poullose (2008). Habitat destruction endangering *Exacum bicolor* (Kannamthali) in Kerala. *Proc. 20th Kerala Science congress*, 28 – 31, Jan. 2008, KSCSTE, TVM. pp 1-4
2. Sreelatha, U., Baburaj, T.S., Narayanan Kutty, C., Jyothy Bhaskar, Nazeem, P.A. and Jyothi Bhasker (2007). Cultivation prospects of *Exacum bicolor*. *Roxb.*
- An endangered, Ornamental and anti – diabetic herb. *J. Natl. Pro. Rad.* (6). pp 402-404.

b) Popular articles

Monthly Agricultural practices from 2007 April to March 2008 .published 36 articles in **Karshakasree by Dr. Joseph P.A Professor (Agronomy)**

b) Books

1. Flora Mapping of Model Organic Farm ARS Mannuthy by Dr. U.Jaikumaran and Dr.C.Narayanan kutty
2. *Nelkrishi* (Malayalam book) by Dr. P.A.Joseph revised edition
3. *Nursery Nirmanam* (Malayalam book) by Dr. P.A.Joseph revised publication
4. *Coconut in Kerala* by Dr. P.A.Joseph New publication
5. Sreelatha,U. Baburaj, T.S. and Narayanan Kutty, C. (2007). *Exacum bicolor - An elegant flowering herb.* (In) Peter, K.V. (ed.) *Under exploited and under Utilized Horticultural Crops*. Chapter 12. New India Publishing Agency, New Delhi, pp 151 – 57.

i) No. of visitors to the Institution

- Honorable Vice Chancellor of Kerala Agricultural University visited the Station
- Dr. P.Alexander Director of Research , Professor Joby V.Paul Registrar KAU, Dr.M.K.Sheela Director of Extension, KAU, Sri. I.K. Subramonian Master General Council Member, Honorable MLA of Manalur Sri. Murali Perunelli and Honorable MLA of Cherpu Sri.Sunilkumar Sri.Joseph Perumpilly President Farm Workers Federation INTUC ,KAU, Sri.Kunjunni Menon President Farm Labour Association AITUC, KAU, Dr.Rajamoni ADR and Dr.Balachandran ADR Pattambi visited the Station in connection with Farm Day celebrations on 16 th 17 th November 2007
- Several groups of farmers and students visited the station to see the Nursery, paddy cultivation , vegetables and farm implements and machinery.

Finance

Head	Expenditure (Rs)	Receipts (Rs)
Non – plan	6437242	2030147
Plan	1875818	
ICAR	-	
Other EAPs	2354983	
Revolving fund	1199820	

CASHEW RESEARCH STATION, MADAKKATHARA

Name of Head of station : Dr. Jose Mathew

Research programmes

Major research achievements

Crop improvement

- A total of 148 accessions, including exotic and indigenous collections, are being maintained and evaluated in the clonal germplasm conservation block.
- Highest yield in the MLT II was recorded by Hy 320 (9.80 kg/tree/year) followed by Hy 303 (9.5 kg). There was significant difference among genotypes for annual nut yield during 2007-08.
- During 1993-2007, 1557 hybrid plants were produced at the station and are being evaluated.
- Hybrid No. 1593 was released by Kerala State Variety Release Committee as "Poornima" for cultivation throughout the state. This hybrid, with upright, compact tree habit and intensive branching, has mid-season flowering behavior, which flowers during December- January. It has desirable nut characters like high nut weight (7.8 g), high shelling percentage (31) and good export grade (W 210) suitable for industry. It has an annual yield of 14.08 kg/tree/annum. In view of its high yield and desirable nut and kernel characters, Poornima is suitable for cultivation, processing and export.

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 7- year cumulative yield of cashew.
- Data on high density planting during the third year of yielding indicated declining per tree yield, when the tree density was increased beyond 400 trees/ha.
- Trees under high and normal density planting systems did not vary appreciably in their per tree annual and 7- year cumulative nut yield during the tenth of planting. In terms of per hectare nut yield (both annual and 7-year cumulative) high density planting systems was significantly superior to normal density systems.
- The study on intercropping revealed that tapioca is the most profitable crop that can be cultivated as intercrop in young cashew plantations. It recorded the highest net returns of Rs. 48766/ha and C: B ratio of 2.75 followed by colocasia with a net returns of Rs. 43290/- and C: B ratio of 2.32.

Crop protection

- The study on the management of tea mosquito bug (TMB) revealed that application of triazophos during second spray completely suppressed the incidence of TMB both in shoots and panicles while total control in the incidence of TMB on shoots and panicles was achieved through the application of profonophos during third spray.
- Monitoring the population dynamics of pests and natural enemies of cashew showed that the occurrence of TMB was the highest during March followed by February and January. Red ant, the important natural enemy of TMB, was also found to have the highest population during January to March.

Extension programmes

A *Kissan mela* was organized on 26.5.07 at this station. The scientists of the station took classes on various aspects of scientific cashew cultivation, with emphasis on improved varieties and possibilities for income enhancement through cashew apple processing. As part of the *Kissan mela*, Sri. Mullakkara Retnakaran, Honorable Minister for Agriculture, Government of Kerala has officially released "Poornima" the 11th cashew variety of the station for cultivation by planting a graft in the "Cashew varietal museum" block of the station as well as by handing over a graft of the variety to Sri. P.A. Anthoney, Padikkalathu House, Pattikkad in the public meeting organised as apart of the *kissan mela* at Diary Plant Auditorium, Mannuthy. Another important event of the *kissan mela* was the commercial launching of the production of "Cashew apple drink", a ready- to-serve beverage produced from cashew apple by the station. The first sale of the product was inaugurated by the Minister by handing over a pouch of cashew apple drink to Sri. Ponnunmani, Oravumadakkalam, Elanadu. The newly established "cashew museum" depicting all aspects of cashew cultivation and industry was also inaugurated by the Minister on the same day.

- ❖ Dr. Jose Mathew visited Republic of Tanzania to serve as International Consultant on "Cashew Apple Processing".
- ❖ Dr. Jose Mathew participated as an expert in the interaction on "Water" by all stake holders including farmers, NGOs and representatives of public institutions organised in connection with the golden jubilee celebration of "Peechi irrigation project" on 4.10.07 at Peechi Dam.
- ❖ Dr. Mini. C prepared Package of Practices Recommendations for organic cashew apple processing.
- ❖ Station has participated in Agricultural exhibition held at Edappal, organised by final year students of College of Horticulture, Vellanikkara under RAWE programme, Agricultural Fair at Neyyattinkara, Trivandrum and in South Indian Agricultural Fair at Mannuthy. Stalls were put up during the exhibition and cashew apple products and grafts were sold during the programme.
- ❖ The station put up a stall during the "Flower show" at Thrissur during January 23-28 for the display of cashew technologies and sale of cashew grafts and cashew apple products.
- ❖ Organised two one- day training programme (1.2.08 and 8.2.08) and one three day training programme (27-29 February 2008) on cashew apple processing to various stake holders.
- ❖ Organised "Cashew day" on February 23, 2008 with the financial support of DCCD, Kochi, wherein a state level farmers seminar was organised which was attended by 200 farmers. The seminar was inaugurated by Sri. Rajaji Mathew Thomas, MLA
- ❖ First sale and commercial launching of three new cashew apple products viz. *cashewman* mixed jam, cashew apple pickle and cashew apple candy was done on 23.2.08.
- ❖ Inauguration of the state level training series on cashew apple processing, where in 30 trainings of 1, 3 and 7 days duration are planned during the year, was done by Hon. Vice Chancellor on 23.2.008
- ❖ A new Rs. 22 lakhs project on "Upgradation of cashew apple processing unit at Madakkathara" was sanctioned under RKVY.
- ❖ Put up a stall for display of technologies for cashew apple processing and sale of cashew apple products during the Business Technology Meet organised by District Industries Centre at Kottayam during 6-7 February 2008 and Dr. Mini.C attended the meet

Training programmes organized

27 different training programmes were organized during the period under report.

Farm Advisory Services

In person	Over telephone	Through letters
50	80	30

Field visits

No. of visits	Problem identified	Recommendations
10	Stemborer attack	Package of Practice

Radio talks/ TV programme/ Audio - video cassettes

Topic	Date	Name of scientist
Flood and its impact on agriculture	23.7.2007	Dr Jose Mathew
Commercial cultivation of cashew	11.12.2007	Dr. Mini. C

List of publications

Scientific papers

- Mini.C., and Jose Mathew. 2007. Cashew apple processing – products and industrial possibilities. In: Souvenir on “Productivity for global competitiveness”, KSCDC Ltd and CAPEX, Kollam, pp. 27-30
- Jose Mathew, Gregory Zachariah and Mini.C. 2007. Scientific cultivation for enhancing cashew production. In Souvenir on “Productivity for global competitiveness”, KSCDC Ltd and CAPEX, Kollam, pp.32-36
- Mini.C and Jose Mathew 2007. Multi uses of cashew apple. Proc. Sixth National Seminar on cashew in “ Indian cashew in the next decade-challenges and opportunities” from 18-19th May 2007. pp.45-52
- A write up about Cashew Research Station, Madakkathara was sent to NRCC, Puttur for publication in ‘Cashew news’.
- Jose Mathew and Mini.C. 2007. Products from cashew apple – potentials for export. Sent to National seminar on “Export of agro based products from kerala” being organized by Federation of Indian Export Organizations at Kochi.
- Mini.C and Jose Mathew.2007. Effect of priming on seed viability and seedling vigour in cashew (*Anacardium occidentale* L) .Sent to Seed Research.
- Anitha, and Jose Mathew. 2007. Green manuring along with rice (In Malayalam) Karshakasree 12 (11) : 2627
- Summary Report 2005-2007 of AICRP on Cashew, Madakkathara Centre.
- Report to Quinquennial Review Team 2002-06, AICRP on Cashew, Madakkathara Centre.
- Anonymous. 2007. Cashew Research Station, Madakkathara – a profile. Cashew News 12 (1): 4-5, NRCC, Puttur

Jose Mathew, Mini. C., Jayaprakash Naik and Rajendran, P. 2007. Organic cashew production. Chapter for incorporation in "Adhoc POP for Kerala for organic production of crops"

Jose Mathew and Gregory Zachariah. 2007. Annual Report 2006-07, AICRP on Cashew, Madakkathara Centre, 67 p

Jose Mathew and Gregory Zachariah. 2007. Summary report 2005-07, AICRP on Cashew, Madakkathara Centre, 55p

Jose Mathew, Gregory Zachariah and Mini. C. 2007. Report to Quinquennial Review Team. 2002-06. AICRP on Cashew, Madakkathara Centre, 38 p

Anonymous 2007. Cashew Research Station, Madakkathara - a profile. *Cashew Bulletin XLV* (10): 5-7

Mini.C. 2007. Bhakshanaththin svaadum manavum nalkunna ilachetikal. krishiyankanam (in Malayalam). VFPCCK Keralam, 17 (5) : 17-18.

Anonymous 2007. Cashew Research Station, Madakkathara - a profile. *Cashew Bulletin XLV* (10): 5-7

Mini.C. 2007. Bhakshanaththin svaadum manavum nalkunna ilachetikal. krishiyankanam (in Malayalam). VFPCCK Keralam, 17 (5) : 17-18.

Mini, C., Jose Mathew and Indira, V. 2007. Preparation of mixed cashew apple jam for increased acceptance and nutritional quality. National seminar on "Research, development and marketing of cashew", November 20-21, Goa, p. 102

Mini, C. Jose Mathew and Pushpalatha, P.B. 2007. Growth characters of cashew as influenced by chemical retardants. National seminar on "Research, development and marketing of cashew", November 20-21, Goa, p. 58

Gregory Zachariah, Mareen Abraham and Jose Mathew. 2007. Poornima (H-1593) – an elite cashew hybrid from Madakkathara. National seminar on "Research, development and marketing of cashew", November 20-21, Goa, p. 22

Mareen Abraham, Mahapatro, G.K., and Jose Mathew. 2007. Canopy structure in various cashew types and their yield performance. *J. Plantation Crops* 35 (2): 116-118

Mareen Abraham and Jose Mathew. 2007. Genetic divergence in cashew (*A. occidentale* L). *Indian J. Genet.* 67 (2): 213-214

Jose Mathew and Gregory Zachariah (Eds.) 2007. Improved production technologies in cashew cultivation. Cashew Research Station, Madakkathara. p. 87

Mareen, A., Mahapatro, G.K and Mathew, J. 2008. Variability in cashew (*A. occidentale*) by induced irradiation. *Indian J. of Agrl. Sciences* 78 (3) : 230-233

Technical Bulletin

Popular articles

Mini. C. 2007. Under utilised vegetable crops. *Krishiyankanam* 12 (6): 9-13

Mini,C.

Books :

Jose Mathew. 2007. Importance of cashew cultivation in India. p.1-10 *In* Improved production technologies in cashew cultivation. (Eds.) Gregory Zachariah and Jose Mathew, CRS, Madakkathara p. 87.

- Jose Mathew. 2007. Climate and soil for cashew cultivation. p.11-14 *In* Improved production technologies in cashew cultivation (Eds.) Gregory Zachariah and Jose Mathew, CRS, Madakkathara p. 87.
- Jose Mathew. 2007. Scientific agronomic management in cashew cultivation. p. 16-22 *In* Improved production technologies in cashew cultivation. (Eds.) Gregory Zachariah and Jose Mathew, CRS, Madakkathara p. 87.
- Gregory Zachariah. 2007. Botany, flowering, breeding of cashew varieties and hybrids and its specialties p 34-40 *In* Improved production technologies in cashew cultivation. (Eds.) Gregory Zachariah and Jose Mathew, CRS, Madakkathara p. 87.
- Mini.C. 2007. Asexual propagation and cashew nursery p.41- 47 *In* Improved production technologies in cashew cultivation. (Eds.) Gregory Zachariah and Jose Mathew, CRS, Madakkathara p. 87.
- Mini.C. 2007. Cashew nut harvesting and processing. p.16-22 *In* Improved production technologies in cashew cultivation. (Eds.) Gregory Zachariah and Jose Mathew, CRS, Madakkathara p. 87
- Mini.C. 2007. Cashew apple processing. p.78-80 *In* Improved production technologies in cashew cultivation. (Eds.) Gregory Zachariah and Jose Mathew, CRS, Madakkathara p. 87
- Dr. Mini. C. 2007. Cashew stem and root borer. A pamphlet was translated into Malayalam.
- Mini. C and Jose Mathew. 2008. Cashew apple processing (Booklet in Malayalam). Cashew Research Station, Madakkathara , 13 p
- Mini.C and Jose Mathew 2008. Cashew nursery (Leaflet in Malayalam). Cashew Research Station, Madakkathara
- Mini. C, K. Krishnakumari and K.V. Peter. Ilakkarivilakal (Book in Malayalam). Kerala Basha Institute, Trivandrum

No. of visitors to the insitution (farmer group/ students)

- 59 farmers from Cuttak district of Orissa visited the station on 27.2.08
- Final year students of College of Agriculture, Padannakkad visited the station on 27.2.08 to study the technologies for cashew apple utilisation
- 1st B Sc (Forestry) students visiting this station on 11.3.08
- 55 farmers and two officials of KVK from Jamnagar district of Gujarath visited on 11.3.08

Important visitors

- Sri. K.R. Viswambaran, Hon. Vice Chancellor, Kerala Agricultural University visited the station on 3.4.07.
- Sri. George Paulose, Ames International, USA visited the station on 25.5.07.
- Regional Manager, Plantation Corporation of Kerla, Kozhikode visited the station in 28.6.07.
- Managing Director, Rehabilitation Plantations Ltd., Punalur on 2.7.07
- Sri. Justus, Regional Manager, PCK Ltd, Kozhikode on 24.7.07
- Dr. B. Chandrachoodan Nair, Director, Planning and Economic Affairs Department, Govt. of Kerala, Trivandrum visited the station on 6.8.07.
- Dr. Patrick Nugawela. Business Department Services Advisor. USAID, Senegal visited the station on 8.8.07.
- Representatives of "Noora International" for export of cashew apple production visited the station on 4.8.07.

- Three scientists from Cashew Research Station, Ullal, UAS, Karnataka along with Executive Director of Kannada Farm Magazine "Sujitha Sanchike" visited the station on 11.9.07.
- Regional Manager, Calicut Division of PCK visited the station on 13.9.07
- Committee constituted by Director of Research to report on the replanting of old cashew germplasm block visited the station on 15.9.07
- The 8-member Quinquennial Review Team of AICRP on Cashew under the chairmanship of Dr. S.S. Magar, Former Vice Chancellor, Dr. BSKKV visited the field experiments, reviewed the projects of Madakkathara and Pilicode centres and interacted with the Honorable Vice Chancellor and university officers visited the station on 31.10.07
- Scientists from Michigan State University and Lanka visited the station on 20.2.08
- Mr. Tomer from National Horticulture Mission and Mr. Jayakumar from State Horticulture Mission visit the station for evaluation of Horticulture Mission funded projects on 23.2.08

Details of sale of seeds planting materials/ bio control agents etc

Item	Quantity	Revenue
Cashew grafts	15098	301960
Syrup bottles	2486	94468
Cashew apple drink	3844	19220
Cashew apple jam	125	4375
Cashew apple pickle	114	3420
Cashew apple candy	112	1120

Finance

Head	Expenditure	Receipts
Non- plan	1760668	1138263
Plan	874131	
ICAR	1712304	230112
Other EAPs	2461229	44127
Revolving fund	122466	125772
Total	6930798	125772

AICRP ON WEED CONTROL, COLLEGE OF HORTICULTURE, VELLANIKKARA

Research programmes

Major research achievements

A survey was undertaken in the Palakkad and Thrissur districts of Kerala during the month of October to January when the parasites were in the flowering stage. Ten species of mistletoes of Loranthaceae and Viscaceae family were identified). Among the parasitic plants *Helicanthus elastica* the common and virulent species in the plains was not seen in elevations above 600 m. Species such as *Scurrula parasitica*, *Viscum articulatum*, *V. capitellatum*, *V. rammosissimum* and *V. monoicum* were observed in above 600 m. *Taxillus tomentosus* was seen at an elevation of 850m and above. *Macrosolen parasiticus*, *V. orientale*, and *Dendrophthoe falcata* were seen both in the plains and the hilly region.

Long term trial on tillage in rice- water fallow system of Kuttanad region revealed that the plots under continuous zero tillage for the last three years had the least weed growth, whereas in the conventional tillage a large number of weeds of typical rice fields emerged, where as in the zero tillage plots, the flora was limited to mostly *Eleocharis* sp. This seems to be due to the reduction in soil pH compared to the tilled plots where the pH was higher and towards neutral .

Soil seed bank studies indicated that the chances of dormancy in both dicots and monocots seeds were most similar

In a seven year study on continuous application of the same herbicide at the recommended dose for weed control in rice, no accumulation of butachlor residues was noticed in the grain, straw or soil

Better control of *Echinochloa* sp. in the rice- rice system was achieved by the use of butachlor along with FYM. The treatments viz., hand weeded control and butachlor application with FYM registered similar grain yields which were very much higher than of application of butachlor alone. The results indicated that FYM improved the bioefficacy of the herbicide

Developed a simpler and less expensive common protocol for extraction and clean up of the residues of oxyfluorfen, butachlor and pretilachlor from the soil.

Studies on oxyfluorfen residues from the Onfarm trial on "Weed management in upland rice" showed that 50- 60 % of the applied herbicide is dissipated from the soil by 10 DAS.

Studies on the Characterisation of leaching behaviour of butachlor, pretilachlor and oxyfluorfen in different soil types indicated that maximum quantity of applied herbicide remained in the upper 7 cm of the soil column. There was a gradual decrease in the concentration of residue with increasing depth of the soil. Among the three herbicides tested , butachlor recorded higher levels of residues in the leachate. Fine textured organic matter rich soil recorded lower residue levels in the leachate compared to the soil with coarse texture and poor organic matter. It could be attributed to the high adsorptive power of the soil, especially at the top layers with high organic matter content.

SRI method produced lesser grain yields than the normal planting. Among the SRI treatments, modified SRI with herbicidal weed control yielded higher than the SRI with cono weeding.

Stale seed bed for 14 days resulted in significant reduction in the weed growth, compared to normal sowing and stale seed bed for seven days.

Screening of popular rice varieties was conducted in rice fields where both high and low density of weeds were present. The data on grain and straw yields obtained for all the three years were similar indicating that C3-2-49, Athira, Jyothi, Aiswarya and Bharathy are highly competitive rice varieties. Kanchana, Uma, C-26 (T) and C-80 are the least competitive and the varieties such as pavizhum, Gowri, Matta Triveni and Remanika are moderately competitive

Details of ongoing research projects

Name of project	Funding agency	Name of PI	Name of Co- PI	Outlay
Evaluation of Phenology, Growth pattern, and phyto-chemistry of <i>Loranthus</i> spp. (<i>Dendrophthoe falcata</i> . L.) of Kerala in Relation to Host Specificity and Control”	Kerala State Council for Science, Technology and Environment	Dr. T. Girija, Assistant Professor Sr. Sc. (Plant Physiology)	1. Dr. S. Mini, Asst. Prof. (Biochemistry) 2. Dr. C.T. Abraham, Associate Professor & Head (Agron)	Rs. 8,19,500

Extension programmes

Highlights of extension activities

Parthenium awareness week

Kerala state has a warm humid tropical climate with an average annual rainfall of 300 cm. Parthenium has not yet become a major weed of concern in Kerala. However, it is in large numbers in the low rainfall areas adjoining Tamil Nadu and Karnataka. It is also seen around the major railway stations indicating its spread through vehicles. A recent survey shows the spread of the weed to newer areas, compared to its presence in 1996.

As part of the “Parthenium awareness week” observed during Sep, 6-12, 2007 the following activities were undertaken by the KAU Centre of the AICRP on weed control at Thrissur.

Awareness class to women leaders of “Kudumbasree project”

The kudumbasree project is a programme of the government of Kerala for empowering of rural unemployed women. Classes were taken to leaders of kudumbasree units at Thrkur, Vadakanchery and Madakkathra. And the classes were handled by Dr. C. George Thomas, Associate Professor, Dept. of Agronomy.

Field visit by B.Sc. (Ag.) students

A study tour was arranged for the first year B.Sc. (Ag.) students to have an on the spot observation on parthenium and its problems. Infestation of parthenium was noted extensively in the areas around the Thrissur railway station. On the spot classes were taken to students on the morphology, growth stages, seed production, health problems to human beings and animals and management of weed. The public present in the railway platform were also educated on the importance of the weed.

Another area in the city where infestation of parthenium was noted was near the Central government office complex. Visit of the students was arranged to this area also. The public present in the area were explained about parthenium and its problems.

Release of *Zygogramma bicolorata* for biocontrol of parthenium.

The *Zygogramma* beetles received from Dr. Susheelkumar of NRC on weed science, Jabalpur were released in a site near Athicode junction Chittor in Palakkad district, where extensive infestation of parthenium is seen

Classes taken for training programmes

Dr. C.T. Abraham, P.I. Classes in weed management in rice were taken in the Farmers Field School organized by the Dept. of Agriculture, Govt. of Kerala on 4-5-07 at Nedupuzha on 22-06-07 at Puthenchira on 27-11-07 at Korkencherry and on 01-12-07 at Mullassery. Classes were taken to the farmers on 6-7-07 (Water hyacinth-the alien aquatic weed) as part of the State

level dissemination workshop at KIDS, Kottappuram and on 29-10-07 (weed management in Pokkali rice) during the Pokkali farmers meet, RRS, Vyttila.

Onfarm Trials

Control of *Limnocharis flava* in paddy field

Limnocharis flava, an alien aquatic weed from S. America is seen spreading in the fresh water areas of Kerala. During the last few years the spread has been fast and many paddy fields have got infested with the weed. A severe infestation of *Limnocharis*, was in the state seed farm at Pananchery, in Thrissur District. An observational trial was taken up with participation of the Agri.officer of the Farm to develop control measures. Both 2,4-D and Almix were found to give good control of *Limnocharis*, slight phytotoxicity was noticed for rice seedlings in the 2,4-D sprayed areas. However, the seedlings recovered soon in the plot sprayed with Almix, 100% control of *Limnocharis*, was obtained without any phytotoxicity to rice seedlings.

List of publications

Scientific papers - 6
Books - 2

No. of visitors to the institution(Farmer group/ students)

Important visitors:

1. Dr. Ramachandra Prasad, P.I. AICRP WC, UAS, Bangalore
2. Dr. Chinuswamy, P.I. , AICRP WC, TNAU, Coimbatore

Finance 2007-2008

Head	Expenditure	Receipts
ICAR	26,42,895/-	59,090
Other EAP s (KSCSTE)	42599/-	-

**ALL INDIA CO-ORDINATED RESEARCH PROJECT ON
BIOLOGICAL CONTROL OF CROP PESTS AND WEEDS
(AICRP ON BCCP &W),
COLLEGE OF HORTICULTURE, VELLANIKKARA.**

Research Programmes

a. Major research achievements (highlights):

A. RICE

Large scale demonstration of IPM for rice pests and disease in the farmer's field

Conducted the demonstration of Bio-Intensive Pest Management at the farmer's field. There was no significant difference in leaf folder and stem borer incidences between BIPM and conventional farming. But hoppers, coccinellid and spider counts were significantly high in BIPM area. Grain yield was significantly high in BIPM plots.

Validation of biointensive pest management practice in organic rice production.

The mean of two seasons data revealed that coccinellid count and spider count were significantly high in organic farming. Grain yield was significantly high in conventional farming.

B. COCONUT

Large scale demonstration on biocontrol of coconut leaf caterpillar *Opisina arenosella* in Kerala

There was no pest incidence after release of natural enemies in the treatment-sequential release of *Cardiastethus exiguus* and *Goniozus nephantidis*.

Evaluation of *Hirsutella thompsonii* for the biocontrol of coconut eriophyid mite

There was no significant difference between treatments. However, the percentage reduction of mite population over untreated control was maximum in Dicofol treated palms followed by *Hirsutella* Mycelia + Glycerin and *Hirsutella* Mycelia+Conidia+Glycerin.

Large area demonstration of *Oryctes rhinoceros* management using *Metarhizium anisopliae* var. *major* and baculovirus in Kerala

The entomofungal pathogen *Metarhizium anisopliae* was proved effective against the grubs of rhinoceros beetle and all the grubs were found diseased in the treated pits.

C. VEGETABLES

Evaluation of *Trichogramma chilonis*, EPN and *B.t.* against fruit borer of brinjal

There is no significant difference between treatments in fruit infestation and yield.

D. WEEDS

Investigation on the differential performance of *Cyrtobagous salviniae* against *Salvinia*

A survey was conducted in Thrissur and Emakulam districts to collect water samples from ponds without *Cyrtobagous* on *Salvinia*. But the weevils were present in all the areas. Water samples were drawn from those areas and analysed.

Survey for the natural enemies of *Cyprus rotundus*

Conducted the survey for the natural enemies of *Cyprus rotundus*, in Thrissur. But no natural enemies were collected during the period. A mealy bug was collected from the roots of the weed and it was identified as *Geococcus citrinus*. But it has been reported as a pest of banana in Kerala.

Biocontrol of *Chromolaena odorata* using *Cecidochara connexa*

101 numbers of adults were released in the field during November, 2007. Field establishment was poor and only two galls were obtained from the released site. The spread of fly to other areas was also absent.

E. PESTS IN POLYHOUSES

1. Biological control of thrips, aphids and mites in polyhouses

Survey for pest problems in polyhouses.

Survey conducted in Vellanikkara area shows that the major pests present in Polyhouses on Gerbera and Croton plants are aphids, mealy bugs, scales, mites and thrips. Gerbera plants were found severely affected by thrips (*Frankliniella* sp.). So the fungal pathogens were tried for the control of thrips on Gerbera.

Evaluation of fungal pathogens for the control of thrips on Gerbera plants

The lowest pest population was recorded in verticel followed by *Beauveria bassiana*, *H. thompsonii*. chemical control, *Verticillium lecanii*, and *Metarhizium anisopliae* treated plots which were on par. In untreated control the thrips count was persistently high throughout the experimental period.

Finance

Head	Expenditure (Rs.)	Internal Receipts (Miscellaneous)
ICAR:KAU (75:25)	19,43,009	1,083

**AINRP ON MEDICINAL & AROMATIC PLANTS
COLLEGE OF HORTICULTURE,
VELLANIKKARA**

Head of the Scheme : Dr. V.V. Radhakrishnan , Professor

Scientists were deputed for various seminars/Symposia

Scientists were conducted various training programmes/ Seminars/ Summer school/ winter school/ short course

Research programmes

a. Major research achievements

Following research projects were carried out under AINRP on M&AP

Crop improvement

Long pepper (*Piper longum*)

Evaluation of the selected eight genotypes along with local check 'Viswam' and hybrid during 2007-08 indicated that Acc.No.2 is superior (640 kg/ha) to the existing variety 'Viswam' (472 kg/ha). Analysis on the association of the characters towards the spike yield indicated that tall plants with maximum number of fruiting branches produced higher spike yield. Height of the plant as well as number of branches has a positive association with dry weight. Fresh weight and size of the spike has a positive association with piperine content, number of spikes and length of spikes.

Chitrak - *Plumbago rosea*

Twenty five accessions collected from different ecogeographical places of Kerala were evaluated and found that significant genetic variability was there for many of the morphological traits as well as root yield and Plumbagin content. Accession-10 a local collection of Trichur District and Accession-9 from Thuruthissery recorded significantly higher number of roots. Accession- 6 from Kozhikode recorded maximum fresh shoot weight. Accession-23 from Santhampara recorded maximum fresh plant weight. Accession-24 from Pulppara recorded maximum fresh root weight. Accession-16 from Vellanikkara recorded maximum height. Accession 1 from Vellanikkara recorded maximum Plumbagin content.

The selected accessions of *Plumbago rosea* were grouped into five clusters. Accessions collected from midland and coastal area mainly falls in one group and the mean root yield was higher in that group. An analysis of *Plumbago* root yield and its component traits indicated that root yield has an association with total biomass production, height of the plant, broader leaves and number of roots. A tall plant with ovate type of leaves having dark green colour with maximum number of roots are the proposed plant architecture for higher root yield. The cluster analysis indicated that there is no relationship between geographical distribution and clustering pattern. Partial shading increases root yield of chitrak (*Plumbago rosea*) which indicates the scope of intercropping in plantations.

Asoka (*Saraca asoca*)

Forty two accessions of Asoka exhibited considerable in variability morphological traits from seedling onwards. Seedling vigor and further growth depended mainly on the origin of the accessions. Observations are recorded on various growth parameters like height of the plant, number of leaves, girth of the plant after two years of planting. Accessions from Thrissur and Trivandrum showed vigorous growth represented by increased height, number of leaves and higher girth of the stem. Higher number of leaves had a positive association with mean girth of stem. Accession number 32 (Thrissur) and 37 (Thrissur) started flowering during February 2007 after two years of planting.

During 2007-08, observations on various morphological traits and active constituents (tannin and phenol) were recorded and analysed. Out of the 42 accessions 24 accessions were selected for assessing the tannin content and its relationship with bark characters.

The flowering nature of the mature asoka trees of 15 to 20 years old was studied. Maximum flowers were produced during the month of February followed by March and during September and October no flowers were produced. Throughout the year except these above two months at least some of the branches of the tree were producing flowers. Maximum number of florets was seen during March followed by February. Maximum mature pods were seen during April followed by March. It is taking two months for setting the seeds after flowering. Number of seeds per pod was also higher during the months of February to April. The Anthesis of flower is occurring during early morning 5-6 am.

The analysis of the mean data of various morphological traits and tannin content of the selected accessions after four years of planting indicated that Accession No. 1- TCR 1 comparatively performed better in terms of its growth exhibited by higher height, more number of leaves, higher girth and better tannin content. TCR.5 shows maximum tannin content. A higher range of variability from 14.7 to 36.1 in tannin content was recorded. The association of morphological traits and tannin content in Asoka indicated that height of the plant, girth of the stem, and number of leaves have significant association among themselves, while all these traits have no significant relationship with tannin content. The reproductive biology of asoka indicated that throughout the year except September and October. Asoka trees produce flowers with maximum during March followed by February. This is of flower recorded as early recorded as early morning 5 a.m. to 6 a.m. Maximum production mature pods and maximum seeds per pod were during February to April.

Brahmi (*Bacopa monnieri*).

In the years 2007-08, the replicated experiment on Brahmi with collected accessions has been carried out. The collected accessions were grouped in to five clusters. Cluster I contains fifteen, II & III with three each, IV with two and V with six accessions. Accessions collected from different regions grouped into one showing that there is no parallelism with geographical sources.

The analysis of data of the Brahmi accessions indicated that plants having shorter internodes with fleshy bigger size leaves contain more therapeutically important constituent Bacoside A. Non flowering and late flowering accessions contain more Bacoside A. Accessions received from coastal regions have higher biomass and higher Bacoside content. The accession No. 14 is identified as higher biomass and Bacoside - A content type.

The means of various traits of accessions indicated that for a period of twelve months growth there is significant variation among the accessions for the morphological traits and biochemical constituent Bacoside A. The variations among the accessions were recorded irrespective of the soil conditions and fertility management practices.

The maximum leaf area and leaf length were recorded in Accession No.8 and the least in Accession No.18. Accession No.20 has been recorded to produce maximum biomass where as the maximum Bacoside A content was recorded in Accession No.14 and No.29 and least in Accession No.12. The phenotypic coefficient of variation (PCV) for the morphological traits is greater than the genotypic coefficient of variation (GCV) for the same traits. PCV is highest for the Bacoside A followed by number of flowers and biomass which means that the apparent variation is not only due to genotypes but also due to the influence of environment. Heritability which is an index of transmission of characters from parents to offspring, were higher for characters like shoot length, biomass and Bacoside A. *Bacopa monnieri* is used in Ayurvedic medicine for its important chemical constituent Bacoside - A. As whole plant is used for the extraction of this constituent biomass is an important criteria for selection. Since the heritability of this character is higher selections among the accessions will be effective for increasing both the biomass and Bacoside A content. Heritability in the case of internodal length is low indicating that environmental effect is higher in the expression of this character.

Association of biomass yield, biochemical constituents and morphological traits were estimated at both phenotypic and genotypic level. The association of characters indicated that leaf length is negatively correlated with number of flowers, internodal length, number of leaves and biomass. It is positively correlated with Bacoside A content and is positively and significantly correlated with leaf width and leaf area. Leaf width is positively correlated with number of flowers and Bacoside A

content where as number of leaves negatively correlated with number of leaves and Bacoside A content. Internodal length is positively correlated with biomass and Bacoside A content where as biomass is positively correlated with Bacoside A content. Significant associations both at genotypic and phenotypic level were observed between number of leaves and biomass, leaf width and leaf area. Bacoside content is positively correlated with leaf width and leaf area. The identified plant type of Brahmi should have higher number of leaves with fleshy broader leaf lamina and shorter internodes and will give higher Bacoside A content. Accession 29 has identified as a better plant for higher biomass yield and Bacoside –A content followed by Accession 14. large quantities of planting materials of the accession 29 and 14 were multiplied and distributed among the farmers. The agrotechnology suitable for the cultivation was also studied.

Summary : The evaluation of Brahmi germplasm indicated that plants having shorter inter node with fleshy bigger size leaves contains more therapeutically important constituent Bacoside A. Non flowering and late flowering accessions having more Bacoside content. Accession 29 has identified as better plant for higher biomass yield and Bacoside A content followed by Accession. No.14. accessions received from costal region have higher biomass and higher Bacoside content.

Agronomy

Effect of organic manures and biofertilisers on yield and quality of *B.monnieri*.

Result: The data revealed that the combined application of organic manures and biofertilizers was found to be better in terms of growth than their individual application. Combined application of organic manures and biofertilisers did not produce pronounced effect on the length of vine compared to their individual application. The number of leaves increased from 1091.73 to 1325.67, which was found to the highest, when FYM was applied along with Azospirillum and Phosphorus Solubilising Bacteria (PSB). The application of coirpith compost and vermicompost along with biofertiliser also showed the same trend with respect to number of leaves. Among the different combinations of organic manures and biofertilisers, FYM @5t/ha along with Azospirillum and PSB each @10 kg/ha produced the highest internodal length of 3.74cm. In the case of different organic manures, the biomass production was significantly higher with the application of FYM compared to coirpith compost or vermicompost. But among different combinations of organic manures and biofertilisers, the combined application of coirpith compost or vermi compost and Azospirillum and PSB was found to be significantly superior in the biomass production than their individual application. Application of coirpith compost @ equivalent to N of 5t/ha of FYM along with Azospirillum and PSB was the highest (23.56 g/pl) which was comparable with that of FYM @5t/ha along with Azospirillum and PSB each @10 kg/ha. The combined application of organic manures and biofertiliser was found to be better in dry matter production also than their individual application.

The drymatter production was maximum with the application of coirpith compost @ equivalent to N of 5t/ha of FYM along with Azospirillum and PSB which was comparable with that of FYM @5t/ha along with Azospirillum and PSB.

Influence of organic manures and biofertilizers on the growth, yield and quality of *P.rosea*

It is reported that the combined application of organic manures with biofertilisers gave higher yield and maintained relatively higher plant nutrient status compared to application of organic manures alone in Plumabgo rosea. Combined application of FYM @ 10 t/ha with Azospirillum and PSB @ 25 kg/ha is found to be the best combination for higher yield and plant nutrient status.

With respect to quality , the treatment FYM @ 10 t/ha with Azospirillum and PSB gave the highest plumbagin content of roots (6.787%) which was on par with FYM@ 15 t/ha + Azospirillum (Table 11). It is followed by FYM15t/ha+Azo+PSB which had comparable plumbagin content with that of FYM @ 10 t/ha with Azospirillum and PSB.

Influence of organic manures and biofertilizers on the growth, yield and quality of *P.rosea*

With respect to quality, the treatment FYM @ 10 t/ha with Azospirillum and PSB gave the highest plumbagin content of roots which was on par with FYM@ 15 t/ha + Azospirillum. It is followed by treatments of FYM15t/ha+Azo+PSB and FYM15t/ha+Azo+PSB which had comparable plumbagin content with that of FYM @ 10 t/ha with Azospirillum and PSB.

Irrigation scheduling in *P.rosea*

Irrigation at higher levels of CPE had pronounced effect on growth and yield of *P. rosea*. The leaf number increased from 47.65 to 58.6 with increase in irrigation from IW/CPE from 0.25 to 1.0 with maximum number of leaves at IW/CPE of 1.0. Root number also followed the same trend. Highest dry matter production of 90 g/pl was obtained for plants having irrigation @ IW/CPE of 1.0. The root length increased with decrease in frequency of irrigation. The highest root yield was produced by plants with irrigation @ IW/CPE of 1.0 (2.105 t/ha) followed by the treatment of IW/CPE of 1.25. Plumbagin content was 2.95% when plants were irrigated @ IW/CPE of 1.0 which was on par with IW/CPE of 0.75. With respect to the soil moisture content, the moisture content of soil decreased when the frequency of irrigation increased. The higher content of moisture was maintained in soil before and after irrigations at IW/CPE of 0.25.

Effect of spacing on growth, yield and quality of *P. rosea*

Different spacing treatments did not show considerable variation on growth characters. However the plants at a spacing of 50 x 30 cm were taller with higher number of leaves and number of branches. The spacing of 50 x 30 cm produced maximum number of roots, longest roots (40.85 cm) and highest root girth (3.57 cm). The dry matter production was highest at a spacing of 50 x 30 cm (181 g/pl). The spacing of 50 x 30 cm produced maximum root yield which was on par with that produced by plants at a spacing of 50 x 40 cm though not significant.

With respect to quality, the plumbagin content did not show much variation owing to difference in plant population. However a decreasing trend was noticed with increase in plant spacing. The highest plumbagin content of 4.12 % was obtained with the plants at a spacing 60 x 30 cm and it was followed by spacing of 75 x 40 cm (3.65 %).

PHYTOCHEMISTRY

Characterisation of phenolics of *Saraca asoca*

The phenols and tannins present in *Saraca asoca* were characterized for ten different accessions maintained at Kerala Agricultural University Campus, Trichur Museum and Trichur Corporation garden. It is seen that six different types of phenols are present in asoka bark. The phenols and tannins are mainly concentrated in bark and flower and very low quantity in different type of leaves like tender, medium and mature. No significant difference is noticed in the contents from different regions of the plant indicated that besides the main stem the branches can also be used for the extraction of the bark. Both the bark and flower contains appreciable amount of tannins and polyphenols indicated that flower can also be used as a substitute of bark.

Comparative analysis of Asoka bark and Polyalthia bark

The barks of the *Saraca asoca* and *Polyalthia longifolia* available in the KAU Campus were dried and powdered. 5 g each of the samples were successively extracted with hexane, chloroform, ethylacetate and methanol. On chemical fingerprinting of these extracts, it is seen that a significant difference between Asoka & Polyalthia barks were observed.

A significant difference between asoka and polyalthia was observed in ethyl acetate fraction. Mobile phase Methanol: Hexane (8: 2) followed by Vanillin - sulphuric acid spray. A compound/compounds with catechin nuclei which give a red color with Vanillin - H₂SO₄ was present in asoka. While this was found to be absent in polyalthia.

Quality analysis of asoka formulations available in the market and comparison with asoka sample.

Asoka formulation *Asoka* from the leading pharmaceutical companies of Kerala were taken for the study. Samples from Kottakkal, Vaidyaratnam and Oshadi products were successively extracted with Hexane, Chloroform and ethyl acetate. These extracts were used for the chemical fingerprinting. The mobile phases which were effective in differentiating asoka from polyalthia were used for this study also. But the similar chromatographic pattern was not observed for the product. It seems the active ingredients are either degraded or converted into other compounds by the processing or by the interaction with the other compounds present in the formulation.

Analysis of market samples of *Saraca asoca*

Asoka bark was collected from different parts of Kerala and analyzed for its authenticity. Samples were collected from Trivandrum, Kottayam, Trichur, Mysore, Kollam, Palakkad, Kannur, Valancheri, Cheruvannur, Koilandy, Changaramkulam, Kuttipuram and Kunnamkulam. Five gram each of the samples was successively extracted with hexane, chloroform, ethyl acetate and methanol. These extracts were used for chemical finger printing. Different mobile phases were used to characterize these extracts and out of these, the best systems were presented below:

Hexane extract

Hexane extract of market samples spotted along with Asoka extract on silica-gel F254 plates. Here solvent system used is methanol:hexane (4:1). Observations were recorded under uv366 nm and 254 nm. The fluorescent spot correspond to Asoka showed some similarity to that of Changaramkulam. No other sample showed similarity to Asoka.

The fluorescent spot correspond to Asoka showed no similarity to that of market samples. The fluorescent spot corresponds to Asoka under UV at 366 nm is not observed in market samples. So these market samples are not Asoka bark. When viewed under UV the spot corresponding to Asoka were not observed in the samples from Kottayam. So these samples are also not the bark of Asoka

Ethyl acetate extract

Ethyl acetate extract of the market samples spotted along with Asoka and polyalthia extract. Solvent system used is ethyl acetate: chloroform (5:5). Observations were recorded under UV at 366 and 254 nm.

The banding pattern observed in Asoka is not seen in the market samples. Also samples collected from Changaramkulam and Kutipuram showed similar chromatographic pattern both viewed under UV 366 and 254 nm. So these market samples are not the bark of Asoka. It can be concluded that sixteen different samples of bark sold as aoka available from different places of Kerala were collected and tested for its truthfulness. None of the market sample was found to be original Asoka bark. Barks of many other unknown trees are sold in the name of Asoka.

Details of Research Projects

Completed projects during 2007-08

Name of Project	Funding Agency	Name of PI	Name of Co-PI	Outlay
Exploration, collection, evaluation, and standardization of quality planting materials of important medicinal plants of Kerala	National Medicinal Plant Board	Dr. V. V. Radhakrishnan	Dr. A. Latha Dr. S. Mini & Dr. Mareen Abraham	Rs.10 lakhs
ICAR Mega Seed Project	ICAR	Dr. V. V. Radhakrishnan	Dr. A. Latha	Rs. 14.5 lakhs

Farm Advisory Service:

In person	Over Telephone	Through Letter
42 persons	170 nos.	Nil

Field Visit

No. of Visits	Problem identified	Recommendation
10 nos.	30 nos.	12 nos.

Other activities

- The planting materials of important medicinal plants are being produced and distributed from this scheme earning annual revenue of >Rs. 40 thousand
- 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 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 Choomam and Rasnadi Choomam produced and distributed with above 1 lakh

List of publications

Scientific papers

- Radhakrishnan,V.V., Latha ,A., Mini. S and Vidhu Francis., Conservation and Reproductive Biology of *Saraca asoca*. National Seminar on Conservation, Cultivation & Sustainable Utilization of *Saraca Asoca*. 16-17 October 2007 at KFRI, Peechi.
- Radhakrishnan,V.V., Variability in Brahmi (*Bacopa monnieri*). National Symposium on Recent Trends in Plant Scienario & Herbal Medicine. 17-18 December 2007 at NDUAT, Faizabad.
- Radhakrishnan,V.V., Mini. S. and Latha A.2008.Assessment of variability in Brahmi (*Bacopa monnieri*). J. Med. Arom Pl.Sci.30:
- Radhakrishnan,V.V., Mini.S., and Latha .A.2008.Genetic variability in Chitrak (*Plumbago rosea* L.). J. Med. Arom Pl.Sci.30:
- Radhakrishnan,V.V .,Latha.A., and Kochurani Kurien., Research on Conservation, Cultivation & Value Addition of Medicinal Plants in Kerala. National Workshop on Medicinal & Aromatic Plants 12-13 February 2008 at AMPRS Odakkali, KAU
- Radhakrishnan,V.V., and Mareen Abraham., Invitro Mutagenesis for Photo Insensitivity to Tuberculosis in *Coleus* (*Solenostemon rotundifolius*). International Symposium on Induced mutations in plants. 12-15 August, 2008 at Vienna, Austria

Number of visitors to the Institution (Farmer group/ students)

Scientists	:	75 nos.
Farmers	:	20 groups
Students	:	40 groups

Important visitors

Dr.Satyabrata Main. Director, NRC on M&AP, Anand

Finance

Head	Expenditure	Receipts
Non - plan	Nil	
Plan	2,40,000	
ICAR	26,19, 228/-	
National Medicinal Plant Board Project	3,00,000	
Revolving Fund	1,00,000	2,14,704

AGRONOMIC RESEARCH STATION, CHALAKUDY

Head of the Station : Dr. V.S. Devadas, Professor (Horticulture)

Research Programmes

RESEARCH HIGHLIGHTS OF THE STATION 2007-08

KSCSTE Project : Nutrition Management and Processing Qualities of Vanilla (*Vanillaplanifolia* Andrews)

Objectives

To evaluate the influence of different organic manures and graded doses of fertilizer on growth, yield and quality of vanilla and to quantify their requirement

Study on foliar absorption of ¹⁴C Urea in relation to duration of absorption and leaf surface

Studies on development of processes for the preparation of value added products of vanilla and its evaluation

Results

Growth of plants, with respect to height and number of branches were not significantly influenced by the treatments. The crop started flowering from the third year onwards. Flowering was not uniform. Yield characters such as number of inflorescences, no. of bunches and no. of beans were taken. Among the different treatments, foliar application of neem cake gave better growth and more beans.

In the foliar absorption study, absorption by the treated leaf, plant part above the treated leaf and the plant part below the treated leaf in relation to duration of absorption and leaf surface were taken. The percentage of absorption increased with time up to a duration of 48 h. At 48 h after application, the percentage of absorption through the upper surface was 46.98% while through the lower surface was 39.5%. Percentage of translocation was more when it was applied on the lower surface of the leaf.

The radiotracer work on foliar absorption study shows that older leaves of vanilla absorb only meager quantity of nitrogen. The younger leaves and aerial roots are the major nutrient absorbing medium. Studies are being continued.

Vanilla powder has been prepared from cured vanilla beans without affecting its quality (vanillin content). Vanilla powder based products such as cakes, ice cream, pudding, chocolate, milk shake etc. have been prepared and evaluated the products using hedonic scale.

Technology was developed for the preparation of vanilla powder from cured vanilla beans and the technology was submitted for patenting through KSCSTE. Vanillin content and other flavor components such as vanillic acid, B-hydroxybenzaldehyde, para-hydroxybenzaldehyde of vanilla powder was tested by an ISO certified agency.

Hedonic evaluation of the powder based products shows that color and flavor of the products are better than the synthetic vanilla based products. Also the flavor is found to be retained in the product after one month.

Storage capacity of the powder developed was tested with respect to appearance, vanillin content and moisture content. It has got a very storage capacity.

KSCSTE Project: Design, construction and performance evaluation of low cost naturally ventilated greenhouse suitable for humid tropical climate

1. Developed Optimal design of greenhouse suitable for Kerala condition.

Greenhouse oriented in north – south direction, having a ridge height of 4.15 m and eave height of 2.5 m with 30% side ventilation and 6% roof ventilation was found suitable under Kerala condition for cultivating vegetables. The ventilators should be provided with insect net. Crops like cauliflower, cabbage, capsicum, tomato and bhindi were cultivated successfully inside the greenhouse. Varieties of cabbage and cauliflower suitable for cultivation inside the greenhouse under Kerala condition was found out (cabbage (NS 43, NS 183 and Gaurav), Cauliflower (NS 245 and NS 131) and tomato (LE 66) Cabbage and cauliflower can be cultivated successfully even in the summer season and tomato can be cultivated in the rainy season inside the greenhouse. Economic analysis of cultivation of vegetable under protected cultivation reveals that a benefit cost ratio of 3.07 could be obtained by raising three crops of cabbage/ cauliflower under the greenhouse (optimal design of greenhouse) in a year. By cultivating two crops of tomato and one crop of cabbage/ cauliflower inside the greenhouse (optimal design of greenhouse) per year, a benefit cost ratio of 2.14 could be obtained.

Response of Neelamari (*Indigofera tinctoria* L.) to irrigation under different fertility status and shade

To find out the response of Neelamari to irrigation and organic manure and to arrive at an optimum irrigation schedule and nutrient requirement, an experiment was started in the year 2004. Organic manure was applied at 10 and 20 tonnes/ha basally. Irrigation to a depth of 2 cm was given at 20, 40, and 60 mm CPE and also on alternate days through KAU micro sprinkler. Observations on plant height and no. of branches were taken when the crop was one month old and green leaf yield was recorded at every harvest.

The results indicated significant influence of irrigation and manure on the green leaf yield of Neelamari under open conditions. Neelamari requires frequent irrigation and high doses of manure for realizing higher green leaf yield.

In general, the yield under partial shade conditions was lower than the yield under open conditions and the different levels of irrigation and manure were on par. The lack of significant influence of the treatments on yield and growth parameters might be due to the overriding influence of shade on these parameters.

Performance evaluation of ground water recharging system of the farm

Results

Deepening and widening of the existing pond near C&B College and Estate office was done. This was a very small pond having a capacity < 100 m³. Initially, the central small portion of the pond was widened and deepened upto a volume of 379 m³. This helped to increase the water level of the three wells lying at the down stream side of this pond during the summer season. On utility point of view, these three wells are very important. One well is used for drinking water supply to the staff quarters. Water of the second well, in the estate factory, is used for the processing of the rubber sheet. The third well in the central nursery is using for irrigating the nursery plants. With this in mind, it was decided to increase the capacity of the pond. By deepening and widening the pond, the capacity of the pond has increased considerably. The present water-spread area of the pond is 1608 m²; average depth of the pond is 4.47 m and the capacity of the pond at full level is 7195 m³. Land on the upstream side of the pond is at higher level. Conveyance channels were cleared of weeds and other obstructions to collect and convey the runoff water from the catchment area (approx. 10ha) to the pond.

Roof top water harvesting system was constructed for the office building of PRC, Vellanikkara (Concrete flat roof) which was provided with a ferrocement tank of 10,000 lit capacity. Provision was also given to convey the overflow water to the existing well at PRC, vellanikkara. This helped to increase the yield of well during the summer months.

Roof top water harvesting system was constructed for the office building of WMRU, Vellanikkara (sloped asbestos roof) which was provided with a ferrocement tank of 10,000 lit

capacity. Provision was also given to convey the overflow water to the existing well at PRC, Vellanikkara. This helped to increase the yield of well during the summer months.

Runoff diversion channels were constructed/cleared off weeds so as to collect all the runoff from the farm and get diverted into an abandoned well having a diameter of 20 m. This helped to collect the runoff water of each and every rain and recharge towards the ground water storage through this well. It was observed that the water level of the well of WMRU, which is using for irrigating the plants was found to increase considerably by collecting water in this big abandoned well since the pumping well is lying at a lower elevation. This well is acting as a percolation tank.

Farm advisory service rendered

Date/period	Solutions to farmer's field problems		
	In person	Through Phone	By Post
April 2007 to March 2008	138	350	

Radio talks/TV programme/Audio-video cassettes

Topic	Name of Scientist	Date
Television programme in Krishi dharshan live phone in programme	Dr. P.Suseela	24-3-08
1 "Rain water storage tanks with different materials", in All India Radio, Calicut		
2. "Efficient irrigation", in All India Radio, Thrissur	Dr. P. Suseela	29-2-08
3. "Jalasechanathinu microsinker" in All India Radio,		
4. "Water management in rice", AIR, Calicut	Dr. T.K.Bridgit	27-11-07

List of publications

Scientific papers

K.P. Visalakshy, Reena Mathew, P.Suseela, T.K Bridjit-2007. Development and performance evaluation of KAU Microsprinkler J. of Indian water resources society 24(3-4) P.17-19

Mini Abraham & Abraham C.T 2007. Preliminary investigation on allopathic properties of Mikania. J.Rubber Research.

Popular Articles published in 2007-08

P.Suseela. 2007. "Harvest rain water, for soil and water conservation ! !". Spice India (Malayalam), Malayalam Journal, Vol. 20 (7) : pp-18-21.

P.Suseela. 2007. "Efficient method of fertilizer application". Karshakan. Malayalam Journal, Vol. 15 (6) : pp-45-46.

P.Suseela. 2007. "Advantages of greenhouse cultivation". Karshakan. Malayalam Journal, Vol. 15 (7) : pp-64-66.

P.Suseela. 2007. "Control of microclimate inside the greenhouse" . Karshakasree, Malayalam Journal, Vol. 15 (10) : pp-63-64.

- P.Suseela. 2007. "Microirrigation - "Measure to protect the plants from draught" . Karshakasree, Malayalam Journal, Vol. 15 (12) : pp-52-54.
- P.Suseela. 2007. "Microirrigation - "Different types of greenhouses" . Karshakasree, Malayalam Journal, Vol. 15 (9) : pp-54-56.
- P.Suseela. 2007. "Geomembrane rain water storage tanks" . Spice India (Malayalam), Malayalam Journal, Vol. 20 (6) : pp-7-9.
- P.Suseela. 2007. "We can conserve rain water and prevent soil erosion !!" . Karshakasree, Malayalam Journal, Vol. 12 (11) : pp-28-30.
- P.Suseela. 2007. "Efficient drip irrigation" . Spice India (Malayalam), Malayalam Journal, Vol. 20 (4) : pp-10-13.
- P.Suseela. 2007. "Percolating tanks - our close friends" . Spice India (Malayalam), Malayalam Journal, Vol. 20 (5) : pp-4-6.
- P.Suseela. 2007. "Methods to enriching carbon dioxide inside the greenhouse" . Spice India (Malayalam), Malayalam Journal, Vol. 20 (2) : pp-10-13.
- P.Suseela. 2007. "Advantages of carbon dioxide enrichment inside the greenhouse" . Spice India (Malayalam), Malayalam Journal, Vol. 20 (1) : pp-11-13.

Book published

P.Suseela., V.S. Devadas, K.P.Prameela and Reena Mathew. 2007. Greenhouse. Kerala Agricultural University Publication

Suseela.P., Devadas, V.S., Bridgit, T.K., Visalakshy, K.P., Prameela.K.P. and Mini Abraham. KAU Micro Sprinkler (Malayalam). Directorate of Extension, Kerala Agricultural University.

Important visits

Sl. No	Date	Person who visited	Purpose
4.	06/11/07	Sri. Wangchuk, Agriculture machinery centre, Bondey, Paro, Bhuttan	Visited the station to know the advantages of KAU Microsprinkler
6.	03/01/08	Sri. B.D.Devassy, MLA, Chalakudy	Visited the station in association with the inauguration of microsprinkler training

Finance

Head of A/c	Expenditure (Rs.)	Receipts (Rs.)
Non Plan (Including EMD refund, Bank charges etc.	1983308	690887
Plan	2490464	
ICAR	3511567	
Other EAPs	590798	
Revolving fund	31899	436998
Total	8608036	1127885

AROMATIC AND MEDICINAL PLANTS RESEARCH STATION, ODAKKLAI, ASAMANNOR POST, ERNAKULAM DIST.

Name of head of station Dr. Baby P. Skaria

Research programme

a. Major research achievements (Highlights)

Research Projects

Collection and maintenance of germplasm of aromatic and medicinal plants. The station maintains about 450 accessions of lemongrass which is the largest collection in the world. Twelve accessions of palmarosa and a good collection of cinnamon (235 nos.), vetiver (18 nos.) and various medicinal plant species 400 nos.) also maintained.

In a project financed by the KSCSTE, studies were conducted on the nursery techniques of *Ficus* specie: 'Nalpamara' group, manurial and shade requirement of *Oroxylum indicum* as well as pruning practice: *Caesalpinia sappan*.

In a study sponsored by the National Medicinal Plants Board, methods were standardised for the estimation of total antioxidant power, Ferric Reducing Antioxidant Power (FRAP), Trolox Equivalent Antioxidant Capacity (TEAC), DPPH assay, Superoxide scavenging capacity, hydrogen peroxide scavenging capacity and nitric oxide scavenging capacity of medicinal p[plants, crude drugs and herbal medicines.

In another study financed by KSCSTE, protocol was standardized for in vivo anti- inflammatory studies (mouse ear erythema method) in acute inflammation model.

Development projects.

In the National Horticulture Mission (Aromatic plants component) project, a well laid out herbal garden with about 500 species of medicinal plants were maintained. A nursery centre for multiplication of medicinal plants also is functioning. About 230 kg of lemongrass seeds were produced and distributed among cultivators in different parts of the country.

Under the spices component of the above scheme, 25000 rooted pepper cuttings were produced and distributed among farmers.

Extension programmes

a. Highlights of extension activities

Being one of the pioneer institution 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 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.

iv) Radio talks / TV programmes / Audio-video cassettes :

A computer compact diskette on medicinal plants was prepared for distribution among farmers.

Radio talks :

Topic	Date of Broadcasting	Name of Scientist
Nutmeg and cloves in arecanut and coconut- planting and early care	13/06/07	Dr. P.P. Joy
Plant protection in Ginger	09/07/07	Dr. Baby. P. Skaria
Patchouli cultivation	14/07/07	Dr. Ancy Joseph
Chethikoduveli (Plumbago) cultivation	06/10/07	Dr. Ancy Joseph
Quality production of Ginger-dry Ginger-int.	05/12/07	Dr. Baby. P. Skaria
Vegetative propagation in fruit trees	10/12/07	Dr. Ancy Joseph
Production of quality nutmeg	28/01/08	Dr. P.P. Joy

List of publications

Books/Monographs

Skaria, B.P., Joy, P. P., Mathew, S, Mathew, G., Joseph, A. and Joseph, R. 2007. Aromatic Plants. In Horticulture Science Series – I (Ed. K.V. Peter). New India Publishing Agency, New Delhi, 270p.

Papers published / presented in Symposia, Workshop etc

Skaria, B.P., Mathew, G. and Joy, P. P. 2007. Organic cultivation of aromatic plants: Challenges and strategies. Souvenir, National Seminar on organic spices and aromatic crops (Eds. Tamil Selvan et al). Directorate of Arecanut and Spices Development, Calicut, 1-2 Feb, 2007, pp.25-35

Skaria, B.P., Joy, P. P. and Mathew, S. 2007. Participatory inventions for sustainable natural resource utilization and livelihood support through agriculture related activities in Eramalloor Thodu watershed. In natural resource management and livelihood support systems. Compendium of selected research papers and articles, Western Ghat Cell, Planning and Economic Affairs Dept, Govt. of Kerala, Thiruvananthapuram, pp.136-142

Joy P.P., Skaria, B. P., Mathew, S., Mathew, G. and Joseph, A. 2007. Standardisation of oleoresin extraction in lemongrass (*Cymbopogon flexuosus*). National Seminar, Navasari

Skaria, B. P., Joy P.P. and Mathew, S. 2007. Lemongrass (*Cymbopogon citratus*) datasheet, Crop Protection Compendium, CABI, Nosworthy Way, Wallingford, Oxfordshire, OX10 8DE, UK

Ancy Joseph and Joy P.P. 2007. Vipanana sadyathayulla oudhada sasyangal . Kerala Karshakan 53 (5) : 48-54.

Sheeja E.C., Biji Joseph, Savitha V. Rajan, Neethu S. Nair, Ancy Joseph. 2008. Ramachasugandham eni puthen Meghalakalil. *Karshakan*, 16(5):6-8

Sheeja E.C., Biji Joseph, Savitha V. Rajan, Neethu S. Nair, Ancy Joseph. 2008. Ramachathinte krishiyum samskaranavum. *Karshakan*, 16(5):9-10,73

Ancy Joseph, K.N. Satheesan and T.G. Jomy. 2007. Seed germination studies in some *Garcinia* spp. *J. Spices and Aromatic Crops*.16(2):118-121

Joseph, A. 2008. Role of Biotechnology in utilization and improvement of aromatic plants. In: Souvenir, 08. National Workshop on Grower Industry linkage for Promotion of Medicinal and Aromatic Plants cultivation.12-13 February 2008. Cochin. pp 57-61

Joy, P. P, Mathew, S, Skaria, B.P. and Mathew, G..2007. *Development of lemongrass oleoresin for flavouring*. Final Report of ICAR Cess Fund Scheme. Aromatic and Medicinal Plants Research Station, Odakkali, Asamannoor PO, Kerala.

Joy P.P., Mathew, G., Joseph, A., Mathew, S., and Skaria, B. P. 2008. *Souvenir of National Workshop on Grower-Industry Linkage for Promotion of Medicinal and Aromatic Plants Cultivation*, 12 -13 February, 2008, Cochin, Aromatic and Medicinal Plants Research Station, Odakkali, Asamannoor P.O., Ernakulam District, Kerala, India, 156 p.

Joseph, A., Skaria, B.P. and Joy, P. P., 2007. Cardamom in midlands. *Kerala Karshakan*, July 2007:52-53.

Skaria, B. P., Joy, P.P., Mathew, S., Mathew, G. and Joseph, A. 2008. 'NONI' – An un-exploited medicinal plant for the tropics. *J. Arecanut, Spices and Medicinal Plants*, 8(2):55-64.

Finance		
Head	Expenditure	Receipts
Non Plan	4948379	903695
Plan	366701	
ICAR	0	
OEAPs	18273429	
Revolving fund		227491
Total	23588509	1131196

PINEAPPLE RESEARCH STATION VAZHAKULAM

Name of Head of the Station : Dr. Kuriakose, K.P.

Research programmes

a) Major research achievements (highlights)

In an elaborate breeding programme, about 20000 pineapple hybrid seedlings, 500 pineapple seedling mutants, 200 pineapple sucker mutants and 2000 in vitro mutants are under evaluation. One hybrid was found to be very promising and has been approved for farm trial.

A clonal variant of pineapple, found promising can be recommended as an alternative to Kew variety due to its shorter duration, has been approved for farm trial.

To develop a passionfruit variety suitable for low altitude areas, about 135 types collected from different states are under evaluation. Among them one yellow type was found to be promising and approved for farm trial.

By continuous pest and disease surveillance in farmers fields, presence of Pineapple Mealybug Wilt Associated Virus was detected in Vazhakulam area.

Farm Advisory Services

In person	Over telephone	Through letters
39	40	-

Field visits

No. of visits	Problems identified	Recommendation
4	Diseases, pests and management problems in pineapple	Remedial measures as per package of practices recommended.

Radio talks/ TV programmes

Topic	Date	Name of scientist
Pineapple cultivation	15.4.2007, TV Interview	Kuriakose K.P.
Commercial cultivation of pineapple	25.4.2007, AIR, Thrissur	Kuriakose K.P.
Pineapple cultivation	19.7.2007, TV interview	Kuriakose K.P.
Passionfruit cultivation	31.8.2007, TV interview	Kuriakose K.P.
Pineapple cultivation	8.10.2007, AIR, Cochin	Kuriakose K.P.
Pineapple cultivation	31.10.2007, AIR Thrissur	Kuriakose K.P.
Pineapple cultivation	25.12.2007, AIR, Thiruvananthapuram	Kuriakose K.P.

Finance

Head	Expenditure(Rs)	Receipts(Rs)
Non plan	-	-
Plan	1504889	136572
ICAR	-	-
OEAPs	1542963	19125
Revolving fund	-	-

BANANA RESEARCH STATION, KANNARA

Name of Head of the station : Dr. K. C. Aipe

Faculty Improvement Programme

a) Deputation of scientists for seminars / Workshop/Symposia

Scientists were deputed periodically to attend symposia.

Details

b) Deputation of scientists for training programmes/Seminars/Summer school/winter school/short course

Dr. Rema Menon and Dr. Anita Cherian, K Professors attended the short course on Advanced Molecular diagnostic technique for viruses & other sucker borne pathogens at NRCB Trichy from 19-09-07 to 28-09-07.

c) Details of seminars/workshops/symposia conducted at the station

A farmer's seminar on New Technologies in banana cultivation was organized in connection with "Karshakadinam" (chingam-1) at this station.

d) Awards/ Scholarship to staff

Dr. Rema Menon, professor was awarded the "KADALI PURASKAR" for the best research worker in banana during 2007 by the Association for the improvement in the productivity and utilization of plantain & banana. The award was presented in the National conference on Banana held at Trichy during 25-28 October, 2007

Dr. Maicykatty, P. Mathew, Professor received the best paper award at the National conference on banana held at Trichy during 25-28 October 2007 for her research paper "Root mealy bug - A new pest problem in banana in Kerala" (Smitha, M.S and Mathew, M.P. 2007).

Research Programme

Varietal evaluation and Improvement

Banana germplasm of 34 accessions was maintained. This consists of natural germplasm, wild Musa and improved hybrid introductions. Two improved hybrid introductions, TMB 5295-1 and SH-3640 were advanced to farm trials in six locations, in Thrissur, Ernakulam and Palakkad. Hybridization work is being continued for developing superior synthetic diploids and Nendran hybrids. Variations in the germplasm were screened against nematodes, leaf spot disease, Fusarium wilt and Bunchy Top categorized based on host reaction.

Planting density, Propagation and Root stocks

In Both Nendran and Roosta planting three suckers per pit at a spacing of 2 x 3 m was the best treatment in term of per hectre yield.

Nutrition

Accommodating three plants per pit at a spacing of 2 m x 3 m with 100 per cent Recommended dose of fertilizers resulted in highest per hectare yield. Trials conducted to identify the ideal stages of fertilizer application revealed that giving 100 percent Recommended dose of fertilizers in three splits with 80 % nitrogen and 20 % potassium before bud initiation and the rest after bud initiation was the most economic

Water Management , weed control and Orchard Management

Irrigating at 80 ER at all growth stages was ideal for Nendran for maintaining proper growth and yield. Turmeric proved to be the most profitable intercrop with rainfed Nendran.

Insect pest and nematodes

Two species of root mealy bug of banana viz, *Geococus citrinus* and *Geococus Coffeae* have been observed as emerging pests on different banana cultivars causing root damage and subsequent weakening of the plant. Nendran plants grown in paddy field suffer the maximum from root mealy bug infestation.

Value addition

Screening the germplasm for banana fibre recovery revealed that highest fibre recovery was for Nendran, followed by Chenkadali and palayankodan(Mysore). The production techniques were standardized for many fibre products. The technique for production of cloth from banana fibre was also standardized.

Jack Fruit

Survey was conducted to study the variability and to establish high yielding and promising superior clonal stocks. Five promising types were identified under varietal trial and promising clones from different regions viz, *Muttam varikka*, Gumless Jack and Palur-1 are being evaluated. The best method of propagation in jack was inarching. Pests noted in jack were defoliators like *Margaronia bivitalis*, spittlebug, cosmocor relata, mealybugs, white flies and stem borer, *Batocera rufomaculata*. No pest attack seemed to affect the trees significantly. Diseases recorded were leaf spot caused by *Colletotricham gloeosporiodes*, Rhizopus fruit-rot (Rhizopus sp.), fruit rot caused by Botryodiplodia sp. And pink disease

Pineapple

The pineapple germplasm is being maintained. Back crossing of hybrids with commercial varieties viz, Kew and Mauritius is in progress. Seedlings of the progenies are being evaluated. Sodium silicate (200 g) and chlorpyrefos (0.05%) were found to reduce the infestation. Grubs of pseudo stem borer, rhizome weevil and slug caterpillars were found susceptible to the entomo pathogenic nematode *Heterorhabditis indica*.

Banana germplasm maintained at the station were screened against the leaf caterpillar *Spodoptera litura*, the mired bug, *prodromus clypeatus* and the slug caterpillar *Miresa decedens* and identified sources of resistance against these pests.

About 200 native isolates of *Bacillus thuringiensis* were tested for lepidoptera toxicity using larvae of *Diaphania indica* as the test insect.

Disease Management

Surveys revealed that the predominant disease prevalent during the period are Sigatoka loeaf spot, Panama wilt, rhizome rot and viral diseases like bunchy top, bract mosaic, banana streak and infectious chlorosis. A new type of symptom caused by *Sclerotium* sp. Was recorded on banana variety 'Kadali'.

Sigatoka leaf spot disease could be effectively managed by spraying Propiconazole (Tilt 25 EC) 1 ml/l (0.1%) + spraying of *Pseudomonas fluorescens* @ 5 g/litre three times. Intensive investigations on viral diseases are being carried out by standardizing the molecular and serological indexing of tissue culture plants and suckers against the viruses infecting banana.

Ongoing research programmes**Completed projects during 2007-08**

Name of Project	Funding agency	Name of PI	Name of Co PI	Outlay (Lakhs)
Characterization and Classification of Banana varieties of Kerala	KSCSTE	Dr. Rema Menon	---	4.66

Ongoing projects

AICRP (TF)-32 Experiments	ICAR	Dr. Rema Menon	Dr. Maicykutty.P Mathew Dr. A. Suma Dr. Anita Cherian. K	25.26 per year
Plan projects	GOK	Station -BRS & PRC		21.6
Biology and management of root mealy bug of banana cultivars	KSCSTE	Dr. Maicykutty.P.Mathew	---	3.88
Establishment of tissue culture facility	DAC	Dr. Rema Menon	Dr. Anita cherian.K	31.45
Rehabilitation of tissue culture facility	SHM	Dr. Rema Menon	Dr. Anita cherian.K	8.00
Banana fibre extraction and utilization for income generation and women empowerment	SHM	Dr. Suma A	Dr Rema Menon	10.35
RKVY	GOI	Dr. Rema Menon	Dr. K.C. Aipe	20.00
Net work project for the production and distribution of planting material	GOK	Smt. Meagie Joseph	Dr. K.C. Aipe	7.00
DBT project	GOI	Dr. Maicykutty. P. Mathew	---	2.00

Extension programmes

Dr. Rema Menon, Professor - to took classes on banana varieties and cultivation to farmers from Calicut, Farmers sponsored by RATTTC, Malampuzha on 3-11-07 & 15-11-07 & Farmers sponsored by SHM Kerala

Dr. Maicykutty. P. Mathew - Classes to farmers from KVK Malapuram on 29-09-07, Farmers sponsored by RATTTC Malampuzha on 3-11-07, 5-11-07, 5-1-08 & 9-01-08. Farmers sponsored

by SHM on 7-12-07&18-12-07 and Farmers of Kaiparambu on 15-12-07, A class on IPM in pineapple cultivation sponsored by SHM on 18-12-07 and pest management on hybrid seed production at C.R.S Madakkathara on 19-12-07.

- Dr. Anita Cherian. K - Class on diseases of banana to farmers sponsored by RATTC Malampuzha on 3-11-07, 6-11-07, Farmers from Malapuram on 6-12-07,12-2-08, 14-2-08,16-2-08, Farmers of Pananchery on 7-12-07 Farmers from Palakkad on 5-1-08 and from Mallappilly on 16-01-08. Resource person in the agro clinic organized in connection with the South Indian agriculture fair at Mannuthy on 28-12-07 & 29-12-07, Trichur flower show on 23-1-08 and Farmers seminar at Ernakulam on 30-1-08.
- Dr. Suma. A, Professor - Class on post harvest management of banana to KVK farms from Malappuram on 29-9-07 and farmers sponsored by RATTC Malampuzha on 9-1-08. Class on banana cultivation to farmers sponsored by RATTC Malampuzha on 3-11-07, 15-11-07, 9-1-08 farmers from chalakudy on 15-11-07 and to farmers of Kaiparambu on 15-12-07. Handled classes on banana fibre extraction to farmers of Wayanad and acted as resource person in the agroclinic for the Trichur flower show on 23-1-08. Organized an exhibition on banana fibre products at South Indian Agri fair Mannuthy & Agri exhibition at Ernakulam .

Training programme organized at the station

Dr. Suma. A has arranged two training programmes on banana fibre extraction and preparation of products during 23-7 -07 to 23-9-07 and 4-9-07 to 4-10-07 for thirteen and seven women trainees respectively at the station.

Farm Advisory services

The scientists of the station visited farmers field, identified the pests and diseases, nutritional and physiological disorders and made appropriate recommendations. The scientists also rendered advises to a large number of farmers over phone.

Radio talks

Dr. Rema Menon has delivered two talks on banana cultivation on 16-10-07 & 7-12-07 through All India Radio Trichur. Dr. Anita Cherian delivered a talk on Bio control agents for disease management in fruit crops on 17-12-07.

List of publications

Rema Menon, Suma. A, Anita Cherian and Shankunthala Nair, 2007 Developing resistant varieties through conventional breeding techniques in Abstracts: National conference on Banana at Trichy during October 25-28,2007 P.P. 66

Maicykutty. P. Mathew, Rema Menon, Anita Cherian, Suma.A and Aipe. K.C,2007 Screening of banana germplasm against leaf caterpillar Spodoptera litura (Fab.) Noctuidae: Lepidoptera) in Abstracts. National conference on Banana, Trichy during October 25-28, 2007 P.P. 80.

- Rema Menon, Anita Cherian.K, Suma. A, Shankuthala Nair, Maicykutty.P.Mathew and K.C. Aipe.2007 Growth and yield of Nendran (Musa AAB) as influenced by planting time in Abstracts. National conference on Banana, Trichy during October 25-28,2007, P.P.94
- A. Suma, Rema Menon, Anita Cherian.K, and Shankunthala Nair, 2007. Bio regulators for yield improvement in banana var. Nendran in Abstracts National conference on Banana, Trichy during October 25-28,07 P.P. 120
- A. Suma, Rema Menon, Aipe.K.C, Anita Cherian and Maicykutty.P.Mathew.2007. Income and Employment generation through banana fibre utilization in Abstracts National Conference on Banana, Trichy during October 25-28,2007. P.P. 164
- Anita cherian.K, Rema Menon, Suma.A, Maicykutty.P.Mathew and Aipe. K.C.2007. Management of sigatoka leaf spot disease of French plantain cv. Nendran (Musa AAB) of Kerala in Abstracts National conference on Banana, Trichy during October 25-28,2007. P.P. 216
- Anita Cherian. K., Rema Menon, Suma. A, Maicykutty.P. Mathew and Aipe. K.C, 2007 Management of sigatoka leaf spot disease of French plantain cv. Nendran (Musa AAB) of Kerala in Abstracts National conference on Banana, Trichy during October 25-28-2007. P.P. 215
- Rema Menon, P.Jacob John, I.A. Chacko and A. Asha. 2007. A study on post harvest handling and storage of Nendran (Musa AAB) in Abstracts. National conference on Banana, Trichy during October 25-28,2007. P. P. 155
- Smitha.M.S and Mathew.M.P 2007. root Mealy bug- Anew pest problem in banana in Kerala in Abstracts National conference on Banana, Trichy during October 25-28,2007. P. P. 18
- Sheela. K.B, Reni. M, Rema Menon and Suma. A, 2007. Influence of packaging on shelf life and quality of banana variety Nendran in abstracts National conference on Banana, Trichy during October 25-28,2007.P.P. 157

Technical Bulletin:

Popular Articles : A. Suma, Rema Menon, K.C. Iypu, Maicykutty, P. Mathew, Anitha Cherian, 2007. Karikkaya Inangulam avayude krishireethikalum, Krishiankanam 2007. October - November pp 7,8.

Dr. K.P.S. Tomer, Senior Deputy Director, NPC, New Delhi visited the banana fibre extraction unit and Tissue culture Laboratory along with representatives from State Horticulture Mission, Thiruvananthapuram and Agricultural Department officers visited the station on 23-2-2008.

Details of sale of seeds / planting materials/biocontrol agencies etc.

Item	Quantity	Revenue
Banana suckers	14718	103026
Pepper rooted cuttings	1050	2100
Nut mug grafts	40	1600
Coconut seedlings	340	10200
		----- 116926 =====

Finance

Head	Expenditure	Receipts
Non Plan	50,46,928	
Plan	1,80,268	
ICAR	41,53,881	
Other EAPs	26,14,367	
	119,95,444	13,70,000
RF	26,179	9,266

CADBURY-KAU CO-OPERATIVE COCOA RESEARCH PROJECT COLLEGE OF HORTICULTURE, VELLANIKKARA

Name of Head of the Station : Dr. V.K.Mallika

- (a) Major research achievements (highlights)
- ❖ 37 exotic cocoa were introduced from Reading, UK, of which 20 clones survived after budding and these are being maintained under quarantine conditions.
 - ❖ 334 Hybrid seedlings obtained from 33 cross combinations were field planted during the year.
 - ❖ Assisted self-pollination was taken up in 93 phenotypes and 58 inbred pods could be developed.
 - ❖ Assisted hand pollination was taken up as part of breeding for black pod resistance in cocoa using 23 parents and 46 crosses were made.
 - ❖ Under the programme for production varieties with bold bean, 21 crosses were made using 11 parents.
 - ❖ Based on yield and pod and bean traits, 24 high yielding plants (two from Progency Trial II, three from progeny trial III, 13 from progeny trial IV, 4 from series IV and 2 from VSD Set D were selected, the budded plants of these were raised for laying out Comparative yield trails.
 - ❖ Studies on refinement of top working procedure in cocoa being continued
 - ❖ Organic farming in cocoa continued.
 - ❖ A new product "KAU Chocolate 4U" developed from farm fresh cocoa beans as part of the PLAN project was released in January 2008. In terms of quality and taste, this chocolate is on par with international brands, that too without any preservatives.

Extension programmes

a) Highlights of extension activities

- a) Participation in exhibitions: The technology for farm level secondary processing of cocoa was exhibited in agricultural and agro-based industrial exhibitions held in Thrissur and neighbouring districts of Ernakulam. During the year, 1.6.5 lakh people visited the stalls established in three locations and the technology for farm level processing was transferred.
- b) Handling classes:
 - 1) Dr.V.K. Mallika, Professor & Head took class on "cocoa cultivation and its management" to the cocoa farmers of Palai on 21 July 2007 in the one day seminar organised by the Kerala State Dept. of Agriculture
 - 2) Dr.S.Prasannakumari Amma, Professor (Hort.) handled class on Secondary processing and value addition of cocoa in the Palai seminar.
 - 3) Dr.V.K.Mallika, handled took class on "Secondary processing of cocoa" in the one day cocoa seminar organised by the Kerala

Finance

Total	Expenditure	Receipts
Non-plan	16,33,030	61,310 (Rabbit)
Plan	15,14,296	2,73,713 (Vechur Project)
ICAR	39,26,802	8,260 (FPT scheme)
Other EAPs	Nil	522 (AICRP on goat) Nil
Revolving Fund	Nil	Misc. 2,599
Total	70,74,128	3,45,882

A survey was conducted in Thrissur and Ernakulam districts to collect water samples from ponds without *Cyrtobagous* on *Salvinia*. But the weevils were present in all the areas. Water samples were drawn from those areas and analysed.

Survey for the natural enemies of *Cyprus rotundus*

Conducted the survey for the natural enemies of *Cyprus rotundus*, in Thrissur. But no natural enemies were collected during the period. A mealy bug was collected from the roots of the weed and it was identified as *Geococcus citrinus*. But it has been reported as a pest of banana in Kerala.

Biocontrol of *Chromolaena odorata* using *Cecidochara connexa*

101 numbers of adults were released in the field during November, 2007. Field establishment was poor and only two galls were obtained from the released site. The spread of fly to other areas was also absent.

E. PESTS IN POLYHOUSES

1. Biological control of thrips, aphids and mites in polyhouses

Survey for pest problems in polyhouses.

Survey conducted in Vellanikkara area shows that the major pests present in Polyhouses on Gerbera and Croton plants are aphids, mealy bugs, scales, mites and thrips. Gerbera plants were found severely affected by thrips (*Frankliniella* sp.). So the fungal pathogens were tried for the control of thrips on Gerbera.

Evaluation of fungal pathogens for the control of thrips on Gerbera plants.

The lowest pest population was recorded in vertice! followed by *Beauveria bassiana*, *M. thompsonii* chemical control, *Verticillium lecanii*, and *Metarhizium anisopliae* treated plots which were on par. In untreated control the thrips count was persistently high throughout the experimental period.

Finance

Head	Expenditure (Rs.)	Internal Receipts (Miscellaneous)
ICAR:KAU (7525)	19,43,009	1,083

CENTRE FOR GENDER STUDIES AND FARM ENTREPRENURESHIP DEVELOPMENT (CGSAFED), VELLANIKKARA

Name of Head of the Station :- Dr. P.Rajendran

Research programmes

a. Major research achievements

1. Eight demonstration plots have been laid out in different parts of the Thrissur District. Each demonstration plot has 50 plants (400 plants). Each unit has been supported by providing with critical inputs.
2. Two demonstration plots have been laid out at Kaiparambu and Trikkur on special banana bunch-Kazchakula.

Finance

Head	Expenditure (Rs.)	Receipts (Lakhs.)
Non - plan	Nil	Nil
Plan	3,15,380	Nil
ICAR	Nil	Nil
Other EAPs	Nil	Nil
i. Promoting Bio-Resource Based Pilgrim Needs as a Livelihood Option by the Rural Women of Kerala	5,70,3963	
Revolving Fund	Nil	Nil

NORTHERN ZONE

REGIONAL AGRICULTURAL RESEARCH STATION, PILICODE

Name of Head of Station

: Dr. P.C. Balakrishnan

Research programmes

a. Major research achievements (highlights)

Utilization of existing germplasm and description of varieties [CAP-01-00-01/76 PIL 9 KAU]

Objectives of the programme are 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. Cultivars included in this collection, viz., "Kudat", "Seychelles" (Kerasagara), "Philippines Lono", "Siam", British Solomon Islands and Kenya and two indigenous types, viz, Andaman Ordinary and WCT were in terms of annual nut yield. The cumulative nut yield for 14 years was highest in Kerasagara, followed by Kudat, Philippines Lono, St.Vincent and Andaman Ordinary. The functional leaves, female flowers and setting percentage significantly varied between varieties. The genotype, Kudat and Phillipines Lono were superior in copra yield/ palm/annum followed by the genotypes, British Solomon Islands and Kerasagara during 2006. The nut setting percentage and the functional leaves in these palms were also high during this period. The analysis of data for the last six years indicated the superiority of Kudat, Kerasagaras and Phillipines Lono and Andaman Ordinary on nut and copra yield/palm/year. The copra yield/palm was also high in this genotype during the last 6 years (2001-2006) and found suitable to the region with lateritic soil.

Screening coconut cultivars for tendernut purpose [CAP-02-00-01/2000/PIL(9)KAU]

The Objectives of the experiment are to identify superior genotypes suitable for tendernut purpose, to decide optimum physiological maturity with maximum quality and quantity and consumer acceptance. The study also aims at seasonal variation in quality parameters of coconut water and the variability within a batch and between palms of the same cultivar. The volume of nut water was found maximum at 190 days after inflorescence emergence (DAIE). Total sugars, reducing sugars, TSS, ascorbic acid and protein were found maximum at 210 DAIE. The optimum physiological maturity having maximum quality and consumer acceptance was found during 210 DAIE. The affect of seasonal variation on quantity and quality parameters of tender nut water was studied in three coconut cultivars namely West Coast Tall, Ganga Bondam and Malayan Yellow Dwarf. Maximum amount of nut water was found in WCT followed by GB and MYD. Total sugars, reducing sugars, TSS, ascorbic acid and protein were found maximum in Malayan Yellow Dwarf followed by Ganga Bondam and West coast Tall. The variation in quality and quantity parameters are mostly variety dependent. The maximum quality parameters of nut water was found during summer season.

Development of short statured high yielding coconut variety with good nut quality [CAP-02-00-01-2006/PIL(9)KAU]

The objective of the trial 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. Field survey in Kannur and Kasaragod districts to identify short statured coconut with desirable attributes in the age group of more than 50 year so as to get their full expression of characters more accurately. Identified types will be used as a parent to cross with popular dwarf varieties so as to produce hybrids. The hybrids will be evaluated for desirable characters. Twenty two palms of desirable characters were identified from the farmers' field and crosses with selected dwarf palms of Chowghat Green Dwarf,

Malayan Yellow Dwarf, Gangabondam and their reciprocals were made. One hundred and ninety one seed nuts developed in the crosses were harvested and sown in the nursery for further studies. 44 interse seed nuts produced from the identified palms were collected for further studies.

Trial of Promising Seed Materials [CAP 02-00-02/76-PIL (A) KAU]

Objectives of the experiments 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 Laccadive Micro followed by the hybrid Lakshaganga, Kerasankara, Keraganga and PP Tall. However the Copra yield was low (10.7 Kg /tree) in LM because of smaller nut size. The Copra yield/palm of the hybrids, LM and PP tall were on par. The cumulative nut yield obtained in COD x WCT was highest followed by WCT x COD, WCT x GB, LO and PP tall. In general the hybrids were superior to WCT and other varieties in nut yield. The mean annual yield for the last six years were on par in all four hybrids and the types LM, PP Tall and LO. The Copra yield/palm/year was highest in the hybrids indicating the superiority of hybrids over other varieties or genotypes.

Evaluation of coconut Hybrids (Exploitation of Hybrid Vigour in Coconut) [CAP-02- 00-07/73-PIL-KAU]

The Objectives are to study the extent of heterosis in different hybrids involving 11 parental combinations, to study the influences 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 LO x AYK produced maximum number of nuts followed by AYK X WCT, CC X AYK, LM X GB, LM X MYD and AYK X MYD which were on par in nut yield . The cumulative nut yield was high in LM x AYK followed by AYK x WCT. Except in combination with PO, AO and LM, the AYK performed well with other tall and dwarf combinations viz, LO x AYK, CC x AYK, AYK x MYD, AYK x WCT in nut yield, cumulative nut yield, female flower production and functional leaves during the early stages of growth. Since the experiment is in the early stages of reproductive phase no conclusive result can be obtained now. Hence the experiment has to be continued.

Multi-locational trial of coconut hybrids [CAP-02-00-07-PIL (9) / KAU]

The objective is to evaluate the performance of three coconut hybrids released from RARS Pilicode at different agro-climatic regions. Three hybrids and WCT seedlings were planted in 1988 at five different locations such as IF-Vellanikkara, RARS-Kumarakom, NARP Special Station-Sadanandapuram, RRS-Kayamkulam and RARS Nileshwar. In all these locations, hybrids were generally performing better than WCT in nut yield, flower production and number of leaves produced. The hybrid WCT x CGD ranked top and was on par with Kerasree and Kerasankara. Hybrids showed varying degrees of susceptibility for root wilt disease.

Hybrid seedling production in coconut [CAP/ 02-00-11-88/ PIL(9)KAU]

The objectives of the project are to develop sufficient parental stock in various research stations of KAU so as to produce hybrid coconut seedlings in large scale. Under this project, 185 nos. of WCT, 360 nos. of LO, 180 nos. of AO, 43 nos. of GB and 15 nos. of MYD seedlings were planted at Pilicode, 110 nos. of LO and 5 nos. of GB seedlings at IF, Vellanikkara and 25 nos. of LO and 5 nos. of GB at Sadanandapuram. The palms are now seventeen years old and seed production started from 2006-07 onwards for the production of Lakshaganga, Keraganga, Anandaganga and Kerasree. Seed nuts produced were collected and stored for raising nursery.

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 5 ha. Coconut plantation in the T and T1 blocks of RARS Pilicode will be 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.

Studies On Yellowing Of Arecanut In Kannur District

The objective of the project is to Identify 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, exploring the feasibility of crop improvement through extensive survey of genetic stock available in the region for resistance/ tolerance. A detailed survey was conducted across the arecanut tracts of Kannur district covering high land, midland and low lands of Alakkode, Sreekandapuram and Naduvil Panchayats. The fields of 50 farmers each constituting a total of 150 was completed and the survey completed. The results have been tabulated and are being analysed. The severity of the yellowing was noticed in both young and aged palms. Severity was seen more in Sreekandapuram Panchayat. Along with yellowing, bud rot, crown choking was also noticed in all the three Panchayats especially in Alakkode. The severity of yellowing was low in well managed plots. The yellowing symptoms were noticed in both local and high yielding variety palms. The spacing between palms was not as per the Package of Practices.

Conservation and Evaluation of Malabari Breed of Goats (Gr-07-01-92/Kau)

The objective of the project is to conserve and evaluate Malabari goats, Selecting breeding of Malabari goats for meat and milk. A herd of Malabari goats with around 80 Does is being maintained under semi-intensive rearing system and the experiment is in progress. Altogether 106 Does belonging to farmers were crossed with Malabari bucks maintained from the station.

External Aided Projects

Germplasm Collection, Conservation, Evaluation, Characterization and Cataloguing (AICRP ON CASHEW)

The objective of the project is 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. Survey for selecting bold nut, cluster bearing, high yielding and dwarf types from the plantations and farmers field was conducted from 1994 onwards in the northern districts of Kerala. Of the 81 diverse types identified, 43 types were planted in the germplasm block for evaluation at this centre during 1998, 2000 and 2002. The experimental plants have not reached the age of economic yield. Of the five accessions planted in 1998, the accession PLD-4 was found to be superior in yield and cumulative nut yield than PLD-3 and all other varieties were on par for the above characters. The canopy spread of the trees significantly varied between the accessions. The accessions, PLD -12, PLD-17, and PLD-20 were on par and superior to the other types planted during the year 2000. 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. The PLD-57(TPB1), a dwarf was used for hybridization with the varieties, MDK1 and ANK1.

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. Among the characteristics recorded the plant height and number of panicles/sqm found significantly varying among the hybrids as well as parents and PLD-57 graft. The hybrid MDK-1 x PLD-57 was found to be near to the dwarf male parent in growth characteristics recorded. The growth characteristics of hybrids, PLD-57 grafts and MDK-1 are on par indicating the transfer and expression of semi dwarf stature in the hybrids.

Fertilizer Application Trials In High Density Cashew plantations (AICRP ON CASHEW)

The objective of the project is to study the level of fertilizers required in different densities cashew plantations. The full dose of fertilizer were given from the 5th year of planting (ie, 1/5 dose in 1st year, 2/5 dose in 2nd year, 3/5 dose in 3rd year, 4/5 dose in the 4th year and full dose in 5th year.

The experiment was laid out in three replications using the grafts of variety MDK-1 during September 2000. The fertilizer was applied as per the treatment schedule. Among the biometric characters recorded, nut yield only showed the significant variation among the densities of planting and levels of fertilizer tried. The interaction effects of fertilizer and planting densities did not exhibit significant variation. The nut yield per ha was significantly superior in the higher density of planting (S3, 5 x 4 m, 600 plants / ha.). Again the yield per ha was significantly high with lower dose of fertilizer (M1, 75 N, 25 P, 25 K₂O).

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.

Other Activities

The Station conducted seminars, workshops, training programmes etc. for the benefit of farmers, department officials etc. on various topics related to agriculture. Scientists of this Station participate in Agricultural Interface programme, academic activities. The Animal Science Division provides hospital and artificial insemination facilities to the farmers. Coconut hybrids, cashew grafts, arecanut seedlings, pepper cuttings, ornamental plants, banana suckers, mushroom spawns, azolla, vegetable seeds, goat kids and piglets were produced and distributed to the public.

Farm Advisory services

In person	Over telephone	Through letters
550	900	50

Radio talks/ TV programmes/Audio – video cassettes

Topic	Date (AIR-Kannur)	Name of scientist
Scientific and organic way of coconut cultivation	25.4.2007	Dr.P.C.Balakrishnan
Problems and prospects of coconut cultivation	2.6.2007	Dr.P.C.Balakrishnan
Discussion on organic farming	17.9.2007	Dr.P.C.Balakrishnan
Discussion on bud rot of coconut	7.1.2008	Dr.P.C.Balakrishnan*
Coconut production and processing	27.7.2007	Dr.M.P.Giridharan
Banana production	30.8.2007	Dr.M.P.Giridharan
Cashewnut production and marketing	31.3.2008	Dr.B.Jayaprakash Naik

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

Book: B.Jayaprakash Naik, A.K.Babylatha, P.C.Balakrishnan and M.P.Giridharan. 2008. Kashumavu krishireethikalum kashumanga samskaranavum. Malayalam.

Important visitors

Sri.K.R.Viswambaran, IAS, Honb'le Vice Chancellor, KAU visited the staion on 4.2.2008

Dr.D.Alexander, DR,KAU, Dr.P.K.Ashokan, ADR, Head Quarters and K.P.Muralidharan, Asst.Gen.Manager, Syndicate Bank visited the station on 17.11.2007

Dr.M.K.Sheela, Director of Extn.visited the station on 4.12.2007

Hon'ble M.L.As Sri.K.Kunhiraman, Sri.Pallipram Balan, Dr.KPrathapan-Director, SHM and Dr.Apparao-DCCD Kochi visited the Station on 15.3.2008

Sri.M.Kunhiraman Master, President, Pilicode Grama Panchayath, Sri. V.Narayanan, Ward Member, Pilicode Grama Panchayath visited the Station on 15.3.2008

Hon'ble Exe.Committee Members Adv.Hareendranath, Adv.Cheriyam Kavanal and Sri. Suresh Mailattupara visited the station during the year

Finance

Head	Expenditure	Receipts
Non-Plan	12191694	1521289
Plan	889733	
ICAR	712929	
Other EAPs	349730	
Revolving fund I	1214057	1239698
Revolving fund II	302505	320392

PEPPER RESEARCH STATION, PANNIYUR

Name of Head of Station : Dr.K.P.Mammooty

Research Programmes

a. Major research achievements (highlights)

Crop: Black Pepper

- In the germplasm collection at present 227 cultivated types of black pepper and 72 wild types are being maintained in the station. During the year 2007, the genotype Karimunda II recorded maximum green berry yield of 5.6 kg /vine followed by Valiyaramundi (3.45 kg/vine).
- Among the intervarietal hybrids planted during 2000, P6 x P 5 is promising. During 2007, is hybrid recorded the maximum green berry yield of 3.540 kg/vine and was promoted for the new CVT under AICRP Spices at different states during the National AICRP workshop held during 2006.
- In CVT – 2000 series, during the year 2007, the maximum green berry yield /vine was recorded by Cul.5489 (1.847 kg/vine) of PRS followed by Karimunda OP (1.747 kg/vine) of IISR.
- For the first time in the history of black pepper research an inter specific hybrid partly fertile was developed through hybridization between *Piper nigrum* and *Piper colubrinum*. The promising hybrid designated as Culture P5PC -1 exhibited distinct anatomical and morphological characters. This hybrid has more number of spikes with few berries / reduced setting percentage.
- The RAPD primers OPE 07 and OPG 08 were identified as hybrid specific molecular markers.
- Two inter-specific hybrids, viz., Culture UKPC-2 and Culture PAPM -1 were evolved and these were found to be resistant to *Phytophthora* foot rot disease based on natural and artificial screening .
- North Eastern Fragrant pepper, a wild genotype of black pepper was identified as an alternative source for *Phytophthora* foot rot resistance in black pepper.
- Pepper grafts on *Piper colubrinum* survived better than the rooted cuttings in the arecanut garden.

Crop : RICE

- First high yielding non-lodging awnless rice cultures suitable for salinity-prone Kaipad paddy tracts of Northern Kerala were evolved. Considering the strong demand for seeds of these cultures by Kaipad farmers, the XXVIII Zonal work shop has recommended to grow seven superior cultures viz., JK 70, JO 583, MK 22 , JO 532-1, JO 345, JK 15 and JK 59 in large areas in Kaipad considering them as pre release cultures.
- High yielding wet land rice cultures suited for organic cultivation were developed- MK 157, JK 14.
- Two cultures viz., JK 71 and MK 115 were evolved as flood tolerant cultures.

Summary of Results

CROP IMPROVEMENT

Germplasm collection and screening of pepper genotypes

At present 227 cultivated types of black pepper and 72 wild types are being maintained in the station. During the year 2007, The genotype Karimunda II recorded the maximum green berry yield of 5.600 kg/vine followed by Valiyaramundi (3.450 kg/vine) and TMB IV (1.800 kg/vine).The number

of spikes were maximum for Karimunda II(2352) followed by Valiyaramundi (1576). The spike length was maximum for Valli (11 cm). The No. of developed berries/spike were more for Valiyaramundi (22). The 100 berry weight was more for Moozhiyar and Vally (18 g). The dry recovery % were more for Karimunda III (37) and TMB IV(37).

Intervarietal hybridization and open pollinated progeny evaluation

Intervarietal hybridization is being carried out every year and the hybrid seeds obtained are planted and evaluated. During 2007 also the hybrid P6 x P 5 is found to be promising with green berry yield of 3.540 kg/vine.

Coordinated Varietal trial in black pepper (CVT 2000 Series V)

The trial was started during the year 2001. During the year 2007, the maximum green berry yield /vine was recorded by Cul.5489 (1.847 kg/vine) followed by Karimunda OP (1.747 kg/vine). Cul.5489 was significantly superior to all other cultures /varieties except Karimunda OP, Cul.5308, Panniyur 1, Karimunda and Coll.1041. The number of spikes/vine was maximum for Coll.1041 followed by Karimunda. There was no significant difference between cultures for number of spikes.

The maximum spike length was recorded by Cul 5489 (12 cm) and this was significantly superior to all other cultures/varieties except Panniyur 1 (10.7 cm). The number of berries/spike was more for Cul 5489 and Coll 1041 (35 berries/spike) and were significantly superior to all other genotypes. The 100 berry weight was more for Cul 5489 (14.3g) but there was no significant difference between cultures. The dry recovery % was uniform for most of the cultures / varieties.

Breeding for *Phytophthora* foot rot resistance in black pepper

Development of a promising interspecific hybrid in black pepper for *Phytophthora* foot rot resistance

For the first time in the history of black pepper research, a partly fertile interspecific hybrid having partial resistance to the dreaded disease *Phytophthora* foot rot, was developed through hybridization of *Piper nigrum* with the wild species *Piper colubrinum*. Hybridity of the promising interspecific hybrid was established through morphology, anatomy, cytology, and molecular studies. The hybrid has the chromosome number is $2n=39$, and it is triploid between a tetraploid and diploid species. The promising hybrid designated as Culture P5PC -1 exhibited distinct anatomical and morphological characters and has more number of long spikes but reduced setting percentage. The RAPD primers OPE 07 and OPG08 were identified as hybrid specific molecular markers. Functional evaluation revealed partial introgression of genes - responsible for *Phytophthora* foot rot resistance - into the hybrid. This hybrid is considered as a successful breakthrough for introgression of resistance to the cultivated species *Piper nigrum* from the wild species *Piper colubrinum*.

Two more interspecific hybrids, viz., Culture UKPC-2 and Culture PAPM -1 were found to be resistant to *Phytophthora* foot rot disease based on natural and artificial screening. Culture UKPC-2 is now at seedling. Culture PAPM-1 is a 4 year old hybrid which started spiking. But its morphological characters are similar to the wild species *Piper attenuatum*.

Identification of an alternative source for *Phytophthora* foot rot resistance in black pepper

Piper colubrinum is the only source for *Phytophthora* foot rot resistance so far reported. The present study could identify the wild accession PRS149 as an additional source for *Phytophthora* foot rot resistance in black pepper. PRS149 is a male species having sweet fragrance during flowering and has some morphological similarities with the cultivated species of black pepper, unlike *P. colubrinum* which is not at all morphologically related to the cultivated species. PRS 149 is cross compatible with the cultivated species. Two interspecific hybrids were evolved between *Piper nigrum* and PRS 149.

The genotype Karimundi and *Piper attenuatum* were moderately resistant, Nilgiris, Perumkodi, Poonjarmunda-1 were tolerant in natural screening but not in artificial screening.

Survey of hot spot areas of *Phytophthora* foot rot disease

About 142 plants (survivors from diseased area) of *Piper nigrum* were collected from Kannur and Kasaragod districts. Among this, collection- ICP 191 was found to be resistant to *Phytophthora* foot rot under natural and artificial screening.

Survey of 17 'Kavus' and 6 forests of Kannur and Kasargode districts resulted in the collection of 217 wild accessions of black pepper. Eighteen wild accessions were resistant, one accession tolerant to *Phytophthora* foot rot disease under natural and artificial screening. These plants are sources for the future breeding programmes

Creation of genetic variability in black pepper for foot rot resistance and drought resistance through mutation breeding

Raising of M₁ generation of gamma ray irradiation: M₁ generation of gamma ray irradiated pepper berries and pepper cuttings were planted in pots during December 2006 and trailed on poles to get enough M₂ generation berries.

Mutagenesis with Ethyl methane sulphonate (EMS): Berries of the varieties Panniyur 1, Panniyur 3 and Panniyur 5 were treated with the chemical mutagen EMS during February to March 2007 and sown in poly bags.

Compatibility of grafting *Piper nigrum* on *Piper colubrinum*: Runner and top shoot grafts of the varieties Panniyur 1 and Karimunda grafted on *P. colubrinum* were planted in the field on arecanut along with runner and top shoots of these varieties as control in RBD design with three replications during the Kharif season of 2006. The percentage of survival and incidence of foot rot disease of graft/ vines were recorded and it is found that the grafts survived better than the rooted cuttings in the arecanut garden. So far there was no *Phytophthora* infection

CROP PRODUCTION

Organic farming in black pepper

The trial was started during the year 2006. During the year 2007, Integrated management recorded the maximum green berry yield of 3.684 kg/vine followed by inorganic treatment (2.388 kg/vine).

Development of organic package for spices based cropping system

During the year 2007, yield recorded by both the treatments were almost same (Organic – 4.846 kg/vine and POP – 4.738 kg/vine). There was no significant difference between the treatments.

CROP PROTECTION

Management of *Phytophthora* foot rot disease in black pepper (adaptive trial)

The trial was started during 2006 June in farmers field. During the year 2007, disease incidence - defoliation of vines was significantly more in treatment T2. Treatments T2 and T3 were statistically on par. Treatment T1 showed less % of defoliation and hence this treatment is more effective in controlling the disease. There was no significant difference between treatments for yield and plant growth data.

Management of *Phytophthora* foot rot disease in black pepper (Existing plantations)

There was no significant difference between treatments. However yellowing and death of vine were more in control. There was no significant difference between treatments for disease incidence and yield. The control plot showed more yellowing, defoliation and death of vine.

Crop : RICE

Evolution of high yielding rice varieties suitable to Pokkali tracts of northern Kerala through farmers participatory breeding approach

Fourteen promising non lodging cultures which became stabilized in F₃ and F₄ generations were raised in Preliminary and Comparative yield trials (PYT & CYT) in the Kharif season of 2007

in progressive farmer's field at Ezhome Panjayath. The cultures MK 22, OK 43, JK 74, JO 583, JK 76, JK 70, JO 532-1 and JO 345 were significantly superior to the high yielding check Vytilla 6. Among these cultures, the culture JK 70 ranked top in grain yield which was on par with the cultures, JO 583, JO 532-1, JO 345 and MK 22.

Evolution of high yielding rice variety to Wet land paddy field suited for organic cultivation

During the Kharif season of 2007, 12 promising wet land cultures which were stabilized in F₃ and F₄ generations were raised in Preliminary and Comparative yield trials (PYT & CYT) in progressive farmer's field at Ezhome Panjayath. All cultures are significantly superior to the control. Among the 12 cultures JK 14, JK 59 and JO 74 are lodging types, all others are non lodging types. Culture MK 157 rank first for yield followed by JK 14, JO 74 and JK 59. All other cultures are on par. Since all MK cultures look alike phenotypically, the top ranking MK 157 need to be considered for release to farmers among MK cultures. Thus the cultures which can be considered for release to farmers are MK 157, JK 14, JO 74, JK 59 and JK 28.

Evaluation of F₅ generation of non stabilized wet land segregants

Sixty four non stabilized cultures were grown in F₅ generation plot. The following 20 cultures were screened out based on performance. JK -1, MK 21-2, MK 139 -1-1, JK 27-2-1, JO 21-1, JO 474-1-1, JO 474-1-2, JK 49-1-2, JK 49-1-3, JO 474-1-3, JK 15-1, JO 290, JO 463-1, JK 15-2, MK 162-2, JO 474-1-4, JO 180-1-1, JK 49-1-1, JK 12-1-1, MK 139-1-2

Evaluation of cultures artificially screened for flood tolerance in Preliminary Yield trial in the farmer's field

The nine cultures viz., - MK 115, MK 76, JK 71, JK 15-1, JK 15-2, JK 35, KO 38-1, JO 377, JO 74 which were found to be tolerant to flood in the artificial condition were grown in preliminary yield trial in the farmer's field at Ezhome during the first crop season of 2007-'08. Only the cultures MK 115 and JK 71 survived in the flood condition.

Extension Programmes

a) Highlights

Harvesting festival of pre released rice cultures suitable for Kaipad area and Karshika Seminar was held at Ezhome on 20th October 2007 where the trial is being conducted. Dr. Vanaja T, briefed the salient achievements. The Harvesting festival was inaugurated by Sri.C.K.P.Padmanabhan, M.L.A & GC Member, KAU and the seminar was inaugurated by Sri.Pallipram Balan, M.L.A & GC Member, KAU. The Agrl. officers, Scientists and Panchayath officers felicitated the function.

Dr.K.G.Padmakumar, Professor, RARS, Kumarakom handled the class on "Scientific cultivation of Rice and Fish. The class on "Mechanization of rice cultivation "was handled by Dr. Shivasami. A discussion was held between farmers and officials for the future development of Kaipad rice cultivation and Sri.Direshan Cheruvatt, Asst.Director acted as the Moderator for discussion.

- Classes were handled to students of COH,Vellanikkara during their RAWE training programme on 26-10-07 and 31-10-07 at PRS, Panniyur.
- Classes were handled to Agrl. Officers of Kannur District on 10-1-08 at PRS, Panniyur sponsored by Spices Board, Taliparamba
- As part of training programme of CPCRI,Kasaragod ,classes were handled to 3 batches of farmers from Kasaragod District on 16-2-08, 27-2-08 and 1-3-08 at PRS, Panniyur
- Handling classes in agricultural seminars organized by agriculture department
- Diagnostic team visit
- Attending workshops and interface organized by agriculture department

Farm Advisory Services

In person	Over telephone	Through letters
35	60	10

Field visit

No. of visits	problem identified	Recommendations
21-6-07	Pepper nursery – Certification at Kankol Seed farm	certified

Visit of Agrl farms under Agrl.Dept of Kannur dt. and authorizing the quality of planting material of Black Pepper – Certificate for selection of Mother vines , Certificate for quality - planting material - Nursery certification

Radio talks / TV programmes / Audio- video cassettes

Topic	Date	Name of Scientist
Organic farming	20-4-07	Dr.K.P.Mammootty
Management of Pepper gardens	18-6-07	Dr. V.P.Neema
Processing of Black pepper	10-12-07	Dr.K.P.Mammootty
Nursery management in pepper	25-3-08	Dr. V.P.Neema

List of publications

Books / Scientific papers

Vanaja, T, Neema V.P, Rajesh , R and Mammooty K.P.2007. Graft recovery of *Piper nigrum L.* runner shoots on *Piper colubrinum* rootstocks as influenced by varieties and month of grafting. *Journal of Tropical Agriculture*, 45 No.1 & 2 : 61-62

V.P.Neema , K.P.Mammootty and T.Vanaja 2007. Effect of P-solubilizers on the yield of black pepper. In:Abstracts of the National workshop cum symposium on "Tree spice cultivation and sustainable development of home gardens for decent livelihood and environmental protection in Andaman and Nicobar islands "held from February 4 – 6th 2008 at Central Agricultural Research Institute, Port Blair.

K.P.Mammootty 2008. Screening of black pepper varieties / cultivars against nursery diseases In: Abstracts of the National seminar on "Current scenario in production , processing & export of spices" held from February 21-22nd 2008 at Hort. Research Station, Yercad , Tamil Nadu.

Important visitors

QRT team of AICRP Spices visited the station on 18-10-2007 and reviewed the projects of Panniyur, Dapoli and Sirsi centres of AICRP .The team consisted of following officials from ICAR .

Dr.I.Irulappan , Dr.B.N.Choudhary , Dr.R.Samiyappan ,Dr.M.Anandaraj
Scientists from Dapoli and Sirsi centres.

Finance

Head	Budget(lakhs)	Expenditure	Receipts
Non-plan	35.950	2920897	711114
Plan	4.040	224686	
ICAR	13.433	2024897	
KSCSTE	-	6667	
NHM	14.325	1122590	
Total	67.748	6299737	

HIGH RANGE ZONE
REGIONAL AGRICULTURAL RESEARCH STATION
AMBALAVAYAL, WAYANAD - 673593

Name of Head of the Station : Dr. V.K. Raju, Associate Director of Research

Research programmes

a. Major research achievements (highlights)

Spices

Black pepper

Comparative studies of 13 varieties of pepper and studies on clonal variations in Panniyur-1 are in progress.

Ginger

Germplasm of 27 Ginger varieties are being preserved in the station. Maran, V₂E₃₋₂, Rio-de-Janeiro are the best varieties among them. Studies on the effect of Azospirillum on ginger is in progress.

Turmeric

Germplasm of 36 Turmeric varieties are being preserved in the station. Studies on the effect of Azospirillum on turmeric is in progress.

Rice

Germplasm of 49 varieties of rice are being preserved in the station. 17 varieties of scented rice also preserved in the station.

Vegetables

The seed production and distribution of vegetables like tomato, ladies finger, bengal gram, bittergourd and cool season vegetables are being undertaken.

Cool Season Vegetables.

Under the plan project on cool season vegetables, varieties of cabbage, carrot, potato, turnip, cauliflower, palak, radish etc were tested under Ambalvayal condition.

Mixed cropping:

Mixed cropping in the garden lands with arecanut, cardamom, and pepper is in progress. The data are being analysed.

Agromet Advisory Service

A collaborative study on Experimental Agromet Advisory Service is in progress and the data is being collected.

Medicinal and Aromatic plants

More than 160 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.

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.

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.

Extension Programmes

a) Highlights of extension activities

- Paddy reaper demonstration to farmers – 04th, 05th January 2008
- Packaging technology for agro based value added products manufactured by Kudumbasree microenterprice units at Kudumbasree office, Thrissur – 07th January 08.
- RSVY interview of Stipendiary training programme in fisheries. 29th January 2008. and the training started on 1st February 2008.
- Sale of vermi compost started – 4th February 2008.
- Department of Agriculture, Wayanad district, Karshaka Sangamam at S. Bathery – 18th February 2008.
- Dr. V.K. Raju delivered a talk on “New trends in agriculture” at S. Bathery block – Ksheerothsavam at Padichira, Pulpally – 22nd February 2008 .
- “Approach to make agriculture more profitable” class handled to IFFCO registered farmers – Training programme. – 27th February 2008.
- Training to team of farmers from Coffee Board – 29th February 2008.
- Mechanised transplanting of paddy demonstration at RARS, Ambalavayal – 1st to 5th March 2008.
- A stall for the sales of seeds, seedlings and KAU publications was put up and an agriclinic on behalf of PTD for the farmers in connection with 35th anniversary of “Vayalum Veedum” of All India Radio was also conducted on 28th, 29th February and 1st March, 2008 at Govt. College ground, Mananthavady.
- A stall for the sales of seeds, KAU publications and different types of plants and bioinputs was put up at the venue of trade fair and exhibition in connection with “Vallyoorkkavu Festival” at Mananthavady from 19th to 29th March, 2008.

Under the PTD Scheme the following activities were carried out

- 30 farmers were tentatively selected from 3 wards for the lay out of demonstration plots. The plots of these selected farmers visited by Dr. K.E. Usha, Associate Professor, RARS, Ambalavayal and discussions were held with farmers to assess need and suitability and fixing crop varieties for demonstration plot. Details of demonstration plots are furnished below:
- Vegetable seeds (pumpkin -100g, cucumber- 100g, snake gourd – 400g, bitter gourd- 600 g, cow pea varieties – 1700g and amaranth- 100g) and KAU publications on vegetable, banana and paddy cultivation were distributed among farmers selected for laying out of demonstration plots.
- Plantlets of 3 varieties of tissue cultured banana (Robusta-74, Nendran-74, and Poovan-49) and 675 banana suckers were distributed among farmers selected for banana demonstration plots.
- 90kg Athira seeds were distributed to selected farmers for laying out demonstration plot during ‘Punja’ season of 2007-08.
- 60 kg Manupriya paddy seeds were distributed to 3 of the farmers from selected 3 wards for laying out of demonstration plots of this new high yielding variety for sowing in the ‘Nanja’ season of 2008.
- 250 no.s of ‘Kattarvazha’ (*Aloe vera*) plants in poly bags, 300gms of ‘Kattupadavalam’ (*Trichosanthes cucumerina*) seeds were distributed to two farmers respectively for laying out of demonstration plots of medicinal plants.

The demonstration plots of farmers are being supervised scientifically and the maintenance of the plots are satisfactory. Among these plots, harvesting is going on in vegetables (bitter gourd cow pea, snake gourd) demonstration plots.

Training programmes conducted under PTD

- A training programme entitled “KAU Micro Sprinkler- Method of making and application” was conducted for the farmers of selected wards. Classes were conducted by Dr.P.Susheela, Course Director and Associate Professor, Agricultural Engineering and Dr. K.P. Prameela Professor of Agronomy from ARS, Chalakkudy. 28 selected farmers attended the training on 22/11/07.

- A training on “Small Farm Machineries and Their Use” was given to 3 unemployed women having VHSE qualification at ARS, Mannuthy. It was 24 days training. They have taken up mechanized farm operations as a self employment. For the first time in Wayanad district machine transplanted paddy cultivation was taken up in RARS, Ambalavayal farm. These trained women are now ready to transplanting and harvesting using machines in farmers field in Wayanad.
- A training programme entitled “Paper bag making” was conducted for unemployed women, at RARS, Ambalavayal. Classes were conducted by Ms.Gouri, Mr.Ramachandran, Ms. Girija and Mr.Mani from Wayanad Sarva Seva Mandal, Sulthan Bathery. The training was attended by 28 women and was conducted on December 13th, 2007.
- One day training programme entitled “Pepper- Diseases and its control measures” was conducted on January 8th and 9th at RARS, Ambalavayal by Dr.K.P.Mammooty, Professor and Head, Panniyur Pepper Research Station, Kannur as resource person. Two groups of 50 farmers attended the training. First batch of 50 farmers attended the training on Jan.8th and second batch on Jan 9th 2008.
- Training on “Mushroom cultivation” was conducted at RARS, Ambalavayal for 38 selected unemployed women on 23.01.08. Theory and practical classes on Mushroom cultivation was conducted.
- A training programme entitled “A nutrition garden in a day” was conducted on 29/01/08, 8/02/08 & 21/02/08 at RARS, Ambalavayal. Vegetable seedlings were planted in an area of 12 cents (480 m²) and 3 model nutrition gardens were established at RARS, Ambalavayal as a part of the practical of the training programme. 44, 35, 29 no.s of farmers attended the training respectively in the 1st, 2nd and 3rd batch.
- KAU publications in Malayalam (30 books worth Rs.677/-) were handed over to Rajiv Gandhi Library, Neerattadi, Panamaram by Dr. K.E Usha, Associate Professor, RARS, Ambalavayal on 17.01.08 for starting a “Farm Book Corner” in the library.

Study tour under PTD

- A study tour was conducted to Mannuthy and Vellanikkara campus of KAU for 50 selected farmers from Pakkam and Neerattadi wards. It was a 2 days tour (Dec. 17th and 18th) and during this programme the following institutions were visited:

1. Veterinary College Mannuthy
2. Cocoa Processing Unit, Vellanikkara
3. Department of Olericulture, Vellanikkara
4. Mushroom cultivation unit & Vermi compost unit, Vellanikkara
5. Central nursery, Vellanikkara
6. Banana Research Station, Kannara

Other details if any

The concept note entitled “A Comprehensive, Multi-Enterprise Project For Resolving The Agrarian Crisis Of Wayanad District Of Kerala” was accepted by the ICAR for final project development. The final project was submitted in September 2007. The same is under evaluation by N/AIP – PIU. It is expected that final clearance of project and commencement of project implementation will start in 2008 -09.

Finance

Head	Expenditure	Receipts
Non-Plan	1,25,84,963	11,07,044
Plan	16,67,578	
AICRP (ICAR 75% - 25%)	71,675	
ICAR	18,38,605	27,00,698
Other EAPs	23,90,295	
Revolving Fund	1,402	90,082

CARDAMOM RESEARCH STATION, PAMPADUMPARA

Name of Head of the Station : Dr. G.Sivakumar

Faculty improvement programme

Sri. M. Murugan Assistant Professor (Soil Science and Agricultural Chemistry) on study leave for undergoing doctoral programme in Environmental Science at National Institute of Advanced Studies, Indian Institute of Science campus, Bangalore.

Research programme

a. Major research achievements (highlights)

IC numbers (547920 to 547992) were obtained for 73 cardamom accessions (CRSP 1-73) from National Bureau of Plant Genetic Resources, New Delhi. Among the germplasm accessions, Hy 9 was found to be tolerant to erant thrips but was highly susceptible to *azhugal* disease. Twenty new high yielding accessions were collected from cardamom plantations of Idukki district and added to the gene bank. Highest fresh yield ($2954 \text{ g plant}^{-1}$) and dry yield (552 g plant^{-1}) of capsules was recorded in CRSP4 followed by CRSP 24 producing $2635 \text{ g plant}^{-1}$ and 528 g plant^{-1} of fresh and dry yield, respectively.

Among the twelve accessions evaluated, S-1, PS 44, MCC 200, *Green Gold*, MCC 347, CI 692, and MCC 18 recorded more than 400g of dry capsule weight per plant. RR 1 and CI 692 were found to be thrips tolerant as the thrips infestation percentage was $<2.0\%$ in the dried capsules. Capsule borer infestation was low in all the accessions. Panicle length was found to be less than 83 cm in all accessions except PS 44, *Green Gold* and S1.

Out of seven cardamom varieties, viz., MCC-73, *Green Gold*, MHC-26, CI-722, MCC-309, PS-27 and MCC-246 evaluated, MHC 26 and PS 27 recorded highest number of tillers and plant height. Establishment of CI-722 was poor compared to that of all other accessions. Maximum of dry capsules obtained from MHC 26 (450 g/plant) followed by PS 27 (300 00g/plant). Plant No. 14 a *vazhuka* type cardamom selected from *Pannikandam* area was found to be high yielding in comparative yield trial. Black pepper accession CUL 5308 was found to be high yielding (820 g vine^{-1}) under coordinated varietal trial.

Application of neem cake twice @ 0.5 kg and $1.0 \text{ kg plant}^{-1}$ resulted in significantly more number of tillers, higher plant height and yield of cardamom capsules. Least damage of cardamom shoots by shoot and capsule borer larvae was also observed in neem cake treated plants. Maximum fresh ($3287 \text{ g plant}^{-1}$) and dry (656 g plant^{-1}) weight was observed in inorganic N 100% + *Phosphobacteria* $50 \text{ g} + 5 \text{ kg FYM}$ treated plots. Maximum fresh weight of capsules ($3528 \text{ g plant}^{-1}$) and dry weight (698 g plant^{-1}) was recorded in plots treated with inorganic nitrogen 100% + *Azospirillum* $50 \text{ g} + 5 \text{ kg FYM}$ and minimum in control plots ($1529.25 \text{ g plant}^{-1}$, 325 g plant^{-1}).

Among the biorationals evaluated, Neem Gold (0.5%) was found to be superior than Neem oil (0.5%) and Fish oil insecticidal soap (3.0%) in reducing the population of mussel scale insects on black pepper. Natural parasitization of cardamom shoot and capsule borer larvae by ichneumonids viz., *Agrypon* sp. and *Temeluchus* sp. ranged from 17.8% to 87.9%. Cardamom root grub, *Basilpeta fulvicorne* was found to be naturally infected by *Metarhizium* sp. to a maximum of 16.5% under field conditions. Size of cardamom capsules were shriveled and became smaller due to thrips damage. No significant difference existed in the number of seeds per capsule as well as drriage percentage in healthy and itch capsules. Fresh weight also indicated a progressive decline with increase in thrips infestation.

Modulation of trypsin-like protease and acid phosphatase was observed in healthy and thrips infested capsules whereas the oil content did not vary. Combination of *H. indica* (100IJ/grub) and imidacloprid (0.006%) was found effective against cardamom root grub, *B. fulvicorne*.

Plots treated with Potassium phosphonate @ 0.3% and *Trichoderma harzianum* @ 50 gm vine⁻¹ was found to be effective in reducing foot rot incidence in black pepper. Minimum foot rot disease incidence and maximum yield was recorded in the plots treated with *Trichoderma harzianum* @ 50 gm vine⁻¹ and consortium of bacteria followed by Potassium phosphonate @ 0.3% and *T. harzianum* @ 50 gm vine⁻¹. Minimum disease incidence on tillers, panicles as well as capsules and maximum yield were recorded in the plots treated with *Trichoderma harzianum* and consortium of bacteria @ 50 gm vine⁻¹ followed by Copper oxy chloride drenching @ 0.2%.

b. Details of research projects

Genetic resources and Crop improvement

Germplasm collection and description of types and varieties of cardamom

IC numbers (547920 to 547992) were obtained for 73 cardamom accessions (CRSP 1-73) from National Bureau of Plant Genetic Resources, New Delhi. Among the germplasm accessions, Hy 9 was found to be thrips tolerant whereas it was highly susceptible to *azhugal* disease. Twenty new high yielding accessions were collected from cardamom plantations of Idukki district and added to the gene bank. Highest fresh yield (2954 g plant⁻¹) and dry yield (552 g plant⁻¹) of capsules was recorded in CRSP4 followed by CRSP 24 producing 2635 g plant⁻¹ and 528 g plant⁻¹ of fresh and dry yield, respectively.

Coordinated varietal trial on cardamom

Coordinated Varietal Trial 2000

Among the twelve accessions evaluated, S-1, PS 44, MCC 200, *Green Gold*, MCC 347, CI 692, and MCC 18 recorded more than 400g of dry capsule weight per plant. RR 1 and CI 692 were found to be thrips tolerant as the thrips infestation percentage was <2.0 % in the dried capsules. Capsule borer infestation was low in all the accessions. Panicle length was found to be less than 83 cm in all accessions except PS 44, *Green Gold* and S1.

Coordinated Varietal Trial 2005

Out of seven cardamom varieties, viz., MCC-73, *Green Gold*, MHC-26, CI-722, MCC-309, PS-27 and MCC-246 evaluated. MHC 26 and PS 27 recorded highest number of tillers and plant height. Establishment of CI-722 was poor compared to that of all other accessions. Maximum of dry capsules obtained from MHC 26(450 g/plant) followed by PS 27(300g/plant).

Evolution of high yielding varieties of cardamom

In comparative yield trial, Plant No. 14 a *vazhuka* type cardamom selected from *Pannikandam* area was found to be high yielding. Pl. No. 10 recorded the second highest yield and was found to be thrips tolerant. Accessions such as NS 50 and NS 18 were found to be high yielding with lean and lanky capsules. Two dwarf type of cardamom were identified from the γ irradiated seeds of *Green Gold* cultivar.

Coordinated Varietal Trial on black pepper

Among the 12 entries evaluated, CUL 5308 was found to be high yielding (820 g vine⁻¹) followed by Col 1041 (420 g vine⁻¹). Even though the spike length of OPKM, CUL 5489 and Panniyur 1 was >14 cm, the berry setting percentage as well as number of spikes per vine was very low in these lines. Lesser incidence of foliar anthracnose disease was observed in the accessions namely PRS 21, PRS 22, HP 1411 and HP 105.

Genetic improvement of local black pepper cultivars of Idukki district for yield and quality characters.

A black pepper vine with bold berries and good berry setting percentage was identified from Block III of this station and kept for multiplication. A total of 14 high yielding accessions were collected from the farmer's field of Idukki district. One of the accessions viz., Abraham II collected from Pulikkamparambil, Kumily Panchayath was found to have bold berries and recorded more than 16 kg berry yield per vine. Appachan selection from Erattayar Panchayat was found to have high oleoresin content compared to local Karimunda and Kumpakal selections.

Crop Production and Management

Application of neem cake on productivity, insect pest and disease incidences in cardamom

Application of neem cake twice @ 0.5 kg and 1.0 kg plant⁻¹ resulted in significantly more number of tillers, higher plant height and yield of cardamom capsules. Maximum yield of cardamom (450 kg ha⁻¹) was recorded in plants treated with recommended dose of fertilizers. Least damage of cardamom shoots by shoot and capsule borer larvae was also observed in neem cake treated plants.

Effect of biofertilizer, P-solubilizer on yield of cardamom

Number of tillers was found maximum (49.8) in plots treated with inorganic P 100% + *Phosphobacteria* 50g + 5kg FYM and minimum in control plots (24.8). Highest plant height (287 cm) was recorded in plots treated with inorganic P 100% + *Phosphobacteria* 50g + 5 kg FYM and lowest in control plots (220.31 cm). Maximum fresh (3287 g plant⁻¹) and dry (656 g plant⁻¹) weight was observed in inorganic P 100% + *Phosphobacteria* 50g + 5 kg FYM treated plots.

Effect of biofertilizer, *Azospirillum* on yield of cardamom

Maximum fresh weight of capsules (3528g plant⁻¹) and dry weight (698g plant⁻¹) was recorded in plots treated with inorganic nitrogen 100% + *Azospirillum* 50g + 5 kg FYM and minimum in control plots (1529.25 g plant⁻¹, 325 g plant⁻¹). Maximum number of tillers (51.32) and plant height (275.21cm) was recorded in the same treatment.

Crop Protection

Management of scale insects of black pepper with organic products

Five different species of scale insect damage were reported in black pepper vines of Idukki district causing >20% loss. Population of mussel scale insects was significantly reduced in vines treated with Dimethoate (0.05%) two times at fortnightly intervals. Among the biorationals evaluated, Neem Gold (0.5%) was found to be superior than Neem oil (0.5%) and Fish oil insecticidal soap (3.0%) in reducing the population of scale insects. Application of biorationals was conducted four times at fortnightly intervals.

Bio-ecology of natural enemies of major pests of cardamom

Natural parasitization of cardamom shoot and capsule borer larvae by ichneumonids viz., *Agrypon* sp. and *Temeluchus* sp. ranged from 17.8% to 87.9%. Cardamom root grub, *Basilpeta fulvicorne* was found to be naturally infected by *Metarhizium* sp. to a maximum of 16.5% under field conditions. Probit analysis of dosage mortality relationship against *B. fulvicorne* revealed that *Heterorhabditis indica* (CRS, isolate) was more virulent than *H. indica* (Hi 6.71). Cardamom whitefly was infected by three species of entomopathogenic fungi.

Estimation of quantitative and qualitative losses due to thrips damage

Size of cardamom capsules were shriveled and became smaller due to thrips damage. No significant difference existed in the number of seeds per capsule as well as drilage percentage in healthy and itch capsules. Husk weight also indicated a progressive decline with increase in thrips infestation. Modulation of trypsin-like protease and acid phosphatase was observed in healthy and thrips infested capsules whereas the oil content did not vary.

Management of cardamom root grub through entomopathogenic nematodes

In laboratory and green house studies, nematode-neonicotinoid interaction {*Heterorhabdits indica* (CRS isolate) [100 IJ/grub] plus Imidacloprid (0.01%)} was found to be synergistic and resulted in the highest mortality (93.27%) of cardamom root grubs. Significant reduction of cardamom root grub was also observed in plots treated with combined application of imidacloprid (0.006%) and *H. indica* (100IJ/grub). Combination of *H. indica* (100IJ/grub) and imidacloprid (0.006%) was found effective against cardamom root grub, *B. fulvicorne*.

Adaptive trial on management of *Phytophthora* foot rot of black pepper in farmer's field

Plots treated with Potassium phosphonate @ 0.3% and *Trichoderma harzianum* @ 50 gm vine⁻¹ was found to be effective in reducing foot rot incidence in black pepper followed by Bordeaux mixture 1% spraying and Copper oxy chloride 0.2% drenching.

Trial on management of *Phytophthora* foot rot of black pepper in existing plantation.

Minimum foot rot disease incidence and maximum yield was recorded in the plots treated with *Trichoderma harzianum* @ 50 gm vine⁻¹ and consortium of bacteria followed by Potassium phosphonate @ 0.3% and *T. harzianum* @ 50 gm vine⁻¹.

Trial on management of *Phytophthora* foot rot of black pepper in new plantation

Three varieties of black pepper namely IISR-Shakthi, IISR-Thevam and Panniyur -I were planted for evolving a management strategy for foot rot disease. The establishment of Panniyur -I was 90% whereas it was 60% in IISR-Thevam and 45% in IISR Shakthi. Minimum foot rot disease incidence and maximum yield was recorded in the plots treated with *Trichoderma harzianum* @ 50 gm vine⁻¹ and consortium of bacteria followed by Potassium phosphonate @ 0.3% and *T. harzianum* @ 50 gm vine⁻¹.

Trial on management of panicle rot and clump rot diseases of cardamom in existing plantation

Minimum disease incidence on tillers, panicles as well as capsules and maximum yield were recorded in the plots treated with *Trichoderma harzianum* and consortium of bacteria @ 50 gm vine⁻¹ followed by Copper oxy chloride drenching@ 0.2%.

Trial on management of panicle rot and clump rot diseases of cardamom in new plantation

Three varieties of cardamom namely *Green Gold*, PV-2 and IISR-Avinash were planted for evolving a holistic management strategy for capsule rot and clump rot diseases of cardamom. The clumps of PV-2 and *Green Gold* have established well whereas the growth and establishment of IISR-Avinash was poor. Minimum disease incidence on tillers, panicles as well as capsules and maximum yield were recorded in the plots treated with *Trichoderma harzianum* and consortium of bacteria @ 50 gm vine⁻¹ followed by Copper oxy chloride drenching@ 0.2%.

EAP: Developing consortium of bio-control agents for the management of capsule rot and clump rot diseases of cardamom -Funded by Kerala State Council for Science and Technology, Trivandrum.

The preliminary works have been initiated. The soil borne pathogens of cardamom viz., *Fusarium*, *Pythium*, *Phytophthora* were isolated. The isolates were sent to Indian Type Culture Collection, IARI, New Delhi for confirming the species. The native antagonistic microorganisms were also isolated in the cardamom ecosystem. The antagonistic microorganisms are being confirmed.

State Horticulture Mission projects

State Horticulture Mission funded for three projects that are under operation at this station.

Establishment of a model floriculture nursery unit

A new externally funded scheme under State Horticulture Mission on the establishment of a model floriculture nursery has been initiated. Three green houses, one glass house, one potting mixture shed and a hardening chamber were installed. Propagation studies on roses and other ornamentals have been initiated. Nursery production of roses and ornamental plants is in progress. Our station maintains around 530 roses of different colours. The propagation of all these varieties has been standardized and budlings are available for sale. The following two projects have also been approved by the Horticulture Mission.

Establishment of Bio-control laboratory unit

The construction works of biocontrol laboratory are progressing and will be completed soon. Effective antagonistic microorganisms such as *Trichoderma* sp, *Pseudomonas fluorescens* and *Bacillus* sp. are being collected from various centers for evaluating the bio-efficacy and virulence studies against the major disease causing pathogens of cardamom and black pepper. Soil samples are also collected from Cardamom Hill Reserves of Idukki district for selecting the effective native antagonistic organism. Preliminary works have been undertaken to isolate the soil borne pathogens of cardamom ecosystem for screening against the antagonistic organisms. Effective antagonistic microorganisms will be selected based on *invitro* bioassays. Effective antagonistic microorganisms such as *Trichoderma harzianum*, *Pseudomonas fluorescens* will be multiplied in talc, coffee husk and rice bran.

A local isolate of entomopathogenic nematode belonging to *Heterorhabditis indica* has been identified and preliminary studies on median lethal concentration and time have been conducted. *In vivo* mass production of the EPN strain using *Galleria mellonella* has been standardized. Storage life and virulence of the local strain have been studied. The local strain was found to be very effective against the cardamom root grub, *Basilepta fulvicorne*.

Establishment of a black pepper nursery unit

The project has 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. Black pepper varieties such as Panniyur 1 to Panniyur 7 were collected from the Pepper Research Station, Panniyur. Similarly IISR varieties namely IISR Sakthi, IISR Thevam, Malabar Excel, Girimunda, Sreekara, Subakara, Panchami, Pouranami were also collected from IISR, Calicut. These varieties are being multiplied under open condition as well as in mist chambers using rapid multiplication propagation methods for large scale production of rooted cuttings. Under conventional method, the runner vines are being trailed over splitted bamboo poles and are allowed to grow for obtaining maximum vegetative growth. The compartments of the bamboo poles are filled with either potting mixture or vermicompost and the runner vines are placed intact on the medium to induce roots at each

node. The runner vines are also being trailed over the series of ploy bags in a serpentine fashion so as to induce root system at each node. The runner vines are trained over barbed iron wire under mist chamber.

Runner vines were also collected from elite mother vines of our own farm for the production of two /three noded rooted cuttings in poly bags. These two/three noded cuttings were dipped in 1000 ppm Indole Butyric Acid (IBA) for 60 seconds for inducing root development. The rooted cuttings are healthy, vigorous and are in 2-3 leaf stage. Around 25000 rooted cuttings were produced and distributed for the farmers.

Construction of mist chamber at a total cost of Rs 2,48,932 (Rupees two lakhs forty eight thousand nine hundred and thirty two only) was entrusted M/s RAIDCO, Kattapana. The construction works are progressing and will be completed soon.

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. Visual aids including LCD projections are normally used in all training sessions. 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. Research extension interfaces are held twice a year 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 fungal *pollu* and quick wilt of black pepper, Panama wilt and bract mosaic disease of banana, gall wasp in *Erythrina*, scale insects in black pepper, coconut and nutmeg, coffee locust, Tapioca basal rot and nematode problems of black pepper

Details of activities (wherever applicable)

Farm Advisory Services

In person	Over telephone	Through letters
325	205	15

Radio talks/ TV programmes/Audio-video cassettes

Topic	Date	Name of scientist
<i>Erythrina</i> Gall wasp management	26.10.2007 (Door Darshan, Tvm – Krishi darshan live Phone in Programme)	Dr. G. Sivakumar, Assistant Professor (Pl. Pathology)

List of publications Scientific papers

Sivakumar, G., Sainamole Kurian, P., Josephraj Kumar, A. and Backiyarani, S and Murugan, M (2007) Bioefficacy of NIPROT (*Trichoderma harzianum*) against capsule rot and rhizome rot of cardamom. Proceedings National symposium on spices and aromatic plants, November 25-26, 2007, Orissa University of Agriculture and Technology, Bhubaneswar, pp 352.

Important visitors

Particulars	Purpose of visit	Date
Sri. Rajaji Mathew Thomas , MLA, Ollur	Know about the research activities of the station	25.4.2007
Dr. Balaravi Dr. Nampoothri Dr. Hrideek	Know about the research activities of the station	17.12.2007
Sri. Tomer Sr. Deputy Director, National Productivity Council, New Delhi	Reviewing the ongoing SHM projects of the station	22.2.2008

Details of sale of seeds/planting materials/biocontrol agents etc.

No.	Item	Quantity sold	Revenue received (Rs.)
1.	Black pepper		
	Karimunda	3630	18348
	Panniyur 1	5544	
	Panniyur-5	1191	2978
2.	Cardamom		
	PV-2	3278	81950
	PV-1 & others	246	4920
3.	Rose Budlings	2117	42,340
4.	Poly bag ornamental plants	1315	13150
5.	Cut flowers	2743	5486
	Total		1,69,172

Other details if any

The station organized one farmer's seminars on spices on 28.2.2008. Scientists from KAU and spices board had handled the training sessions on spices cultivation, bioagents and integrated pest management. A meeting of Cardamom Growers Association was also held on 28.2.2008 in the presence of Hon'ble Vice Chancellor, and Director of Research, Kerala Agril. University. Various problems faced by Cardamom Research Station, Pampadumpara were discussed in detail.

Finance

Head	Expenditure (Rs)	Receipts (Rs.)
Non-plan	42,92,767.00	702737.00
Plan	125312.00	
ICAR	903207.00	
Other EAPs	913684.00	
Revolving Fund	63643	64526

SPECIAL ZONE OF PROBLEM AREAS

REGIONAL AGRIL. RESEARCH STATION, KUMARAKOM

Name of Head of Station : Dr. Joseph Philip

Deputation of Scientists for Seminars /Workshops/Symposia

Scientists were deputed various Seminars /Workshops/Symposia

Deputation of Scientists for Training Programmes/ Seminars/Summer Institutes

Scientists were deputed various Training Programmes/ Seminars/Summer Institutes

Research Programmes

1. Major Research Achievements

Under the State Horticultural Project "Mushroom spawn production nursery" a new medium, coconut water supplemented by Potato Dextrose Agar was standardized for culturing the common mushroom *Tricholoma* which supported fast and efficient growth of the culture. Similarly a technique was standardized to reduce the sterilization time from 2 h to 20 min using an organic product "Crop Protect"

A new edible mushroom "*Tricholoma sp*" was identified for the first time and its cultivation technology also was standardized.

Studies on coconut hybrids with WCT x MYD, WCT x CGD and WCT x COD with check variety WCT revealed that WCT x CGD ranked first in female flower production. But WCT x CGD recorded the highest yield of nuts /palm (60.9 nuts) followed by WCT x CGD (58.5 nuts)/palm. Root wilt disease incidence was low in WCT x CGD.

Variability and character association studies conducted in Chowghat Green Dwarf showed that genetic improvement in the population could be achieved by adopting selection for weights of copra and kernel, husk:nut ratio, thickness of husk and weight of husked and unhusked nut. Since nonadditive gene action was observed for oil content, diameter of husked nut and thickness of meat possibility of exploiting hybrid breeding in this variety is under consideration.

Evaluation of germplasm of garcinia genotypes collected during 1987 showed that close GC 15/90 recorded the highest yield of dry fruit rind (30.3kg/tree) followed by GC 33/90 (11.54kg/tree).

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.

Under the centrally sponsored scheme on Macro management of Agricultural supplementation - Aromatic and Medicinal plants 5 genotypes of *Garcinia indica*, Kokum were introduced. Fruits obtained from the Kokum trees were used for the preparation of Kokum syrup on experimental basis.

RARS has undertaken pioneering studies on culture of endemic fishes, pearlspot, (*Etroplus suratensi*) in openwater base in Vembanad lake and standardized technology of cage culture under an ICAR project. In order to extend the technology the centre has taken up a project on cage culture of karimeen in Vembanad lake and Andkaranazi with funding support from KSCSTE during the period under report.

The study revealed that *Etroplus suratensis* is an ideal candidate species for culture in open water case fish production ranging from 9 -35k/m³ could be achieved. Karimeen was demonstrated to grow upto a size of around 250 gms in 7 months. This study was taken up in a participatory mode involving four Self Help Groups (SHG) viz., *Kavya*, *Karunya* and *Tuna* at Ottamassery, Andhakaranazhi and *Vemband Matsyathozhilali Kootayma* (VMTK) at Thanneermukkom comprising coastal and inland fishers. The SHGs were formed with the support of the Gandhi Smaraka Gram Seva Kendram (GSGSK), S.L.Puram, Chethala. The participating fishers were given field training on cage fish culture.

Culture of Karimeen in cage has been demonstrated for the first time. This is a significant achievement not only to increase fish production from open waters but also to provide gainful employment to the landless unemployed. In this context, that the state as abundant open water resources the technology will help to utilize such areas for inland fish production. The technology is being extended through the State Department of Fisheries two farmer training programmes were organized on open water cage culture.

Seed Production in Agricultural crops and Fisheries

The captive breeding techniques of indigenous fishes viz., *H. brachysoma*, *Etroplus suratensis*, *Clarias dussumieri*, *G. curmuca* etc under the ICAR NATP project was utilized for mass production of seeds of the species under the ICAR Mega seed project. During the year under report seed production of different varieties, as been undertaken on a massive scale under the ICAR Mega seed project. In addition to the endemic fishes seed production of freshwater carps and ornamental fish species viz, old fish, Angel fish etc were undertaken. Near 9.13 lakh fry were produced during this year and total seed worth Rs. 94154.00 has been distributed to farmers during the period. In the context of the heavy demand for local fish species such as pearlspot and Golden catfish(*H. brachysoma*) as compared to carps, seed production of these species assumes immense relevance. Being a high value fish of great demand, the captive breeding technique for pearlspot and seed production is of significance. The technology has helped to boost the popularization of pond/tank farming of Karimeen in the state.

The seeds of *H.brachysoma* produced utilizing the captive breeding techniques developed in the station were utilized for conservation stocking in Sasthamkotta lake as part of a project operated by the State Department of Fisheries. Similarly *H.brachysoma* rated as an endangered species in Vembanad till recent past is on a massive come back consequent to standardization of seed production technique.

Results of the project entitled "Yield prediction analysis in banana" revealed that the base temperature at which growth starts in nendran banana is 14°C. Secondary corm formation is an integral part of the crop cycle in banana raised from suckers and it is the first report of its kind. The secondary corm carries the crop to maturity and the planted corm gradually becomes necrotic, deteriorates and falls off. Experiments conducted in all the five agro climatic zones of Kerala revealed that the time of shooting is a factor of secondary corm development. Studies further revealed that size of planted corm is related to secondary corm initiation and development.

Translocation of photosynthates within the different plant parts and at different phases of plant growth was studied by using radio active carbon. An air tight chamber with environmental controls for feeding the labeled ¹⁴C was developed in-house for the purpose. The study involved to different experiments. First one was aimed at studying the ¹⁴C absorption and translocation two various tissues at different biotic phases. Second experiment was aimed at studying ¹⁴C absorption and translocation during bunching by different leaves. An air tight leaf chamber was first designed for the purpose. Such a study on banana is the first of this kind. This chamber with internal cooling helps to prevent the scotching of banana leaves taken for experiment.

Extension Programmes

(a) Highlights of Extension Activities

Organized an exhibition from 13-2-2008 to 17-2-2008 at Changnacherry in the farm fest conducted by Changnacherry Social Service Society and AIR

Scientists of this station attended off campus training programmes and imparted classes on different topics like organic farming, IPM in rice, coconut, banana, spices and vegetables, crop management in rice, bio pesticides, bio fertilizers, watershed management and water harvesting technologies, mushroom cultivation, aquaculture, stress management in crops, seed production technology, sustainable agriculture and roof rain water harvesting were held in different locations of Kottayam, Ernakulam, Alappuzha and Idukki districts for the Department Officials and farmers by the scientists of this station.

(b) Details of Activities

(i) Training Programmes organized at the station

Topic	No. of Trainees	Category	Venue	Date	Name of Scientist
Mushroom Cultivation	360	Farmers	RARS, Kumarakom	First Saturday of every month (12 batches)	Dr.A V Mathew

(ii) Farm Advisory Services

	In Person	Over Telephone	Through Letters
Plant Protection –	350	270	0
Crop Management -	75	47	0
Crop Improvement -	6	40	0
Farm Mechanization –	5	10	0
Aquaculture	750	500	0

List of Publications

Scientific Papers

- (c) Poornima Yadav P.I, Elizabeth K Syriac, Thomas George and Samuel Mathew. Suitability of the new generation herbicide pyrazosulfuron, ethyl in the low land eco system. Proceedings of the Kerala Environment Congress 2007, 8-10 May 2007
- (d) Poornima Yadav P.I, Elizabeth K Syriac, and Girija V.K. Effect of pyrazosulfuron, ethyl on *Rhizoctonia solani* International. Proceedings of International Conference on Sustainable agriculture, 6th February 2008 held at Thiruvananthapuram
- (e) Padmakumar K.G., L. Bindu and P.S. Manu. 2007. Utilisation of life history traits for recruitment promotion of pearlspot, *Etroplus suratensis* through engineered sanctuaries. 'Sustain Aqua '07'. National Workshop on Sustainability of Indian Aquaculture Industry. Abstract No. SBA-13. Agriculture and Food Engineering Department, Indian Institute of Technology, Kharagpur. 152pp
- (f) Padmakumar K.G., P.S. Manu and L. Bindu. 2007. Openwater culture of Pearlspot, *Etroplus suratensis* (Bloch) in low volume cages. In : Fisheries and Aquaculture: Strategic outlook for Asia. Book of Abstracts, 8th Asian Fisheries Forum (Organised

by Asian Fisheries Society, Indian Branch) November 20-23, 2007 Kochi, India p. 120-121

- (g) Padmakumar K.G., L. Bindu and P.S. Manu. 2007. Captive breeding and seed production of *Etroplus suratensis* in controlled systems. In : Fisheries and Aquaculture: Strategic outlook for Asia. Book of Abstracts, 8th Asian Fisheries Forum (Organised by Asian Fisheries Society, Indian Branch) November 20-23, 2007 Kochi, India p. 121
- (h) Bindu, L and K.G.Padmakumar. 2008. Hatchery seed production protocols for conservation of endangered catfish, *Horabagrus brachysoma*(Gunther), endemic to Western Ghats, India. In Proc. 20th Kerala Science Congress. 28-31 January 2008, Thiruvananthapuram. India. pp 6-8
- (i) Padmakumar K.G., L. Bindu and P.S. Manu. 2008. Aquaculture for food security. *Kerala Calling*. 28(3): 32-34

Popular Articles

Chila praayoagika karshika dhinthakal - karshakan December 2007 to March 2008 – Dr. A.V. Mathew, Professor
 Pathinettam patta, kizhangu, chena – Gramasree 2007, 2008 – Dr. Alice Antony, Assoc. Prof.
 Aratta, ashokam, arutha, adapothiyan, athi, ayamothakom - Gramasree 2007, 2008 – Dr. K.A. Inasi, Assoc. Prof.

Number of Visitors to the Institution (Farmer Group/Students)

Six student groups from different colleges

Important Visitors

1. Sri. Devaraj Sikka, Former Director I.I. Tropical Meteorology, Pune
2. Air Vice Marshal Dr. Ajit Tyagi, Assistant Chief of Air Staff
3. Dr. L.S. Rathore, Additional Director General. IMD, Delhi
4. Dr. R.R. Kelkar, ISRO Chair Professor, University of Pune
5. Dr. B.M. Reddy, INSA Scientist, NGRI, Hyderabad

Finance

Head	Expenditure (Rs.)	Receipts (Rs.)
Non-plan	13989908	978489
Plan	2365228	
ICAR	206857	203876
Other EAPs	1511693	
Revolving Fund	1041771	1172805

RICE RESEARCH STATION, MONCOMPU

Name of Head of the Station : Dr. Abraham Varghese, Professor

Awards/ Scholarships to staff

Dr. Annie Koruth, Associate Professor (Soil Science & Agrl. Chem.) received Commendation Certificate for ISSS Best Doctoral Research presentation award held at Birsa Agricultural University, Ranchi.

Research Programmes

Research highlights

Breeding short duration high yielding varieties of rice suited to Kuttanad

Seed material of four advanced cultures SD.6, SD 36, M 9 and M 20 were multiplied during Puncha 2007-08. The cultures were sent for quality analysis. After getting the result of quality analysis the best culture will be proposed for release. SD 36 was found promising with comparatively higher Fe and Zn contents in their grain.

Breeding high yielding varieties of rice with resistance to important rice diseases of Kuttanad

Seed material of three advanced cultures M 87-1, M 87-5 and M 95-1 were multiplied during Puncha 2007-08. The cultures were sent for quality analysis. After getting the result of quality analysis the best culture will be proposed for release. Fresh crossings were initiated between BLB resistant donors and locally adapted varieties.

Collection, maintenance and evaluation of rice

During the period under report, 430 accessions of rice were raised in the field and seed material collected. Fifty more cultures selected from National Screening Nursery of AICRIP were added to the germplasm.

Genetic analysis of gall midge resistance in rice and evolving resistant varieties for gall midge biotype 5

Five selected cultures from the following three crosses which attained uniformity are in the initial evaluation trial stage.

Sl. No.	Culture No	Cross	Duration(days)	Av. Yield (t/ha)
1	M109-1-2	Kakathiya/Mo.6	115-120	4.5 - 5.5
2	M 110-1-1	NHTA8/Pavithra	115-120	5.0 - 6.0
3	M 111-14-6	Triguna/ Jyothi	115-120	5.0 - 6.0

Segregating progenies from three crosses are being subjected to selection.

Breeding for high yielding rice varieties with resistance to major pests of Kuttanad

From the screening trials donors were identified and hybridization programme is in progress against major pest like stem borer, leaf folder etc.

Breeding for high yielding rice varieties with resistance/tolerance to adverse soil conditions

Trials were repeated in large plots of 25-50 cents) during August -November 2007 in three locations in Karumady, Purakkad Kari and Vaikom Kari using the varieties identified from the previous season. At Karumady R 50138 was found to be the best yielder with 4100 kg/ha followed by Krishnanjana with 3700 kg/ha. In Purakkad, Mo.16 (Uma) performed best with an yield of 7500 kg/ha followed by Vytilla 2 with 6200 kg/ha. At Vaikom Kari, Uma recorded 3930 kg/ha followed by CIRJ 7 with 3775 kg/ha.

Breeding for high yielding rice varieties with submergence tolerance

Single plant selections made from the F2 generation of the following crosses were raised in the field during the current season and further selections made.

Sl.No.	Cross	No. of plants selected
1	Uma / IET 18382	23
2	IET 18382/ Uma	15
3	Jyothi/ IET 18382	26
4	IET 18382/ Jyothi	22

Fresh crosses using parents like Thavalakkannu, Athikkiramundakan, Uma, Jyothi etc. have been made and F1 generation raised during Punja 2007-08.

Characterization and Evaluation of medicinal rice (*Oryza sativa L*) var Njavara

The twenty three accessions of Njavara collected from different parts of Kerala were short listed avoiding duplicates and synonyms based on morphological characters. Five different accessions possessing Njavara characters viz., Long awned Brown Njavara, Awnless Brown Njavara, Long awned Black Njavara, Partly awned Black Njavara and Awnless Yellow Njavara were identified and were multiplied in the station. Single plant selections with superior expressions made from the collection were raised in the field during the current season for further evaluation

Advanced Variety Trial - VE

Nineteen entries received from DRR, Hyderabad were tested for yield and reaction to biotic stresses. IET 19252 (RR 433-2-1) with a duration of 80 days recorded the maximum yield of 5430 kg/ha followed by IET 19836 (RP4663-26-5-2-1-1-B) and IET 19264 (OR 2081-5) with 5330 kg/ha.

Initial Variety Trial - VE

Sixty four entries were laid out in an RBD with two replications. IET 20322 (TTB 122-33-1) recorded the maximum yield of 5816 kg/ha followed by IET 20306 (MUR SB2-10-6) and IET 20307 (HUR SB2-10-6) with 5716 kg/ha. A medium bold red kernelled culture from Orissa, IET 20309 recorded 5667 kg/ha. in 85 days.

Advanced Variety Trial - 2- E

Ten entries were tested for yield and reaction to biotic stresses. The hybrid Check PSD 3 recorded the maximum yield of 8417 kg/ha followed by IET 19562 (NDR 1036-4-3) with 8183 kg/ha and IET 19589 (R1218-598-1-281-1) with 7617 kg/ha. Remanika, the local check recorded 3783 kg/ha.

Advanced Variety Trial - 1- E

Twenty one entries were tested along with 4 checks in an RBD with three replications. Among the entries, IET 20130 (CR 898-2-1) recorded the maximum yield of 7967 kg/ha followed by IET 20121 (BAU - GVT 437-06) with 7466 kg/ha and IET 20150 (R1432-246-101-3-1-1) with 6833 kg/ha. Remanika, the local check recorded 4783 kg/ha.

Initial Variety Trial - E

Forty nine entries received from DRR, Hyderabad along with check variety Remanika were laid out in an RBD with two replications. IET 20487 (NDR 1041-3-1) recorded the maximum yield with 6750 kg/ha followed by IET 20493 (UPR 2783-1-1-1) and IET 20516 (BAU GVT 468-07) with 6550 kg/ha.

Advanced Variety Trial - 2- IME

Nine entries were tested for yield and reaction to biotic stresses in an RBD with three replications. Among the entries, IET 19287 (PAU 3116-25-5-1) recorded the maximum yield of

10917 kg/ha followed by the hybrid check PA 6201 with 7150 kg/ha and local check Krishnanjna with 5900 kg/ha.

Advanced Variety Trial - 1- IME

Eleven entries with 2 hybrids, 5 inbreds and 4 checks were evaluated during Punja 2007-08. IET 19557(HKR 2002-81) recorded the maximum yield of 8167 kg/ha followed by MTU 1010 with 6984 kg/ha and IR 64, the national check with 6783 kg/ha.

Initial Variety Trial - IME

Sixty four entries were laid out in an RBD with two replications. IET 20115 (NVS R 20) recorded the maximum yield of 9675 kg/ha followed by IET 20152 (R 2340-10) with 9575 kg/ha and IET-19985 (UPR 3193-99-471-1-1-1) with 9000 kg/ha.

Maintenance Breeding programme

A strong maintenance breeding programme to produce nucleus and breeder seeds of all the Moncompu rice varieties is in progress at RRS, Moncompu.

Permanent Manurial Trial

Results of the Permanent Manurial Trial in rice conducted at Rice Research Station, Moncompu during 20th year showed that there was no response to Potash in the intensive double crop rice in Kuttanad eco system, where straw recycling is practiced, whereas response to Nitrogen is 2 ton/ha. Skipping Phosphorous continuously reduced yields.

Field Evaluation of Rice Herbicide PIH 2023

The test herbicide PIH 2023 10% SC was evaluated for its effectiveness in direct seeded rice during the Puncha season in comparison with hand weeding twice, Clincher and Almix. The herbicide was found to be effective for controlling echinocloa, sedges and broad leaved weeds in a single application. The grain yield and weed dry weight recorded for the herbicide at 25, 30 and 60 gm ai/ha were statistically on par with hand weeding twice and significantly superior to Clincher and Almix.

Weed Control Trial for transplanted rice

In this experiment, a new herbicide molecule Penoxsulam 24 SC was evaluated for weed control efficiency at different doses both as pre emergence and early post emergence. The herbicide was found to be effective against grasses, sedges and broad leaved weeds. The grain yield recorded for the different doses at different times of application were statistically on par with weed free check, hand weeding twice and Butachlor.

Evaluation of different crop establishment methods for increasing the yield in transplanted rice

The experiment was conducted to find out the suitability of SRI method of planting in Kuttanad. The treatments included conventional method of transplanting using 25 days old seedlings @ 2 seedlings/hill, transplanting with dapog seedlings of 15 day old seedlings @ 2 seedlings/hill and SRI method with 7 day old seedlings @ one seedling/hill. The spacing adopted for the conventional method was 20x10 cm, 20x 20 cm and 25x25 cm, for the dapog method 20x20 cm and 25x25 cm and for SRI 25x25 cm. The SRI plots were managed as per the SRI guidelines. The results indicated that the grain yield was highest for conventional method of planting which was on par with planting using dapog seedlings. The SRI method recorded the lowest grain yield significantly inferior to the other methods.

Studies on crop stand establishment and water management of direct sown rice under puddled conditions

In this experiment the performance of different incubation periods (for sprouting) of the paddy seed was tested under varying water management situations at sowing. The water management situations included drained seed bed, 2.5cm standing water and 10 cm standing water at the time of sowing and the incubation periods were 12, 24, 36 and 48 hours. During puncha season 2005-06, there was no significant difference in the growth performance and yield between the treatments. However during Kharif 2006, sowing in 2.5 cm standing water or completely drained field recorded significantly higher grain yield compared to 10 cm standing water. Though not statistically

significant, the performance of the seeds incubated for 12 hours was better in 2.5 cm of standing water while that of the seeds incubated for 24 and 36 hours was better on a drained seed bed. The seeds incubated for 48 hours did not show much variation in any of the situations. During Puncta 2006-07, the water management practices or incubation methods did not show any significant influence on grain yield.

Effect of tillage and nutrient management on performance of direct seeded rice under Rice-Rice-Water Fallow cropping system

The treatments included four tillage methods viz. Conventional tillage, Zero tillage, Minimum tillage before Puncta and Minimum tillage before Additional crop along with two sources of P fertilizer with and without additional Sulphur. The tillage methods and P sources did not significantly influence the grain yield during the Puncta season of 2005-06. During 2006-07, the grain yield was significantly lower in Zero tillage while conventional or minimum tillage recorded comparable grain yields during both the seasons. The different sources of Phosphorus or addition of Sulphur did not significantly influence the grain yield.

Rice productivity in relation to internal supply capacity of nutrients

The objective of this trial is to evaluate the field variability in soil supply capacity of nutrients and its relationship to rice productivity at current fertilizer management levels.

There is statistically significant grain and straw yield reduction in the N omission plot indicating that nitrogen fertilization is a must for economic rice production. The grain and straw yield data of the P and K omission plots are on par with POP applied plots. 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.

Screening of rice germplasm for Fe and Zn contents

The objective of this study is to identify promising donors accumulating more Fe and Zn especially in seed that can be used in bio-fortification programmes. In the screening trial 29 Moncompu and Pattambi varieties were included. At the All India level 221 test varieties/cultures were included from six locations.

For Fe Karthika from Moncompu with 58 mg kg⁻¹ Fe content, were included in the top ten cultures. For Zn Renjini from Moncompu recorded the highest Zn content of 44 mg kg⁻¹ in the grain.

Out of 221 rice varieties/cultures screened by AICRIP at 6 locations for Fe and Zn accumulation in grain (brown rice), 3 varieties/cultures from KAU, KARTHIKA, BHARATHY and SD 36 were found promising recording comparatively higher Fe and Zn contents in their grain.

Karthika from Moncompu were also found superior in terms of grain yield (6.75 t ha⁻¹) and both Fe (58 mg kg⁻¹) and Zn (43 mg kg⁻¹) contents.

Evaluation of new fungicide formulations for sheath blight control

Filia 52.5 SE @ 1.5 ml, 2.0 ml, 2.5 ml/lit, Nativo @ 0.4 g, Rhizocin @ 2.5 ml and Tilt 25 EC @ 1.0 ml/lit were effective against sheath blight incidence. There was significant difference in the grain yield data.

Evaluation of new fungicides against blast Filia 52.5 SE @ 1.5 ml, 2.0 ml and 2.5 ml/litre and Nativo 0.4 g/litre were found effective against blast disease.

Evaluation of biopesticides against location specific diseases

The biopesticides Trichozen -T @ 10 g, Biotos @ 2.5 ml/lit, Florezen P @ 2.5 g/lit, Ecomonas @ 10 g/lit were found effective in checking the sheath rot severity. But there was no significant difference in grain yield data.

National Screening Nursery (NSN)

Eight hundred and twentyfive AICRIP cultures (161 NSN-1, 543 NSN-2, 56 NHSN and 65 DSN cultures) were screened against blast, sheath blight, brown spot, sheath rot and bacterial leaf

blight diseases during Rabi 2006-07 season. 20 cultures showed their Multiple Resistant nature for all major diseases in both season.

Screening rice varieties against important diseases

Twenty Moncompu varieties and 14 Njavara cultures were screened during this season. Moncompu varieties MO 5, MO 16, Njavara cultures 5 and 7 were multiple resistant to sheath blight, sheath rot, neck blast, brown spot and bacterial blight diseases.

Control of False smut of rice

The results showed that Result 25 EC @ 1.0 ml/lit, Kochide 2000 54 DF @ 3.0 g/litre were equally effective for false smut disease and followed by Kochide 2000 54 DF @ 2.0 g, Kavach 75 WP @ 2.0 g and Indofil M-45 75 WP @ 2.5 g/litre were statistically on par.

Pesticide Compatibility Trial

The combined spray of Sivic 75 WP @ 0.6 g + Caldan 50 SP @ 1.6 g, Sivic 75 WP @ 0.6 g + Indoxacarb @ 0.4 ml, Kitazin 48 EC @ 2 ml + Caldan 50 SP @ 1.6 g/lit and Kitazin 48 EC @ 2 ml + Indoxacarb @ 0.4 ml were found most effective in restricting the neck blast and stem borer incidence during this season.

Integrated Pest and Disease Management in rice (RIC/03-01-08-2003/ MON(4) KAU)

The treatments of *Pseudomonas fluorescens* as seed+soil+foliar, seed+foliar and the botanicals Neem oil 3%, Actoak @ 5 ml/lit were found to be effective for the sheath blight and blast diseases during Rabi 2006-07.

Surveillance for detecting incidence of pests and diseases of rice

Pest Surveillanace was conducted during Rabi 2007. Incidence of leaf folder and stem borer were below ETL in Kuttanadu. The late sown crop at Mathikayal recorded 10-15 % white earheads.

Population dynamics and integrated management of leaf folder in rice

Neem Oil 1%+ Chlorpyrifos 0.05%, Neem Oi 2%+ Monocrotophos 0.05% and Imidachlolprid 0.005% gave maximum yield and treatments were on par with control.

Extension Programmes

a) Highlights of extension activities

• Formation of Self Help Group

The SHG "Grama Sree" was formed with 14 VHSE qualified unemployed women and registered under the Registrar of Society, Alappuzha. They were given a vocational training on Production of *Pseudomonas*, Trichocards, Mushroom, Vermicompost and Nursery management.

• Formation of Sales Counter

A Sales cum information counter was started from 12.3.08 onwards at Rice Research Station, Moncompu for dissemination of knowledge and sale of KAU products.

• Mitigating distress of Kuttanad farmers

A Karshaka Sevana Kendra was opened at RRS, Moncompu on 25.3.08 to help the Kuttanad farmers who were in distress following an unexpected and untimely rain which occurred during the second week of March, 2008. The one Paddy reaper available in the station was given on rent to the farmers based on their request to complete the harvesting

• HRD activity

Organised a training on, "Mass production of *Pseudomonas*, Trichocards, Mushroom, Vermicompost and Nursery management" to VHSE qualified unemployed Women from 28.1.08 to 3.3.08.

The scientists of the station took classes for Assistant Director of Agriculture and Agricultural Officers of Alappuzha in the Pe season training organized by DOA during Kharif 2007 and Rabi 2007-08.

Participated in the Research-Extension Interface conducted by Department of Agriculture at Kottayam, Alappuzha and Pathanamthitta.

- **Field Visits**

As members of Multidisciplinary Diagnostic team, 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 100 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.

Farm Advisory Services

In Person	Over Telephone	Through Letters
91	62	3

Radio talks/ TV Programmes/ Audio-Video Cassettes

Topic	Date	Name of Scientist
Keralathil Nelkrishi Nilanilkanamenkil	16.4.2007	Dr. Leenakumary. S

List of Publications

Scientific papers

Leena Kumary. S. 2007. Protection of Kerala's rich genetic diversity in crops from Biopiracy. Paper presented in the National Seminar on "Patent on Seeds", May 2007, organised by Gandhi Smaraka Grama Seva Kendram, Kerala.

Leena Kumary. S (2007) Collection, documentation and conservation of indigenous scented and medicinal rice germplasm of Kerala. Proceedings of the Interactive workshop on Agro Biodiversity Hotspots and Access and Benefit Sharing held on 19th and 20th July 2007 at Annamalai University, Tamil Nadu.

Important visitors

Category	Institution	Date
Central Team visit to assess the flood damage	Ministry of Agriculture	03-08-07

Details of Sale of Seeds/ Planting materials/ Biocontrol agents etc.

Item	Quantity	Revenue (Rs.)
Paddy seeds	5.316 tons	92854
Coconut seedlings	251	7530

Finance

Head	Expenditure	Receipts
Non-Plan	55,68,645	1,89,353
Plan	8,10,067	
ICAR	26,44,591	
Other EAPs		
Revolving Fund		

ONATTUKARA REGIONAL AGRICULTURAL RESEARCH STATION, KAYAMKULAM

Name of Head of Station : i). Dr.Sverup John, Professor
(1-4-07 to 18-6-07 and from 5-11-07 to till date)
ii). Dr.T.N.Vilasini, Professor (19-6-07 to 4-11-07)

Deputation of Scientists for seminars/workshops/symposia

Scientists were deputed for various seminars/workshops/symposia

Deputation of Scientists for training programmes/seminars/summer school/winter school/short course

Scientists were deputed for various training programmes/seminars/summer school/winter school/short course.

Research Programmes:

a. Major research achievements (highlights)(Attach photographs of salient Findings)

- Under AICRP oil seeds breeding, trials IVTS(27X3RBD), AVTS(11X4 RBD) and maintenance of germplasm (249 Nos.) and evaluation of inter specific cultures (99 Nos) were undertaken during summer 2007
- Evolved eight mudakan cultures of rice for Onattukara which are under evaluation and identified two promising pre-release cultures, viz: culture-18 and cul-56 for cherady tract.
- Under the CDB project, collected 8090 elite seed nuts and produced 821 hybrid nuts.
- The storage pests viz; *Triboleum spp*, *Oryzaephilus surinamensis* and *Rhizopertha dominica* were identified in stored groundnut samples.
- Triazole fungicides viz. hexaconazole and bettertanol were significantly superior in controlling the late leaf blight in groundnut and recorded maximum yield.
- Two rice cultures OM-2 and OM-3 performed better in the farm trial conducted in the Oorumundakan area.
- Two cowpea varieties Culture -3 and Culture -5 and a local variety CDM-1, performed better in the farm trial.

Extension programmes;

a) Highlights of extension activities

Scientists of this station participated in different Agricultural Seminars organized by the department of Agriculture, FACT and other organization related to Agriculture in Trivandrum, Kollam, Alappazha, Pathanamthitta and Kottayam Districts and handled classes.

Farm Advisory services:

In person	Over telephone	Through letter
100	40	6

List of publications

Scientific papers

Suja.G. and Indira.M. 2007. Influence of organic and inorganic fertilizers on the incidences of insect pest of paddy. *Insect Environment* 13(1)P45-47

Suja.G. 2008. Evaluation of insecticide against pea aphid *Aphis craccivora* Koch. in cowpea relative toxicity to its potential predators *Menochilus sexamauculatus* Fab. XX Kerala Science Congress January 28-31

Suja, G. 2007. Toxicity and relative safety of insecticides to *Coccinella transversalis* Fab, a potential predator of *Aphis craccivora* Koch in cowpea. *Current Biotica* 1(1) P 29-31

Finance

Head	Expenditure	Receipts
Non plan	65,82,826/-	
Plan	4,14,867/-	5,76,358/-
ICAR	16,36,030/-	
Other EAPS	3,90,650/-	
Revolving fund	1,70,900/-	6,34,121/-

RICE RESEARCH STATION, VYTTILA

Name of Head of Station : Dr. C.G. Rajendran

Major research achievements:

Rice and rice based farming system:

- Proline content, peroxidase activity and superoxide dismutase activity can be used as biochemical markers for salinity tolerance screening.
- Semidwarf plants of VTL-3 could be evolved through mutation breeding programme. Some of the mutants were found to be very good yielders in the preliminary evaluation.
- Three promising cultures viz. cul.2625, cul.204 & cul.253 were selected from the national and international screening trials conducted at this station.
- The results of 24 years of Permanent Manurial Experiments indicated the necessity for a re-scheduling of existing practice of lime application. Instead of applying lime 50 – 50 at sowing and dismantling, the entire quantity applied at the time of sowing is more preferred in terms of reduction of toxins and better establishment.
- Marginal increase in yield was obtained under situations of daily inflow and flushing due to tidal currents under pokkali conditions than under stagnant water conditions.
- Preliminary studies on the use of commercially available biofertilisers revealed any significant positive influence on rice production under pokkali conditions.
- Efforts to find out an alternate effective sowing method for pokkali rice revealed that sowing sprouted seeds on ridges taken at 25 cm height and 40 cm apart were equally effective as the traditional method of mounds.

Other crops:

- Screening the orchid germplasm, yielded varieties viz. Sonia, Sakura pink, Kasim whiter, Emma white and Caesar white saline environment. These varieties were selected for large scale multiplication through tissue culture

Details of research projects:

Completed projects : 1

Ongoing EAP projects: 1

Name of project	Funding agency	Name of PI	Name of Co-PI	Outlay (Lakhs)
<i>in vitro</i> and <i>in vivo</i> mutagenesis in rice and screening for tolerances to abiotic stresses.	BRNS	Dr.K.S.Shylaraj Professor(Pl.Br.)	Dr.V.Sreekumaran Prof (agro)	17.69

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.

List of publications:

Scientific papers:

- K.S. Shylaraj, Preeta Liz Korah, Snitha. S and Lovely B. (2008) Semidwarf mutants induced by gamma irradiation in rice (*Oryza sativa L.*) Presented in International Conference on Sustainable Agriculture, February 6-7, held at CMS College, Kottayam
- K.S. Shylaraj, Snitha S, Preeta Liz Korah, and Nayana Jose. (2008) Improved salinity stress tolerance in rice (*Oryza sativa L.*) by accumulation of osmoprotectant proline. Presented in International Conference on Sustainable Agriculture, February 6-7, held at CMS College, Kottayam
- K.S. Shylaraj, Snitha. S, Preeta Liz Korah, and Nayana Jose. (2008) Antioxidant enzyme peroxidase in germinating rice seeds in relation to salt tolerance. Presented in International Conference on Sustainable Agriculture, February 6-7, held at CMS College, Kottayam
- K.S. Shylaraj, Preeta Liz Korah, Snitha. S and Lovely B. High yielding semidwarf Pokkali rice mutants tolerant to abiotic stresses of coastal saline ecosystem. Accepted for poster presentation in International Symposium on Induced Mutations in Plants to be held in 12-15 August 2008, at Vienna, Austria

Popular articles:

Anila kumar, K. and Sreekumaran, V. (2007) 'Thavidinte vila arariyunnu' Karshakasree 12 (12) pp 46- 47

Anila kumar, K. and Sreekumaran, V. (2007) 'Vinasathinte vitheriyumbol' Janmabhumi 2007, Oct 25.

. Finance 2007 - 2008

Head of a/c	Provision for the year (lakhs)	Expenditure(Rs)	Station receipts(Rs)
Non plan	71.100	63.550	301725
Plan	23.880	6.350	
ICAR/ Other EAPs	3.680	3.520	
Total	98.660	73.420	301725

SUGARCANE RESEARCH STATION, THIRUVALLA.

Name of Head of station : Dr.T.M.Kurian

Faculty improvement programme:

a. Deputation of Scientists for Seminar / Workshops / Symposia
Dr.K.Sreekumar, Professor (Plant Breeding), Smt. Nimmy Jose, Sri. Surendran, M Asst. Professors (Agronomy) attended seminar on AICRP on Sugarcane at College of Agriculture, Pune from 9 to 11 October 2007.

b. Deputation of Scientists for training programmes/ seminars / summer school / winter school / short courses

Name and Designation	Details of training			Sponsoring organization
	Topic	Venue	Date	
Smt. Nimmy Jose Asst. Professor (Agronomy)	Information Technology	UGC Academic Staff College, Trivandrum	21-07-07 to 17-08-2007	UGC
Dr. Sosamma Cherian Professor (Biochemistry.)	Processing, Handling and Storage of Jaggery from Sugarcane	IISR, Lucknow	10-12-2007 to 30-12-2007	ICAR

Research

a. Major research achievements (highlights)

Crop Improvement

Seven Sugarcane cultures viz., culture no. 12/97, culture no. 24/97, culture no. 25/97, culture no. 27/97, culture no.33/97, culture no.44/97 and culture no.48/97 were evaluated in CYT (1st and 11nd plant crop and 1st ratoon crop)

Nine Sugarcane genotypes viz., culture no. 31/98, culture no. 61/98, culture no 95/98, culture no. 106/98, culture no. 116/98, culture no. 119/98, culture no. 160/98, culture no. 167/98 and culture no. 176/98 were evaluated in CYT (1st and 11nd plant crop and 1st ratoon crop)

Ten Sugarcane cultures viz., culture no. 2/99, culture no. 11/99, culture no. 12/99, culture no. 18/99, culture no. 37/99, culture no. 40/99, culture no. 45/99, culture no. 52/99, culture no. 58/99 and culture no. 70/99 were evaluated in CYT (1st and 11nd plant crop and 1st ratoon crop)

Crop Management

Spraying ethrel at 500 ppm four months after planting was found to be effective in delaying/controlling flowering in sugarcane for staggered harvesting in madhuri variety.

Application of 75% of the recommended dose of NPK as inorganic and 25 % as organic (FYM) in plant crop of sugarcane is found to be superior in cane yield and sugar yield compared to the other combinations of organics and inorganics.

Pre emergence application of the weedicide Metribuzine 1 kg ai/ha along with hoeing 45 days after ratoon initiation is found to be effective in controlling weeds in sugarcane ratoon. The yield of the crop was also superior compared to the other weedicides tried.

Cultural practices like hoeings 1st, 4th and 7th week after ratoon initiation or thrash mulching in alternate rows along with hoeings at 1st and 6th week after ratoon initiation was superior in cane yield than weedicide application.

Extension programmes

a. Highlights of extension activities

Sugarcane Research Station, Thiruvalla is actively involved in the extension programme of the University to cater to the technical needs of the farming community and other personals involved in agricultural extension and education. The major contribution in the field of extension as on 31.4.2008 are provided below.

Dr.T.M.Kurian, Professor and Head of the station is the chairman of the Research – Extension Interface Programme for Pathanamthitta District and all scientists of the station serves as resource personals in the interface. Dr.Jessy.M.Kuriakose, Professor (Horticulture) presented a paper on “Sustainable vegetable production” in the interface held on 12.2.2008.

The scientists of the station are handling classes for Department officials and farmers of Pathanamthitta, Kottayam and Idukki districts

Seminars/classes were organised on control of SWA during July – August at Kuttoor. Classes were also arranged on integrated management of the pest including biological means. Leaflets on SWA infestation and its control were distributed on the occasion. Dr.T.M.Kurian, Dr. Ambika devi, Professor, RARS, Kumarakom, Dr.V.R.Shajan and Smt.Nimmy Jose attended the campaign.

The station celebrated the Karshakadinam (17.8.2007) by supplying planting materials offering classes for farmers and conducting field visits. Dr.T.M.Kurian conducted field visits in Thiruvananthapuram and Pandanad sugarcane plots and Dr.Jessy.M.Kuriakose, Professor took a class on scientific vegetable production for the farmers of Ezhamkulam Krishi Bhavan.

Elite planting materials including breeder seeds of vegetables have been produced and distributed from the station. A total quantity 61 Kg. vegetable seeds (Breeder seed 3.7 kg.), 1.25 tonnes of sugarcane sets, 617 nos of banana snakers and 20 nos coconut seedlings have been distributed from the station during 2007-08.

Dr.Jessy.M.Kuriakose, Professor and Dr.V.R.Shajan, Associate Professor are the technical experts from Kerala Agricultural University in the SHM and ATMA programmes for Pathanamthitta district and contributed actively in the programmes. Under ATMA programmes, four research projects have been submitted for approval on refinement of the existing cultivation practices in yard long bean, banana tapioca and coconut followed by the farmers of Pathanamthitta district. Smt.Nimmy Jose, Assistant Professor is the technical member of the district seed campaign committee for IPM in Pathanamthitta district.

A farmer’s meet was organised on 29.4.2008 in the station involving the sugarcane growers and jaggery producers of Pathanamthitta and Alappuzha districts, to discuss about registration of Thiruvalla sarkara as geographical indication. The meeting was chaired by Dr.D.Alexander, Director of Research and addressed by Dr.Atman, Associate Director of Research and Co-ordinator of WTO cell, Dr.C.R.Elsy, Professor and Convenor, IPR cell, KAU, Dr.Joseph Philip, ADR, Kumarakom, Dr.Sosamma Cheriyan, Professor and Smt.Anitha, AO, Eraviperoor. Dr.Jessy Thomas, Professor and member of IPR cell and four A.O.s from the Kerala Agriculture Department also attended the meeting. Possibility of forming a sugarcane farmers society apart from GI registration, was also discussed.

The station has participated actively in five agricultural exhibitions conducted at Alappuzha, Neyyattinkara, Changanachery, Kottayam and Thrissur and exhibited jaggery products, sugarcane and vegetable varieties released by the station, coconut and arecanut bunches and supplied improved vegetable seeds for sale.

The scientists of the station were judges for selection of progressive farmers in Pathanamthitta district together with State Agriculture Department. They also served in committee for judging the homegardens, institutional gardens, collections of ornamental plants, agricultural produce etc. in connection with the Pushpamelas organised by Horticulture Development Society, Thiruvalla.

Dr.Jessy.M.Kuriakose, Professor delivered two lectures on 20.2.2008 and 28.2.2008 on the topic "Nursery management and Plant Propagation techniques in fruits and ornamental plants" to the VHSC qualified trainees in connection with a training programme conducted in the station during 2007-08.

The scientists of the station also took part in Krishi adalath programmes organised at Krishi bhavans. Dr.Jessy.M.Kuriakose, Professor and Smt.Nimmy Jose, Assistant Professor attended the Krishi adalath held at Krishi bhavan, Eraviperoor on 24.10.2007.

In sugarcane, FLD programmes were undertaken in three locations in an area of 0.5 hectare each, under AICRP on sugarcane Dr.K.Sreekumar, Professor and Smt.Nimmy Jose, Assistant Professor were in charge of the programme.

Technical advice is being disseminated to farmers directly and also over phone. During 2007-08 about 12 farmers were given technical guidance in farming. The scientists also visited problem fields as and when reported and gave necessary recommendations.

The meteorological data recorded in the station is utilized in the entire district of Pathanamthitta.

b. Details of activities

Scientists of this station had acted as resource person in various agricultural seminars/ training programmes

ii) Farm advisory Services

In person	Over telephone	Trough letters
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.	

iii) Field visits

Other extension activities:

Scientists of this station visited farmer's fields and gave necessary technical as and when reported by them.

iv) Radio talks/TV programmes/Audio-video cassettes:

Dr.Jessy.M.Kuriakose, Professor spoke in a Karshakavedi programme of AIR, Thiruvananthapuram that was broadcasted on 30.12.2007.

11. List of publications

Popular Articles:

Two popular articles were published from the station during 2007-08 as shown below.

(1) Nimmy Jose 2007 'Karimbil ninnum jaiva inthanam' Kerala Karshakam (Nov.) P.32-33

(2) Nimmy Jose and Dr.V.R.Shajan 2008 'Maduram vilayikam' Karshakan (April)

P.31-33

Visitors

I) No. of visitors to the Institution (farmer group/students)

Students from College of Agriculture, Padannakkad, MACFAST College, Thiruvalla and Believers church, Thiruvalla and several farmers visited the station and the activities were explained during 2007-08.

II) Important visitors

Dr. D.U. Patel, Professor. Agricultural University. Gujarat, I. Singh, Agronomist, AICRP (S), IISR, Lucknow, . Karunaanidhi, Sugarcane Research Station (TNAU), Cuddalore, S.B.Patil, Sugarcane Breeder , Agricultural Research Station, Sankeshere

Details of sale of seeds/planting materials/biocontrol agents etc.

Sl. No	Crops	Production during 2007-08			Total receipt (Rs.)
		Varieties	Seeds	Planting materials	
1.	Snake gourd	Kaumudi	28.73 kg	-	33644
2.	Bitter gourd	Priyanka	16.93 kg.	-	25395
3.	Yard long bean	Sharika	12.59 kg	-	9621
4.	Cucumber	Mudi.local	2.45 kg	-	2390
5.	Ashgourd	Indu	0.135 kg	-	135
6.	Pumpkin	Ambili	0.245 kg	-	294
7.	Sugarcane setts	Madhuri	-	27.18 t (sale 1.25 t)	1875
8.	Banana suckers	Palayankod.	-	286 no.	2780
		Njalipoovan	-	176 no.	1408
		Chenkadali	-	104 no.	1248
		Kannan	-	44 no	352
		Others	-	7 no.	30
Total					Rs.79, 172

Other details if any:

- Installed a nursery unit in the station and 1000 coconut had been sown
- Started a small vermicompost unit and produced about 250 kg of vermicompost.

Finance

Head	Expenditure (Rs.)	Receipts
Non-Plan		
347-31-0034 (Non-Plan)	4249767	
347-31-0035 NARP (Non-Plan)	488968	
Plan		
347-31-2251 Seed and nursery programe	33255	
347-31-2273-Srengthening Res. On Cucurbatious Vegetables (Res. On Vegetables)	5583	
347-31-4427- Research on sugarcane	13151	
ICAR		
347-31-6632 AICRP on Sugarcane (ICAR 75-25)	1653285	
347-31-5517 Frontline Demonstration	13500	
Other EAPs		
347-31-8219 KSCTE Project on product diversification of sugarcane	126814	
Revolving Fund		
Receipts		360218

FACULTY OF VETERINARY AND ANIMAL SCIENCES CENTRE FOR PIG PRODUCTION & RESEARCH, MANNUTHY

Name of Head of the Station : Dr. Philomina P.T., Ph.D.

Details of Seminars/ workshops / symposia conducted at the station

Name & Designation	Name of the Seminar/ workshops/symposia	Venue	Date
Dr. MR. Rajan, Professor	National Workshop on pig	College of Veterinary & Animal Sciences, Mannuthy	28 th and 29 th June 2007
Dr. Syam Mohan, Assoc. Professor	National Workshop on pig	College of Veterinary & Animal Sciences, Mannuthy	28 th and 29 th June 2007
Dr. Kannan A., Assoc. Professor	National Workshop on pig	College of Veterinary & Animal Sciences, Mannuthy	28 th and 29 th June 2007

Research Programmes

a. 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 combination with Duroc as terminal sire (i.e. Duroc as terminal sire and crosses of Desi, Large White Yorkshire and Land race).
2. Under the field condition swill feed was found to be equally effective compared to concentrate feed in producing growth of the fattener pigs.
3. The study on the interactions of minerals and their availability at different levels of calcium and phosphorous and on phytase supplementation in crossbred pigs utilizing 64 crossbred piglets. Study also includes digestibility trials and carcass characters such as dressing percentage, back fat thickness and loin eye area.
4. A study on the isolation and characterization of bacteria associated with gastroenteritis in weaned piglets was under taken in to considering antibiotic susceptibility pattern of isolates, pathogenesis of isolates in mice and presents of plasmids in isolates
5. Efficiency of the two types of housing systems adopted for farrowing in relation with litter size, birth weight, weight gain and pattern of mortality till weaning in the crossbred piglets were evaluated.

On going Projects

Name of the Project	Funding Agency	Name of the PI	Name of the Co-PI	Outlay (in lakhs)
Scaling up of piglet production	State govt.	Dr. M.R. Rajan (1-4-07 to 2-11-07) Dr. Syam Mohan (3-11-07 to 21-11-07) Dr. Kannan A. (22-11-07 to 31-3-08)		16.000
AICRP on Pigs	ICAR	Dr. M.R. Rajan (1-4-07 to 2-11-07) Dr. Syam Mohan (3-11-07 to 21-11-07) Dr. Kannan A. (22-11-07 to 31-3-08)		9.900

Extension Programmes

Highlights of extension activities

There was incidents of sudden deaths in the Centre and in different parts of Kerala due to swine fever. The Centre had discussion with the field veterinarians of Animal Husbandary Department, Govt. of Kerala and recommended to procure the vaccine against the swine fever from Animal Disease Control Programme of Govt. of Kerala.

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. During the last year there were 4365 telephone calls from farmers of Kerala and even neighbouring states. There were 1320 personal contacts seeking advice on various aspects of pig farming which were entertained by the unit. During the last year about 45,000 farmers & students from different states of India visited the farm.

The Centre for Pig Production and Research could establish 150 piggery units throughout the State of which sizable number of farmers took up this as a full time engagement and this unit is proud to report that it could provide a sustainable income for the farmers and many of them now totally depends on their pig farm as their regular income. The Centre gives technical advice in the preparation of project reports, establishment of field units of pigs and active involvement in people's campaign programmes in decentralised planning. Many progressive pig farmers have been participating and discussing the prospects and problems of pig rearing in Kerala and many of the pig farmers expressed their success stories. Self employment training was given to unemployed women from weaker section of the community for starting their own piggery units. Recently different units of Kudumbashree programme were undertaken for short-term training on piggery for their better livelihood.

With the collaboration of Kerala Live Stock Farmers Association, the Centre has organized farmers meet and discussed the constraints and limitations of the pig farming in the state and remedial measures were evolved and the same has been submitted to the state government for necessary action through the association. The Centre has been producing and distributing approximately 5000 quality piglets to the farmers of Kerala and all over India every year attaining an average body weight of 150 kg with lean meat at the market age

Farm Advisory Service

In person	Over Telephone	Through Letters
1320	4365	96

Field visits

No. of visits	Problem identified	Recommendations
22	In efficient waste utilization, Lack of information regarding pig rearing	Recommended construction of bio gas plant, educate people through media (eg. NECC), Protection to pig farmers by the state govt.

List of Publications:

Scientific papers

Poultry by-product meal as a alternative Protein source in grower pig diets. Kannan A.; Sekhar M.; Syam Mohan K.M. and Rajan M.R (in press)

Effect of different housing system on production performance of post weaned crossbred pigs. Kannan A.; Syam Mohan K.M.; Binesh K. and Kishore Kumar K.J.(in press)

Mortality pattern of classical swine fever in Kerala. Kannan A.; Sekar M.; Syam Mohan K.M; Rajan M.R. and Chacko B.(in press)

Evaluation of different housing system of pigs. Kannan A., Syam Mohan K.M. and Rajan M.R.(in press)

Utilisation of chaff grain meal in the rations for Large White Yorkshire pigs. Syam Mohan K.M.; Joseph Mathew and Kannan A. (in press)

Effect of feeding a low cost ration containing three unconventional feedstuffs to Large White Yorkshire pigs. Syam Mohan K.M.; Joseph Mathew and Kannan A.(in press)

No of visitors to the institution (farmer group /students)

Farmers group : 45

Students group : 56

Important visitors

Following eminent scientists from different parts of the country participated in the National Workshop on Pig held at this Centre on 28th & 29th of June 2007'

Dr. K.M. Bujarbaruah,, Dy Director General (AS) ICAR, Krishi Bhavan, New Delhi

Dr. T.J.Rasool, Asst. Director General (AP& B), ICAR, Krishi Bhavan, New Delhi

Dr. Anubrata Das, Director, NRC on Pig, Guwahati

Dr. M.K.Tamuli, Principal Scientist, NRC on Pig, Guwahati

Dr. Mohan, N.H., Scientists, NRC on Pig, Guwahati

Dr. Dhireswar Kalita, Incharge AICRP on Pig, Assam Agrl Unvrersity, Guwahatti

Dr. S.K. Singh, Incharge AICRP on Pigs, Birsar Agrl. Univeristy, Ranchi

Dr. D. Srinivas Rao, Professor, Sri Venketeswars Veterinary University, Tirupati

Dr. E.B. Chakurkar, Incharge AICRP on Pig, ICAR Research Complex for Goa, Goa

Dr. J.s. Arora, Incharge AICRP on Pig, Jawaharlal Nehru Krishi Viswavidyalay, Jabalpur, M.P

Dr. A.K.Chabra, Incharge AICRP on Pig, IVRI, Izat Nagar, U.P.

Dr. Sivakumar, Incharge AICRP on Pig, Livestock Research Station, Kattupakkam

Dr. S.C.Chopra, Rtd. ADG, Haryana

Dr. Kishorekumar Barua, Dept. Of Animal Nutrition. COVAS, Khanpara. Guwahati

Details of Sale of pig

	Item	Quantity	Revenue (Rs. In lakhs)
CPPR & Scaling up of piglets	pigs	898 Nos	16.894
AICRP on Pigs	pigs	150 Nos	1.920

Finance

Head	Expenditure(Rs. In lakhs)	Receipts(Rs. In lakhs)
Non Plan		
CPPR	26.367	16.894
Scaling up of piglet production	12.470	-
Plan		
AICRP on Pigs	25.549	1.920

**UNIVERSITY POULTRY AND DUCK FARM,
MANNUTHY**

Name of Head of the Station

:Dr. Leo Joseph

Finance

Head	Expenditure	Receipts
Non-Plan	74,97,895/-	38,55,953/- (Internal receipt)
Plan		
ICAR	1,00,900/-	-
Other E A Ps	4,60,600/-	-
Revolving Fund	8,11,019/-	5,60,010/-

LIVESTOCK TECHNOLOGY (MEAT TECH.UNIT)

Name of Head of the Station

:Dr. P. Kuttynarayanan

Finance

Head	Expenditure	Receipts
Non-Plan	35,54,121/-	21,87,000/-
Plan		
ICAR	10,00,000/-	10,00,000/-
Other E A Ps	22,101/-	1,02,000/-
Revolving Fund	48,53,590	63,88,028/-

GOAT SHEEP FARM, MANNUTHY

Name of Head of the Station : DR.K.C.Raghavan

Ongoing projects

Name of Project	Funding Agency	Name of PI	Name of Co-PI	Outlay
AICRP on Goats	ICAR	Dr.K.C.Raghavan	Nil	23laks

The project is operating attached to Goat and Sheep farm, Mannuthy, Centre for Advanced studies in Animal Breeding and Genetics and farmer's flock of northern districts of Kerala. Separate report is given from CASAGB, Mannuthy.)

A nuclear stock of Malabari goats was purchased during the year. The animals were multiplied and the performance is being evaluated. Presently there are 38 animals belonging to this breed. The average birth weight of the unselected population was found to be 1.59kg with an average litter size of 1.5.

A basic stock was purchased during the year and presently we 34 numbers of animals and this breed is also conserved and evaluated. The average body weight at birth of the unselected population was 1.77 kg with a mean litter size of 1.0.

Crossbreds available in the farm are crosses of Malbari with Saanen, Alpine and Boer. This is a highly selected group with an average birth weight of 2.16kg and litter size of 1.90.

Germplasm centre

Eighteen Elite Malabari bucks were selected from the farmers flock based on the performance recorded. The animals were evaluated in the farm and were distributed to different places by avoiding inbreeding, for genetic improvement. The average weight at six months of selected bucks was 21.3±3.25Kg. The selection differential was 5.74 kg and genetic gain 1.00kg. The genetic gain was calculated based on the performance of progeny recorded in the field.

Thirty five bucks were distributed from the germplasm centre during the year 2007-2008. The body weight at six months age of bucks selected were 22.50±4.55 kg with a selection differential of 5.94 kg. The average peak yield of dams of selected bucks were 953.23±28 ml with a selection differential of 105 ml

Extension programmes

Highlights of extension activities (Attach photographs of important activities)

Details of activities (wherever applicable) Regular field visits are undertaken and meetings held.

Training programmes organized

Topic	No. of trainees	Category	Venue	Date	Name of Scientist
Goat breeding and Management	30	Intership students of B.V.Sc &AH	Goat farm, Mannuthy		Dr.K.C.Raghavan

Farm Advisory Services

In person	Over telephone	Through letters
1500	2000	25

Field visit

No. of visits	Problem identified	Recommendations
Field visit in connection with the implementation of Genetic improvement programmes of AICRP on goats.	Non availability of good quality bucks	Selection of bucks from farmer's flock based on dam's milk yield and growth rate of bucks.

Radio talks/TV programmes/Audio-video cassettes

Topic	Date	Name of Scientist
Conservation of Malabari and Attapadi breeds	Asianet-Suprabatham	Dr.K.C.Raghavan

List of publications:

Raghavan,K.C.(2007)Some disturbing trend in goat breeding in Kerala. Souvenir, Travancore meet of IVA.

Raghavan,K.C.(2008) Artificial Insemination in Goats-Is the time ripe? Journal of Indian Veterinary Association.6 (1)P12-14.

Details of sale of seeds/planting materials/bio-control agents etc.

Item	Quantity	Revenue
1. Animals		Rs.1,45,920
2. Goat Milk		Rs.28013
3. Goat Manure		Rs.68868

Finance 2007-2008

Head	Expenditure	Receipts
Plan	1815906	242568

**CENTRE FOR ADVANCED STUDIES IN POULTRY SCIENCE,
MANNUTHY**

Name of the Head of the station : **Dr. A Jalaludeen.**

Faculty improvement programme.

a. Deputation of scientists for Seminar/ Workshops/ Symposia

Name & Designation	Name of Seminar/Workshop	Venue	Date
Dr. A.Jalaludeen	KAU's efforts in the Entrepreneurial Development of women	College of Forestry, Vellanikkara	13.03.2008
Dr.P.Anitha	-do-	-do-	-do-

Deputation of Scientist for training Programme/seminar/summer school/winter school/short courses

Name & Designation	Details of Seminar	Topic	Venue Date	Sponsoring Organisation
Dr.P.Anitha, Assoc.Professor	International Seminar	Animal Health Management for improving Productivity, Food Safety and Market access.	Bangkok, Thailand. 22 nd to 26 th October, 2007.	Asian Productivity Organization

Details of Seminar/ Workshops/ Symposia Conducted at the station.

Period	Topic	Venue	Date	Sponsoring Organization	No. of Farmers attended
One day programme	Capacity Building for Adoption of Technology (CAT) Scheme	CAS in Poultry Science, Mannuthy	29.02.08	NABARD	42

Research Programmes

a. Major research Achievements (Highlights)

Utilization of dried fish waste and fermented fish waste silage in Japanese quail layer ration.

A study conducted in quail layers from 7 to 26 weeks of age revealed that Cuttle fish waste silage could be used economically to replace 50% of crude protein from unsalted dried fish on protein basis without any adverse effect on overall performance.

Effect of dietary supplementation of turmeric on production performance of broiler chicken.

Dietary supplementation of dried turmeric at three levels (0.2, 0.4 & 0.6%) in broiler chicken indicated that dressed yields of broilers were high in the first two treatment groups. Supplementation

at 0.6% levels resulted in significant reduction of serum cholesterol while 0.4% resulted in reduced thigh meat cholesterol content.

Effect of Mannan Oligosaccharides on alleviation of aflatoxicosis in broiler chicken.

An experiment was conducted to study the effect of esterified Glucomannan (E-GM) on alleviation of aflatoxicosis in broiler chicken. Results revealed that inclusion of E-GM in the Aflatoxin B1 treated diet significantly counteracted the toxic effects of Aflatoxin and improved the performance of broilers. The percent eviscerated, dressed and giblet yield was restored by supplementation of E-GM to Aflatoxin B1 treated feed.

(ii) Farm Advisory Services.

In Person	Over Telephone	Through Letters
160	200	50

(iv) Radio Talk/ TV Programme/ Audio/video Cassettes.

Topic	Date	Name of Scientist
How to get increased income from backyard poultry - interview	19.10.2007	Dr. A. Jalaludeen
How to tackle Avian Influenza - radio talk	25.1.2008	Dr. A. Jalaludeen

Finance 2007-2008.

Head	Expenditure	Receipt
Other EAPs		
Revolving Fund	12385073/-	13862172/-

CATTLE BREEDING FARM, THUMBURMUZHI

Name of Head of the Station : Dr.Francis Xavier

Academic programmes:

a. UG Programme:

The Cattle Breeding Farm, Thumburmuzhi functions as a nodal centre in imparting training to the B.V.Sc. & A.H. students on various aspects of dairy cattle production during their internship period. A similar type of training with special emphasis on dairying is given to the B.Tech. (D.Sc & Tech.) students and dairy diploma trainees also.

b. P.G programme:

Thesis submitted during 2007-08 (discipline-wise)

Discipline	Name of student	Major Advisor	Title of the thesis
Livestock production And Management	Raja Ganapathy	Dr.Francis Xavier	Village level Livestock Poultry Production under industrialisation scenario

Research programmes

a. Major research achievements (highlights) (Attached Photographs of salient findings)

The farm acts as a field unit of the ICAR Field Progeny Testing Scheme of Centre for Advanced Studies in Animal Genetics & Breeding, CV& AS, Mannuthy. The semen of high, pedigreed crossbred bulls are used for artificial insemination. Evaluation of the bulls is carried out by progeny testing. In addition routine research activities like recording of milk production, reproduction and growth traits are also carried out.

b. Details of research projects

Established a Gene Sanctuary for fodder crops at Thumburmuzhy under the RKVY Project. The fodder museum construction is taken up. Different varieties of fodder grass both exotic and indigenous were collected and planted. Scientific rainwater harvesting, utilizing a geo-membrane covered pond (24x16x4m tr.) holding 17 lakh of rainwater and a permanent sprinkler system were also established.

Extension programmes

Artificial insemination and treatment of sick livestock of rural farmers of the area as per mandate of the station and supply of improved variety of fodder slips to the farmers are the major extension activities.

The first project of CBF after its inception-"RKVY- Project-Establishing of gene sanctuary of fodder crops at Thumburmuzhy" with Dr.Francis Xavier as PI and Dr.Shyama and Dr.John Abraham, COVAS, Pookot as associates envisaged Rs.20 lakhs for infrastructure development.

Farmers were trained in livestock production during the period. All the farmers were from the Milma Training Institute, Thrissur.

A biogas plant was commissioned during on March 2008 with an outlay Rs.1.5 lakhs and the use of LPG in CBF was terminated. Power generation from biogas is in the offing.

Scientific replanting of waste land of the station with improved exotic fodder was taken up in 2008

Sri.U.G.Velayudhan, President, Pariyaram Grama Panthayath, inguarated planting of trees at CBF, Thumburmuzhi and Dr.F.M.H.Kaleel, Executive Committee Member participated no it.

The base planting fodder varieties were collected from other national institutes in India.

Water Audit and management actions were started during the year and a demonstration unit of rainwater harvesting established.

Fodder cultivation and extension tie-ups with Amrita Institute of Medical Sciences utilizing their waste land at Cochin started on April 2008. Technical input and fodder slips were supplied.

Technical support was extended to 'Ecofarm Attappadi' for Tribals; 2.5 ha land for fodder and livestock model system were developed for tribals by CBF at Attappadi.

Sri.Anilkumar a reputed fodder farmer of Kolcncherry who cultivates CO3 Killikulam, Suguna and Supriya is given technical advice.

This year MILMA deputed women secretaries from Milk societies for training and demonstration at CBF dairy, during May 2008 as part of women empowerment programme.

Dairy engineering science students, internship started from 11.06.08 onwards, and did the water audit of the station.

Due to intensive production strategy the sale of fodder from the station (@ Rs.1.50 per Kg.) to ULF Mannuthy started during June 2008. The practice of procuring paddy straw for dairy was stopped.

Dr.Francis Xavier, Professor & Head served as nominee (CPCSEA) in the following institutional committes: TVM Medical College, Calicut Medical College, National College of Pharmacy Mukkam, Pariyaram Medical College, Amrita Medical College, St. James College of Pharmacy Chalakudy, Cochin University Dept. of Biotechnology, Calicut University Dept. of Biotechnology, Rajiv Gandhi Centre for Biotechnology TVM, Nagarjuna Herbal Concentrate Ltd., Thodupuzha, St. Joseph's College Trichy Tamil Nadu and Al Shifa College of Pharmacy.

Details of activities (wherever applicable)

A total of 89 artificial inseminations were done and 12800 nos. of fodder slips were supplied to the farmers during the report period. In addition the farmers were given advice on various aspects of cattle rearing and given opportunities to witness routine farm operations. Field visits were made occasionally as part of first aid service.

1) No. of visitor to the institution (Farmer/group/students) : 275

Important visitors:

Sri.B.D.Devassy, MLA, Parhayath President, (Nedumbassery), Panchayath President (Pariyaram) and Standing committee members Pariyaram Panchayath.

Details of sale of seeds/planting materials/bio-control agents etc.

Item	Revenue (Rs.)
Coconut	2,02,039.00
Arecanut	80,000.00
Jack, Mango, cashew, Nelli, Cotton	20,900.00
Firewood	7,622.00
Tamarined	650.00
Grass Slips	4,103.00
Pepper	500.00
Others	14,892.00
Total	3,30,70

Other details if any

a) Herd strength of cattle as on 31.03.2008

Sl.No	Age Group	Strength
1	Below 3 Months	11
2	3 to 6 months	14
3	6 to 12 months	11
4	12 to 18 months	14
5	Above 18 months	46
6	Dry non pregnant	2
7	Dry pregnant	10
8	Pregnant above 6 months	22
9	Milch cows	52
	Total	182

b) Milk production and reproduction performance of Crossbred Cattle during the year 2007-08

Sl.No	Parameter	2007-08
1	No. of calving	73
2	Average No. of animals in milk	58
3	Average daily milk yield/animal/day(Kg)	7.26
4	Total milk yield (Kg.)	153846.5
5	Total revenue from Veterinary Section	21,66,111.39

Finance

Head	Expenditure	Receipts
Non-plan	72,20,378	24,96,815.39
Plan	8,65,077	
ICAR	0	
Other EAPs	0	
Revolving Fund	0	
Total	80,85,455	24,96,815.39

LIVESTOCK RESEARCH STATION, THIRUVAZHAMKUNNU

Name of Head of the Station : Dr.M.R.Rajan, Associate Professor

Major Research achievements(highlights)

- During the period, the center conducted 16 research experiments, of which ten are concluded. Two masters theses and one PhD were produced during this period.
- An experiment on suitability of seven fast growing tree species as pepper standards was evaluated. The trees include *Grevillea robusta*, *Acacia auriculiformis*, *Ceiba pentandra*, *Artocarpus heterophyllus*, *Ailanthus triphysa*, *Macaranga peltata* and *Casuarina equisetifolia*. Maximum dry pepper yield was recorded by *Acacia auriculiformis* (2.90 Mg ha⁻¹ of dried black pepper). *Casuarina equisetifolia* and *Ceiba pentandra* were the poor performers with respect to pepper yield. Over all, the non-traditional pepper supports like *Acacia auriculiformis* and *Artocarpus heterophyllus* were found to be better as compared to the traditional supports.
- Results indicate that integrating MPTs and *kacholam* into the coconut based production systems increase overall productivity and profitability with no adverse effect on the growth and yield of either the main crop or the component MPTs/field crop, although the tree-crop interactions may change over time.
- *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 dense stands, however, suggests its non-suitability for growing in stands and compact blocks. It may therefore be recommended for widely spaced boundary planting and/or mixed species stands
- Evaluation of the performance of forage grasses under different light regimes suggests that Riversdale guinea and Congo signal are the most suitable species for growing under shaded conditions.

Finance

Head	Expenditure	Receipts
Non-Plan 379-36-000	1590767	3979694
Plan Seed & Nursery 379-1-2251		
ICAR 379-33-6621 AICRP on AF	108163	----
379-36-2204 Addl Facilities	1912,914	---
Other EAPs		----
Revolving Fund	-	-

KAU DAIRY PLANT, MANNUTHY

Name of Head of the Station : Dr. P. I. Geevarghese

Study tours

Sri P.Sudheer Babu accompanied the 2004 batch of B.Tech Dairy Science and Technology students in the All India Study tour from 22-2-08 to 18-3-08.

Other activities (brief outline only)

a) Students Union activities:

1. Dr.P.I.Geevarghese, Professor and Head acted as the Staff Editor of college Magazine for the College of Dairy Science and Technology Magazine
2. Dr.P.I.Geevarghese, Professor and Head acted as the Convenor of the Placement Cell of the College of Veterinary and Animal Sciences, Mannuthy
3. Sri. P. Sudheer Babu acted as the Associate Patron of the Students Union, College of Veterinary and Animal Sciences, Mannuthy
4. Sri. P. Sudheer Babu acted as the Officer in charge of the Placement Cell of the Collège of Dairy Science and Technology, Mannuthy

Extension programmes:- a) Highlights of extension activities
(Attach photographs of important activities)

b) Details of activities (wherever applicable): Dr.P.I.Geevarghese, Professor and Head attended the following farmers seminar

1. Attended the RAWE programme of the College of Dairy Science and Technology on 7-6-07 and presented a paper on Milking machines
2. Attended the Farmers Seminar at Veterinary College on 17-8-07 in connection with Karshakadinam (Chingam-1) and acted as the chief moderator of the programme.
3. Acted as the resource person for the training programme for the officers of State Soil conservation Department, conducted at Central soil and water conservation, Research and Training Institute, Udhagamandalam and handled a class on Livestock as an integral component of water shed management.

List of publications: Technical

- Beena.A.K.,Geevarghese,P.I. and Anju,K. 2007. Fermented milk products to counter lifestyle diseases. Proceedings of the National Seminar on Nutrition and lifestyle diseases held at Mannuthy on 16-4-07
- Babu,C, Geevarghese,P.I. and Harsha, V.S. 2007. Food Safety and standards Act-2006. A Dairy entrepreneurs perspective. Proceedings of the National Seminar on Safety assessment and consumer protection with reference to Dairy and Food Industry held at Tamilnadu Veterinary and Animal Sciences University, Chennai- 28 th 29 th November-2007
- Sudheer Babu,P.2007 Neutraceuticals- An imposing trend in Food Industry. Proceedings of the National Seminar on Future prospects of milk based health foods held at Mannuthy on 3-11-07.
- Sudheer Babu,P.2007 Ksheerapadam- Traditional ayurvedic preparation of dairy based neutraceuticals. Proceedings of the International convention on Traditional dairy foods ,Karnal 13 th to 17 th Nov-2007.

No. of visitors to the Institution (farmer group/students) : Farmers : 5761
Students : 2692

Important visitors

Four senior officers from Madhura Veterinary University Visited the Plant

Details of sale of Milk and Milk Products

Item	Quantity	Revenue
Pasteurised cow milk	132714 Ltr	
Pasteurised buffalo milk	20718 Ltr	
Ghee	467 Ltr	
Curd	6969 Ltr	
Ice cream 500 ml	693 Packets	
Ice cream 100 ml	1024 Cups	
Ice cream 50 ml	6436 cups	
Khoa 25 gms	10512 packets	
Paneer 250 gms	2145 packets	
Sambharam 200ml	2539 packets	
Gulabjamun 10 Nos	775 packets	
Yoghurt 50 ml	209 cups	Total : 3013289/-

Other details if any

During the period the Dairy plant procured 13,50,73 Liters of cow milk and 33251 Liters of buffalo milk. An amount of Rs 30,13,289 was collected by sale of milk and milk products during this period. During the financial year an amount of Rs 3.75,000 was transferred to the university account from the revolving fund of the Dairy plant.

Finance

Head	Expenditure	Receipts
Non-Plan	672827	
Plan	2110545	
ICAR		
Other EAPs Re-imbusement of 50% Stipend from Board of Apprentice ship Chennai		16332
Revolving Fund	2707384	3013289

UNIVERSITY LIVESTOCK FARM & FODDER RESEARCH & DEVELOPMENT SCHEME, MANNUTHY

Name of Head of the Station : Dr. V. Prasad

Faculty improvement programme

a. Deputation Scientists for Seminars/Workshops/symposia

Dr. V. Prasad, Professor was deputed to attend the 36th Dairy Industry conference at BHU, Varanasi from 19.2.08-21.2.08.

b. Awards /Scholarships to staff

Dr. V. Prasad, Prof. & Head was received the Best research article award on All India basis Published in Indian Journal of Dairy Sciences for the year 2006

i. No. of visitors to the Institution (farmer group / students) : 57

ii. Important visitors : 13

Details of sale of seeds/planting materials/biocontrol agents etc.

Item	Quantity	Revenue
Milk	1,47,182.5 kg	(worth Rs.25,05,778/00
Grass production	20,14,815 kg	Rs.20,14,815 *
Silage from grass	1,37,700 kg	Rs.2,75,400/-
Co3 cutting	2,09,000 -	Rs.62700/
	vol.21 350-kg-	Rs.10675/-
Killikulam cuttings	19550	Rs.2,75,400/-
		Rs.5865
Guinca Grass slips		
Total		48,75,233/-00

- The fodder produced is being utilized in various farm at Mannuthy campus.

Finance

Head	Expenditure	Receipts
Non-plan	Rs.1,73,40991	Rs.35,45,464.00

UNIVERSITY VETERINARY HOSPITAL, KOKKALAI

Name of Head of the Station : Dr. K. V. Athman, Professor and Head

Faculty Improvement programmes

Deputation of scientists for Seminars/Workshops/Symposia

Dr. M. K. Narayanan, Asst. Professor attended the SAARC Congress on Canine Practice at Chennai in November 2007..

Deputation of Scientists for Training Programmes/Seminars/Summer School/Winter School/Short Course

Dr. G. Ajitkumar, Asst. Professor (S.S.) attended the ICAR Winterschool on Ultrasonography and other imaging techniques for diagnosis of disease in farm and pet animals at Madras Vety. College, Chennai on December 2007.

Study tours

Dr. M. K. Narayanan, Asst. Professor accompanied the South India study tour with students of 2005 batch of College of Veterinary and Animal Sciences, Mannuthy.

Ongoing Projects

Name of project	Funding agency	Name of PI	Name of Co-PI	Outlay
Anaesthesia and Operation Theatre Management	Department of Animal Husbandry, Kerala	Dr. M. K. Narayanan	-	Rs. 6.5 lakhs

Finance

Head	Expenditure	Receipts
Non - plan	19,08,634	-
Plan	60,512	-
ICAR Dev. Grant	9,99,530	1,00,000
Other EAPs Anaesthesia	4,64,642	-
Revolving Fund	2,89,937	3,79,860

REGIONAL CATTLE INFERTILITY RESEARCH CENTRE, KOZHIKODE

Name of Head of Station : Dr. K. Ramachandran

Fisheries

Two research proposals titled: "Prelude to the biodiversity of Kadalundy estuary" (Director of Fisheries, Govt. of Kerala, Vikas Bhavan, Trivandrum) and "Aquatic bio communities of Kadalundy estuary" Kerala State Council for Science, Technology and Environment, Pattom, Trivandrum) were submitted.

Agricultural Engineering

A project on "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" was submitted to the Kerala State Council for Science, Technology and Environment, Pattom, Trivandrum.

a. Training programmes.

Topic	No. of trainees	Category	Venue	Date	Name of Scientist
Ornamental Fish culture and Homestead management	50	Practicing farmers	Krishi Bhavan, Chelanur Calicut	11.03.08 12.03.08	Dr. G.S. Narayanan Associate Professor

Radio talks

Topic	Date	Name of Scientist.
1. Diseases of ornamental Fishes	08.06.07	Dr. G. S. Narayanan Associate Professor
2. Ornamental fishes - varieties	16.11.07	
3. Breeding of egg laying fishes	07.03.08	

List of publication

Dr. G S Narayanan and Dr. K Ramachandran
Fish fauna of Kadalundy estuary

Dr. G S Narayanan and Dr. K Ramachandran
Plankton of Kadalundy estuary

Dr. G S Narayanan and Dr. K Ramachandran
Benthos of Kadalundy estuary

Details of seeds/planting materials

Sl. No	Item	Amount
1	Planting materials	Rs. 45970.00
2	Vegetable seeds	70101.00
3	KAU publications	23300.00
4	Processed foods	6390.00
	Grand total	145761.00

Finance

Head	Expenditure	Receipts
Non-Plan		
Plan	Rs. 1940556.00	
ICAR		
Other EAPs		
Revolving fund	128361.00	Rs. 145761.00

FISHERIES STATION, PUDUVEYPU, KOCHI

Name of Head of the Station : Dr. M. M. Jose

Research Programmes:

Major Research achievements (highlights)

- (i) The relative abundance of *Chanos chanos* fry during the season indicated better prospects for brackishwater farming in Kerala.
- (ii) Effective nursery management providing supplementary diet and adequate water exchange enabled to achieve optimum survival of post larvae and fry of *Chanos chanos* (Milk fish), *Mugil cephalus* (Grey mullet) and *Liza parsia* (Mullet).

Extension Programmes

a) Highlights of extension activities

i) 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 is the main hindrance for taking up farming endeavours. Since inception of the station, fish seed collection and distribution have been a major activity. 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 till fingerling stage. They are then distributed to pisciculturists and research institutions for farming purpose. In all, 68,035 seed of commercially important brackish water fish species were distributed during the report period. Two photographs depicting the works are attached. (See Annexure – I)

ii) Distribution of mangrove seed and seedling for coastal afforestation programmes:

In order to create an 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 Kerala coast and other maritime states. As a result demand for planting material has been increased considerably and distributed 1.01 lakh seed and seedling of economically important varieties of mangrove during 2007 – 08.

Details of mangrove seed distributed during 2007 – 08

Species	Number
<i>Rhizophora mucronata</i>	56,000
<i>Bruguiera cylindrica</i>	35,000
<i>B. gymnorrhiza</i>	10,000
Total	1,01,000

b) Details of activities (wherever applicable)

- ❖ 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
300	750	6

Field visit

No. of Visits	Problem identified	Recommendations
20	Impairment of water quality, Microbial diseases. Reclamation and associated problems	Good management practices , quality seed stocking, better water exchange, avoiding metabolic waste accumulation.

List of publications**Scientific papers**

- M. M. Jose. "Biculture of Sea bass, *Lates calcarifer* and Tilapia, *Oreochromis mossambicus*, a low cost method for carnivorous fish farming" 2007. National Symposium on the "Recent advances in Bio-Sciences", Bangalore. Abstract – pp 39
- M. M. Jose. "Effect of a low protein supplementary diet on the growth and production of Grey mullet *Mugil cephalus* in brackishwater ponds" 2007. – National Symposium on "Recent advances in Bio-Sciences, Bangalore – Abstract – pp. 84
- M. M. Jose. "Diversity of Mangroves at Puduveypu, a low lying marsh land in the Cochin bar mouth area". 2008. International Conference on Biodiversity Conservation and Management, Kochi. Abstract. pp. 46 .
- M. M. Jose. "Seasonal abundance of fish seed at Puduveypu, a low lying wet land in the Cochin bar mouth area". 2008. International Conference on Biodiversity Conservation and Management, Kochi. Abstract. pp. 47

Details of sale of seeds/ planting materials/ bio-control agents etc.

Item	Quantity	Revenue
<i>Chanos chanos</i>	34,660	1,03,980.00
<i>Mugil cephalus</i>	13,045	65,225.00
<i>Liza parsia</i>	16,610	12,458.00
<i>Oreochromis mossambicus</i>	2,125	14,875.00
<i>Etroplus suratensis</i>	1,595	4,785.00
Banana sucker	25	75.00
Mangrove seed and seedlings	1,01,000	1,01,000.00
Total	1,69,060	3,02,398.00

Other details if any

The land belongs to the Fisheries Station was surveyed by the Kochi Taluk Surveyor on 14th & 15th December 2007 and issued a provisional sketch. He has informed that the original sketch would be issued after completing the survey of surrounding areas.

Finance

Head	Expenditure	Receipts
Non-Plan	29,80,091.00	4,63,561.00
Plan	10,02,555.00	---
ICAR	2,29,064.00	---
Other EAPs	---	---
Revolving Fund	---	---
Total	42,11,710.00	4,63,561.00

CHAPTER IV

EXTENSION

DIRECTORATE OF EXTENSION, MANNUTHY

During 2007-08, Directorate of Extension was actively involved in the monitoring, evaluation and Co-ordination of the various extension activities under KAU. Different activities taken up in all ten Colleges, 26 Research Stations, 6 RARS and 7 KVKs directly under KAU.

KAU Pavilion was set up at Thrissur Pooram Exhibition for the purpose of transferring of advanced/latest technologies related to agriculture and related areas to public. It functioned for 45 days and more than 7 lakh people visited the stall. A Coconut-Fest was organized by College of Agriculture, Vellayani, Thiruvananthapuram. A two days festival "Malabar Mango Fest 2007" was conducted at College of Agriculture, Padannakkad which was a great success. KAU also participated in the Suvarna Varsham Exhibition at Marine Drive, Kochi, Organic Kerala Exhibition at Town Hall, Ernakulam, Mrugasamrakshanam Mela "Dhenukom" at Peringottukara, Thrissur, Karshaka Mela Thodupuzha 2008, Fruit and Flower Show Thrissur 2008. All India Exhibition at Uthralikkavu, State Agri Fair, Marine Drive, Kochi, and played a significant role.

South Indian Agri Fair 2007 was organized from December 27-30 at the Veterinary College Ground and was a great success. The fair was inaugurated by His Excellency the Vice-President of India, Sri. Muhammed Hamid Ansari and various dignitaries attended the function. Various seminars were conducted in connection with the fair.

The Director of Extension is also the coordinator of other units viz.. Communication Centre, Public Relations Office, KAU Press, CTI & ATIC, Mannuthy through which the effective extension activities of KAU were undertaken. Director of Extension is also the Chief Controlling Officer of the seven KVKs directly under KAU.

The Director of Extension performed a pivotal role in the co-ordination of various NSS activities under nine constituent colleges under KAU and many camps and various activities were conducted by the various NSS Units. A state level NSS Camp "Jeevamrutham" was conducted at College of Co-operation Banking & Management, Vellanikkara which was a great success. A ten day special camp 'Unarvu' also was organized at Wayanad.

Annual Report of the PRO Unit for the period 2007-08

The following activities have been undertaken by the PRO Unit during 2007-08.

1. 102 advertisements received from various institutions of KAU had been published through the advertising agency of KAU
2. 276 press release were issued to various news papers during the period
3. 2441 press clippings connected to KAU from various news papers were collected and forwarded to the office of Hon'ble Vice Chancellor and Registrar, KAU.
4. Timely corrective defending statements of the university were issued for publication in the case of allegations about the university published through various print and electronic media.
5. Extensive news coverage was arranged for various university level functions including the inauguration of the South Indian Agricultural Fair 2007 by Dr.Muhammed Hamid Anzari, Hon'ble Vice President of India.
6. KAU Diary 2008 (2000 copies) was published by canvassing advertisements for Rs.1.70 lakhs from various government and private agencies.

COMMUNICATION CENTRE, MANNUTHY

Name of Head of the station : Smt. K.K. Santha

Faculty improvement programme

Deputation of scientists for training programmes /seminars/summer school/winter school/short course

Various scientists were deputed for different training programmes/meetings during the year.

Awards/ Scholarships to staff

Name & designation	Other details
Dr. Jose Joseph	Best farm Journalist Award of Kerala 2007
Dr. S. Estelitta	Best stall in Thrissur Pooram Exhibition, 2007

Research programmes:

Details of research projects

1. Extension programmes

a) Highlights of extension activities

1. Providing weekly KAU News bulletin to All India Radio. Thrissur.
2. Organised KAU pavilion in Thrissur Pooram Exhibition 2007. (Dr.S. Estelitta as General Convener): Communication Centre, Mannuthy organized the KAU Pavilion in the Thrissur Pooram Exhibition 2007 at Thrissur. It was inaugurated on 11.04.2007 by Sri. K.R. Viswambharan, Honorable Vice chancellor of KAU. Pesticides free vegetable and fruit cultivation was the main theme of the exhibition with the major thrust on organic farming and terrace cultivation of fruits and vegetables. Exhibits from College of Horticulture, Vellanikkara. Pineapple Research Station, Vellanikkara, Agricultural Research Station, Mannuthy and Banana Research Station, Kannara were collected and exhibited in the pavilion. The details of latest varieties of KAU, samples of recently released paddy varieties, bio control agents, details of pest control in coconut, details of jasmine cultivation, banana cultivation, samples of vegetable varieties, blowups of breeds of domestic animals developed by KAU were exhibited in the pavilion.
3. 20000 copies of Agricultural university calendar-2008 and 250 Table top calendar-08 were printed and distributed (Dr. S Estelitta as Convener)
4. Organized KAU Pavilion in the "Flower Show" held at Thrissur during 22.01.08 to 28.01.08 (Dr. Jyothi Bhaskar as Convener)
5. Organized KAU Pavilion in the "Organic Kerala-2007" organized by Organic Charitable Trust, Emakulam during 23.04.07 to 26.04.07. (Dr. S. Estelitta as Convener)
6. 8000 copies of Package of Practices Recommendations in English (Crops 2007) were printed and released (Dr. S. Estelitta as Editor)
7. Organized KAU Pavilion in the "State Agri-Fair-2008" organized by State Department of Agriculture during 18.02.08 to 24.02.08.

8. Organized KAU Pavilion in the "Suvarnavarsham" organized by Organic Charitable Trust, Ernakulam during 20.08.07 to 25.08.07.
9. Organized KAU Pavilion in the "Samrudhi" agricultural exhibition organized by Gramapanchayath and State Animal Husbandry department at SMT GHS, Chelakkara during 30.03.07 to 02.04.07. (Dr. C.B. Manomohan as Convener)
10. Organized KAU Pavilion in the "Sneholthsavam" exhibition organized by Talikkulam gramapanchayath and State Tourism development dept. at Talikkulam beach during 06.05.07 to 07.05.07. (Dr. C.B. Manomohan as Convener).
11. South Indian Agricultural Fair 2007 was organized by KAU Dec 27th to 30th Dec 2007. It was inaugurated by the Vice- President of India His Excellency Sri. Mohammed Hamid Ansari and the Governor of Kerala Sri. R. L. Bhatia presided over the function. Sri. Mullakkara Rathnakaran, Minister for Agriculture and Sri. Elamaram Kareem, Minister for Industries, Sri. Rajaji Mathew Thomas, MLA and Prof. R. Bindhu, Mayor of Thrissur Corporation were the chief guests of the function. Theme of the fair was 'Value addition of agricultural produce'. Government institutions, private institutions, NGOs, business organizations etc from Tamilnadu, Karnataka, Kerala and Pondichery participated in the fair. Seminars were organized on each day on specific topics wherein experts from different sectors interacted with thousands of participated farmers. Each seminar was inaugurated by the local MLAs. Cultural programmes were organized during the evening hours. Prizes were distributed for the winners who participated in different competitions. The valedictory function was presided over by Sri. Vaidhyalingam, Minister for Electricity, Pondichery.
12. As part of Village adoption program in Panachery panchayath five meetings were conducted with panchayath officials, the Honourable Vice Chancellor and Scientist of KAU. A preliminary socio economic survey was conducted 22 wards.

ii) Farm advisory Services

Name of the Scientist	In person	Over telephone	Through letters	Kissan call centre
Dr. Jayasree Sankar	51	126	7	-
Dr. Jyothi Bhasker	100	200	30	-
Dr. S. Estelitta	162	220		65
Dr. C.B. Manomohan	50	50	25	-
Smt. Santha. K. K	23	100	3	51
Dr. S. Helen	4	125	5	-

iii) Field visit

Name of the Scientist	No. of visits	Problem identified	Recommendations
Dr. Jayasree Sankar	2	2	To overcome problems recommendations were suggested.
Dr. Jyothi Bhasker	5	4	To overcome problems recommendations were suggested.
Dr. S. Estelitta	30		
Dr. C.B. Manomohan	4	4	

Radio talks/TV programmes/ Audio-video cassettes

Topic	Type of programme	Venue	Date	Name of scientist
Scope for marketing of dried flower	Straight talk .	AIR, Thrissur	09.01.08	Dr. Jyothi Bhaskar

List of publications

Farm Journal: Kalpadbenu was published from the centre as part of KAU farm journal.

Scientific papers

1. Underexploited flowers of our surroundings (2007) In under utilized and under exploited Horticultural crops, Vol. 2. 2007. p.267-281
2. Cultivation prospects of Exacuem bicolor Roxbi- An endangered, ornamental anti-diabetic herb natural product radiance vol.6 (5), 2007. pp. 402-404

Books:

1. Management of Horticultural crops. New India publishing agency (Dr. Jyotji Bhaskar)
2. Estelitta et.al Organic pesticides
3. Estilitta et.al Biological control in Rice
4. Estelitta et.al IPM in vegetables
5. Final report 2006-07 of Concurrent evaluation of Schemes under Macro management in Agriculture.

Important visitors:

1. Sri. Mohammed Hamid Ansari (Vice- President of India)
2. Sri. R. L. Bhatia (Governor of Kerala)
3. Sri. Mullakkara Rathnakaran (Minister for Agriculture)
4. Sri. Elamaram Kareem (Minister for industries)
5. Rajaji Mathew Thomas (MLA)
6. Prof. R. Bindhu (Mayor of Thrissur Corporation)
7. Sri. Vaidhyalingam (Minister for Electricity, Pondichery)
8. Dr. M. Beena (District Collector, Thrissur)

Details of sale

Item	Quantity	Revenue Rs.
Publications	-	4,99,837.00

Finance 2007-08

Head	Expenditure	Receipts
Non-plan	79,14,006.00	
Plan	9,40,064.00	
ICAR	1,61,801.00	
Other EAPs	3,41,567.00	
Total	93,57,438.00	73,25,000.00

CENTRAL TRAINING INSTITUTE, MANNUTHY

Name of the Head of Station : Till 31.5.2007: Dr. Alexander George
From 1.6.2007: Dr. Joy Mathew

Academic Programmes :

Dr. Joy Mathew and Dr. Alexander George were Course Teachers for the Laboratory. for Personal Growth and Development (0 = 1) for MBA in Agribusiness Management Programme 2007-08

Agriculture

Discipline	Name of the Student	Major Advisor	Title of the Thesis
Agricultural Extension	Jaliya M.K.	Dr. Joy Mathew Professor	Reorienting the concept of Agricultural Development in the context of Kerala

HRD Activities:

- Talk on 'An introduction to Transactional Analysis as an effective tool for public relations
- Talk on 'TA for personal and organisational effectiveness' for newly appointed lecturers at UGC sponsored Orientation Course, Academic Staff College, University of Calicut on 04.02.08
- Orientation talk for RAWE, College of Forestry, Vellanikkara
- Talk at Orientation Programme, College of Cooperation, Banking and Management, Vellanikkara

Extension Programmes:

Radio Talks/TV Programmes/ Audio-Video Cassettes

Topic	Date	Name of Scientist
Freedom from Poverty and Hunger	15.08.07	Dr. Joy Mathew Professor

Finance

Head	Expenditure	Receipts
Non-Plan	-	-
Plan	3524811	1704062
ICAR	-	-
Other EAPs	-	-
Revolving Fund	-	-

AGRICULTURAL TECHNOLOGY INFORMATION CENTRE (ATIC)

Name of Head of the Station : Dr. K. Aravindakshan

Extension programmes

a) Highlights of extension activities
(Attach photographs of important activities)

b) Details of activities (wherever applicable)

i. Training programmes organized: State Horticulture Mission Sponsored training programme for the cultivation of crops such as Banana, Mango, Pineapple, Minor fruits and gooseberry, Cashew, Pepper, Ginger, Turmeric, Cocoa, Vegetables and Cut flowers. Eleven trainings covering 275 farmers were conducted.

ii. Farm Advisory Services

In person	No. of farmers	Over telephone	Through letters
Sale	50,245		
Medicinal plant advice	450	35-50 / day	25-45 / month
Horticultural crops	1,100		
Field crops	550		
Egg, Meat & Milk Products	150/ day		

Details of sale of seeds/planting materials/bio control agents etc.

Transactions for the year 2007-2008

Sl. No	Name of Items	Amount (Lakhs)
1.	Ornamental Fish	0.44
2.	Value added Products (Cocoa Chocloates, Coconut oil, fertilizers, Bio pesticides etc.)	13.67
3.	Sedlings of ornamentals, medicinal, spice, forestry and vegetable plants	12.52
4.	Dairy Products	15.23
5.	Fruit Plants	14.39
6.	Meat Products	46.29
7.	Publications	1.91
8.	Plantation Crops	14.26
9.	Poultry Products	5.77
10.	Vegetable Seds	16.57
11.	Quail & Rabbit	0.14
12.	Miscellaneous	2.59
Total		143.78

Other details if any

- a. **Onam Fair:** An onam fair was conducted on August 24th to 26th 2007 at ATIC, Mannuthy. A stall to market fruits, vegetables, dairy products and processed food products to the public at reasonable rates was opened at ATIC Centre, Mannuthy in addition to the sale of quality planting materials.
- b. **ATIC on the Internet:** 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.
- c. **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.
- d. **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.
- e. 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. Facilities for subscription of trimonthly publication of KAU- "Kalpadhenu" is possible at ATIC .
- f. **Exhibition** : ATIC participates in all major and minor exhibitions including Thrissoor Pooram Exhibition.

Involving students in ATIC Technology Dissemination Process

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 9 am to 6 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. 2007-2008 the total transaction through the veterinary counter amount to Rs. 79,56,649.05 and the students benefited Rs.1,98,916/- being their remuneration at the rate of 2.5% of the transaction.

Finance

Head	Expenditure (Rs.)	Receipts (Lakhs.)
Non – plan	Nil	Nil
Plan	35,69,323/-	Nil
ICAR	Nil	Nil
Other EAPs	Nil	Nil
Revolving Fund	1,36,08,631/-	6 lakhs

KAU PRESS, MANNUTHY

Name of Head of the Station : Press Manager

1. Introduction

The KAU Press is engaged in Printing quality information materials like 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 and current file leaves, practical manuals, kalpadhanu, 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

178 printings works were received and altogether 208 works were completed during the period.

Finance

Head of account	Expenditure (Rs)	Receipts (Rs)
Non-plan 404-40-1103	46,97,295	-
Plan 404-40-2278 404-40-3426	15,76,638	20,35,377 (including FT bills)
Total	62,73,933	20,35,377

KRISHI VIGYAN KENDRA, KOTTAYAM

Name of Head of the Station : Dr. K.J. Joseph

Deputation of Scientists for Seminars/Workshops/Symposia :

Scientists were deputed for various for Seminars/ Workshops/ Symposia :

Deputation of Scientists for training programmes/seminars/summer school/winter school/short course:

Details of Seminars/Workshops/Symposia conducted at the station

Particulars	Venue	Date
Sensitizing workshop for scientists of Zone of Problem Areas	Seminar Hall, RARS, Kumarakom	4-3-2008

Ongoing projects

Name of Project	Funding Agency	Name of PI	Name of Co-PI	Outlay (Rs.)
Biodiversity of cultivable air-breathing fishes in Kerala and development of appropriate culture strategies for <i>Heteropneustes</i> and <i>Clarias</i> spp.	Dept. of Fisheries, Govt. of Kerala	Dr. K.R. Salin, Asst.Prof., KVK Kottayam	Dr. K.J. Joseph, KVK Kottayam; Dr. C. Mohanakumaran Nair, College of Fisheries, Panangad	20,78,448
Characterisation of different stocks of <i>Macrobrachium rosenbergii</i> and development of genetically improved strain through selective breeding	Dept. of Fisheries, Govt. of Kerala	Dr. C. Mohanakumaran Nair, College of Fisheries, Panangad	Dr. K.R. Salin, Assistant Professor, KVK Kottayam	3,14,720
Assessment of resident time of antibiotics in farmed aquatic animals by evaluating the metabolites in vital organs	ICAR, New Delhi	Dr. K. Ashok Kumar, Central Institute of Fisheries Technology (CIFT), Kochi	Dr. K.R. Salin, Assistant Professor, KVK Kottayam	36,00,000
Environmental and socioeconomic impacts of aquaculture in Pokkali fields of Kerala	Agency for Development of Aquaculture, Kerala (ADAK)	Dr. C. Mohanakumaran Nair, College of Fisheries, Panangad	Dr. K.R. Salin, Assistant Professor, KVK Kottayam	8,41,000
The impact of one crop paddy – one crop prawn rotational farming on environment and socio-economics in Kuttanad	Agency for Development of Aquaculture, Kerala (ADAK)	Dr. C. Mohanakumaran Nair, College of Fisheries, Panangad	Dr. K.R. Salin, Assistant Professor, KVK Kottayam	5,06,000

Ameliorative management techniques for acute soil acidity in direct sown rice crop of Kuttanad wetland ecosystem	State Planning Board	Dr.Vandana Venugopal Assistant Professor (SS) in Agronomy	Dr.K.J.Joseph Programme Co-ordinator KVK ,Kottayam	70,000
Studies on water quality parameters from various sources in Kumarakom Panchayath	KSCSTE	Dr.Aparna.B Assistant Professor in SS & AC	Dr.K.J.Joseph Programme Co-ordinator KVK, Kottayam	30,000

Extension programmes

- a. Highlights of extension activities (Attach photographs of important Exhibitions - 7 activities)
- b. Details of activities (wherever applicable)
 - i. Training programmes organized

Field visit

No. of visits	Problem identified		Recommendations
(Agronomy)	1.	Weed problem of sedges in rice	Recommended application of weedicides
	2.	Fe Toxicity in rice	Recommended avoidance of dry seeding and periodic washing with improved management practices
	3.	Imbalanced nutrition in banana	Recommended balanced application of nutrients as per POP
	4.	Rotting in Azolla	Application of Phosphatic fertilizers
(Horticulture)	1.	Blight in Anthurium	Application of suitable fungicides
	2.	Yellowing in cowpea	Application of suitable fungicides
(Aquaculture)	1.	Flood in Kuttanad affecting fish culture	Demonstrated the use of net pen enclosures for culturing fish and prawns in padashekharams
	2.	Poor growth of fish and prawns in Vechur area	Created awareness of good feeding practices, and means of maintaining good water quality in farms
	3.	Size variation in freshwater prawn culture	Demonstration done on the culture of all-male monosex juveniles of prawns to reduce size variation
(Soil Science & Agrl.Chemistry)	1.	Acute acidity and poor germination	Application of lime based on soil tests

List of publications

- | | |
|---|-----------|
| Scientific papers | : 12 Nos. |
| Popular Articles | : 10 Nos. |
| Books | : 1 No. |
| i. No. of visitors to the Institution (farmer group/students) | 3000 |

ii. Important visitors

Sri.V.N.Vasavan,MLA,Kottayam
Sri.K.R.Viswambharan
Hon'ble Vice-Chancellor of KAU
G.C.Damodaran,President ,Kumarakom
GramaPanchayath
Sri. Suresh Myladumpara,
Executive Committee Member of KAU.

Finance 2007-08

Head	Expenditure	Receipts
Non-plan		
Plan		
ICAR	Rs. 26,16,214.00	
Other EAPs	Rs. 29,997.00	
Revolving Fund of KVK	Rs. 6,35,806.00	Rs. 14,24,703.87
Revolving Fund for chemicals	Rs. 11,531.00	Rs. 9,175.00

KRISHI VIGYAN KENDRA – THRISSUR

Name of Head of the Station : Dr. Suma Paulose, Professor.

Faculty Improvement programme

Deputation of Scientists for Seminars/ Workshops/Symposia

Dr. U Sreelatha, Asst. Prof, was deputed for the National symposium on Recent Advances in Floriculture at Navsari Agri. University, on March 4th to 6th 2007.

Awards / Scholarship to staff

Dr. Sabin George, Asst. Professor was awarded the Farm Journalism award of Indian Veterinary Association, Kerala chapter, 2007

On-Farm Trials conducted

1. Effect of Pruning on flower yield in Jasmine
2. Ecofriendly management of amaranth leaves
3. Use of biofertilizers in Banana var. Nendran
4. Export oriental marketing system for profit maximization in Bitter gourd
5. Low cost wind tunnels as solar dryers
6. By pass fat & mineral mixture to high yielding cows

Extension programmes

Highlights of extension activities

Name of the project	Funding agency	Name of PI	Name of Co-PI	Outlay
Training for Gardeners 50 gardeners -duration 6 month	State Horticulture Mission	Associate Prof. & Head	All KVK staff	13.525 lakhs
Small Nursery of Pepper -	State Horticulture Mission	Dr. Sreelatha U	All KVK staff	3 lakhs
Herbal Garden	National Medicinal Plant Board project	Associate Prof. & Head	All KVK staff	1.8 lakhs
Cultivation of Medicinal rice -Njavara, INM and IPM in rice Mechanization in rice cultivation	State Planning Board	Associate Prof. & Head	All KVK staff	3.140 lakhs

Front Line Demonstrations conducted

1. Popularization of medicinal rice variety - Njavara.
2. Popularization of turmeric variety- Sobha
3. Popularization of Organic vegetable cultivation in urban house terraces
4. Management of Footrot using tissue culture planting material & biocontrol agents in Pepper
5. Popularization of Coconut climbing equipment
6. Control of Pseudostem veevil in Banana
7. Scientific cultivation of Hybrid napier Killikulam-1
8. Estrus induction and artificial insemination in goats
9. Subabul as a quality tree fodder for feeding goats
10. Fish-Duck integrated farming

Training programme organized

23 Training programmes were organized during the period under report.

Farm advisory services

In person	Over telephone	Through letters
450	850	95

iv. Radio talks/ TV programmes /Audio – video

	Topic	Name of scientist
Radio Talks	Spirulina	Dr. Suma Paulose
	Beekeeping in rubber plantation	Dr. Suma Paulose
	Self employment avenues for rural women	Dr. G Jayalakshmi
	Present agricultural scenario	Dr. G Jayalakshmi
	Soil & Water conservation in homesteads	Shri. Leven
	Marigold potential for commercial cultivation	Dr. U. Sreelatha
TV Programme	Vigova Thaaravu, Maamsa vipaniyille puthu ruchi ,(Script) Doordarshan, Thrissur(04 May,2007) ---(Vigova duck)	Dr. Sabin George

Details of sale of seeds/ planting materials /biocontrol agents etc.

Seeds/ planting materials	Quantity
Flower seeds	2.3 kg
Vegetable seeds	200 kg
Planting material	95000 nos.
Njavara	150 kg
Tapioca	5017 kg
Paddy straw	720 kg
Fodder slips	11650 nos
Vegetables	500 kg

Finance 2007-08

Head	Expenditure	Receipts
ICAR	5089035	6933420
Other EAPs	2002995	-
Revolving Fund	21022	315256

KRISHI VIGYAN KENDRA, MALAPPURAM

Name of Head of the Station : Dr. Habeeburrahman P.V

Awards/ Scholarships to staff :

Dr. Deepu Mathew, Assistant Professor (Horticulture). Post Doctoral Research – Israel Govt. Scholarship 2007-08 Florogeneses And Sexual Seed Production Of Garlic Volcani Centre: Agricultural research Organization 09.01.08 to 05.09.08

Ongoing Projects

Name of Project	Funding Agency	Name of PI	Name of Co-PI	Outlay
FLD on Mechanical Transplanting with Yanji Transplanter and reaping with KAMCO KR 120 M reaper	State Planning Board, Govt. of Kerala	Dr. Habeeburrahman	Er. Sajeena, S	Rs.1.92,000
'Farmers Participatory Action Research Programme' in collaboration with RARS Pattambi	Ministry of Water Resources, Govt. of India	Dr.B. Shanmugasundaram RARS, Pattambi	Er. Sajeena, S	25 lakhs.

Highlights of extension activities

INTERFACE BETWEEN FARMERS AND COMMODITY BOARDS AND CORPORATIONS

Organized an interface of the farmers and the officers of various departments in the agricultural sector on 18th December 2007 in which 200 farmers from different parts of the Malappuram district participated. Dr.K.Prathapan, Director, Kerala State Horticultural Mission; Sri.P.S.Sasi, General Manager, Small Farmers Agri.Business Consortium; Sri Melwin Jose, Regional Manager, Horti Corp; Sri.P.K.Hameedkuty, Marketing Officer, Directorate of Marketing and Inspection and Sri.M.S.Nair, Inspecting Officer, Kerala State Co-operative Agricultural and Rural development Bank, Thiruvananthapuram gave lectures on their various schemes and subsidies aimed at the farmers and cleared the doubts of the farmers.

AWARENESS CAMP

KVK, Malappuram and Directorate of Marketing and Inspection (DMI) Govt. of India, jointly organized a three-day awareness camp on "Marketing in agricultural sector". This camp was held from 20-22 February 2008 at KVK, Malappuram, for the selected farmers. Sri.Noohukannu, Senior Marketing Officer, DMI, delivered key note address to the function. Experts gave lectures on marketing and its various aspects and visited Godown of FCI as part of the training.

METHOD DEMONSTRATIONS

Organized an interface of Agricultural Engineering students (III Year), KCAET and farmers on 17th January 2008 at Easwaramangalam and on 23rd February 2008 at Naduvattom. Students demonstrated instruments like Tender Coconut Punch and Splitter, Udyanamithra Garden

Transplanter, different types of Coconut Climbers, Micro irrigation methods and cleared the doubts of the farmers.

PARTICIPATORY RURAL APPRAISAL (PRA)

As a part of its action plan preparation for the year 2008-09, identified and conducted Participatory Rural Appraisal(PRA) in two panchayats namely Vettom and Tanalur in Tirur and Thanur blocks of Malappuram District. Students of Kelappaji college of Agricultural Engineering and Technology, Tavanur were involved as the part of their course curriculum in Extension education. As an initial step, collected basic details from the panchayat office and Krishi Bhavan. The students went to each ward and collected information from farmers and ward members. Different PRA tools like recourse mapping, institutional mapping, Enterprise mapping, Venn diagram, time line, Inflow-out flow diagram have been used in PRA.

HORTICORP

One day training camp has been conducted in collaboration with HORTICORP on Apiculture. Prof P.Ravindranath, Managing Director, HORTICORP delivered the key note address. Mr.Sunil. Regional manager handled the technical session. It was also decided to conduct a six day training programme to 50 farmers in the month of August.

Farm Advisory Services

In Person	Over Telephone	Through Letters
271	335	37

iii) Field Visit

No. of Visits	Problem identified	Recommendations
156	Bush Jasmine - mite Paddy - BLB suspected Fungus control in banana Paddy-Severe stem borer & leaf roller infestation Mushroom-Severe rotting Frequent abortions in goat	NSOE 5% at 15 Bleaching powder, fresh cow dung Recommended Trichocard Pest attack due to nearby compost pit - advised to relocate compost pit Change the buck used for breeding

iv. Radio talks/ TV Programmes/ Audio-Video Cassettes.

Topic	Date	Name of Scientist
Mushroom Cultivation - Guidelines & Tips Nutritional & Cultivational Aspects of Amaranthus	06.02.08	Smt. Seeja Thomachan Asst. Professor(Home Science)
Biological pest control in vegetable Different ways to hold water content in uncultivated paddy fields Paddy transplanter - research findings from farmers field Drum seeder for seed sowing and cono weeder for weeding	09.06.08	Dr. Deepu Mathew Asst. Professor(Horti) Dr. Habeeburrahman P.V Prof & Head (Agronomy) Er. Sajeena .S Asst. Professor (Agrl. Engineering)

List of Publications

Scientific papers	- 2
Technical Bulletins-	
Popular Articles	- 17
Books	- 1

12. 1. No. of visitors to the Institution (farmer group/ students) – 198

Important visitors

Sri. Mullakkara Ratnakaran, Minister Agriculture, Government of Kerala
 Sri. Rajaji Mathew Thomas, MLA and Member Executive Committee, KAU
 Sri. Abdullakutty, MLA
 Sri. K.R. Viswambaran, Vice Chancellor, KAU
 Dr.S.Prabhu Kumar, Zonal Coördinator, ICAR TOT Projects
 Dr.K.Prathapan, Director, Kerala State Horticultural Mission
 Sri.P.S.Sasi, General Manager, Small Farmers Agri.Business Consortium
 Prof..P.Ravindranath, Managing Director, HORTICORP

Details of Sale of Seeds/ Planting materials/ Biocontrol agents etc.

Item	Quantity	Revenue
Coconut seedlings	600 Nos	18165
Vermicompost	167 kg	1336
Azolla	6.75 kg	342
Earthworms	45710 Nos	22855
Flower seeds	66 packs	330

Finance 2007 - 08

Head	Expenditure	Receipts
ICAR	4989020	5317000
Other EAPs (SHM)	214805	417000
State Planning Board	246985	292000
Revolving Fund		

KRISHI VIGYAN KENDRA, PALAKKAD

Name of Head of the Station : Dr. Shaji James, P

Deputation of Scientists for training programmes/seminars/summer school/winter school/short course:

Name & designation	Details of training		
	Topic	Venue	Date
Dr. P. Rajendran Programme Coordinator	Annual Review meeting	Gandhigram Rual University, Dindigal	29.10.07 to 1.11.2007.
Dr. R. Ilangovan SMS (Agronomy)	Annual Review meeting	Gandhigram Rual University, Dindigal	29.10.07 to 1.11.2007
Smt. T. Premalatha SMS (Horticulture)	Environmental studies	Dr. John Mathai Centre, Aranattukara, Thrissur	18.9.07 to 8.10.07
Smt. T. Premalatha SMS (Horticulture)	Promotion of sustainable Agriculture	CTI, Mannuthy	7.1.08 to 11.1.08

Academic programmes:

Dr. Shaji James P., Programme Coordinator handled classes for B. Tech. programme of KCAET Tavanur (Courses: 1. Renewable Energy Sources (2+1), 2. Bioenergy (2+1))

Dr. Shaji James P., served as the major advisor of m. Tech. student Sri. Joe Joe L. Bovas of KCAET, Tavanur.

Research programmes:

Dr. Shaji James P., Prog. Coordinator is the Principal Investigator of the KSCSTE funded research project entitled, 'Development of Technology for the use of Agricultural Byproducts as matrix in high rate methane bioreactors.'

Extension programmes

a) Highlights of extension activities

'Puthuma': Keeping Novelty

The 'Puthuma' is a small pickle production unit started by three brothers as a sustenance venture. Their major capital was the technical know-how on pickle making gained from a training programme at KVK Palakkad. *Puthuma* has flourished to support a large number of unemployed youth. It is noteworthy that they have maintained their quality through the years.

Success story from Maruthoor

Smt. Usha of Maruthoor started Oyster mushroom cultivation after a training at KVK. She is at present raising 100 beds of mushroom in an interval of 45 days and is getting around Rs.38000 per annum as net profit. She is also running a tailoring unit for school drop-outs and is able to get job works.

Integrated farming in coconut holdings for productivity improvement on cluster basis

KVK, Palakkad joined with Coconut Development Board (CDB) to implement their scheme, "Integrated farming in coconut holdings for productivity improvement on cluster basis" in Palakkad district. It is a collaborative program implemented in eleven clusters of size approximately 50 hectares in each unit.

There were demonstrations and classes use right inputs for right technologies at right the time for solving the specific problems such as button shedding, stem bleeding and *eriophid* mite control. Method and field demonstrations were conducted in the clusters.

Training programmes were conducted in the following topics:

1. INM for coconut and intercrops
2. Preparation of Bordeaux mixture and its application
3. Root feeding Techniques
4. Coconut Climbing

On Farm Testing

Double sucker planting in banana var. Nendran

Treatments:

Farmers Practice: Planting at a spacing of 1.5x1.5m with one sucker per pit. 4444 plant per ha.

Recommended practice : 2 x 2 m with one plant per pit. 2500 plant per ha

Alternate practice 2 x 3 M with two suckers per pit. 3332 per ha.

Result: Double sucker planting is cost effective with a BC ratio 2.16 for the 2 x 3m spacing treatment.

Nutrient Management in Bush Jasmine

Treatments :

Farmers practice: Cow dung 6 kg

Recommended practice: Cowdung 2 kg, Urea 265 g, Rajphose 1200 g, potash 400 g per plant in 4 splits

Alternate practice: Vermi compost 1.2 kg, Neemcake 1.2 kg, farmyard manure 10 kg per plant at monthly interval

Result: Chemical fertilizer applied plots gave the highest yield of 7.5 ton/ha with BC ratio 2 closely followed by organic manure applied plots with an average yield of 7.38 t/ha and BC ratio 1.81.

Management of Fusarium wilt by trichoderma & pseudomonas in Banana

Treatments :

Farmers practice : Application of lime 500 g /plant

Recommended practice: Destroy affected plant and drench soil with 0.2% bavistin solution to prevent spread

Alternate practice : Application of trichoderma -- multiplied in neem cake cow dung mixture 5kg/plant & pseudomonas – 2L per plant (20g per litre)

Result: Chemical fungicide applied plots gave highest bunch yield of 30T/ha with a B.C ratio 1.54. Trichoderma & pseudomonas applied plots recorded 28.75 T/ha with B.C. ratio 1.51 which is environmentally safe.

Management of Leaf spot by EM technology in Amaranthus

Farmers practice Application of strong systemic fungicide bavistin 4 g/L

Recommended practice : Application of dithane M-45, 4G in 1 L supernatant solution of cow dung on both sides of leaf

Alternate practice : Application of EM-5, 2L per ha with 100 L of water at 15 days interval.

Result : Application of chemical fungicide recorded the highest yield of 18 T per ha with a B.C ratio 7.01. Application of EM solution plots gave 17 T/ha with a B.C. ratio 6.37 and can be adopted in smaller areas which is environmentally safe also.

Management of stem & fruit borer in bringal by EM technology

Farmers practice. Application of ash

Recommended practice: Application of Phorate G – 8 kg/ha at seeding

Alternate practice: Application of EM-FPE – 2L per ha in 100 L of water at 15 days interval

Result : T2 gave the highest yield of 25T/ha with a BC ratio 6.66. Application of EM solution recorded 22 T/ha with a BC ratio 5.28 which is eco-friendly and can be adopted in smaller areas.

Extension activities and service rendered

Sl. No.	Title	Numbers
1	Scientist to Farmers Field	46
2	Farmers visited to KVK	227
3	Radio Talks	2
4	Newspaper coverage	7
5	Popular article	2
6	TV coverage	5
7	Exhibition	2
8	Advisory services	80

Farm Advisory Services

In person	Over telephone	Through letters
82 Nos.	95 Nos.	-

Field Visit

No. of visits (place)	Problem identified	Recommendations
Vadanamkurissi, Pavukonam, Kappur, Koppam	White flies, mite attack and wilt in bush jasmine.	Against white flies attack contact insecticides like Ekkaluk, Sevin etc. were recommended. Against mite attack Acaricide like Dicophole was recommended. Against wilt attack drenching soil with bordo mixture was recommended.
Paruthur, Koppam, Kadambazhipuram	Fusarium wilt in banana	Drench the basin with bavistin/ pseudomonas @ 20gm/litre
Kondurkara, Perumudiyoor	Leaf spot and leaf eating caterpillar in amaranth	Against leaf spot Dithane-M 45 - 4gm in 1 litre supernatant solution of cowdung and spraying on both sides of leave was recommended. Against leaf eating caterpillar removing the affected leaves and in severe cases application of malathion 3ml per litre of water and spraying on the leaves was advised.
Meenakshipuram, Vandithavalam, Kozhinjampara	Stem bleeding in coconut	Chistle out the affected and burn and swab with calixin 5%, the next day applying coaltar on the affected portion, drenching the coconut basin with calixin 25ml in 25 ltrs. of water 3 times an year. Applying 5 kg. neem cake to the affected palm were recommended.

List of publications**Scientific:****Popular articles:**

'Aaramathinu Azhakayi Pulthakidi' Kerala Karshakan July, 2007 by Smt. T. Premalatha.
'Prakrithayile Irumbu' (Muringa) Kerala Karshakan March, 2008 by Smt. T. Premalatha.

No. of visitor to the Institution (farmer group/students) : 5 Farmer group
565 Students

Important visitors:

Dr. Moolchand, Senior Scientist from the Zonal Coordinating unit, Bangalore visited this
Kendra on 17.3.2008

Dr. Jobi V. Paul, Registrar, KAU visited this Kendra on 17.3.2008

Finance 2007-2008

Head	Expenditure	Receipts
ICAR	31,51,101.00	00,269.00
Revolving Fund	00,60,835.00	48,895.00

KRISHI VIGYAN KENDRA AMBALAVAYAL

Name and Head of the Station : Dr. A. Radhamma Pillai,
Professor and Head.

Faculty improvement programme:

a. Deputation Scientists for Seminars/Workshops/Symposia:

Dr. D. Dhalin, Assistant Professor attended the Workshop on NWDPR at Calicut from Oct. 9 – 11, 2008

b. Deputation of Scientists for Training programmes/Seminars/Summer School/Winter School/Short course:

Dr. D. Dhalin, Assistant Professor attended the Training on GIS based water management at NAARM, Hyderabad from July 4 – 25, 2008.

Extension programmes:

a. Highlights of Extension activities:

Apart from the regular activities of the Kendra, the KVK – Wayanad at Ambalavayal organised and celebrated “Karshaka Dinam” on Chingam 1 and “Women in Agriculture Day” on Dec. 4, 2008. Also, the Kendra participated in the South Indian Agricultural Fair held at Mannuthy from Dec. 27 to 30, 2008.

b. Details of activities (wherever applicable):

i) Training programmes organised:

64 Training programmes organised in the year.

ii) Farm Advisory Services:

In person	Over telephone	Through letters
479	Many	-

iii) Field visit: 142

Major crops & enterprises being practised	Major problems identified	Recommendation
Coffee Pepper Ginger Arecanut Tea Rubber Cardamom Paddy Banana Vegetables Vanilla	<i>Phytophthora</i> foot rot and stunted disease; Pollu beetle. Soft scale and nematode (<i>Radopholus similis</i>) incidence in pepper Koleroga (Mahali or fruit rot) and yellow leaf disease in arecanut Nematodes, thrips and root grubs in cardamom Rhizome rot and shoot borer in ginger Nematode and bunchy top in banana Drought, water scarcity Low yield of vegetables crops	Training on scientific crop management, INM, IPM. Organic farming in all crops FLD on introduction of KAU micro-sprinkler irrigation system FLD on popularisation of Oriental pickling melon - <i>Soubhagya</i> OFT on IPM vegetable crops and banana

Animal Science	Poor conception rate in heifers and lactating cows Late calving in cross bred cows Incidence of nutritional deficiency diseases 70 - 80% incidence of viral and bacterial diseases in livestock Poor milk and meat yield in goats Less than 50% egg production in the district	Training on importance of insemination in proper time, proper feeding of balanced ration and nutritional management of cows FLD on Introduction of Japanese Quails FLD on introduction of fodder grass BH-2 OFT on control of mastitis in cow OFT on performance evaluation of Gramasree- under backyard poultry system
Home Science	Prevalence of nutritional deficiency diseases Contamination of infectious diseases by poor sanitation Poor dietary habits among pregnant and lactating women Improper and unhygienic infant feeding practices Ignorance about nutritious food items Intake of foods deficient in many essential nutrients	Training on prevalence, symptoms and remedial measures of nutritional deficiency diseases Training classes on sanitation Educating people about the nutritional requirements during different physiological conditions Training on Nutrition education on healthy and hygienic infant feeding practices Training on balanced diet, composition of a balanced diet and low cost nutritious food items Training on Recommended Dietary Allowances (RDA) for different age groups
Agricultural Engineering-Farm Mechanisation	Pumps are not maintained properly Pepper thresher working with low efficiency Power tillers operated by the farmers not giving proper results Plant protection equipments like sprayers are not giving good results Tractors used by farmers giving more operational troubles Farmers are not aware of various farm machineries	Training on repairing and maintenance of water pumps for agriculture Training on parameters of pepper for getting maximum operation efficiency Training on repairing and maintenance of the power tiller Training on agricultural machines

iv) Radio talks/ TV programmes/Audio-video cassettes

Topic	Date	Name of Scientist
Vayalaelakalilae Nilamorokal	27.03.08	Dr.D.Dhalin

Visitors to the institution

a. No. of visitors to the institution (Farmer group/Students):

Visitors	Number
Farming community	975
Students	140

b. Important visitors:

As a part of Scientific Advisory Committee (SAC) meeting, the following were the important visitors to the Kendra.

1. Prof. M.K. Sheela (Director of Extension KAU Mannuthy)
2. Dr. Moolchand Singh, Sr. Scientist ICAR, ZC Unit, Bangalore.
3. Mrs. Shajna A, Range Officer, Social Forestry, S.Bathery.
4. Ismayil C, TEO. Cheengari
5. Balan K., Lead District Manager, Wayanad.
6. Dr. Priya .K. Nair, VS, DAH office.
7. Jose Emmanuel, Asst. Director Dairy Development.
8. T. Usman, Soil Conservation office.
9. P. Hariharan, Kisan Jyothi Farmers Club.
10. K.M. Sankaran Kutty, Kadhi Board.
11. Sebastian V Joseph, Agricultural officer.
12. K.J.Pramod, Kissan, Pulpilly
13. Valsala Thankachan, Advisory Board Member.
14. Aji Thomas Kunnel, Organic Consortium

Staff strength as on 31-03-2008

Sl. No.	Cadre	Sanctioned	filled
1	Scientific	7	3 (Permanent) + 2 (Temporary)
2	Administrative	2	2 (Temporary)
3	Supporting	2	1 (Permanent) 1 (Temporary)
4	Others:		1 (Permanent)
	a. Technical Assistants	3	1 (Temporary)
	b. Drivers	2	2 (Temporary)
	Total	16	13

Details of sale of seeds/ planting materials/ bio-control agents etc.

Item	Quantity	Revenue (Rupees)
Trichoderma, Goat and seeds	-	540842

Finance

Head	Expenditure in Lakhs	(Budget/Receipts) Rupees in Lakhs
ICAR	3177575	-
Revolving fund	598176	540842

KRISHI VIGYAN KENDRA, SADANANDAPURAM

Name and Head of the Station: Dr. S.Ravi.

List of Publications

Scientific papers

1. Shalini Pillai, P., Geethakumari, V.L and Sheeba Rebecca Isaac 2007. Balance sheet of soil nitrogen in rice (*oryza sativa*) based cropping systems under integrated nutrient management *Indian Journal of Agronomy* 52(1) : 16-20
2. Sheeba Rebecca Isaac 2007 and Shalini.P.2007. Organic recycling through leaf litter in an agroforestry homegarden of kerala. *In challenges to sustainable agro food systems (Ed.)Chengappa, P.G, Nagaraj, N. and Kanwar, R.I.K.* International Publishing House, New Delhi : 166-171
3. Shalini Pillai, P., Geethakumari, V.L and Sheeba Rebecca Isaac 2007. Proeductivity, profitability and sustainability of rice based cropping systems in the wetlands of Onattukara tract of Kerala *In: Proceedings of Kerala Enviornment Congress at Trivandrum, May 8-102007* p :320-324
4. Shalini Pillai, P., Sheeba Rebecca Isaac 2007. Validation or monsoon forecasts *In : Proceedings of the National Seminar On Impacts of Climate change with particular reference to agriculture.* ACRC, TNAU Coimbatore August 22-24,2007
5. Shalini Pillai, P., Sheeba Rebecca Isaac 2007.Impact of intensive cropping and manuring on soil productjvity and sustainability *In : Proceedings of National workshop on Fertility Evaluation for Soil Health Enhancement Kanakakuni Palace, Thiruvananthapuram Soil survey Organisation Sept. 11-13-2007 : 239-256*
6. Sheeba Rebecca Isaac 2007 and Shalini.P and Ravi.S.2008. Nutrient recycling and evaluation of leaf litter as a potential nitrogen source in Amaranthus *In : Proceedings of national seminar on Organic Farming and Sustainable Agriculture for Food Security at GRU, Gandhigram, Feb.29 and mar.01,2008*
7. Sheeba Rebecca Isaac, and Shalini.P and Ravi.S.2008. Nutrient recycling and evaluation of leaf litter as a potential nitrogen source in bhindi *In: Proceedings of national seminar on Fifty years of at Annamalai University. Feb.20 and 21, 2008*

Finance

Head	Expenditure in Lakhs	(Budget/Reciepts) Rupees in Lakhs
ICAR	5071573	
Revolving fund	87078	147828

SUB CENTRE OF RARS (NR),
KERALA AGRICULTURAL UNIVERSITY, P.O. VORKADY – 671 323,
MANJESWAR, KASARAGOD DISTRICT

Name of Head of the Station : **Dr. B. Jayaprakash Naik**
 Professor & Head

Extension Programmes

- a. *Highlights of extension activities (Attach photographs of important activities)*
- b. *Details of activities (wherever applicable)*
- i) *Training Programmes organized*

<i>Topic</i>	<i>No. of trainees</i>	<i>Category</i>	<i>Venue</i>	<i>Date</i>	<i>Name of Scientist</i>
Medical camp	100	farmers & farm women	SCRARS (NR) Vorkady	Dr.
Awareness of Environmental protection and tree planting	30	farmers	SCRARS(NR) Vorkady	6/7/2007	Dr. B.Jayaprakash Naik

- ii. *Farm Advisory Services*

In person	Over telephone	Through letters
25	30	10

- iii. *Field visits*

No. of visits	Problem identified	Recommendations
20	Cashew TMB	Sevion 0.02% as per package of practice recommendation
	Cashew stem borez	Sevin 0.04%
	Mahali in areca nut	Bordeaux mix spray
	Bud root in coconut	Bordeaux paste

I) No. of visitors to the Institution (farmer groups/students)

Farmers : 150 Students: 20

Sri.C.H.Kunhambu, M.L.A, Manjeshwar constituency, Sri.Abdul Khader, Panchayath Presided, Vorkady, Sri. Vasantha and Smt.Rahmath - Members, Vorkady Panchayath and Sri.Revappa sheety, Ex-President, Vorkady Panchayath visited the station during the period.

II) *Important visitors*

Details of sale of seeds/planting materials/biocontrol agents etc.

<i>Item</i>	<i>Quantity</i>	<i>Revenue</i>
Nendran Banana	5.600 kg	84
cashew nuts	32 kg	1060

Other details if any

The Krishi Vigyan Kendra, Manjeswar has been re-designated as **Sub Centre of RARS Pilicode** w.e.f. 1/1/2004. In the view of changed mandate of the station a new farm plan was prepared during last year for the office block and quarters block and accordingly implemented. The Farm Plan consists of cashew orchard, fruit orchard, coconut varieties, ornamental plants, Neem Park, institutional social forest trees and medicinal plants. The periodical agronomic management practices were carried out during this year also. The cashew plants started yielding and 32 Kg of cashew nuts were obtained. Annual Moringa and local variety of Moringa yielded well and Rs. 375/- was received as sale proceeds. The fire belts were renewed in order to protect the planted seedlings. In spite of this fire out break occurred four times due to tress passers throwing cigarette butts and spark from the electric line passing over the farm area. Correspondence was made with the University to get sanction to execute the strengthening of fencing. Action is being initiated to acquire the presently leased land by the Kerala Agricultural University

Shortage of sufficient staff is a major factor inhibiting the activities of station. One Typist and one Assistant Grade I are in position in this station. One Farm Assistant and Security staff are to be posted urgently.

16. Finance 2006-2007

Head	Expenditure	Receipts
Non-Plan	8,52,885.00	8,10,000.00
Plan	46,863.00	50,000.00
ICAR	-	-
Other EAPS	43,865.00	47,500.00 (not released to the office)
Revolving Fund	-	-
Total	9,43,613.00	8,60,000.00

CHAPTER V

CENTRAL LIBRARY AND INFORMATION SYSTEM, VELLANIKKARA

Name of Head of the Station : Mr. K.P.Sathian

a. Details of Seminars/ Workshops/ Symposia conducted at the Station

Particulars	Topic	Venue	Date
e journal training	Presentation and Training of E journals available through Science direct.	Central Library	26/3/2008
Gifting of Publications by Dr. P.N.Ravindran	Interaction with invisible colleagues: Gifting of Publications	Central Library	20/06/2007

Extension programmes

- a) Highlights of extension activities
Details of activities (wherever applicable)

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 Centrai Library and College Libraries of KAU. Four Apprentice Trainees are being trained at the Centrai 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 Softwares.

College of Dairy Science & Technology, Mannuthy (Dec 2007)

1. Installed CDS/ISIS. a Library Management Software developed by UNESCO and provided functional guidance.
2. Installation of "Easy Label" (an indigenously developed Barcode Generating Software

College of Fisheries , Panangad (Jan.2008)

1. Re-installation of SOUL software and established network connections (The SOUL (Software for University Libraries) developed by INFLIBNET of UGC was installed in the Server and established network connection on client systems)

College of Vety.& ASc., Mannuthy (Feb.2008)

The SOUL (Software for University Libraries) was installed and maintained Network connection to client systems.

College of Horticulture, Vellanikkara (Mar. 2008)

1. Re-installation of SOUL software and established network connections
2. Installation of "Easy Label" (an indigenously developed Barcode Generating Software .

No. of visitors to the Institution (farmer group/students)

Important visitors

1. Mr. Shuley Eicher, Former Regional Development Planner, USAID & UNDP Southern Africa
2. Mary Ochs, Mann Library, USA
3. Dr.P.N. Revindran, former National Co-ordinator for Spices Research, ICAR

Staff strength as on 31.3.2008.

Scientific: 06
Administrative: 03
Supporting: nil
Others (specify): 03 (Permanent Labourers)
Total: 12

Finance

Head	Expenditure	Receipts
Non-Plan	Nil	Nil
Plan	29,83,667	23,50,000
ICAR	42,50,000	42,50,000
Other EAPs	Nil	Nil
Revolving Fund	Nil	Nil

CHAPTER VI

DIRECTORATE OF STUDENTS WELFARE

Name of Head of the Station : Sri.O.K.Paul relieved w.e.f. 15.07.2007
Dr.Jose John Chungath w.e.f. 16.07.2007

Students Union activities

KAU Union 2006-07 was inaugurated on 17.08.2007 at Central Auditorium, Vellanikkara by Sri. Srinivasan, Film Actor. KAU Arts Festival was conducted on 29th, 30th, 31st of October and 1st November 2007.

Extra-curricular activities

Celebrated Independence Day of 2007 and Republic Day of 2008 in a befitting manner. As part of Golden Jubilee Celebrations of Kerala Legislative Assembly we conducted University level Quiz competition and the winners (College of Fisheries, Panangad team) was sent to participate in the State level competition. KAU team participated in the National Level Inter University Debate Competition at GB Pant University of Agriculture & Technology, Pant Nagar. This office convened a meeting of Students Welfare Committee on 12.09.2007 to discuss to raise the sum insured of students insurance and increase of Internship / RAWE allowances of students.

NSS activities

Sports & Games

KAU team participated in South Zone Inter University Football tournament at Annamali, South Zone Inter University Cricket tournament at University of Madras, South Zone Inter Uty. Table Tennis tournament at Vellore Institute of Technology, Vellore and South Zone Inter Uty. Shuttle Badminton tournament at Mahatma Gandhi University, Kottayam.

KAU team participated in the 68th All India Inter University Athletic Championship at Annamali University. KAU team participated in the 9th All India Inter Agricultural University Sports & Games Meet at Mahatma Phule Krishi Vidyapith, Rahuri, Maharashtra and won three Gold, one Silver and a Bronze medals in the meet.

KAU team participated in the All India Inter University Aquatic Championship at Kerala University, Thiruvananthapuram.

University Employment Information & Guidance Bureau:

This Bureau conducted 25 group discussions in various topics for 217 candidates. Dy. Chief conducted 35 career talks in various institutions for 2516 candidates. 204 career informations were collected and kept in the career room for ready reference. Two coaching classes were organised by the bureau for those who preparing for various competitive examinations, in which 69 candidates had participated. Bureau published twelve career information bulletin during the period. The Dy. Chief visited 28 institutions and given educational guidance to students.

NCC Activities:

Sactioned strength of NCC is 200 cadets. Conducted daily Equestrian training in show jumping. Conducted 40 parades during the period. Participated 80 cadets in musketry and firing practice. Six students attended Republic Day camp 2008 at Delhi. 20 cadets attended in Army Attachment Camp 2007 at RVC Centre and College, Meerut Cantonment. Two students got service selection in Rank of Captain. Three Bronze medals were secured in 2008 Republic Day camp. Four students awarded Chief Minister's Scholarship Rs.1,200/- for the year 2008. 55 cadets donated 25 litre blood to IMA. 40 cadets participated in World's Aids Day rally at Thrissur. Participated in World Environment Day, Gandhi Jayanthi, NCC Day and Armed Force Flag Day celebrations.

Other activities:

Two floors of DSW office building which were under the custody of the Dean, College of Veterinary & Animal Sciences, Mannuthy were transferred to this Directorate. Subsequently we could extend accommodation to the following teams/functions ie. Keralaolsavam 2007, South India Agri Fair 2007, Calicut University Football team, Santhosh Trophy Kerala Team coaching camp, NCC 2008 camp etc.

An amount of Rs.16,500/- collected towards rent during the period. This building is being renovated to extend standard and comfortable accommodation and to generate internal revenue continuously

Utilisation of ICAR Development Grant

An amount of Rs. 12,50,000/- was spent from the ICAR development grant of 2007-08 for the students amenities of various colleges.

Finance

Head	Expenditure	Receipts
Non-Plan	(Available in Head Quarters)	-
Plan	(Available in Head Quarters)	-
ICAR	(Available in Head Quarters)	-

CHAPTER VII

**DIRECTORATE OF PHYSICAL PLANT
MAIN CAMPUS, VELLANIKKARA**

Name of head of station : The Director of Physical Plant

Financial

Salaries and Contingencies

Expenditure : Rs.54,23,012/-

Revenue Rs.53,15,000/-

Statement of Expenditure

Receipt		Expenditure	
From Comptroller	32668000.00	Plan	23105384.00
Other Receipts	32289096.00	Non-Plan	10884379.00
Revenue	492728.10	Deposit Work	35615580.00

ELECTRICAL SUB DIVISION, VELLANIKKARA

Name of Head of the Station : Lukose B, Assistant Exe. Engineer.

Finance

Head	Expenditure	Receipts
Non-Plan	a) 21,96,786 (Establishment)	Nil
	b) 316834 (works)	Nil
Plan		
ICAR		
Other E A Ps		
Revolving Fund	Nil	

ENGINEERING SUB DIVISION, VELLAYANI

Name of Head of the Station : Sr. Muhammed Irshad, Asst. Exe. Engineer.

Finance

Head	Expenditure	Receipts
Head of Account		
507-50-0057 Non-Plan	2434762	2450000

ENGINEERING SUB DIVISION, MANNUTHY

Name of Head of the Station : K.V.Ajitha, Assistant Exe. Engineer.

Finance

Head	Expenditure	Receipts
Non-Plan	22,95,742/-	23,65,000/-
Plan		
ICAR		
Other EAPs		
Revolving Fund		

MECHANICAL SUB DIVISION, VELLANIKKARA

Name of Head of the Station : The Exe. Engineer.

Finance

Head	Expenditure	Receipts
Non-Plan	1,95,78,466	15,71,991.54
Other EAPs		
Revolving Fund		

CHAPTER VIII

KAU ESTATE, VELLANIKKARA

Name of Head of the Station

C.Kunhunny, SO incharge from 1.4.07 to 22/4/07
P.T. Thankamany from 23/4/07 to 7/6/07.
K.K. Sadeesan, from 8/6/07 to 31/3/08

Finance 2007-08

Head	Expenditure	Receipts
Non- Plan	36,65,863	24,81,344
Plan	1,96,095	

FINANCE AND ACCOUNTS

Sri. Vijayan, Senior Finance Officer, Finance Dept, Government of Kerala held the post of Comptroller for the period from 1-7-2007 to 31-1-2008. Dr. E. Nanu, Dean, College of Veterinary and Animal Sciences, Mannuthy held the additional charge of Comptroller from 1-2-2008 and continued for the period. Three audit circles viz. Northern, Central and Southern zones headed by Assistant Comptroller/ Deputy Comptroller functioned during the period.

Budget Estimate-2007-'08

The University formulated a budget estimate for 2007-2008 showing Rs. 11932.54 lakhs as receipt, Rs. 15539.161 as expenditure in anticipation of Grant in aid of Rs. 8871.00 lakhs (Rs. 6771.00 lakhs under Non Plan and Rs. 2100.00 lakhs under Plan) from the State Government. ICAR assistance of Rs. 1374.915 lakhs, Rs. 256.885 lakhs from other externally aided projects, Rs. 1019.100 lakhs internal resources and Rs. 410.640 as institutional finance. Though the Budget was formulated with expectation of Rs. 8871.00 lakhs as Grant in aid from State government, the government has released Rs. 8396.00 lakhs (Rs. 6296.00 lakhs under Non Plan, Rs. 2100.00 lakhs under Plan).

Receipts details

The actual receipts details for 2007-'08 is given below.

i) Receipts	Amount
1) i) Grant-in-aid under Non-Plan	: Rs. 62,96,00,000
ii) Grant-in-aid under Plan	: Rs.20,00,00,000
iii) Spl Plan programmes FLD & production of planting materials	: Rs.1,00,00,000
2) i) ICAR assistance	: Rs.17,17,87,354
ii) Other Externally Aided Project (GOI&GOK&Misc)	: Rs.8,59,22,947
iii) Internal Resources	: Rs.7,20,13,755
iv) Others	
a) NSS (Non plan)	: Rs.6,20,000
b) Five Year MSc integrated Bio Technology course	: Rs.1,90,00,000
d) Amount received from District Development Officer for SC, TVM (Sri Ayyankali Memorial Govt Model Sports Hostel)	: Rs. 99,00,000 + Rs. 3,50,000

ICFRE

Amount received from ICFRE	
New forest Dehradun infrastructural Development forestry in KAU	: Rs. 28,50,000

LIST OF MEMBERS OF GENERAL COUNCIL

EX-OFFICIO MEMBERS

H.E. the Governor,
Kerala Rajbhavan,
Thiruvananthapuram – 695 099.

Hon'ble Minister for Agriculture,
Government of Kerala, Thiruvananthapuram.

The Vice Chancellor,
Kerala Agricultural University,
KAU P.O., Thrissur-680 656.

The Agricultural Production Commissioner,
Government Secretariat,
Thiruvananthapuram.

The Secretary to Government,
Department of Agriculture,
Government Secretariat, Thiruvananthapuram.

The Secretary to Government,
Department of Finance
Government Secretariat, Thiruvananthapuram.

The Secretary to Government,
Department of Fisheries,
Government Secretariat, Thiruvananthapuram.

The Secretary to Government,
Department of Animal Husbandry,
Government Secretariat, Thiruvananthapuram.

The Director of Agriculture,
Thiruvananthapuram.

The Director of Animal Husbandry,
Thiruvananthapuram.

The Director of Dairy Development,
Thiruvananthapuram.

The Director of Fisheries,
Thiruvananthapuram.

The Principal Chief Conservator of Forests,
Thiruvananthapuram.

The Chairman,
Rubber Board, Kottayam – 686 002.

The Chairman, Spices Board,
Sugandha Bhavan, NH By-pass, P.B.No. 2277,
Palarivattom (P.O), Kochi – 682 025.

The Chairman,
Marine Products Export Development Authority,
Panampilly Nagar, Kochi – 682 036.

The Director,
CPCRI, Kasaragod – 671 124.

The Director,
KFRI, Peechi, Thrissur – 680 653.

Representative of Indian Council of Agricultural Research

Dr.S.Edison, Director,
Central Tuber Crops Research Institute,
Sreekaryam, Thiruvananthapuram-695017

The M.L.A representing the constituency in which the Head Quarters of the University is situated.

Sri.Rajaji Mathew Thomas, M.L.A,
Member, Executive Committee of KAU
Thenguvilayil House,
Chemboothara, Pattikkad P.O, Thrissur – 680652.

ELECTED MEMBERS

Four members of the Legislative Assembly of whom one shall be a SC/ST

Shri. A.K. Balan, M.L.A and
The Hon'ble Minister for Electricity & Welfare of
SC/ST and Backward classes
Government of Kerala,
Thiruvananthapuram.

Sri.C.K.P.Padmanabhan, MLA
Member, General Council of KAU
Chengal, Kizhakkepurayil,
Kunhimangalam, Kovvapuram.P.O.Kannur

Prot. C.Ravendranath, MLA
Member, General Council of KAU
Lakshmi Bhavan Panthalathu Lane,
Kanattukara, Thrissur.

Sri.Pallipram Balan, MLA
Member, General Council of KAU
Pushpa Nivas, Shri Shilpa Housing Apartment,
Karattuvayal, Kanhangadu P.O., Kasargode,

One member from the Deans of Faculties of the University

Vacant

Four members from the Constituency of Teachers of the University

Dr. Jose Joseph,
Assistant Professor, Communication Centre,
Mannuthy, Thrissur – 680 651.

Dr.P.B.Pushpalatha
Assistant Professor (Sr.Scale),
College of Horticulture, Vellanikkara.

Sri.P.K.Sureshkumar
Assistant Professor,
College of Horticulture Vellanikkara.

Dr.Joy Mathew,
Associate Professor,
Central Training Institute. Mannuthy

Two members from the constituency of Students of the University

Sri.Shibin J.S.(2002-03-37)
College of Veterinary & Animal Sciences,
Mannuthy

Sri.Abdul Gafoor (02-01-251)
College of Horticulture,
Vellanikkara

Two members from the constituency of non-teaching staff of the University

Shri. P. Sreejith,
Section Officer, KAU Head quarters,
KAU P.O., Thrissur – 680 656.

Sri.R.Vijayan
Binder
KAU Headquarters, Vellanikkara

Two members from the constituency of Permanent Labourers of the University

Sri.M.S.Pushpakumar,
Permanent Labourer,
College of Veterinary & Animal Sciences,
Mannuthy.

Sri. T.Surendran Pappanchani,
(up to 29.02.2008)
Permanent Labourer,
Instructional Farm, Vellayani

Members Nominated by the Chancellor

Four eminent Scientists in the field of Agriculture and allied subjects from the concerned University or from outside.

Dr.F.M.H.Khaleel
Associate Professor and Head
Department of Agricultural Extension
College of Horticulture Vellanikkara

Dr.R.Sabarinathan Nair
Founder Dean(Retired)
Rajiv Gandhi College of Veterinary Science,
Pondicherry Gayathri; 70,Hill Gardens,
Ancheri.P.O.Thrissur-6.

Dr. M.K. Sheela,
Director of Extension in charge
Kerala Agricultural University,
Mannuthy, Thrissur – 680 651

Dr.K.Gopakumar
Former Deputy Director General (Fisheries),ICA
28/947, Nandanam
Cheruparambath Road,Kadavanthara, Kochi

Four Farmers of whom one shall be a member belonging to SC/ST and one shall be a woman

Smt.Alice Joseph
President,Kumaranellur Panchayat
Kadavilparambil
Gandhinagar P.O.
Kottayam-686608

Shri.V.S.Hareendranath
Member, Executive Committee of KAU
PLRA,C23A,Panikker's Lane,
Sasthamangalam. P.O.Thiruvananthapuram

Shri.Suresh Mylattupara,
Mylattuparamanimala .P.O. Kottayam

Shri.I.K.Subramanian Master
Milk Society President
Illathuparambil House P.O.Marottichal
Thrissur-680 014.

One member from the Association of Planters of Kerala

Advocate Cherian Kavanal
Kavanal House
Kaithaparambu.P.O.,Adoor
Pathanamthitta District

Two Presidents of the Grama Panchayat

vacant.

vacant

Member to represent University of Calicut

Dr.K.P.Janardanan
Head of the Department,
Department of Zoology,
University of Calicut,

Member to represent Cochin University of Science & Technology

Sri.Zakkariya.K.A.
(Member, General Council of KAU)
Lecturer,School of Management Studies,
Cochin University of Science & Technology, Kochi - 22.

Member to represent University of Kerala

Sri.K.Sunil Kumar.
(Member, General Council of KAU)
Senior Grade Assistant.
University of Kerala, Thiruvananthapuram.

LIST OF EXECUTIVE COMMITTEE MEMBERS

Sri. K.R Viswambharan. I.A.S
Vice Chancellor,
Kerala Agricultural University

Agricultural Production commissioner,
(Member, Executive committee of KAU)
Government secretariat,
Thiruvananthapuram.

Secretary to Government,
Finance Department,
(Member, Executive committee of KAU)
Government secretariat,
Thiruvananthapuram

Member Representing the ICAR

Dr. S. Edison,
(Member, Executive Committee of KAU)
Director, Central Tuber Crops Research Institute,
Sreekrayam,
Thiruvananthapuram-695 017

One Dean of Faculty

Vacant

One Elected Teacher

Dr. Jose Joseph,
Member Executive Committee of KAU
Assistant Professor, Communication Centre,

Non - Official Members-General

Adv. Cherian Kavanal,
(Member, Executive Committee of KAU)
Kavanal House,Kaithaparambu P.O,
Adoor,Pathnamthitta (Dist).

Dr.F.M.H.Kaleel,
(Member, Executive committee of KAU)
Associate Professor & Head,
College of Horticulture,
Vellanikkara.

Adv.V.S.Harindra Nadh,
(Member, Executive Committee of KAU)
PLRA, C 23 A, Panikker's Lane,
C Street, Sasthamangalam. P.O.
Thiruvananthapuram

Shri.Suresh Mylattupara,
(Member, Executive Committee of KAU)
Mylattupara, Manimala. P.O.
Mannuthy, Thrissur – 680 651.

Dr. M.K. Sheela,
(Member, Executive Committee of KAU)
Director of Extension in-charge,
Kerala Agricultural University,
Mannuthy, Thrissur – 680 651.

The M.L.A representing the constituency in which the Head Quarters of the University is situated.

Sri.Rajaji Mathew Thomas,M.L.A,
(Member, Executive Committee of KAU)
Thenguvilayil House,Chemboothra
Pattikkad P.O,Thrissur – 680652.

SUB COMMITTEES OF THE EXECUTIVE COMMITTEE.

Finance Committee

- | | | |
|---|---|----------|
| 1. Vice-Chancellor | - | Chairman |
| 2. Finance secretary to Government | - | Member |
| 3. Agricultural Production Commissioner | - | Member |
| 4. Adv.V.S. Harindranadh | - | Member |
| 5. Comptroller | - | Convenor |

Planning & Development Committee

- | | | |
|-----------------------------------|---|----------|
| 1. Dr.F.M.H. Khaleel | - | Chairman |
| 2. Sri. Rajaji Mathew Thomas, MLA | - | Member |
| 3. Adv. Cherian Kavanal | - | Member |
| 4. Sri.Suresh Mylattupara | - | Member |
| 5. Adv.V.S.Harindranath | - | Member |
| 6. Director of Research | - | Member |
| 7. Comptroller | - | Member |
| 8. Director of Extension | - | Convenor |

Research Review Committee

- | | | |
|-------------------------|---|----------|
| 1. Vice-Chancellor | - | Chairman |
| 2. Dr. Jose Joseph | - | Member |
| 3. Adv.V.S.Harindranadh | - | Member |
| 4. Dr.M.K.Sheela | - | Member |
| 5. Dr.F.M.H. Khaleel | - | Member |
| 6. Director of Research | - | Convenor |

Establishment Committee

- | | | |
|-----------------------------|---|----------|
| 1. Sri.Rajaji Mathew Thomas | - | Chairman |
| 2. Adv. Cherian Kavanal | - | Member |
| 3. Adv.V.S.Harindranadh | - | Member |
| 4. Sri.Suresh Mylattupara | - | Member |
| 5. Dr. M.K. Sheela | - | Member |
| 6. Dr. Jose Joseph | - | Member |
| 7. Dr. F.M.H.Khaleel | - | Member |
| 8. Registrar | - | Convenor |

Students welfare Committee

- | | | |
|----------------------------------|---|----------|
| 1. Sri. Suresh Mylattupara | - | Chairman |
| 2. Sri.Rajaji Mathew Thomas, MLA | - | Member |
| 3. Adv.Cherian Kavanal | - | Member |
| 4. Dr. M.K. Sheela | - | Member |
| 5. Dr.Jose Joseph | - | Member |

	6. Adv.V.S.Harindranadh	-	Member
	7. Director of Students Welfare	-	Convenor
VI	<u>Works Committee</u>		
	1. Adv.Cherian Kavanal	-	Chairman
	2. Sri.Rajaji Mathew Thomas, MLA	-	Member
	3. Dr. F.M.H.Khaleel	-	Member
	4. Sri. Suresh Mylattupara	-	Member
	5. Adv.V.S.Harindranadh	-	Member
	6. Dr.Jose Joseph	-	Member
	7. Director of Physical Plant	-	Convenor
VII	<u>Legal Monitoring Committee</u>		
	1. Adv.V.S.Harindranadh	-	Chairman
	2. Dr.Jose Joseph	-	Member
	3. Sri.Rajaji Mathew Thomas, MLA	-	Member
	4. Adv.Cherian Kavanal	-	Member
	5. Dr. M.K. Sheela	-	Member
	6. Registrar	-	Convenor

SUB COMMITTEES OF GENERAL COUNCIL

Statute Sub Committee

Dr.R.Sabarinathan Nair	-	Chairman
Sri.C.K.P.Padmanabhan, MLA	-	Member
Sri.Pallipram Balan, MLA	-	Member
Dr.Joy Mathew	-	Member
Sri.R. Vijayan	-	Member
Dr.P.B.Pushpalatha	-	Member
Shri. P. Sreejith	-	Member
Smt.Alice Joseph	-	Member
The Registrar	-	Convenor

Accounts Committee

Smt.Alice Joseph	-	Convenor
Sri.C.K.P.Padmanabhan, MLA	-	Member
Prof. C.Raveendranath, MLA	-	Member
Dr.Joy Mathew	-	Member
Sri.R. Vijayan	-	Member
Shri.I.K.Subramanian Master	-	Member
Sri.Abdul Gafoor	-	Member
Sri.P.K.Sureshkumar	-	Member
The Comptroller	-	Convenor

ASSURANCE COMMITTEE

Shri.I.K.Subramanian Master	-	Chairman
A.K.Balan.M.L.A	-	Member
Sri.K.Sunil Kumar,	-	Member
Sri.Pallipram Balan, MLA	-	Member
Prof. C.Raveendranath, MLA	-	Member
Dr.K.Gopakumar	-	Member
Sri.M.S.Pushpakumar	-	Member
Sri. T.Surendran Pappanchani,	-	Member (up to 29.02.2008)
Sri.Shibin J.S	-	Member
Sri.Zakkariya.K.A.	-	Member
The Registrar	-	Convenor

APPENDIX II

LIST OF STAFF AT K A U HEAD QUARTERS, VELLANIKKARA

	Name of Employee	Designation	Remarks
1	Viswambharan.K.R. , I.A.S.	Vice-Chancellor	
2	Dr. Jobi.V.Paul	Registrar I/c	
3	Vijayan.V.	Comptroller	
4	Nanu.E. Dr.	Comptroller I/c	From 24.01.2008
5	Alexandar D. Dr.	Director of Research I/c	
6	Athman. K.V. Dr.	Asso. Director of Research I/c	
7	Rajamony.L. Dr.	Asso. Director of Research I/c	
8	Asokan. P.K. Dr	Director Acad & PG studies I/c	
9	Madhavan Nair K	Professor	
10	Savithri.K.E.	Professor	
11	Rajan S. Dr.	Officer on Special Duty	
12	Shirley Bai George	Joint Registrar (Acad)	
13	Vanaja.S.	Joint Registrar	
14	Usharani. N.	Joint Registrar	
15	Girija. S. G.	Dy. Registrar	
16	Achuthan V.A.	Dy. Registrar	
17	Mercy John C	Sr. Dy. Comptroller	
18	Annamma P.P.	Asst. Compt IAC (CR)	
19	Mathew.K.F.	Asst. Compt (B&P)	
20	Sophiamma Joseph	Asst. Compt (DD & A)	
21	Santha.K.R.	Asst. Compt (DD & A)	
22	Ammini. V. M.	Asst. Compt (P&L)	
23	Sobhanakumari.C.	Asst. Registrar I	
24	Leela.V.	Asst Registrar I	
25	Vasanthakumari Anma.K.	Asst. Registrar I	
26	Chanrika. V. R.	Asst. Registrar I	
27	Santhakumari.G.	Asst. Registrar II	
28	Suma Varghese	A.O. Gr II (DoR)	
29	Usha C.	A.O. Gr II (DoR)	
30	Vareed.K.A.	Recruitment Officer	
31	Ramachandran Nair.S.	Recruitment Officer	
32	Sherly Mathew C.	Recruitment Officer	
33	Bhaskaran.P.	Labour Officer	
34	Unnikrishnan Nair N.V.	P.S. to Vice-Chancellor	
35	Haridasan.P.	P.A. to Vice-Chancellor	upto 30.04.2007
36	Noel.R.	P.A. to Vice-Chancellor	
37	Muraleedhara Karanavar	P.A. to Registrar	
38	Sulaiman V.M.	P.A. to Comptroller	
39	Viswanathan Nair M.	Systems Manager I/c	
40	Sebastian T.A.	Programmer	
41	Abdul Hakkeem.B.	Assistant	
42	Abdul Kader P.B. Dr.	Assistant	
43	Abhiiash.R.	Assistant	
44	Ajayakumar M.K.	Assistant	
45	Ajayakumar P.K.	Assistant	
46	Aji.V.N.	Assistant	
47	Ally T.	Assistant	
48	Ancy George	Assistant	
49	Anitha Venugopal	Assistant	
50	Anjali R	Assistant	

51	Anto Varghese	Assistant
52	Arun B. Asok	Assistant
53	Asokan T.M.	Assistant
54	Babu K.D.	Assistant
55	Baby K.P.	Assistant
56	Bennet Thomas	Assistant
57	Bhagya Lakshmi V.R	Assistant
58	Bijith.B.L.	Assistant
59	Biju.D.S.	Assistant
60	Bobby Kurien	Assistant
61	Chandrika.C.	Assistant
62	Deepa V.D	Assistant
63	Deepa.K.S.	Assistant
64	Deepthy V	Assistant
65	Denny C.V.	Assistant
66	Flora C.V.	Assistant
67	Gireesh. M.	Assistant
68	Gopakumar S	Assistant
69	Haridas P.C.	Assistant
70	James.K.D.	Assistant
71	Jayan N.B.	Assistant
72	Jitha K.S.	Assistant
73	Joy Paul	Assistant
74	Joy.M.U.	Assistant
75	Jyothi S. Sharma	Assistant
76	Kiran.R.V.	Assistant
77	Liakath Alikhan I.A.	Assistant
78	Madhumohan.A.S.	Assistant
79	Mahesh.V.Naick	Assistant
80	Malathi T.V.	Assistant
81	Manikantan M.B.	Assistant
82	Manikuttan C.	Assistant
83	Manoj T.R.	Assistant
84	Manojkumar K.C.	Assistant
85	Maria John C.K.	Assistant
86	Mini T.	Assistant
87	Mini. A.C.	Assistant
88	Mohammed Shanar. V.M.	Assistant
89	Murali P.R.	Assistant
90	Nisha.K.Krishnan	Assistant
91	Nisha.M.S.	Assistant
92	Pradeesh.K.R.	Assistant
93	Prashanth.P.S.	Assistant
94	Radhadevi.S.	Assistant
95	Radhakrishnan N.	Assistant
96	Rajesh.S.	Assistant
97	Rajeshkumar . R.	Assistant
98	Raju Kurien. M.	Assistant
99	Rakesh.K.R.	Assistant
100	Raphijan P.H.	Assistant
101	Reese. V. A.	Assistant
102	Remani K.K.	Assistant
103	Resmi.V.	Assistant
104	Rethesh.R.	Assistant

105	Roshini.T.M.	Assistant
106	Santhamma K.N.	Assistant
107	Sarada P.M.	Assistant
108	Seema. T.	Assistant
109	Shanmugarajan S.	Assistant
110	Sheen.P.Felix	Assistant
111	Sivadasan C.	Assistant
112	Sobha K.S.	Assistant
113	Subramanian.K.V.	Assistant
114	Suja George	Assistant
115	Sujatha. C.	Assistant
116	Sunilkumar.S.	Assistant
117	Suresh. M.N.	Assistant
118	Thilakan T.A.	Assistant
119	Usha.R.	Assistant
120	Valsala N.K.	Assistant
121	Valsala P.V.	Assistant
122	Venugopalan.I.K.	Assistant
123	Vijayakumar.P.	Assistant
124	Vijendra Lal.S.	Assistant
125	Vijesh C.V	Assistant
126	Yamuna.K.B.	Assistant
127	Vijayan R.	Binder
128	Abdul Rasheed K.A	Bus Attendent
129	Anilkumar P.B.	Bus Attendent
130	Dasan.A.V.	Bus Attendent
131	Ratnakumaran P.S	Bus Attendent
132	Saji Antony K	Bus Attendent
133	Sasi S.	Bus Attendent
134	Somasekharan K.N.	Bus Attendent
135	Unnikrishnan T.A.	Bus Attendent
136	Bineesh N.V.	Class IV/Peon
137	Chandru K.K.	Class IV/Peon
138	Dilshad.C.	Class IV/Peon
139	Indira P.N.	Class IV/Peon
140	Janaky P.R.	Class IV/Peon
141	Kochammu A.	Class IV/Peon
142	Mary P.A.	Class IV/Peon
143	Mukami M.K.	Class IV/Peon
144	Ponnumon K.M.	Class IV/Peon
145	Rajan M.K.	Class IV/Peon
146	Rajani	Class IV/Peon
147	Santhosh,K.K.	Class IV/Peon
148	Shinoj Antony	Class IV/Peon
149	Shylan A.K.	Class IV/Peon
150	Sobhana V.R	Class IV/Peon
151	Sreedevi.K.S.	Class IV/Peon
152	Sreeja kumari Singh	Class IV/Peon
153	Sujana.K.V.	Class IV/Peon
154	Christy John P.	Clerical Asst.
155	Itiara V.A.	Clerical Asst.
156	Jayarajan C.K.	Clerical Asst.
157	Rajan K.T.	Clerical Asst.
158	Sali P.A.	Clerical Asst.

159	Sasi T.	Clerical Asst.	
160	Sreedevi V.	Clerical Asst.	
161	Sumesh C.G.	Clerical Asst.	
162	Sumesh P.B.	Clerical Asst.	
163	Tony C.A	Clerical Asst.	
164	Balakrishnan.C.	Driver(HDV)	
165	Benny P.N.	Driver(HDV)	
166	Biju.N.Baby	Driver(HDV)	
167	Jayan K.S.	Driver(HDV)	
168	Karappan M.V	Driver(HDV)	
169	Mohanan A.N.	Driver(HDV)	
170	Sundaran. M.K.	Driver(HDV)	
171	Vasudevan L.	Driver(HDV)	
172	Ajikumar M.	Driver(LDV)	
173	Basheer K.A.	Driver(LDV)	
174	Chacko T.M.	Driver(LDV)	
175	Manjithkumar.T.R.	Driver(LDV)	
176	Santhosh P.K.	Driver(LDV)	
177	Geetha V.B.	Dupl. Machine Operator	
178	Indira P.S.	Dupl. Machine Operator	
179	Vilasini I.R.	Dupl. Machine Operator	
180	Malathy A.N.	Office Superintendent	
181	Manjula Mercy Patrick	Office Superintendent	
182	Shiras B.	Office Superintendent	
183	Umaiva V.H.	Office Superintendent	
184	Razia Becvi . H.	Pool Officer	upto 19.06.2007
185	Sadan.R.	Pool Officer	From 6.09.07 to 30.9.07
186	Valsaladevi.S.	Pool Officer	From 30.06.2007 & continuing
187	Annamma Scaria.P.	Section Officer	
188	Babychan T.J	Section Officer	
189	Boby Abraham	Section Officer	
190	Chamunny.P.V.	section Officer	
191	Dinesan K.	Section Officer	
192	Harinath.K.	Section Officer	
193	Hymavathy.E.	Section Officer	
194	Jagadeesan T.	Section Officer	
195	Jayasankar K.V.	Section Officer	
196	Krishna Prakash P.	Section Officer	
197	Latha.T.B.	Section Officer	
198	Many.M.A.	Section Officer	
199	Meera K.	Section Officer	
200	Mohanan P.V.	Section Officer	
201	Mohanan. K.	Section Officer	
202	Mohini P.	Section Officer	
203	Narayanan V.N.	Section Officer	
204	Paul K.S.	Section Officer	
205	Pradeep A.	Section Officer	
206	Prema.P.P.	Section Officer	
207	Pushpaja P.K.	Section Officer	
208	Radhakrishnan K.N.	Section Officer	
209	Rajalakshmi. C.	Section Officer	
210	Rajan M.E.	Section Officer	

211	Rajeswari A.	Section Officer
212	Saraswathy.P.A.	Section Officer
213	Sarojini.K.N.	Section Officer
214	Sethumadhavankutty.O.	Section Officer
215	Sheela. A. Attokkaran.	Section Officer
216	Sreejith P.	Section Officer
217	Sudha K.B.	Section Officer
218	Sudha P.	Section Officer
219	Sujatha M.A.	Section Officer
220	Sunitha K.K.	Section Officer
221	Vasanthakumari K.P.	Section Officer
222	Wilson Raj M.W.	Section Officer
223	Geethabai S.	Section Officer (FC&D)
224	Mariamamma V.C.	Section Officer (FC&D)
225	Mary K.K.	Section Officer (FC&D)
226	Mary K.M.	Section Officer (FC&D)
227	Parameswaran K.K.	Section Officer (FC&D)
228	Sarada.P.	Section Officer (FC&D)
229	Sreedevi Amma P.K.	Section Officer (FC&D)
230	Sukumari T.K.	Section Officer (FC&D)
231	Valsala K.A.	Section Officer (FC&D)
232	Ramaachandra Bahadur A.	Security Guard to V.C.
233	Ajitha T.C.	Typist
234	Babitha P.K.	Typist
235	Baby T.D.	Typist
236	Fathima Beevi S	Typist
237	Joseph.E.L.	Typist
238	Joshy P.B	Typist
239	Lalitha V.	Typist
240	Leena T.J.	Typist
241	Minitha. M.K	Typist
242	Narayanan T.P.	Typist
243	Parukutty M.K.	Typist
244	Radhakrishnan P.K	Typist
245	Rajini M.A.	Typist
246	Rekha.V.	Typist
247	Remani P.	Typist
248	Remlath Malayil	Typist
249	Sabarish V.	Typist
250	Seena P.V	Typist
251	Selmath K.U.	Typist
252	Sreejith K Balan	Typist
253	Sreemathykumari.P.	Typist
254	Vincent T.A.	Typist
255	Sasidharan P.K.	Vehicle Supervisor (HDV)
256	Arumughan.M.V.	Vehicle Supervisor (LDV)
257	John Stephen.K.O.	Vehicle Supervisor (LDV)
TOTAL		257

upto 31.01.2008

APPENDIX III

LIST OF STAFF IN VARIOUS CAMPUSES

COLLEGE OF AGRICULTURE, VELLAYANI

Faculty position

Cadre	Name of the scientist	sanctioned post	In position	vacant
Dean	Dr.Harikrishnan Nair	1	1	-
Professor (RC)	Dr.S.K.Nair	1	1	-
Agronomy				
Prof. & Head	1 Dr.M.Abdul Salam (Joined on Sept; 2007)	10	10	-
Professor	2 Dr.Annamma George			
	3 Dr.S.Chandini(Joined on July 07)			
	4 Dr.V.L.Geetha Kumari(Joined back on June 2007)			
	5 Dr.Pushpakumari			
	6 Dr.M.Meerabai (Transferred to College of Agriculture on December 2007)			
	7 Dr.P.Sukumari			
	8 Dr.Sansamma George			
	9 Dr.S.Lakshmi			
	10 Dr. O. Kumari Swadija.			
	Dr.K.R.Sheela(Transferred from College of Agriculture, Padanakadu in place of Dr. Meera Bhai			
Assoc. Prof.	1 Dr.S.M.Shahul Hameed(joined on July 07)	+	+	-
	2 Dr.Babu Mathew			
	3 Prathapan.K.(Relieved from duty on Dec. 07 to join as Mission Director Kerala State Horticulture Mission)			
	4 Dr.V.Jayakrishna Kumar			
Soil Science & Agricultural Chemistry				
Professor	1 Dr.K.Harikrishnan Nair(Dean)	10 ✓	10	-
	2 Dr.N. Saifudeen (Head)			
	3 Dr. M.Subramonia Iyer			
	4 Dr. R.S. Shehana			
	5 Dr. Sumam Susan Varghese			
	6 Dr. Sumam George			
	7 Dr. Sam T. Kurumthottical			
	8 Dr.P.B. Usha			
	9 Dr.K.Ushakumari			
	10 Dr. K.C. Manorama Thampatti			
Assoc. Prof	1 Dr.E.Komala Amma	2	2	-
	2 Dr. Usha Mathew			
Department of Plant Breeding and Genetics				
Professor	1 Dr. P. Manju(Professor and Head)	6 ✓	6	-
	2 Dr. Sunny K. Oommen			
	3 Dr. D. Wilson			
	4 Dr. K. Arya			
	5 Dr. K.M. Abdul Khader			
	6 Dr. D.I. Suma Bai			
Assoc. Prof	1 Dr. Maya Devi	5	4	1
	2 Dr. C. Lekha Rani			

P
Asst
Asst

	3	Dr. Mareen Abraham			
	4	Dr. V.G.Jayalekshmi			
Asst. Prof.	1	Mrs. Seeja .G	1	1	-
Plantation Crops					
Professor	1	Dr.B.K.Jayachandran (Head)	3	3	-
	2	Dr.B.R.Reghunath			
	3	Dr.G.R.Sulekha			
Assoc. Prof.	1	Dr. P.C. Jessykutty	1	1	-
Agri.Engineering					
Professor	1	Dr.V.Ganessan	1	1	-
Assoc. Prof.	1	Dr.Xavier K.Jacob	1	1	-
Home Science					
Professor	1	Dr.Mary Ukkuru (Head)	4	4	-
	2	Dr. S. Chellammal			
	3	Dr.Syamakumari.S			
	4	Dr.P.V Nandini			
Assoc. Prof.	1	Dr.Prasannakumari	5	5	-
	2	Smt.P.Geetha			
	3	Dr.Nirmala.C			
	4	Dr.M. Rajani			
	5	Dr.Rari John. K			
Asst. Prof.	1	Dr.Suma Divakar	1	1	
Plant Physiology					
Professor		Vacant	1	-	1
Assoc. Prof.		Vacant	1	-	1
Asst. Prof.	1	Dr. Roy Stephen	4	2	2
	2	Dr. R.V. Manju			
	3	Dr. M.M. Viji (on leave)			
Biotechnology					
Professor	1	Dr. K. Rajmohan (Head)	1	1	-
Assoc. Prof.	1	Dr. Swapna Alex	2	1	1
Entomology					
Professor	1	Dr. T. Nalinakumari (Head)	11	11	-
	2	Dr. C. Nandakumar			
	3	Dr. K. Sudharma			
	4	Dr. R. Krishnakumar			
	5	Dr. J. Arthur Jacob (NARP)			
	6	Dr. Hebsy Bai (NARP)			
	7	Dr. S. Naseema Beevi (AINP on Pest. Res.)			
	8	Dr. Thomas Biju Mathew (-do-)			
	9	Dr. M.S. Sheela (AICRP on Nematode Pests)			
	10	Dr. T. Jiji (AICRP on Nematode Pests)			
	11	Dr. S. Devanesan (AICRP on Honey Bee)			
Assoc. Prof.	1	Dr. K.S. Premila (AICRP on Honey Bee)	4	4	-
	2	Dr. N. Anitha (-do-)			
	3	Dr. M.H. Faizal (-do-)			
	4	Dr. Thomas George (AINP on Pest. Residue)			
Asst. Prof.	1	Dr. K.D. Prathapan (AICRP on Nem. pests)	1	1	-
Plant pathology					
Professor	1	Dr. K.K. Sulochana (Head)	9	9	-
	2	Dr. P. Santha Kumari			
	3	Dr. A Naseema			
	4	Dr. P.J. Joseph			
	5	Dr. C.A. Mary			
	6	Dr. Luludas			

	7	Dr. C.Gokulapalan			
	8	Dr. V.K. Girija			
	9	Dr. K.Umamaheswaran (on deputation)			
Asst. Prof.	1	Sri. M. Joy (on leave)	2		2
Economics					
Professor	1	Vacant	1 ✓		1
Assoc. Prof.	1	Dr.Elsamma Job (Transfeered to COA Padannakkad from 11.2.08)	2 ✓		2
Asst. Prof.	1	Smt.Santha.A.M.	2	2	
	2	Sri. T.Paul Lazarus			
Animal Husbandry					
Professor	1	Dr. R. Vijayan (Head)	1 ✓	1	
Assoc. Prof.	1	Dr. Jiji	3 ✓	1	2
Agricutlural Extension					
Professor	1	Dr. S.Motilal Nehru (Head)	10	10	
	2	Dr.C.Bhaskaran			
	3	Dr. R. Prakash			
	4	Dr.S.Shylaja			
	5	Dr.V.V.Padmanabhan			
	6	Dr.N.P.Kumari Sushama			
	7	Dr.B.Seema			
	8	Dr.A.Anilkumar			
	9	Dr.N.Kishorekumar			
	10	Dr.A.K.Sherief			
Asst. Prof.	1	Dr. Sakeer Hussain	1	1	
Agricultural Statistics					
Professor		Vacant	1 ✓		1
Assoc. Prof.	1	Dr. R. Balakrishnan Asan (Head)	2 ✓	2	
	2	Dr.Brigit Joseph			
Asst. Prof.	1	Dr. Susan Thomas (NARP)	1	1	
Olericulture					
Professor	1	Dr. M. Abdul Vahab (Head)	2 ✓	2	
	2	Dr. V.A.Celine			
Assoc. Prof.	1	Dr. I. Sreelathakumari	2 ✓	1	1
Pomology					
Professor	1	Dr. C.S. Jayachandran Nair (Head)	3 ✓	3	
	2	Dr. Sabina George T			
	3	Dr. V. L. Sheela			
Physical Education					
Assoc. Prof.	1	Dr. T.I Manoj (Head)	1 ✓	1	
Asst. Prof.		Vacant	1		1
Agricultural Micro-Biology					
Professor	1	Dr. P. Sivaprasad (Head)	2 ✓	2	
	2	Dr. K.S. Meenakumari			
Assoc. Prof.	1	Dr. K.N. Anith	1 ✓	1	

Staff strength

Economics

Scientific	2
Supporting	1 ✓
Total	3

Animal Husbandry

Scientific	2
Supporting	3 ✓

Support

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150-36

Total	4
Home Science	
Scientific	11
Administrative	1 ✓
Supporting	1 ✓
Total	13
Agri.Chemistry	
Scientific	12
Administrative	1 ✓
Supporting	3 ✓
Total	16
Agri.Engineering	
Scientific	2 ✓
Administrative	1 ✓
Supporting	1 ✓
Total	5
Plantation Crops	
Scientific	4
Total	4
Plant Breeding	
Scientific	7
Administrative	1 ✓
Supporting	2 ✓
Total	10
Entomology	
Scientific	9
Administrative	1 ✓
Supporting	2 ✓
Total	12
Agronomy	
Scientific	12
Administrative	1 ✓
Technical	1
Supporting	3 ✓
Total	17
Physiology	
Scientific	2 ✓
Supporting	1 ✓
Total	3
Biotechnology	
Scientific	2
Total	2
Pathology	
Scientific	13
Supporting	3 ✓
Total	16
Extension	
Scientific	9
Supporting	4 ✓
Others (specify)	2 ✓
Total	15
Agri.Stat	
Scientific	2
Total	2

Ad-6
 Sup-24
 0.17/11/22

COLLEGE OF HORTICULTURE, VELLANIKKARA

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor			70	
Associate Professor			19	
Assistant Professor			13	
Total			102	

Staff strength

	Sanctioned	In position	Vacant
Scientific (Teachers)	138 ✓	102	36
Administrative	33 ✓	25	8
Supporting	63 ✓	29	34
Others 1) Assistant Librarian	2 ✓	1	1
2) Permanent Labourers	-	58	-
Total	236	157	79

COLLEGE OF AGRICULTURE PADANNAKKAD

Faculty position

Cadre	Name of the Scientist	Sanctioned post	In position	Vacant
Plant breeding and Genetics Professor	Dr.D.Radhadevi	1 ✓	2	
	Assoc. Professor Dr.J.S.Minimol (Asst. Professor)	1 ✓		
Plant Pathology Professor	Dr.M.Govindan	1 ✓	2	
	Asso.Professor Dr.Sible G Vargheese (Asst. Professor)	1 ✓		
Agronomy Professor	Dr.I.John Kutty	1 ✓	3	1
	Dr.Meerabai	2 ✓		
Assistant Professor	Dr.Usha C Thomas	1 ✓		
Horticulture Professor	Dr.A.Rajagopalan	1 ✓	3	
	Asso.Professor Dr. P.Anitha (Asst.Prof) Dr.Saji Gomaz (Asst.Prof)	2 ✓		
Soil Science Professor	Dr.Sudharmai Devi	1 ✓	1	1
	Associate Professor	1 ✓		
Entomology Professor		1 ✓	3	
	Assoc. Professor	1 ✓		
Asst. Professor	Dr.L.M.Sreekumar	1 ✓		
	Mr.B.Ramesha Kum.Amrutha V.S.			
Plant Physiology Asso.Professor	Dr.B.T.Krishnaprasad (Asst.Prof)	1 ✓	1	-

Bio Technology Assoc. Professor	Dr.K.B.Soni	1 ✓	1	-
Agri. Extension Professor		1 ✓	1	-2
Associate Professor		1 ✓		
Asst. Professor	Dr.Allan Thomas	1 ✓		
Agri. Economics Professor	Dr.C.Latha Bastine	1 ✓	2	
Asso.Professor	Dr.Elsamma Job (Professor)	1 ✓		
Agri. Statistics Asst.Professor	Dr.Vijayaraghavakumar (Professor)	1 ✓	1	
Home Science Asst.Professor	Mrs. Sofi Cheriyan (Associate Professor)	1 ✓	1	
Agri. Engineering Asst. Professor	Mrs.P.K.Mini (Asso.Professor)	1 ✓	1	
Physical Education Asst. Professor	Dr.E.Soman (Professor)	1 ✓	1	
Computer Science Asst.Professor	Vacant	1 ✓	-	1
Animal husbandry Asst.Professor	Vacant	1 ✓	-	1
Agri Materiology Assist.Professor	Vacant	1 ✓	-	1
Assistant Librarian	Vacant	1	-	1
Officer i/c Academy Professor	Vacant	1	-	1
Associate Dean	Vacant	1	-	1
Total		33	23	10

Staff strength

Scientific	: 23 ✓
Administrative/Supporting	: 16
Administrative/Supporting (Provisional)	: 7
Others (Specify) Technical	: 7
Total	: 53

AL-1
Dean-1
P-9
Asst-12
Asst-10

**COLLEGE OF FORESTRY
VELLANIKKARA**

Faculty position

Department	Sanctioned posts (Dept./discipline wise)			In position		
	Professor	Associate Professor	Assistant Professor	Professor	Associate Professor	Assistant Professor
				In position	In position	In position
Silviculture & Agroforestry	Nil	Nil	3	(2) Dr. B. Mohankumar Dr. K. Sudhakara	Nil	(1) Dr. T.K.Kunhamu
Tree Physiology & Breeding	Nil	1*	1*	(1) Dr. P.K.Ashokan	Nil	(1) Mr. A. V.Santhosh Kumar
Forest Management & Utilization	Nil	Nil	2+1**	(1) Dr. K. Gopikumar	(1) Dr. K. Vidyasagaran	(1) Mr. S. Gopakumar

Wood Science	Nil	Nil	1***	Nil		(1) Dr. E.V.Anoop.	Nil
Wildlife Science	Nil	1****	(1+1)****	-		(1) Dr. Nameer. P.O.	(2) Dr. Ambikavarma Mr. Animon. M. M (On study leave)
Associate Dean	1			(Vacant - Dr. P.K.Ashokan, Associate Dean(i/c)		-	-
Total	1	2	10	4		3	5
Total	Sanctioned = 12+1			In position = 12 (1 post of Associate Dean vacant)			

* One post originally sanctioned as AP (Tree physiology) and one post as Assoc. Prof (Tree Physiology); ** One post originally sanctioned as AP (Forestry); *** Originally sanctioned as AP (Forestry); **** One post originally sanctioned as AP (Zoology), one post sanctioned as AP (Tree Genetics) and one post as Asso. Prof (Tree Genetics)

Staff strength

Staff	Total
Scientific	11
Administrative	7
Supporting	Nil

COLLEGE OF VETERINARY & ANIMAL SCIENCES, MANNUTHY

Faculty position

Cadre	Name of the Scientist	Sanctioned post	In position	Vacant
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Anatomy.

Professor	Dr. Jose John Chungath	1 ✓	1	0
Assoc. Professor	Dr. Sreedharan Unni ,C.K.	3 ✓	1	2
Asst. Professors	Dr. Maya ,S. Dr. Lucy, K.M.	6 ✓	2	4

Animal Reproduction.

Professor	Dr.V. Vijayakumaran	3 ✓	1	2
Associate Professor	Dr. T Sreekumaran Dr. Joseph Mathew	5 ✓	2	3

Biochemistry.

Professor	Dr.Sisilamma George	1 ✓	1	0
Assoc. Professor	Dr.K.K. Jayavardhanan	2 ✓	11	
Asst. Professors		5 ✓	0	5

Clinical Medicine

Professor	Dr.P.G.Baby (On leave)	2 ✓	1	1
Associate Professor	Dr.K.M. Jayakumar Dr.Usha Narayana Pillai	2 ✓	2	0
Asst. Professor	Dr.Premni Elias	5 ✓	1	4

Animal Genetics & Breeding

Assoc. Professor		1 ✓	0	1
		2 ✓	2	0

Extension

Professor		1 ✓	0	1
Assoc. Professor	Dr.M.R. Subadra	3 ✓	1	2

	Dr.Rajkamal	3 ✓	0	3
Asst. Professors				
Livestock Production				
Management				
Professor	Dr.P.C.Saseendran	2 ✓	1	1
Assoc. Professors	Dr.Joseph Mathew	2 ✓	1	1
Asst. Professors		4 ✓	0	4
Livestock Products Technology				
Professor		1 ✓	0	0
Assoc. Professor	Dr.P. Kutty narayanan	2 ✓	2	0
	Dr.George T.Ommen	1 ✓	0	0
Microbiology				
Professor		2 ✓	0	2
Assoc.Professor	Dr.G. Krishnan Nair	2 ✓	1	1
Asst. Professor	Dr. Koshy John	5 ✓	1	4
Dairy Science				
Professor		1 ✓	0	1
Assoc. Professor	Dr.M.Mukundan	4 ✓	1	3
Asst. Professor		2 ✓	0	0
Nutrition				
Professor		1 ✓	0	1
Assoc.Professor	Dr.A.D.Mercy	3 ✓	1	2
Asst. Professors	Dr.K.Alley	6 ✓	2	4
Dr.Syam Mohan				
Parasitology				
Professor		1 ✓	0	1
Assoc. Professors	Dr.H.Subramanian	4 ✓	0	4
	Dr.Lucy Sabu			
	Dr.K.Devada			
Transferred to Pookot				
Pathology				
Professor		2 ✓	0	2
Assoc. Professors	Dr. Lalithakunjamma	3 ✓	3	3
	Dr.N. Vijyan			
	Dr.N. Divakaran Nair			
Asst. Professors		6 ✓	1	5
Pharmacology & Toxicology				
Professor		2 ✓	0	2
Assoc.Professors	Dr.A.M. Chandrasekharan Nair	3 ✓	4	0
	Dr.A.D.Joy			
	Dr.C.M.Aravindakshan			
	Mr.V.R.Raghunandan			
Asst. Professor	Dr.Usha , P.T.A.	5 ✓	1	4
Physiology				
Professor		1 ✓	0	1
Assoc. Professor	Dr. K. P. Sreekumar	3 ✓	1	2
	Dr. Ramnath			
Asst. Professor	Dr.K.Karthiyani	4 ✓	1	3
Poultry Science				
Professor		2 ✓	0	2
Assoc. Professors	Dr.A. Jalaludhin	4 ✓	2	2
	Dr.Peethambaran			
	Dr.Leo Joseph			
Asst.Professor		4 ✓	0	4
Surgery				
Professor		2 ✓	0	2
Assoc. Professor	Dr.Sarada Amma	4 ✓	2	2
	Dr.K.Rajankutty			
Asst.Professor	Dr.C.B.Devanand	6 ✓	4	2

Statistics

Professor		1	0	1
Assoc. Professor	Dr.K.S.Sujatha	3 ✓	2	1
	Dr.K.A.Mercy			
Asst. Professor		4	0	4

Veterinary Epidemiology & Preventive Medicine

Professor		1	0	1
Assoc. Professor	Dr.M.R.Saseendranath	2 ✓	1	1
Asst Professor	Dr.P.V.Tresamol	4 ✓	1	3

Veterinary Public Health

Professor	Dr. E.Nanu	1 ✓	0	
Assoc. Professor		2 ✓	0	2
Asst. Professor	Dr.B.Sunil	6 ✓	1	5

Veterinary Hospital, Mannuthy

Assoc. Professor	Dr.Aravinda Ghosh	1 ✓	0	
Asst. Professor		2 ✓	0	2
Professor RC	Dr.A.D.Joy (Additional Charge)	1	1	1

Physical Education

Assoc. Professor	Mrs. Molley Cherian (Asst. Professor)	1 ✓	1	0
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Pig Farm

Staff strength

Scientific

Cadre	Sanctioned Posts	In Position	Vacant	Remarks
CPPR				
Associate Professor	1 ✓	-	1	
Asst. Professor	1 ✓	-	1	
AICRP on Pigs				
Professor	1	-	1	
Associate Professor	-	2	-	
Asst. Professor	2 ✓	-	2	

Administrative & Supporting Staff

Cadre	Sanctioned Posts	In Position	Vacant	Remarks
CPPR				
Admn.Asst.	1	1	-	
Sl.Grade Asst.	1	-	1	
Asst.Sr.Gr.	1	1	-	
Typist Gr.I	1	1	-	
Pump Operator	1	1	-	
Pig Attendant	2	-	2	
Class IV	2	-	2	
Labourers	18	8	10	
AICRP on Pigs				
Asst.Sr.Gr.	1	1	-	
Labourers	6	6	-	

Technical Staff

Cadre	Sanctioned Posts	In Position	Vacant	Remarks
CPPR				
Farm Supervisor Gr.I	1	-	1	
Farm Supervisor Gr.II	1	-	1	
Farm Asst.	2	-	2	
AICRP on Pigs				
Farm Asst.	2	2	-	
Technical Officer	1	1	-	

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 450-620

Livestock Production & Management

Staff strength
Scientific
Administrative
Supporting
Others (Specify)
Total

Professor-1, Assoc.Professor-2, Asst.Professor-2

Farm Supervisor-I
Labourer -2
7

COLLEGE OF VETERINARY & ANIMAL SCIENCES, POOKOT

Faculty position

DETAILS OF TEACHING STAFF IN POSITION

DEPARTMENTS	PROFESSORS	ASSOCIATE PROFESSORS	ASSISTANT PROFESSORS
Associate Dean	1.Dr.P.P.Balakrishnan		
1. Veterinary Anatomy	2.Dr.K.R.Harshan	1.Dr.N.Asokan** (Vacant - 1)	1.Dr.Indu.V.Raj 2.Dr.Sreeranjini.A.R (Vacant - 1)
2. Veterinary Physiology	3.Dr.P.T.Philomina	2.Dr. Gireesh Varma (Vacant - 1)	3.Dr. V. Beena 4.Dr. Raji (Vacant - 1)
3. L.P.M.	4.Dr.FrancisXavier (Transferred)	3.Dr. K.S. Anil (Vacant - 3)	5.Dr. C. Balusamy 6..Dr. John Abraham (Vacant - 1)
4. Vety. Pharmacology	5.Dr.N.Gopakumar	(Vacant - 2)	7.Dr. Sanis Juliet 8 Dr .Nisha A.R
5. Vety.Microbiology	6.Dr.V.Jayaprakasan	4.Dr. M. Mini** (Vacant - 1)	9. Dr. Chintu Ravisankar 10.Dr. Priya. P.M. (Vacant - 1)
6. Vety. Parasitology	7 Dr.H.Subramanian	5.Dr. K. Devada** 6.Dr. Lucy Sabu	11 Dr. Reghu Ravindran 12. Dr. Bindu Lakshmanan (Vacant - 1)
7. Vety. Pathology	8.Dr.T.Sreekumaran(Retired)	(Vacant - 2)	(Vacant - 1)
8. Animal Nutrition	9.Dr.T.V.Viswanathan	7.Dr. K. Alli (Vacant - 2)	13.Dr. Dildeep. V. (Vacant - 2)
9. Vety. PublicHealth & Hygiene	Vacant	8.Dr. C. Latha	(Vacant - 2)
10. L.P.T.	Vacant	9.Dr. C.T. Sathyan (Vacant - 1)	14.Dr. Renuka Nair 15.Dr.Deepa Surendran
11. Animal Reproduction & Gynecology	Vacant	10.Dr. Metilda Joseph (Vacant - 1)	16.Dr. K. Pramod 17.Dr Jayakumar K(Vacant - 1)
12. Vety. Surgery & Radiology	Vacant	(Vacant - 1)	18..Dr. K. Anoop (Vacant - 1)
13. Vety. Medicine & Jurisprudence	Vacant	(Vacant - 1)	19.Dr. S. Ajithkumar
14. Animal Breeding & Genetics	Dr.M.R.Rajan (Retired)	11.Dr. A.P. Usha** 12.Dr. K.Anil Kumar (Vacant - 1)	20.Dr. G. Radhika 21.Dr. C.N. Dinesh (Vacant - 1)
15. Animal Husbandry& Extension	Vacant	(Vacant - 1)	22.Dr. T.S. Rajeev 23.Dr. Reeja George 24.Dr. Sentilkumar
16. Vety. Biochemistry	Vacant	(Vacant - 1)	25.Dr. Shynu. M. (Vacant - 2)
17. Vety.Epidemiology & Preventive medicine	-	(Vacant - 1)	(Vacant - 1)
	Sanctioned post(Prof): 17 ✓ In position : 10 Vacant : 7	Sanctioned post (Assoc. Prof) : 32 ✓ In position : 12 Vacant : 20	Sanctioned post (Assist. Prof) : 41 ✓ In position : 25 Vacant : 16

** promoted as Professor (CAP)

ABSTRACT: TOTAL SANCTIONED POSTS FOR FIRST THREE YEARS =90

Staff strength

Scientific staff

Scientific Staff	Associate Dean : 1 Professor In position : 6 Dr. Divakaran Nair on working arrangement from Mannuthy	Associate Professor In position : 12	Assistant Professor In position : 25
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Administrative and supporting staff:

Name of sanctioned post	No. of posts	Present staff position	Vacancy
Administrative Officer	1	1	-
Section Officer	4	4	--
Assistant	12	3	9
Office Supdt.	1	-	1
Senior office superindent	1	-	1
Store Assistant	1	-	1
Typist	4	2	2
Matron/Hostel Manager	3	-	3
Classs IV	60	-	60
Libraian	1	-	1
Library Assistant	2	2	0
Programmer	1	-	1
Asst. Librarian	2	-	2
Data Entry Operator	1	-	1
Farm Supervisor	1	1	-
Farm Assistant/Tech	36	2	34
Driver (LDV)/Tractor Driver	1	-	1
Driver (HDV)/LDV	2	1	1
Permanent Labourers	19	-	19
Pump/Plant Operator	2	2	0
Security Staff/Security officer	13	1	12
Lab assistant	15	2	13
Total	183	15	168
Non Teaching posts			
Assistant Student Welfare/AP	1	-	1
Instrumentation Engineer/AP	1	-	1
Grand total	185	15	170

Others(specify)

Teaching Assistants: 8

Electrical Technicians : 1

Staff position of all Units.

- DR. Anil Kumar
Associate Professor.
Incharge of All farms. Drawing and Disbursing officer.
- Dr. John Abraham
Assistant Professor
i/c Dairy, Goat farm and Horse unit
- Dr. C. Balusami.
Assistant Professor.
i/c Pig, Poultry farm and Laboratory Animal Unit

- 4 Farm Supervisor Grade. 1
 1. Mr.K.Sivasankaran.
 2. Mr.K.K Gangadharan.
 5 Farm Assistant (Agri. Sn. Gr) -1
 1. Mr. Abdul Rehman
 6. Pump Operator.
 1. M. V. Surendran
 7. Labours: All Labourers are engaged on Daily Wages / Contract basis

Dairy Unit:

Milker: 2 males

Night duty: 1 male

Grazing, feeding,

Cleaning- 2 males, 3 females

Goat Unit:

Labourers: 1 male, 1 Female

Pig Unit:

Labourer: 1 Female, 1 Male

Poultry Unit:

Labourer 2 Females,

**COLLEGE OF DAIRY SCIENCE AND TECHNOLOGY
 MANNUTHY, THRISSUR**

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Associate Dean	Dr.R.Rajendrakumar	01	01	Nil
Associate Professor	Dr.E.K.Kurien		01	
Assistant Professor	Dr.A.K.Beena	02	01	01

Staff strength

- (a) Scientific Staff : 3
 (b) Administrative : 11
(including 4 employment hands & 1 Typist on daily wages)
 (c) Supporting : 9
(including 5 employment hands & 1 LDV Driver on daily wages)
 (d) Others : 6
(Teaching Assistants on daily Wages)
 (C) Staff position at Kolahalamedu
 (a) Scientific Staff : 1
 (b) Administrative : 3
(including employment hands & Typist on daily wages)
 (6)
 (c) Supporting : 2
(including employment hands & 1 LDV Driver on daily wages)

COLLEGE OF FISHERIES, PANANGAD

Faculty position

I. Department of Aquaculture					
Cadre	Name of the Scientist	Sanction-ed Post	In position	Vacant	Remarks
Assoc. Professor	Dr. C.Mohanakumaran	3	1	2	

	Nair (Professor)				
Asst. Professor	Dr. Thresiamma James (Professor)	8	4	4	
	Dr. S. Shyama (Assoc. Professor)				
	Dr. Devika Pillai (Assoc. Professor)				
	Sri. K. Dinesh				
II. Department of Fish Processing Technology					
Professor	---	1	0	1	
Assoc. Professor	Dr. D.D. Nambudiri (Professor)	1	1	0	
Asst. Professor	Dr. P.M. Sherief (Professor)	7	4	2	
	Dr. M.C. George (Assoc. Professor)				
	Dr. Sajan George (Professor)				
	Sri. S. Krishnakumar				
III. Department of Fishery Engineering					
Assoc. Professor	---	1	0	1	
Asst. Professor	Sri. George Mathew	2	1	1	
IV. Department of Fishing Technology					
Assoc. Professor	---	1	0	1	
Asst. Professor	Dr. B. Manojkumar (Assoc. Professor)	2	1	1	
V. Department of Fishery Hydrography					
Professor	---	1	0	1	
Assoc. Professor	---	2	0	2	
Asst. Professor	Sri. N.N. Raman	5	1	4	
VI. Department of Fishery Biology					
Professor	---	1	0	1	
Assoc. Professor	Dr. K.V. Jayachandran (Professor)	2	2	0	
	Dr. J. Rajasekharan Nair (Professor)				
Asst. Professor	Dr. T.M. Jose (Professor)	7	2	5	
	Dr. T.V. Anna Mercy (Professor)				
VII. Department of Management Studies					
Assoc. Professor	---	1	0	1	
100Asst. Professor	Dr. V. Ambilikumar (Assoc. Professor)	7	7	0	
	Dr. M.S. Raju (Professor)				
	Dr. K.M. Mathew (Professor)				
	Sri. Mathew Sebastian				
	Smt. V. Malika				
	Smt. Daisy.C. Kappan				
	Smt. Alphi Korath				
VIII. Physical Education Cell					

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 No. 11
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Assoc. Professor	Smt. Suci. V. John	1	1	0
* Working against the post of Assoc. Professor				
** Working against the post of Asst. Professor				

Staff strength

Scientific	: 27
Administrative	: 23
Supporting	: 20
Others (specify)	: 24 labour

KELAPPAJI COLLEGE OF AGRIL. ENGG. & TECHNOLOGY, TAVANUR

Faculty position

Cadre	Name	Sanctiond Post	In Position	Vacant
Dean		1	0	1
LWRCE				
Professor		1	0	1
Assoc. Prof.		2	0	2
Asst. Prof.	Smt. Renukumari J, Asst. Prof. (Sel.Gr.)	5	3	2
	Sri. T. D. Raju, Asst. Prof (Sel. Gr.)			
	Smt. Rema K. P, Asst. Prof (Sel. Gr.)			
IDE				
Professor		1	0	1
Assoc. Prof		2	0	2
Assistant Prof.	Sri. Alexander Seth, Asst. Prof. (Sel. Gr.)	5	4	1
	Smt. Asha Joseph, Asst. Prof (Sel.Gr.)			
	Sri. K.V. Levan, Asst. Prof. (Sel. Gr.)			
	Sri. Vishnu B. Asst. Prof (Sr. Scale.)			
Asst. Prof. (Civil Engg.)	Smt.D. Sasikala, Asst. Professor (Sel.Gr.)	1	1	0
PHT & AP				
Professor	Dr.V. Ganesan, Professor	1	1	0
Assoc. Prof		2	0	2
Asst. Prof.	Dr. Sudheer K. P, Asst. Prof (Sr. Scale.)	3	1	2
FPME				
Professor		2	0	2
Associate Prof.	Sri. Jippu Jacob, Assoc. Prof	3	1	2
Asst. Prof.	Dr. Geetha Susan Philip, Asst. Prof. (Sr.Scale)	5	3	2
	Sri. Manoj Mathew, Asst. Prof. (Sel. Gr.)			
	Sri. Hamza Mollakadavath, Asst. Prof. (Sel. Gr.)			
	Asst. Prof (Mech. Engg.)	2	0	2
	Asst. Prof. (Elec. Engg.)	1	0	1
SAC				
Mathematics				
Professor		1	0	1
Asst. Prof.	Dr.V. Anil Kumar, Assoc. Prof.	2	1	1
Agronomy				
Professor		1	0	1
Asst.Prof.		1	0	1
Agri. Chemistry				
Assoc. Prof.		1	0	1
Asst. Prof.		1	0	1
Physics				
Assoc. Prof		1	0	1

Asst. Prof.	Dr. K.M. Valsamma, Asst. Prof. (Sr. Scale)	1/	1	0
Plant Physiology				
Asst. Prof.		1/	0	1
Computer Science				
Asst. Prof.		1/	0	1
Farms				
Asst. Prof.		1/	0	1
Pharmacology (Vety.)				
Asst. Prof.		1/	0	1
Phy. Edn.				
Asst. Prof.	Sri. M.Velayudhan Kutty, Asst. Prof. (Sel. Gr.)	1/	1	0
Poultry Science				
Asst. Prof.		1/	0	1
Animal Breeding & Genetics				
Asst. Prof.		1/	0	1
AICRP on FIM				
Professor	Dr. M. Sivaswami, Professor	1	1	0
PFDC				
Assoc. Prof.	Dr. E.K. Mathew, Associate Prof.	1/	1	0
Asst. Prof.	Sri. K. K. Sathian, Asst. Prof. (Sel. Gr.)	1/	1	0
AICRP on PHT				
Assoc. Prof.	Dr.Santhi Mary Mathew, Assoc. Prof.	1	1	0
Asst. Prof.	Sri. Prince M. V, Asst. Prof. (Sel. Gr.)	2	1	1
		60	22	38

Staff strength

Scientific	:	22
Administrative	:	11
Supporting	:	6
Others	:	19
Total	:	58

AP
Asst. Prof. 1/13/15

KAU HIGH SCHOOL, VELLANIKKARA

Staff Position

Designation	Name	Sanctioned Posts	In position	Vacant
Head Master	--	1	Nil	1
HSA (Natural Science) & Head Mistress i/c	Deborah Cyril	1	1	--
HSA (Natural Science)	Leena. K.S *	Super Numerary posts of HSA created as per order No. GA/J2/19720/04 dt. 23/8/06		
HSA (Natural Science)	Latha Balaraman *			
HSA (Social Science)	Lilly. A.J	1	1	--
HSA (Maths)	Indiradevi. K.S	2	2	--
HSA (Maths)	Magy. T.J			
HSA (Physical Science)	Najeema. U	1	1	--
HSA (English)		1	--	
HSA (Malayalam)		1	--	
HSA (Hindi)		1	--	
UPSA (Maths)		1	--	
UPSA (Social Science)		1	--	
UPSA (Natural Science)		1	--	
UPSA ((Physical Science)		1	--	

UPSA (English)		1	--	
UPSA (Malayalam)		1	--	
UPSA (Hindi)		1	--	
LPSA		8	--	
Specialist Teacher (Drawing)		1	--	
Specialist Teacher (Physical Education)		1	--	
School Assistant (Music)	Naseera. K	1	1	--
Nursery School Assistant	Devika. P	4	2	2
Nursery School Assistant	Sylaja. D.V			
Assistant Senior Grade	Brigit Kuruvilla	1	1	--
Typist Senior Grade	Saleem. A.K	1 (Post shifted as per GA/A1/19061/07 dated, 14/08/07)	1	--
Ayah	Sumithra. K.R	4	2	2
	T.R. Ratnam *	* Permanent Labourer on working arrangement at KAU School from College of Horticulture, Vellanikkara		
Class IV/ SCA	Sunil. S	3	2	1
	T.M. Omana *	* Permanent Labourer on working arrangement at KAU School from CRS, Madakkathara		

Services of provisional Teachers appointed through Employment Exchange has been terminated with effect from 31/03/2008

NARP (SOUTHERN REGION), VELLAYANI

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Associate Director	VACANT	1	--	1
		Dr. Arthur Jacob, Assoc. Prof. working as ADR i/c. w.e.f. 21-5-2005		
Associate Professor (Agrl. Statistics)	VACANT	1	--	1
Associate Professor (Plant Breeding & Genetics)	Dr. K.M. Abdul Khader Professor	1 ✓	1	--
Associate Professor (Soil Science & Agrl. Chemistry)	VACANT	1 ✓	--	1
Assistant Professor (Horticulture)	Dr. Vasanthakumar Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. Arthur Jacob Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. Hebsy Bai Professor	1 ✓	1	--
Assistant Professor (Plant Breeding & Genetics)	Dr. P. Manju Professor	1 ✓	1	--
Assistant Professor (Soil Science & Agrl. Chemistry)	Dr. Usha Mathew Associate Professor	1 ✓	1	--
Assistant Professor (Ag. Engineering)	Dr. M.S. Hajilal Professor	1 ✓	1	--

Assistant Professor (Horticulture)	Dr. Sreelathakumari. I. Professor	1 ✓	1	--
Assistant Professor (Computer Science)	Smt. Susan Thomas Assistant Professor	1 ✓	1	--
Assistant Professor (Ag. Extension)	VACANT	1 ✓	--	1
Assistant Professor (Plant Pathology)	VACANT	1 ✓	--	1

AICRP on Forage Crops

Associate Professor (Plant Breeding & Genetics)	Dr. D.I. Sumabai Professor	1 ✓	1	--
Assistant Professor (Agronomy)	Dr. S. Lakshmi Professor	1 ✓	1	--

AICRP on Nematode Pests

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Associate Professor (Ag. Entomology)	Dr. M.S. Sheela Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. T. Jiji Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. K.D. Prathapan Assistant Professor	1 ✓	1	--

AINP on Pesticide Residue

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Associate Professor (Ag. Entomology)	Dr. S. Naseema Beevi Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. Thomas Biju Mathew Professor	1 ✓	1	--
Assistant Professor (Soil Science) From 31-12-2005	Dr. Thomas George Associate Professor	1 ✓	1	--

AICRP on Honey Bee

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Associate Professor (Ag. Entomology)	Dr. S. Devanesan Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. K.S. Pramila Associate Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. M.H. Faizal Associate Professor	1 ✓	1	--
Assistant Professor (Ag. Entomology)	Dr. N. Anitha Associate Professor	1 ✓	1	--

AICRP on Mushroom

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Assistant Professor (Plant Pathology)	Dr. Lulu Das Professor	1 ✓	1	--

DST Project on AA

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Technical Officer (Agronomy)	Dr. P. Shalini Pillai Assistant Professor	1	1	--

Technical officer - 1
ASP - 19
ASO - 7
AO - 1

Staff strength

Scientific	22
Administrative	22
Supporting	11
SRF+JRF	67 (contract)
Total	55 + 67 (contract)

**INSTRUCTIONAL FARM, COLLEGE OF AGRICULTURE,
VELLAYANI**

Faculty position

Cadre	Name of the scientist	Sanctioned posts	In position	Vacant
Professor & Head	Dr.M.Suharban (Plant Pathology)	1 ✓	1	Nil
Professor	1.Dr.G.Sobhana (Agrl. Extension) 2.Dr.D.Geetha (Plant Pathology) 3.Dr.Kamala Nayar (Plant Pathology)	5	5	Nil
Associate Professor	1.Dr.A.S.Anilkumar (Agronomy) 2.Dr.T.Sajitha Rani (Agronomy)			
Professor	1.Dr.M.S.Hajilal (Agrl. Engg. - on working arrangement from NARP)			
Associate Professor	Dr.P.H.Latif (Agronomy - on working arrangement from College of Agriculture. Vellayani)			

Staff strength

Scientific staff

Professor & Head	Dr.M.Suharban (Plant Pathology)	1 ✓	1	Nil
Professor	1.Dr.G.Sobhana (Agrl. Extension) 2.Dr.D.Geetha (Plant Pathology) 3.Dr.Kamala Nayar (Plant Pathology)	5	5	Nil
Associate Professor	1.Dr.A.S.Anilkumar (Agronomy) 2.Dr.T.Sajitha Rani (Agronomy)			
Professor	1.Dr.M.S.Hajilal (Agrl. Engg. - on working arrangement from NARP)			
Associate Professor	Dr.P.H.Latif (Agronomy - on working arrangement from College of Agriculture, Vellayani)	NA	NA	NA

Administrative and supporting staff

Department / Designation	No. of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remark
Administrative Officer	1	1	Smt.K.Vasanthakumari Amma	Nil	
Section Officer	2	2	1.Smt.K.Indirakumari 2.Sri.M.S.Sanal Kumar	Nil	
Assistants	7	6	1.Smt.K.Sudharma (Sl Gr) 2.S.R.Safini (Sr. Gr) 3.R.Seena (Gr II) 4.Sri.G.R.Sujith (Sr. Gr.) 5.Sri.G.Praveen (Gr II) 6.Sri.S.Sureshkumar (Asst.)	1	
SO (FC &D)	1	1	1.S.Majida Beevi	Nil	
Typist	2	2	1.Smt.B.Sthanulekshmi (Sr Gr) 2.Smt.A.Roida (Gr. II)	Nil	

Class IV			1.Sri.J.Roby 2.Smt.S.Usha Kumari		
Lab Asst (WA)			1.Smt.V.Mini		
Peon	1	1		1	

Technical

Department / Designation	No. of posts		Name of the incumbent	Vacant	Remarks
	Sanctioned	In position			
Sr. Farm Supervisor	8	7	1.Sri.G.Raveendran Assari	1	
Farm Manager			1.Sri.S.R.Rajeevan (Gr I) 2.Sri.Jones Charles		
Farm Officer (Sl. Gr)			1.Smt.I.Krishnakumari 2.Sri.I.Gershan 3. Sri.A.S.Hareeshkumar		
Farm Officer (Sr.Gr)			1.Sri. V.T.Bose		
Technical Supervisor Gr I	1	1	Sri.N.Sambasivan Nair	Nil	
Driver (LDV Gr I)	2		Sri.S.Anilkumar Sri.Aji (Provisional appointment through Employment Exchange)		
Establishment Farm Worker	21	8	1.Sri.R.Vijayan 2.Sri.R.K.Sanal Kumar 3.Sri.S.Asokan 4.Sri.A.Santhoshkumar 5.Sri.R.Sadasivan 6.Sri.M.Suresh 7.Smt.Kumari Vimala 8.Sri.D.Maheswaran	13	
Technician			1.Sherin Raj.J. (Provisional appointment through Employment Exchange)		

*Print 4/11-2
P -
ASP -
ASO -10*

**TRAINING SERVICE SCHEME COLLEGE OF AGRICULTURE
VELLAYANI**

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr. A. K. Sherief	1	1	0
Assistant Professor	Sri. A. Sakeer Husain	1	1	0

Staff strength.

Scientific : 2
Administrative : 3
Supporting : 1
Total : 6

Staff members on Roll

Sl No.	Post	Name	Designation	Remarks
1.	Professor & Head (i/c)	Dr.A.K.Sherief	Professor	
2.	Asso. Professor	Sri. A. Sakeer Husain	Assistant Professor (SS)	
3.	Farm Officer	Sri. M. Kamarudeen	Farm Officer(Sel.Gr)	
4.	Office Assistant	Sri .G. Reghunath	Office Assistant (Sr.Gr)	
5.	Typist	Sri. V.Rajayyan	Typist (Sr.Gr)	
6.	Peon	Smt.S..Rajithakumari	Peon	

*ASP - 1
ASOP - 1*

**CROPPING SYSTEMS RESEARCH CENTRE
KARAMANA, TRIVANDRUM**

Faculty Position

Cadre	Name of the Scientist	Sanctioned Post	In position	Vacant
Professor	Dr. M. Vijayan	Assistant Professor	1	Nil
Associate Professor	Dr. B. Rani	Assistant Professor	1	Nil
Assistant Professor (Sr.Scale)	Dr. Jacob John	Assistant Professor	1	Nil

Staff strength

Scientific	Dr. Kuruvilla Varughese, Professor & Head
	Dr. M. Vijayan, Professor, Plant Pathology
	Dr.B. Rani, Associate Professor, Soil Science & Agricultural Chemistry
	Dr. Jacob John, Assistant Professor(SS) Agronomy
Administrative & Supporting	Smt.N. Indira Devi, Administrative Assistant Sri. Riaz, Assistant Sri.Sareesh Kumar, Assistant Smt.P.S. Sindhu, Typist Senior Grade Sri.K. Maniyan, Class IV Sri.R. Sajikumar, Lab Assistant
Technical	Smt. K.S. Sujatha, Farm Manager Grade I Sri.Tomy Abraham, Farm Officer Senior Grade
Others	NIL

COCONUT RESEARCH STATION, BALARAMAPURAM

Faculty Position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor of Agronomy and Head	Dr.K.Viswambharan	1	1	Nil
Assistant Professor of Agronomy	Vacant	1	0	1
Assistant Professor (SS) of Plant Pathology	Dr.N.V.Radhakrishnan	1	1	Nil

Staff strength

a. Scientific staff:

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor of Agronomy and Head	Dr.K.Viswambharan	1	1	Nil
Assistant Professor of Agronomy	-	1	0	1
Assistant Professor of Plant Pathology (SS)	Dr.N.V.Radhakrishnan	1	1	Nil

b. Administrative and Supporting Staff

Designation	No. posts Sanctioned	No. posts In position	Name of the incumbent	Vacant	Remarks
1. Administrative Assistant	1	1	B. Shobana	Nil	
2. Assistant	2	2	P.J.Vipin G.L.Prathiba	0	
3. Typist	1	1	B.Lalithakumari	Nil	
4. Peon	2	2	K.Mohanam G.Binu	0	
5. Watchman	1	1	S.Krishnakumar	0	

c. Technical Staff

Designation	No. of posts Sanctioned	No. of posts In position	Name of the incumbent	Vacant	Remarks
Farm Supervisor	1	1	L.Mohandas	0	
Farm Assistants	2	1	Suni*	1	Vacancy to be filled *On daily wages

**FARMING SYSTEMS RESEARCH STATION
SADANANDAPURAM, KOTTARAKKARA**

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Assoc.Professor (Hort)		1	0	1
Assoc.Prof.(SS&AC)		1	0	1
Asst. Professors				
1. Pathology		1	0	1
2. Agrl.Economics	Dr.S.Regeena, Professor	1	1	0
3. Agronomy		1	0	1
4. Entomology		1	0	1
5. Soil and water conservation Engg/ Agri. Engg	1. Smt. Jayasree G. S. Asst. Professor 2. Dr.Bini Sam Assoc. Professor	2	2	0
Asst.Professor (Animal Management)		1	0	1

P
Asst - 2
Asst - 7

Staff strength

Designation	Sanct-ioned	In position	Vacant/Remarks
Scientific Staff			
Assoc. Professor (Hort)	1		Post shifted to CoH, Veilanikkara
Assoc. Prof.(SS&AC)	1		
Asst. Professors			
1. Pathology	1		Vacant from 23.05.2002.
2. Agrl. Economics	1	Dr.S.Regeena, Professor & Head	
3. Agronomy	1	Vacant	Vacant from 01.02.2007
4. Entomology	1	Vacant	Vacant from 20.12.2000
5. Agri. Engineering/ Soil & Water Conservation Engg.	2	1. Smt. Jayasree G. S. Asst. Professor 2. Dr.Bini Sam Asst. Professor	
6. Animal Management	1	Vacant	Vacant from 06.06.02
Farm Asst.(Ag) Gr.I	3	i.Sri. Rajendran FA (Sr. Gr.)	Two posts vacant
Farm Asst.(Vety) Gr.II	1	Vacant	Vacant from 01.12.2006

Technician Gr.I	1	Sri.A.Raju, Technical Supervisor	
Administrative Staff			
Administrative Asst.	1	Sri. P. K. Mohanan	
Asst.Gr.II	2	I. Smt. Priya P. K. Asst.Gr. II	One post vacant
Typist Gr.II	1	Smt.Bhamini Amma Sr.Gr.Typist	
Supporting Staff			
Lab Asst.	1	Vacant	Vacant from 21.01.2007
Peon/Class IV	1	Smt. Sreelatha Class IV	Temporary posting through Employment Exchange

ECF UNIT, SADANANDAPURAM

Faculty Position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Assoc. Professor & Head	Dr. Thomas Mathew	1	1	Nil
Asst. Profess (Agronomy)		1	Nil	1

Staff strength

Scientific	:	1
Administrative	:	1
Technical	:	6
Supporting	:	vacant

Total : 8

SOIL CONSERVATION RESEARCH STATION, KONNI

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Associate Prof	Madhusudan Nair	Nil	1 On working arrangement	Nil
Associate Prof	Noble Abraham	Nil	1 "	Nil

Staff strength

Scientific

Cadre	Name	Sanctioned Posts	In position	Vacant
Madhusudan Nair	Nil	1 On working arrangement	Nil	
Noble Abraham	Nil	1 "	Nil	

REGIONAL AGRICULTURAL RESEARCH STATION, PATTAMBI

Faculty position

Sl. No.	Sanctioned post	Discipline	Name of the scientist in position	vacant
	Non-Plan			
1	Assoc. Professor	Plant breeding & Genetics		vacant

2	Assoc. Professor	Plant breeding & Genetics		vacant
3	Asst. Professor	Agronomy		vacant
4	Asst. Professor	Agronomy		vacant
5	Asst. Professor	Plant Pathology		vacant
6	Asst. Professor	Plant Pathology		vacant
7	Asst. Professor	Agri. Extension		vacant
8	Asst. Professor	Plant Physiology		vacant
	NARP - PHASE 1 + 2			
9	Professor	Plant breeding & Genetics		vacant
10	Professor	Soil Science & Agri. Chem.		vacant
11	Assoc. Professor	Agronomy	K. Madhusoodanan Nair	
12	"	Agronomy		vacant
13	"	Agri. Economics		vacant
14	"	Agri. Engg.	Dr. P.R. Jayan	
15	Asst. Professor	Plant breeding & Genetics		vacant
16	"	Agri. Entomology		vacant
17	"	Agri. Extension	B. Shanmughasundaram	
18	"	Agri. Economics	Chithra Parayil	
19	"	Horticulture	Dr. M.C. Narayanankutty	
20	"	Horticulture	Dr. M.L. Jyothi	
21	"	Bio-chemistry	Dr. C. Beena	
22	"	Agri. Engg.	Susan Cherian	
23	"	Agri. Engg.	Deepthi Susan. P.E	
	NSP - BSP - (ICAR)			
24	Asst. Professor	Plant breeding & Genetics		vacant
	AICRIP - Double Cropping			
25	Assoc. Professor	Agronomy	Dr. P.V. Balachandran	
26	"	Plant Pathology	Dr. P. Raji	
27	"	Plant breeding & Genetics		vacant
28	"	Agri. Entomology	Dr. K. Karthikeyan	
29	Asst. Professor	Plant Pathology		vacant
30	"	Plant breeding & Genetics		vacant
31	"	Plant Physiology	Dr. G.V. Sudarsana Rao	
	AICRP - on ARID LEGUMES			
32	Assoc. Professor	agronomy	Musthafa Kunnathodi	
33	"	Plant breeding & Genetics		vacant
34	Asst. Professor	Plant Pathology	S.M. Purushothaman	
	AICRP - on LTFE			
35	Assoc. Professor	Soil Science & Agri. Chem.		vacant
36	Asst. Professor	Soil Science & Agri. Chem.		vacant
	Total	36	15	21

P
ASP = 2
ASOP = 21
11

Staff strength

Scientific : 15 in position
Administrative : 22
Supporting : 33

Others (Specify)

Farm Supdnt.(Agri)	1	1	Nil	C.P. Muhammad Abdul Azeez
Farm Manager Gr. I (Agri)	1	1	Nil	C. Subramanian
Farm Officer (Agri)	7	Nil	7	Nil
Technician	1	1	Nil	P. Surendran
Asst. Engineer	1	Nil	1	vacant
Tractor Driver	1	1	Nil	R. Thankappan
Lab Asst/Clerikal Asst. Gr.III	4	2	2	T. Mohandas K. Ali Akbar
Pump Operator	1	1	Nil	M. Appu
Lab Asst Gr.II	1	1	Nil	N. Safiya
Class IV/Wat.man/Reg. Maz	15	12	3	M. Narayanan Beg Behadur M.P Mohanan N. Rugmini N.P. Thankamony C. Parukutty A.P. Yesoda C. Mohmmmed Kutry M. Parvathy P.C. Khadeeja C.K. Dileep C. Sujeesh
Section Officer	4	4	Nil	A.W. Kishore CT William UP Davis I.C.Sheela
Assistants	9	9	Nil	P. Ramadasan P.M. Suresh K.Surendran M.S Ramakrishnan C.M. Ahammad Abbas P.N. Indu S. Bijuram P.V. Girija U. Haseena
Office Superintendent	1	1	Nil	E. Gopinathan
Typists	2	2	Nil	K. Krishnakumari Sakkeer Hussain Karivaden
Peon	3	3	Nil	N. Hamza P. Kunhilakshmi V. Vasunni
NARP - PHASE 1 + 2				
Lab Asst/Clerikal Asst. Gr.III	1	1	Nil	M. Mohammad Shaji
Tractor Driver	1	Nil	1	
Farm Asst. (Vety)	1	Nil	1	
Technician	1	1	Nil	T.P. Ramakrishnan
Administrative Officer Gr.II	1	1	Nil	M.Jesseentha
Typists	2	2	Nil	V. Santhakumari K. Vijayalakshmi
Dupli. Machine Operator	1	1	Nil	T. Rugmini

Assistant	1	nil	1	
NSP - BSP - (ICAR)				
Technical Asst.	2	2	nil	Johani K. Varghese
				P. Abdu ssaboor
Lab Asst/Clerikal Asst. Gr.III	1	1	nil	P. Suresh Babu
Driver LDV	1	nil	1	
AICRIP - Double Cropping				
Farm Officer (Agri)	4	4	Nil	P.K. Rajasekharan
				M.V. Yusuf
				V.P. Ramakrishnan
				T.P. Ali
Tractor-cum-Jeep Driver	1	Nil	1	vacant
AICRP - on ARID LEGUMES				
Lab Asst Gr.III/Clerikal Asst.	1	1	Nil	T. Ramakrishnan
Farm Officer (Agri)	2	2	Nil	K. Radhakrishnan
				T. Velayudhan
Assistant	2	Nil	2	
AICRP - on LTFE				
Class IV	1	1	nil	A.Unnikrishnan

CASHEW RESEARCH STATION, ANAKKAYAM

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
a) Associate Professor				
1. Associate Professor (Hort)	1. Dr. P. Rajendran	2	2	Nil
2. Associate Professor (Stati)	2. Sri. M.P Abdurazak			
b) Assistant Professor				
1. Assistant Prof (Hort)		2	0	2*
2. Assistant Prof (Pl. Breeding/Pl. Physiol)				

*The post of Assistant Prof (Hort) temporarily shifted to CoH, Vellanikkara with effect from 31-5-04

AGRICULTURAL RESEARCH STATION, MANNUTHY

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor & Head(Agro)	Dr. U.Jaikumaran	1	1	Nil
Professor (Agron)	Dr.P.A.Joseph	1	1	Nil
Professor (Plant Breeding & Genetics)	Dr. C.A.Rosamma Dr. Kanakamany M.T	2	2	Nil
Professor (Horticulture)	Dr. C.Narayanankutty	1	1	Nil

Staff strength

Scientific Staff strength

Scheme	Sanctioned	In position	Vacant	Name
A. KAU (306-31-034)				
1. Professor (Agron)	2	2	Nil	i Dr. U. Jaikumaran (a) ii Dr. P.A.Joseph (b)
2. Professor (Pl Br & Genetics)	1	1	Nil	Dr. Kanakamany M.T (c)
3. Professor. (Hort)	1	1	Nil	Dr. C. Narayanankutty (d)

ICAR/NARP Central Zone (306-31-035)

1. Professor (Pl.Br.) 1 1 Nil Dr. Rosamma C.A. (e)
 Joined as Professors (a) w.e.f. 17.05.2001, (b) w.e.f. 19.05.2004
 (c) w.e.f. 06.02.2006, (d) w.e.f. 27.07.2006
 (e) w.e.f. 19.12.2006

Administrative / Supporting / Para-technical Ministerial/ Other posts

Scheme	Sanctioned	In position	Vacant	Name
KAU (306-31-034)				
1. Administrative Asst. Joseph	1	1	Nil	Smt. N. Mary
2. Asst. Grade 1	1	1	Nil	T. Vijayalakshmi,
3 Asst. Grade II	2	1	1	Agnes T.L
4. Typist	1	1	Nil	Mini S.
5 Class IV	2	Nil	2	
6. Driver LDV	1	Nil	1	
7. Watchman	2	Nil	2	

Para Technical Staff

KAU (306-31-034)				
1. Farm Superintendent	1	1	Nil	Sri. M.J.Kochappan
2. Farm Officer Grade II (from 21-02-08)	2	1	1	Smt Shebhana V.S
3. Farm Officer Sr. Gr. D.Ollakkat	1	1	1	Sri. Shaiju
4. Lab Assistant	1	Nil	1	
5. Tractor Driver	1	1	Nil	C.P.Rappat

NARP I - Central Zone (306-31-035)

1. Technical Supervisor 1 1 Nil
 K.P.Sudarsanakumar
 2. Assistant Engineer (Agrl. Engg)

**CASHEW RESEARCH STATION,
 MADAKKATHARA**

Faculty position

Cadre	Name of the scientist	Sanctioned post	In position	Vacant
Assoc. Prof. (Agro)	Dr. Jose Mathew	1	1	Nil
Asst. Prof. (Plant Breeding)	Sri. Gregory Zachariah	1	1	Nil
Asst. Prof. (Hort)	Dr. Mini.C	1	1	Nil
Asst. Prof. (Ent.)		1	Nil	1

Staff strength

Scientific staff

Dept. & Designation	Number of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks
Assoc. Prof.(Agro.)	1	1	Dr. Jose Mathew	Nil	
Asst. Prof. (Ent.)	1	Nil		1	
Asst. Prof. (Pl. Breeding)	1	1	Sri. Gregory Zachariah	Nil	
Asst. Prof. (Hort.)	1	1	Dr. Mini. C	Nil	

Administrative and supporting staff

Designation.	No. of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks

P
 AX P-6
 A50 p-2

Asst Gr.	1	1	Sri. Saji Joseph Vattoly	Nil	
Lab Asst.	1	Nil		1	
Class IV Employee	1	Nil		1	
Driver.	1	Nil		1	

Technical staff

Designation.	No. of posts		Name of the incumbent	Vacant	Remarks
	Sanctioned	In position			
Farm Manager	1	1	Sri. A. Sasidharan	Nil	
Farm Officer	1	1	Sri. P.K. Ramachandran	Nil	
Jr. Tech. Asst.	1	1	Sri. M.K. Manoj	Nil	
Grafter	1	Nil		1	

**AICRP ON WEED CONTROL, COLLEGE OF HORTICULTURE,
VELLANIKKARA**

Faculty Position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor- (Agronomy)	Dr. C.T. Abraham	1	1	
Professor (Plant Physiology)	Dr. T. Girija	1	1	
Associate Professor (Soil Science & Agricultural Chemistry)	Dr.K.M.Durga Devi	1	1	

Staff strength

Category	Sanctioned	In position	Vacant
Scientific	3	3	-
Administrative	1	1	-
Supporting	3	2	1
Others	-	-	-
Total	7	6	1

P-1
ASCP-1

**AICRP ON BIOLOGICAL CONTROL OF CROP PESTS & WEEDS
COLLEGE OF HORTICULTURE, VELLANIKKARA**

Faculty position:

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor & PI	Dr. S. Pathummal Beevi	One	One	Nil
Professor	Dr. K.R. Lyla	One	One	Nil

P-2

Staff strength

a. Scientific staff

Designation	Sanctioned	In position	Vacant
Professor	2	2	-

c. Supporting staff:

Designation	Sanctioned	In position	Vacant
Technical Assistant	1	Nil	1
Farm Assistant	2	2	-
Driver	1	Nil	1

**AICRP ON MEDICINAL & AROMATIC PLANTS
VELLANIKKARA**

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor (Plant Breeding)	Dr. V.V.Radhakrishnan	1	1	-
Assistant Professor (Agronomy)	Dr. A. Latha	1	1	-
Assistant Professor (Biochemistry)	Nil	1	Nil	1

Staff strength

Scientific	:	3
Administrative	:	1
Supporting	:	4
Others (Class IV)	:	3
Labourers	:	4
Total		15

P-1
Asst P-2

AGRONOMIC RESEARCH STATION, CHALAKUDY

Faculty position

Department and Designation	No. of posts		Name of the incumbent	Vacant	Remarks
	Sanctioned	In position			
Professor of Agronomy/Soil Science/Ag. Engg	1	1	Dr. K.P. Visalakshi (up to 31-05-07) Dr. K.P. Prameela (from 15-06-07)	-	Professor (Ag. Engg. in position) Professor (Agronomy)
Assoc. Professors					
1) Soil Physics	1	-		1	
2) Agrl. Engg.	1	1	Dr. P. Suseela *	-	
3) Agronomy	1	1	Dr. K.P. Prameela* (up to 14-06-07) Vacant	- 1	
4) Pl. Breeding	1	1	Dr. V.S. Devadas	-	Professor. (Hort.) in position
Agronomy	1	1	1) Dr. T.K. Bridgit		
Asst. Professors					
Agronomy	1	1	Dr. Mini Abraham	-	
Soil Physics	1	-	-	1	

P-1
Asst P-5
Asst P-2

*-Stationed at WMRU, Vellanikkara

Staff Strength

Administrative and supporting staff

Designation	No. of posts				Remarks
	Sanctioned	In position	Name of the incumbent	Vacant	
Admn. Assistant	1	1	Sri. K. K. Kuttappan Sri. K. Hemalatha (From 19/11/07)	-	

Assistant Gr. I	1	1	Smt. M. N. Jayanthi	-	Senior Grade
Assistant Gr. II	1	1	Smt.M.D. Thressiama Arun Sankar(From 29/05/07)	-	Grade I
Typist	2	2	1) Sri.M.C. Devassy 2) Smt. Salomi Silas	-	Senior Grade Office Supdt.
Driver	1	1	-	1	
Peon	1	1	-	1	

Technical staff

Designation	No: of posts		Name of the incumbent	Vac-ant	Remarks
	Sanct-ioned	In position			
Farm Assistants	7	7	1) Sri. N. M. Mohanan	-	F S, Gr. I
			2) Sri. Unnikrishnan		F S, Gr. I
			3) Smt. Vasanthy T.A.		F S, Gr. II
			4) P. K. Reghu		F A, Sr. Gr
			4) Sri. Anil Kunar		F A, Sel. Gr
			5) Sri.P.P.Philip (from 1/02/07)		F A, Sr. Gr
			6) Sri. M.T. Varghese		F S, Gr. I
Lab Assistants	2	2	Smt. C.O. Mercy	-	
Pump Operator	1	1	Sri. K.S Kuttan	-	
Ploughman	1	-	-	1	

**AROMATIC AND MEDICINAL PLANTS RESEARCH STATION,
ODAKKLAJ, ASAMANNOOR POST. ERNAKULAM DIST.**

Faculty position

Cadre	Name of the scientist	Sanctioned posts	In position	Vacant
Professor (Entomology)	Dr. Baby P Skaria (Professor & Head)	1	1	-
Professor (Agril. Chemistry)	Dr. Samuel Mathew (Professor)	1	1	-
Associate Professor (Agronomy)	Dr. Joy P. P. (Associate Professor)	1	1	-
Associate Professor (Agronomy)	Dr. Gracy Mathew (Associate Professor)	1	1	-
Associate Professor (Horticulture)	Dr. Ancy Joseph (Associate Professor)			#
# On working arrangement from Pineapple Research Station, Vazhakkulam since 04-07-2005				
Staff strength				
Scientific:				
Professor&Head: 1				
Professor : 1, Associate Professor (SS): 2				
Administrative:				
Administrative Assistant : 1, Assistant : 2, Typist : 1, Class IV :2				
Supporting:				
Farm Supervisor : 1, Farm Assistants : 3, Lab Assistant : 2				
Others (specify)				
Research Associates : 1				
Research Assistants: 3				

P-2
Asst P-2
Asop-2

PINEAPPLE RESEARCH STATION VAZHAKULAM

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Associate Professor (Pl. Br. & Gen.)	Kuriakose K.P.	1	1	-
Associate Professor (Hort)	Ancy Joseph	1	1*	-

Staff strength

Scientific : 2 (The Asst. Prof (Hort) is on working arrangement at AMPRS, Odakkali)
 Administrative : 1
 Supporting : Nil
 Research Assistant : Nil
 Total : 3

ASOP 2

BANANA RESEARCH STATION, KANNARA

Faculty position

Cadre	Name & Designation of the Scientist	Sanctioned posts	In position	Vacant
<u>NARP (Phase II)</u>				
Associate Professor (Agronomy)	Dr. K.C. Aipe Professor & Head	1	1	---
Assistant Professor (Horticulture.)	Mrs. Meagle Joseph Asst. Professor (Seln. Gr.)	1	1	---
Assistant Professor (Entomology)	---	1	---	1
<u>AICRP (Tropical Fruits)</u>				
Associate professor (Horticulture)	Dr. Rema Menon Professor (Hort.)	1	1	---
Assistant Professor (Entomology)	Dr. Maicykutty. P. Mathew Professor (Ento.)	1	1	---
Assistant Professor (Horticulture)	Dr. A. Suma Professor (Hort..)	1	1	---
Assistant Professor (Plant pathology)	Dr. Anita Cherian. K Professor (Pl. Path.)	1	1	---

*
Abp - 1
Asop - 3

Staff strength

Staff position - Scheme wise

Scheme	Name of Post	Sanctioned	Staff in position	Vacant.
AICRP				
Scientific				
	Horticulturist	1	Dr. Rema Menon, Prof.	---
	Junior Horticulturist	1	Dr. Suma. A, Prof	---
	Junior Entomologist	1	Dr. Maicykutty. P. Mathew, Prof	---
	Junior Plant Pathologist	1	Dr. Anita Cherian. K, Professor	---
Technical				
	Technical Assistant	2	Sunny. K.M	1 daily wages
	Field man	3	K.G. Satheesan P.N. Bhashajan	1 daily wages
Para technical/Supporting				
	Lab Assistant	1	---	1 daily wages
	Oil engine driver	1	A. Narayanan	---

Mali	2	---	2 daily wages
Typist Gr. II	1	Subash.V.K	----
Peon	1	---	1 daily wage
Security	1	Contract Security	----
Non Plan			
Scientific			
Assoc. Professor (Agron)	1	Dr. K.C. Aipe, Professor	----
Asst. Professor (Ento.)	1	Vacant	1
Asst. Professor (Hort.)	1	Smt. Meagle Joseph. Ass. Prof. Sln. Gr.	----
Technical			
Farm Manager	2	C. Esarachandran	1
Administrative			
Administrative Assistant	1	K.V. Ammalukutty	----
Assistants	2	Shaji. K.T, Sln. Gr. Anandh. K	---
Supporting			
Peon	1	Vacant	1
Pump Operator	1	Sunil. K.M	----
Driver	1	Vacant	1

**CADBURY-KAU CO-OPERATIVE COCOA RESEARCH PROJECT
COLLEGE OF HORTICULTURE, VELLANIKKARA**

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor (Pl. Br. & Gen.)& Head	Dr.V.K.Mallika	1	1	0
Professor (Hort)	Dr.S.Prasannakumari Amma	2	2	0
Professor (Agronomy)	Dr. E.K.Lalitha Bai			

Staff strength

Category	Sanctioned	In position	Vacant
Scientific	3	3	0
Administrative	2	1	1
Supporting	2	1	1
Others-Driver	1	0	1
Total	8	5	3

**REGIONAL AGRICULTURAL RESEARCH
STATION PILICODE, KASARAGOD**

Faculty position

Department	Cadre	Name of the incumbent	Sanctioned posts	In Position	Vacant
Plant Pathology	1. Associate Professor	-	1 ✓	1	1
	2. Asst.Prof.	-	1 ✓	1	1
Plant Breeding	1. Associate Prof.	-	1 ✓	1	1
Horticulture	1.Professor	Dr.A.K.Babylatha	1 ✓	1	1
	2. Asst.Prof.	-	1 ✓	1	1

Training Service Scheme					
Extension	1. Asst.prof.		1 ✓		1
NARP Phase I	1. Associate Director of Research	Dr.P.C. Balakrishnan (Professor)	1 ✓	1	-
Soil science and Agrl.Chemistry	1. Professor		1 ✓		1
Plant pathology	1. Associate Professor 2. Asst.Prof		1 ✓ 1 ✓ 1 ✓		1 1
Agronomy	1. Associate Professor 2. Asst.Prof	Sri.P.K. Ratheesh*	1 ✓ 1 ✓	1	1 -
Agrostology	Associate Professor	-	1 ✓	-	1
Plant Physiology	Associate Professor	-	1 ✓	-	1
Agrl. Engineering	Associate Professor	-	1 ✓	-	1
Agrl.Met-eorology	1. Associate Professor	Dr.Kesava Rao**	1 ✓	-	
Agrl.Micro biology	1. Associate Professor	-	1 ✓	-	1
Agrl.Statistics	1. Associate Professor	-	1 ✓	-	1
Agrl.Economics	Associate Professor	-	1 ✓	-	1
Plant breed. & Genetics	Associate Professor	-	1 ✓	-	1
Agrl. Entomol.	1. Asst.Prof.	Dr.Madhu Subramanian	2 ✓	1	1
Horticulture	1. Asst.Prof.	Dr.M.P. Giridharan (Assoc.Prof)	1 ✓	1	-
NARP Ph.II :					
Agrl.Engineering	1.Associate Professor	-	1 ✓	-	1
Animal Management	1. Assoc.Prof.	Dr.Sashikanth	1	1	-
Soil science and Agrl.Chem.	1. Asst.Prof.	-	1 ✓	-	1
Agrl.Microbiolog y	1. Asst.Prof.	-	1 ✓	-	1
AICRP on Cashew					
Horticulture	1.Asst.Professor	Dr.B.Jayaprakash Naik (Professor)	1 ✓	1	-
Agromet Advisory Service(DST)					
Agronomy	1. Asst.Prof.		1 ✓		1
TOTAL				29	8
					21

* On study leave for undergoing Ph.D

** LWA for taking employment at KRISAT

Staff strength

Scientific:

Department	Designation	No. of posts				Remarks
		Sanctioned	In Post-tion	Name of the incumbent	Vacant	
Plant	2. Associate Professor	1 ✓	-	-	1	

Pathology	2. Asst.Prof.	✓	-	-	1	
Plant Breeding	2. Associate Prof.	✓	-	-	1	
Horticulture	1. Professor	✓	1	Dr.A.K.Babyl atha'	1	Post shifted
	2. Asst.Prof.	✓	1	-		
Training Service Scheme						
Extension	1. Asst.prof.	✓			1	
NARP Phase I	1. Associate Director of Research	✓	1	Dr.P.C.Bala krishnan	-	Holding full additional charge
Soil science and Agrl. Chemistry	1. Professor	✓	-	1	1	
Plant pathology	3. Associate Professor	✓			1	
	4. Asst.Prof	✓			1	
Agronomy	5. Associate Professor	✓	-	-	1	*On study Leave
	6. Asst.Prof	✓	1	Sri.P.K.Ratheesh*	-	
Agrostology	Associate Professor	✓	-	-	1	
Plant Physiology	1. Associate Professor	✓			1	
Agrl. Engineering	1. Associate Professor	✓	-	-	1	
Agrl.Meteorology	1. Associate Professor	✓	1	Dr.Kesava Rao*		*On LWA
Agrl.Microbiology	1. Associate Professor	✓	-	-	1	
Agrl.Statistics	1. Associate Professor	✓	-	-	1	
Agrl.Economics	1. Associate Professor	✓	-	-	1	
Plant breed. & genetics	1. Associate Professor	✓	-	-	1	
Agrl. Entomol.	1. Asst.Prof.	2✓	1	Dr.Madhu Subramanian	1	
Horticulture	1. Assoc.Prof.	✓	1	Dr.M.P.Giridharan	-	
NARP Ph.II						
Agrl.Engineering	1. Associate Professor	✓	-	-	1	
Animal Management	1. Assoc.Prof.	✓	1	Dr.Sashikanth	1	

H
 20/11/22
 P
 Asst Prof
 70

Soil science and Agri.Chem.	1. Asst.Prof.	✓	-	-	1	
Agri.Microbiology	1. Asst.Prof.	✓	-	-	1	
AICRP on Cashew						
Horticulture	1. Asst.Prof.	✓	1	Dr.B.Jaya prakash Naik (.Prof.)	-	
Agromet Advisory Service (DST)						
Agronomy	1. Asst.Prof.	✓	1		1	
TOTAL			29	8	21	

Administrative:

Designation	No. of posts					Remarks
	Sanctioned	In position	Name of the Incumbent	Vacant		
1.Admin. Officer	1	1	Sri.E.V.Sasidharan	-		
2. Section officers	2	2	Sri.Anilkumar Sri.Ramesh	-		
3. Assistants	7	6	Sri. Sabu Joseph Kum.Arathy Sri.Prasanth Sri.Jineesh Sri.Rajanarayanan	1		
4.Section Officers (FC & D)	1	1	Smt. P.Radha	-		
5. Typists	3	1	Smt. V. Anitha	2		
6. LDV Drivers	2			2		
7. Class IV	26	-	-	26*		*Posts of ClassIV (Reg. Mazdoor)
8. Tractor driver	1	1	Sri.K.P.Sivadathan	-		
Total	43	12		31		

Supporting & Other:

Designation	No. of posts					Remarks
	Sanctioned	In position	Name of the Incumbent	Vacant		
1. Technical Asst.	1	1	Sri P. Vijayakumaran	-		
Technical Asst. (AICRP on Cashew)	1	-	-	1		
2. Farm Assistant(Agri)	11	7	1.Smt. K. Rugmini Amma 2.Sri.K.A.Kurian 3.Sri N.K Murali dharan 4.Sri P. Rathish 5.Sri P. Ajithkumar 6.Sri T.V Rajeevan 7.Sri.K.C.Jaimon	4		
3. Farm Asst. (Vet)	3	3	1.Sri. V:Bhaskaran 2.Smt. K. Santha Kumari 3.Sri.E.Samikutty	-		
4.Pump Operator	2	2	1.Sri. P.V Mohanan 2. E.Prabhakaran	-		
5.Lab Asst. Gr I & II	1	-		1		

6. Lab Asst. Gr.III / Clerical Asst.	5	1	Sri M.V Radha Krishnan	4	
7. Technician	1			1	
8. Asst. Engineer(Ag.Engg)	1	-		1	
9. Programmer	1			1	
10 Trainees Hostel Class IV	2	-		2	
11. Cook cum care taker	1	-		1	
	30	14		16	

Labourers:

Designation	No. of posts			Remarks
	Sanctioned	In position	Vacant	
Permanent labour	83	37	46	
Casual labourer	30	0	30	

PEPPER RESEARCH STATION, PANNIYUR

Faculty position

Cadre	Name of the scientist	Sanctioned posts	In position	Vacant
AICRP on Spices (ICAR)				
Assoc. Prof (Pl.Pathology)	Dr.K.P.Mannocott	1	1	0
Assoc. Prof (Pl.Breeding)	Dr. V.P.Noema	1	1	0
Asst. Prof (Agron/ Hort)	-	1	0	1 (from 2001)
Asst.Prof (Pl.Pathology)	-	1	0	1 (from 2005)
KAU (Non-plan)				
Assoc. Prof., SSAC	-	1	0	1
Asst.Prof (Bot/ Agron/ Ento)	-	2	0	2 (Dr.T.Vaaja on long leave from Dec 2007)

Staff strength

Scientific	: 2
Administrative	: 7
Supporting	: 5
Others (Labours)	: 11 M + 6 W = 17
Total	: 14 + 17 = 31

Administrative Staff

Designation	Name of the incumbent	Sanctioned	In position	Vacant	Remarks
KAU (Non-plan)					
Administrative Asst.	A.Anithakumari	1	1	0	from 30-4-07 to 24-5-08
Senior Grade Asst	K.M. Joseph	1	1	0	
Assistant Grade II	K.K.Assootty	1	1	0	
Sel.Gr.Typist	P.Sarasu	1	1	0	from 8-6-07 till date
Peon	-	3	0	3	one temporary hand from 29-6-07 to 24-12-07
LDV Driver Sr. Gr	E.P.Narayanan	1	1	0	
Pump operator Sel Gr	T.V.Madhavan	1	1	0	retired substitute joined on 23-2-08
AICRP (SPICES)					

Peon Sel.Gr	K.Rajeev	1	1	0	
Technical Staff					
Designation	Name of the incumbent	Sanctioned	In position	Vacant	
KAU (Non- plan)					
Farm Manager Gr . I	-	1	0	1	
Farm Manager Gr .II	-	1	0	1	
Farm Officer Gr.I	-	1	0	1	
AICRP (SPICES)					
Farm Manager Gr II	Lakshmanan	1	1	0	
Farm Officer. Sel Gr	P.P.Muralidharan	1	1	0	
Farm Officer Sr Gr	P.Krishnan	1	1	0	
NHM					
Farm Officer Sr Gr	K.J.Joseph	1	1	0	
AICRP (SPICES)					
Lab Asst. Gr.III	Nirmala Chellath	1	1	0	

**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. V.K.Raju	1	1	0	
Assoc. Prof. (Agronomy)	Dr. K.E. Usha	1	1	0	
Assoc. Prof. (Agri. Economics)	-	1	0	1	
Assoc. Prof. (Plant Breeding & Genetics)	-	1	0	1	
Assoc. Prof. (Horticulture)	-	1	0	1	
NARP Phase II					
Assoc. Prof. (Plant Pathology)	-	1	0	1	
Assoc. Prof. (Horticulture)	-	1	0	1	
Assoc. Prof. (Horticulture)	-	1	0	1	
Assoc. Prof. (Farm Power Machinery & Energy)	-	1	0	1	
Assoc. Prof. (Animal Management)	-	1	0	1	
KAU Non-plant					
Assoc. Prof. (Soil Science & Agril Chemistry)	-	1	0	1	
Assoc. Prof. (Microbiologh / Pathology)	-	1	0	1	
Assoc. Prof. (Microbiology)	-	1	0	1	
AIRCP (Spices)					
Assoc. Prof. (Plant Breeding & Genetics)	-	1	0	1	
DST on AAS					
Agron/Agromet	-	1	0	1	
Total		15	2	12	

Staff strength

Scientific	: 2 out of 15
Administrative	: 8 out of 11
Supporting/ Class IV	: 7 out of 17
Lab Asst. / Technician	: 3 out of 4
SFS/ FA/ FS	: 6 out of 12

**CARDAMOM RESEARCH STATION,
PAMPADUMPARA**

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
AICRP on Spices Associate Professor (Horticulture/Agronomy)	Vacant	1 ✓	--	1
Assistant Professor (Agrl. Entomology)	Vacant	1	--	1
NARP (Non-Plan) Assistant Professor (Agrl. Extension)	Vacant	1	--	1
Assistant Professor (Pl. Br. & Genetics)	Vacant	1	--	1
KAU (Non-Plan) Associate Professor (Pl. Br. & Genetics)	Vacant	1 ✓	--	1
Associate Professor (Entomology)	Vacant	1 ✓	--	1
Assistant Professor (Pl. Pathology)	Dr. G. Sivakumar	1	1	--
Assistant Professor (Horticulture)	Vacant	1	--	1
Assistant Professor (Soil Science)	Sri. M. Murugan*	1	--	1
	Total	9	1	8

* On study leave undergoing doctoral programme at National Institute of Advanced Studies, Indian Institute of Science campus, Bangalore.

Staff strength

No	Scheme	Designation	Name	Remarks
1	Scientists AICRP on Spices	Associate Professor (Agron/ Horti)	Vacant	Vacant since 5.11.2005
2	AICRP on Spices	Assistant Professor (Ag. Ento.)	Vacant	Vacant since 6.10.2007
3	NARP-Non Plan	Assistant Professor (Pl. Breeding)	Vacant	Vacant since 25.8.2007
4	NARP-Non Plan	Assistant Professor (Ag. Extension)	Vacant	Recently shifted to Gender Studies, Vellanikara
5	KAU-Non Plan	Associate Professor (Pl. Breeding)	Vacant	Vacant for more than 10 years
6	KAU-Non Plan	Associate Professor (Ag. Entomology)	Vacant	Vacant for more than 10 years
7	KAU Non-plan	Assistant Professor (Pl. Pathology)	Dr. G. Sivakumar	In position from 09-09-2005
8	KAU Non-plan	Assistant Professor (Horticulture)	Vacant	Vacant for more than 8 years
9	KAU Non-plan	Assistant Professor (Soil Science)	Vacant	Sri. M. Murugan on study leave at IAS, Bangalore
	Farm and technical staff			
1	NARP-Non Plan	Farm Manger Gr. I	Sri. V.P. Prasadu	In position
2	KAU Non-plan	Farm Manger Gr. I	Sri. K. K. Vijayakumar	In position from 01-06-2005
3	AICRP on Spices	Farm Manager Gr.II	Sri. C.G. Pradeep	In position
4	NARP-Non Plan	Farm Manager G.II	Sri. K.G. Mohanadas	In position

ASBP - 6
ASOP - 3

5	KAU Non-plan	Farm Assistant	Vacant	Vacant for more than 5 years
6	KAU Non-plan	Pump operator	Sri.K.K.Sreekumar	In position from 17.5.2008
7	AICRP on Spices	Laboratory Asst	Sri. C. S. Manoj	In position from 16-10-2002
8	KAU Non-plan	Laboratory Assistant	Sri. R. Anil kumar	In position from 05-07-2006
Administrative staff				
1	KAU Non-plan	Administrative Assistant	Smt. A. K. Valsala	In position from 20-05-2005
2	KAU Non-plan	Assistant	Sri. O.M. Iby	In position from 01-06-2006
3	KAU Non-plan	Assistant	Vacant	Vacant
4	NARP-Non Plan	LDV Driver Sln.Gr. II	Sri. C.A. Alikhan	In position
5	KAU Non-plan	Driver	Vacant	Vacant
6	KAU Non-plan	Typist Gr. I	Smt. K.G. Rejani	In position from 11-07-2005
7	NARP-Non Plan	Typist Gr. II	Vacant	Vacant from 02-07-2008
8	AICRP on Spices	Peon	Smt. Radhamani	In position
9	KAU Non-plan	Class IV	Vacant	vacant
10	KAU Non-plan	Class IV	Vacant	Vacant
11	KAU Non-plan	Class IV	Vacant	Vacant

Summary of staff strength

Staff	Sanctioned posts	In position	Vacant
Scientists	9	1	8
Farm & technical staff	8	7	1
Administrative staff	11	6	5
Total	28	14	14

**REGIONAL AGRL. RESEARCH STATION,
KUMARAKOM**

Faculty Position

Cadre	Name of Scientists	IP	V	Remarks
Associate Director/ Professor of Agronomy (upgraded)	--	1	-	1 Professor (Hort.) holding charge w.e.f.
Agronomy Associate Professor (Root Wilt)	Dr. K. Geetha	1	1	- Asst. Professor
Assistant Professor (Weed Science)	Sri.K.C. Rajan	1	1	- Assoc. Professor
Assistant Professor (Agronomy)	Dr.N.K. Sashidharan	1	1	- Assoc. Professor
Soil Science & Agri. Chem. Assistant Professor	--	1	-	1
Biochemistry Assistant Professor	--	1	-	1
Extension Associate Professor	--	1	-	1
Agri. Economics Assistant Professor	--	1	-	1

<i>Horticulture</i> Assistant Professor	Dr. Joseph Philip. Dr.Sajan Kurian	2	2	-	Professor
<i>Entomology</i> Associate Professor	Dr Ambika Devi	1	1	-	Professor
<i>Pl. Pathology</i> Associate Professor	--	1	-	1	
Assistant Professor (Microbiology)	Dr. A.V. Mathew	2	1	1	
<i>Pl. Breeding</i> Asst. Professor (P.B.&G)	1.Alice Antony 2.Dr. K.A. Inasi	2	2	-	Assoc. Professor Asst. Professor
<i>Pl. Physiology</i> Asst. Professor (Pl. Phy.)	--	1	-	1	
<i>Agrl. Engg.</i> Associate Professor Assistant Professor	Sri. Joby Bastian Dr. Noble Abraham*	2	2	-	Asst. Professor (*Working arrangement at CRS, Konni)
<i>Agrl. Statistics</i> Assistant Professor		1	-	1	
<i>Aquaculture</i> Assistant Professor	Dr.KG Padmakumar	2	1	1	Assoc. Professor
<i>Animal Reproduction</i> Assistant Professor	--	1	-	1	
Asst. Professor (Ento.)*		1	-	1	Post shifted DOE.
Assoc. Professor (Agron.)	Dr. Elizabeth K Syriac	1	1		Post shifted from COA. Vellayani, 6/2007
Total	--	25	13	12	

S - Sanctioned; IP - In Position; V - Vacant

Staff Strength

Scientific	: 13
Administrative	: 16
Supporting	: 12
Others	: 3
Total	: 46

Asst P 17
Asst P 8
P 1
Asst P 1

RICE RESEARCH STATION, MONCOMPU

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Professor (Pl.Br)	-	1	-	1
Assoc. Professor (Pl.Br)	Dr. S. Leenakumary (Professor)	1	1	-
Asst. Professor (Pl.Br)	Dr.R.Devika	2	1	1
Assoc. Professor (Agron)	Dr.Abraham Varughese (Professor)	2	1	1
Asst. Professor (Agron)	Dr. Reena Mathew (Assoc. Professor)	1	1	-
Assoc. Professor (Ent.)	-	-	-	-
Asst. Professor (Ent.)	Sri.N.V.Satheesan	1	-	1

P 1
Asst P 3
Asst P 9

Asst. Professor (Pl. Path)		2	1	1
Asst. Professor (SS& Agrl. Chem)	Dr.Reeny Mary Zacharia	3	2	1
Junior Statistician	Sri. M. Surendran Dr.AnnieKoruth (Assoc. Professor)	2	1	1
Total		1	-	1

Staff strength

I. Scientific

Sl. No.	Department/Discipline	Sanctioned post	In position	No. of vacant posts
1.	Agronomy	3	2	1
2.	Plant Breeding and Genetics	4	2	2
3.	Plant Pathology	3	2	1
4.	Agricultural Entomology	3	1	2
5.	Soil Science and Agricultural Chemistry	2	1	1
6.	Statistics	1	0	1
7.	Agricultural Extension	1	0	1
Total		17	8	9

II. Administrative

Sl. No.	Designation	Sanctioned post	In position	No. of vacant posts
1.	Administrative Assistant	1	1	0
2.	Assistant	4	4	0
3.	Typist	1	1	0
4.	Peon	2	0	2
5.	Sweeper cum attendant	1	0	1
6.	Watchman	1	0	1
7.	Boat Driver	1	0	1
8.	Boat Syrang	1	0	1
9.	Jeep Driver	1	1	0
Total		13	7	6

III. Supporting

Sl. No.	Designation	Sanctioned post	In position	No. of vacant posts
1	Technical Assistant	2	2	0
2	Farm Assistant	4	1	3
3	Lab Assistant	5	1	4
Total		11	4	7

IV. Others (Labourers)

	Sanctioned post	In position	No. of vacant posts
a)Permanent Labourers	17	6	11
Men	4	4	0
Women	13	2	11
b)Casual Labourers	20	11	9
Men	4	3	1
Women	16	8	8
Total Labourers (a + b)	37	17	20

Total

Sl. No.		Sanctioned post	In position	No. of vacant posts
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1.	Scientific Staff	17	8	9
2.	Administrative Staff	13	7	6
3.	Supporting Staff	11	4	7
4.	Others (Labourers)	37	17	20
Total		78	36	42

**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	1	1	Nil
Professor (Hort.)	--	1	Nil	1
Associate Professor (Plant Breeding)	Smt.Susamma.P.George Dr.M.R.Bindu	2	2	Nil (Assistant Professor(Sel. Gr.) holding one post
Associate Professor (Agrl.Ent.)	Dr.G.Suja	2	1	1
Associate Professor (Soil Science & Agrl.Chem.)	Dr.M.Indira	1	1	Nil
Associate Professor (Plant Pathology)	--	1	Nil	1
II. AICRP on Oil seeds				
Professor(Pl.Br.)	Dr.Sverup John	1	1	Nil
Professor(Agronomy)	Dr.P.Sushanlakumari	1	1	Nil

*P - 6
Asst P.
Asst P - 12*

Staff strength

a). Scientific

Designation	Sanctioned	In position	Vacant
I. KAU - NON-PLAN			
Professor (Pl.Path.)	1	1	Nil
Professor (Hort.)	1	Nil	1
Associate Professor(Pl.Br.)	2	2	Nil Asst.Professor(Sel.Gr.)holding one post
Associate professor(Agrl.Ent.)	2	1	1
Associate Professor (SS&Agrl.Chem.)	1	1	Nil
Associate Professor (Pl.Path.)	1	-	1
II. AICRP on Oil Seeds			
Professor (Pl.Br.)	1	1	NIL(Holding the charge of Project Director & Head
Professor (Agronomy)	1	1	Nil
b. Administrative/Supporting Staff			
Administrative Assistant	1	1	Nil
Section Officer (FC&D)	1	1	Nil
Assistants	2	2	Nil
Typists	1	1	Nil
Driver	1	-	1

Peon	2	1	1
c. Technical Staff			
Farm Manager	2	2	Nil
Farm Officer	2	1	1
Lab Assistant (Sel.Gr.)	1	1	Nil
Lab Assistant (Sel.Gr.)	1	1	Nil
AICRP on Oil Seeds			
Farm Officer	1	1	Nil

RICE RESEARCH STATION, VYTILA.

Faculty position

Dept. and Designation	No. of posts				
	Sanctioned	In position	Name of incumbent	Vacant	Remarks
Professor (Agron)	1	1	Dr. V. Sreekumaran		
Professor (SS & AC)	1	1	Dr. K. Anila kumar		
Professor (Aqua)	1	1	Dr. C.G. Rajendran		Till 3-4-2008
Professor (Pl. Br.)	1	1	Dr. K.S.Shylaraj		
Asst. Professor (Aqua)	1	-		1	
Asst. Professor (Pl. Br.)	1	-		1	
Sr. Research Fellow	1	1	Snitha. S.	-	
Jr. Research Fellow	1	1	Preeta Liz Korah	-	

Staff strength

Scientific

Dept. and Designation	No. of posts				
	Sanctioned	In position	Name of incumbent	Vacant	Remarks
Professor (Agron)	1	1	Dr. V. Sreekumaran		
Professor (SS & AC)	1	1	Dr. K. Anila kumar		
Professor (Aqua)	1	1	Dr. C.G. Rajendran		HOS
Professor (Pl. Br.)	1	1	Dr. K.S.Shylaraj		
Asst. Professor (Aqua)	1	-		1	
Asst. Professor (Pl. Br.)	1	-		1	
Sr. Research Fellow	1	1	Snitha. S.	-	
Jr. Research Fellow	1	1	Preeta Liz Korah	-	

Administrative and Supporting staff.

Dept. and Designation	No. of posts				
	Sanctioned	In position	Name of incumbent	Vacant	Remarks
Administrative Asst.	1	1	K. R. Santha B. Bhanumathy		Till 14-12-07 From 18-12-07
Assistant Seln. Grade	1	1	K.B. Jaya		
Assistant Sr. Grade Assistant	1	1	K.S. Anitha Nibin. K.S		Till 29-11-07 From 30-11-07
Typist Seln. Grade	1	1	T.M. Meera		
Driver Gr. II LDV	1	1	Bose. M.P.		Temporary from 21-4-07 to 16-10-07
Class IV	2	2	N.G. Helena N.G. Vimala		

Technical staff

Dept. and Designation	No. of posts				
	Sanctioned	In position	Name of incumbent	Vacant	Remarks
Farm	1	1	V. Jaims		

P - 8
A 56 P - 14
A 50 P - 14

Superintendent				
Farm Manager	3	3	i) P.A. Moni ii) P.N. Sadasivan iii) A.A. Abdulla	
Lab Assistant	1	1	T.K. Kunjumon	From 9-5-2007
Pump Operator	1	1	P.Radhakrishnan Nair C.S. Pareed	Till 19-5-07 From 28-5-07
Fisherman	2			2

**SUGARCANE RESEARCH STATION,
KALLUNGAL P.O., THIRUVALLA**

Faculty Position

	No of posts				
	Sancti- oned	In position	Name of the incumbent	Vacant	Remarks
ICAR					
Professor (Plant Breeding)	1/	1	Dr.K.Sreekumar	Nil	
Asst. Professor (Agronomy)	1/	1	Smt. Nimmy Jose	Nil	
Assoc. Professor (Plant Pathology)	1/	1	Dr. Babu George**		
NARP					
Professor (Hort.)	1/	1	Dr.Jessy.M.Kuriakose	Nil	
KAU					
Assoc. Professor (Plant Breeding)	1/	0	-----	Vacant	
Assoc. Professor (Plant Breeding)	1/	1	Dr.V.R.Shajan	Nil	
Professor (Agron.)	1/	1	Dr.T.M.Kurian	Nil	
Asst. Professor (Agron.)	1/	0	-----	Vacant	
Professor (Biochemistry.)	1/	1	Dr. Sosamna Cherian	Nil	

***on long leave

Staff strength Scientific staff

	No of posts				
	Sancti- oned	In posi- tion	Name of the incumbent	Vaca- nt	Remarks
ICAR					
Professor (Plant Breeding)	1/	1	Dr.K.Sreekumar	Nil	
Asst. Professor (Agronomy)	1/	1	Smt. Nimmy Jose	Nil	
Assoc. Professor (Plant Pathology)	1/	1	Dr. Babu George*	----	
NARP					
Assoc. Professor (Hort.)	1/	1	Dr.Jessy.M.Kuriakose	Nil	
KAU					
Assoc. Professor (Plant Breeding)	1/	0	Vacant	1	
Assoc. Professor (Plant Breeding)	1/	1	Dr.V.R.Shajan	Nil	
Professor (Agron.)	1/	1	Dr.T.M.Kurian	Nil	
Asst. Professor (Agron.)	1/	0	Vacant	1	
Professor (Biochemistry)	1/	1	Dr. Sosamma Cherian	Nil	

ASOP 17
ASOP 17

* On long leave

Administrative and supporting staff

	No of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks
KAU					
Adm. Asst.	1	1	Sri. Vijayachandra Babu		
Asst. Sr. Gr.	1	1	Sri. Manojkumar, A	Nil	
Asst.	1	1	Sri. Sunil Johns		
Typist	1	1	Smt. AK. Indiradevi Amma * Smt. Rekha, V**	Nil	
Peon	1	1	Smt. K.G. Pushpakumari	Nil	
LDV Driver	1		Vacant	1	

*Up to 26.03.08

**from 27.03.08

Technical staff

	No of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks
ICAR					
Technical Asst.	1	1	Sri. G. Jayakumar	Nil	
Farm Officer Gr II	1	0	Vacant	1	
Lab. Assistant	1	1	Smt. Solly K Jacob	Nil	
KAU					
Farm Manager Gr I	1	0	Vacant	1	
Farm Manager Gr II	1	1	Sri. T.K. Omanakuttan	Nil	
Lab Assistant Gr II	1	Nil	Vacant	1	

**CENTRE FOR PIG PRODUCTION & RESEARCH
MANNUTHY**

Faculty Position

Cadre	Name of the Scientists	Sanctioned Posts	In Position	Vacant	Remarks
CPPR					
Assoc. Prof.	-	1 ✓	-	1	
Asst. Prof.	-	1 ✓	-	1	
AICRP on Pigs					
Professor	Dr. M.R. Rajan	1	1	-	1-4-07 to 2-11-07
Assoc. Prof.	Dr. Syam Mohan	-	1		
	Dr. Kannan A.	-	1		
Asst. Prof.		2 ✓	-	2	

Staff Strength

Scientific

Cadre	Sanctioned Posts	In Position	Vacant	Remarks
CPPR				
Assoc. Prof.	1 ✓	-	1	
Asst. Prof.	1 ✓	-	1	
AICRP on Pigs				
Professor	1	-	1	
Assoc. Prof.	-	2	-	
Asst. Prof.	2 ✓	-	2	

Administrative & Supporting staff

Cadre	Sanctioned Posts	In Position	Vacant	Remarks
CPPR				
Admn. Asst.	1	1	-	
Sl. Grade Asst.	1	-	1	
Asst. Sr. Gr	1	1	-	

*Asst. Prof. - 1
Asst. Sr. Gr - 2
26*

Typist Gr I	1	1	-	
Pump Operator	1	1	-	
Pig Attendant	2	-	2	
Class VI	2	-	2	
Labourers	18	8	10	
AICRP on Pigs				
Asst. Sr. Gr	1	1	-	
Labourers	6	6	-	

Technical staff

Cadre	Sanctioned Posts	In Position	Vacant	Remarks
CPPR				
Farm Supervisor Gr I	1	-	1	
Farm Supervisor GrII	1	-	1	
Farm Asst.	2	-	1	
AICRP on Pigs				
Farm Asst.	2	2	-	
Technical Officer	1	1	-	

**UNIVERSITY POULTRY AND DUCK FARM,
MANNUTHY**

Faculty Position

Cadre	Name of the Scientists	Sanctioned Posts	In Position	Vacant
Assoc. Prof.& Head	Dr.Leo Joseph	1	1	NIL
Asst. Prof.	-	2	NIL	2

Staff Strength

Scientific	: 1
Administrative	: 4
Supporting	: 3
Others (Specify)	
Laboures	
Permanent	: 7
Daily wages	: 14
Total	: 29

*ASO P - 1
ASST P - 2*

LIVESTOCK TECHNOLOGY (MEAT TECH.UNIT)

Faculty Position

Cadre	Name of the Scientists	Sanctioned Posts	In Position	Vacant
Profseor	Dr.P.Kuttynayanan	1	2	NIL
Profseor	Dr.George T.commen			
Assoc. Profess.	---	2	NIL	2
Asst.Prof	---	5	NIL	5

: 2	
Administrative	: 5
Supporting	: 5
Others (Specify)	: Nil
Total	: 12

**Staff Strength
Scientific**

*ASO P - 1
ASST P - 12
5*

GOAT AND SHEEP FARM, MANNUTHY.

Staff strength

Scientific	:	NIL
Administrative	:	01
Supporting	:	01 (1 post lying vacant)
Others (specify)	:	Class IV lying vacant
Total	:	02

CENTRE FOR ADVANCED STUDIES IN POULTRY SCIENCE, COLLEGE OF VETERINARY AND ANIMAL SCIENCES, MANNUTHY

Faculty Position.

(a) Centre for Advanced Studies in Poultry Science

Cadre	Name of the Scientist	Sanctioned Post	In Position	Vacant
Director	Dr. A Jalaludeen	1	0	1*
Professor	Dr. P A. Peethambaran	1	1	0
Asst. Professor	-	1	0	1

*Professor i/c of Director.

Department of Poultry Science.

Cadre	Name of the Scientist	Sanctioned Post	In Position	Vacant
Professor	Dr. Anritha Viswanath (Retired on superannuation on 15.2.2008)	2	1	1
Assoc. Prof	Dr. P.Anitha	2	1	1
Asst. Professor	-	4	0	0

CATTLE BREEDING FARM, THUMBURMUZHI

Faculty Position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Professor.	Dr.Francis Xavier	1	1	Nil
Asst. Prof.	Dr.KShyama	2	1	1

Staff strength

Designation	No of Posts			Remarks
	Sanctioned	In Position	Name of the incumbent	
Scientific				
Professor	1	1	-	Nil
Asst. Professor	2	1	Dr.K.Shyama	1
Administrative & Supporting Staff				
Administrative Assistant	1	1	Tony.P.L. Prema B Nair	Nil 1.4.07 to 21.7.07 2.8.08 to 31.3.08
Assistant	2	2	Asokan.P.V. T.A.Sadanandan.	Nil
Typist	1	1	Surendran.P.R.	Nil
Para- Technical Staff				
Farm Asst. (Vety.)	4	2	Mohanan Nair.P. Polson Varghese	2
Farm Asst. (Agri.)	2	2	P.G.Satheesh	1
Lab Asst.	1	1	K.S.Dharmajan	1 1.4.07 to 31.10.08
LDV Driver	1	1	-	1
Pump Operator	1	1	K.G.Vincent.	1
Class IV	6	2	T.N.Sasi, K.R. Valsala	

**LIVESTOCK RESEARCH STATION,
THIRUVAZHAMKUNNU**

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant	Remarks
Associate Professor	Dr.M.R.Rajan	2	1	1	
Assistant Professor		5	-	5	
AICRP on Agroforestry Associate Professor	Dr.T.K.Kunhamu, Assistant Professor(Sr.Scale)	1	1	-	On working arrangement at College of Forestry,Vellanikkara
Assistant Professor	Sri.V.Jamaludheen, Assistant Professor, Sri..V.M.Abdul Hakkim,Assistant Professor,Sr.Scale	2	2	-	On deputation-Study leave

*Asst P-13
Asst P-7*

Staff strength

Scientific (1+3)	-	4
Administrative	-	9
Supporting	-	13
Officers(Specify)	TA	2
	RA	2
Total		30

DAIRY PLANT MANNUTHY

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr.P.I.Geevarghese	1	1	Nil
Associate Professor	Nil	2	Nil	2
Assistant Professor	Sri. P.Sudheer Babu Dr. S NRajakumar	3	2	

*D-1-1
Asst P-2
Asst P-3*

Staff strength

Scientific	: 3
Administrative	: Nil
Supporting	: 5
Others (specify)	
P M P A	: 2
Permanent Labourers	: 2 (On working arrangement)
Total	: 12

**UNIVERSITY LIVESTOCK FARM & FODDER
RESEARCH & DEVELOPMENT SCHEME,
MANNUTHY**

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor (Vety)	Dr. V. Prasad	1	1	-
Assoc.Prof. (Vety)		1		1
Asst.Prof.(Vety.)		2	-	2
Asst.Prof. (Agronomy)		1	-	1

*Asst P-2
Asst P-2
Asst P-6*

Staff strength Scientific

Department & Designation	Sanctioned	In position	No. of posts Name of the Incumbent	Vacant	Remarks
Professor(Vety)	1	-	Dr. V. Prasad	Nil	
Associate Professor (Vety)	1			1	
Asst.Professors (Vety.) (Agronomy)	2 1	-		2 1	

Administrative Staff

Designation	Sanctioned	In position	No. of posts Name of the Incumbent	Vacant	Remarks
Administrative Asst.	1	1	Smt. Daisy Anto. A.	Nil	
Section Officer	1	1	Sri.K.Pradeep	Nil	
Assistants	4	4	Smt.Kanathi.t.R. Senior Gr. Asst. Smt. Anitha M. P., Asst. Grade I Smt. M.P.Rckha Nambudiri Asst. Grade I Sri.Soloman.C.D.Asst	nil	
S.O (FC & D).	1	1	Smt.B.Kumary Sathiyabhama, (Steno to Professor)		
Typist	1	1	Smt. T.Sudha Sel.Gr. Typist		
Class IV	4	1	Smt. C. Anitha	3	

Supporting Staff

Designation	Sanctioned	In position	No. of posts Name of the Incumbent	Vacant	Remarks
Farm Supervisor	5	3	Sri.Sudhakumar,Sr.F.S.(Vety) Sri. K. K. Kuttan, F.S Gr. II (Vety) Sri. A. P. Peter F.S Gr. II (Vety)	2	
Farm Assistants	7	5	Sri.V.V.Thulaseedharan Sel.Gr FA (Vety) Sri.K.K.Pushpan Sri. C.I. Surendran Sr. Gr FA (Agr) Sri.M.K.Johnson Sr. Gr. FA (Agri) Sri.Gireesan	2	
Lab.Asst	1		Smt.P.A.Mini	-	
Pump Operator	1	1	Sri. Mathew	-	
Tractor driver	2	1	T.C.Francis	1	
Total	33	20			

**PLANT PROPAGATION AND NURSERY MANAGEMENT UNIT,
CAMPUS DEVELOPMENT, KAU P.O., VELLANIKKARA,
THRISSUR**

Faculty Position

Cadre	Name of the scientist	Sanctioned post	In position	Vacant
Professor (Entomology.)	Dr. Babu M. Philip	1 ✓	1	--
Assistant Professor (Agronomy)	Dr. Anitha. S	2	1	1

Staff strength

Scientific Staff

Department & Designation	No. of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks
Associate Professor (Entomology)	1	1	Dr. Babu M. Philip	--	
Assistant Professor (Agronomy)	2 ✓	1	Mrs. Anitha.S	1	

Administrative and Supporting Staff

Designation	No. of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks
Assistant	1	1	Dylan Tom.P.M	--	
Typist Senior Grade	1	1	T. Kamalam	--	

Technical Staff

Department & Designation	No. of posts				
	Sanctioned	In position	Name of the incumbent	Vacant	Remarks
Sr. Farm Supervisor	1	1	C.B. Sugathan	--	
Farm Assistant Selection Grade	1	1		1	
Lab Assistant Senior Grade	1	0		1	

*P - 1
Asst P - 1
Ascp - 1*

**FISHERIES STATION, PUDUVEYPU,
KOCHI**

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Asst. Professor (Aqua)	Dr. M. M. Jose	Asst. Professor (Aqua)	Professor (Aqua)	Nil
Assoc. Professor (Aqua)	Dr. K. S. Prushan	Assoc. Professor (Aqua)	Nil	Vacant since 14.11.2007
Asst. Professor (Aqua)	--	--	--	Vacant

Staff strength

Scientific .. 3*
Administrative .. 5**
Supporting .. 4***
Others (Paratechnical) .. 2

Total .. 11

* Posts of One Assoc. Professor & One Ast. Professor Vacant

** Post of Class IV (Peon) - Vacant.

*** LDV Driver under suspension.

*P - 1
Asst P - 1
Ascp - 1*

COMMUNICATION CENTRE, MANNUTHY

Faculty position

INFORMATION UNIT							
Sl. no	Discipline	Cadre	Name of the scientist	Sanctioned post	In position	Vacant	Remarks
1	Extn	Assoc. Professor	Dr. R.M.Prasad	1	1	Nil	
2	Extn	Assoc. Professor	Dr. Binoo P. Bonny	1	1	Nil	TA to DE
3	Extn	Assoc. Professor		1	Nil	1	
4	Extn	Assoc. Professor		1	Nil	1	
EXHIBITION UNIT							
1	Extn	Assoc. Professor		1	Nil	1	
2	Extn	Asst. Professor		1	Nil	1	
PUBLICATION UNIT							
1	Extn	Assoc. Professor		1	Nil	1	
2	Extn	Asst. Professor	Dr. Sreevalsan J. Menon	1	1	Nil	Working at ATIC
3		Language editor		1	Nil	1	
FARM ADVISORY SERVICE							
1	Agron	Professor		1	Nil	1	
2	Agron	Asst. Professor		1	Nil	1	
3	Plant protect	Professor		1	Nil	1	
4	Ent.	Assoc. Professor	Dr. M.K. Sheela	1	1	Nil	DE in charge
5	Plant protect	Asst. Professor	Dr. S. Estelitta	1	1	Nil	
6	Plant protect	Asst. Professor		1	Nil	1	
7	AH	Assoc. Professor	Dr. C.B. Manomohan	1	1	Nil	Working at ATIC
8	AH	Assoc. Professor	Dr. P. Nandakumar	1	1	Nil	
9	Poultry	Assoc. Professor		1	Nil	1	
10	Soil Scie	Asst. Professor	Dr. Jayasree sankar	1	1	Nil	
11	Aqua	Assoc. Professor		1	Nil	1	
12	Hort	Assoc. Professor	Smt. Santha.K.K	1	1	Nil	Head of Office
13	Hort	Asst. Professor	Dr. Jyothi Bhaskar	1	1	Nil	Shifted from CoA, Padannakad
14	Hort	Asst. Professor		1	Nil	1	
15	Extn	Asst. Professor	Dr. Jose Joseph	1	1	Nil	PRO to KAU
16	Extn	Asst. Professor	Dr. S. Helen	1	1	Nil	
17	Extn	Asst. Professor		1	Nil	1	
18	Ag. Engg	Assoc. Professor	Dr. Joby.V. Paul	1	1	Nil	Registrar of KAU (Shifted from KVK Manjeswaram)

Staff strength

INFORMATION UNIT							
Sl. no	Discipline	Cadre	Name of the scientist	Sanctioned post	In position	Vacant	Remarks
1	Extn	Assoc. Professor	Dr. R.M.Prasad	1	1	Nil	
2	Extn	Assoc. Professor	Dr. Binoo P. Bonny	1	1	Nil	TA to DE
3	Extn	Assoc. Professor		1	Nil	1	
4	Extn	Assoc. Professor		1	Nil	1	
EXHIBITION UNIT							
1	Extn	Assoc. Professor		1	Nil	1	
2	Extn	Asst. Professor		1	Nil	1	
PUBLICATION UNIT							
1	Extn	Assoc. Professor		1	Nil	1	
2	Extn	Asst. Professor	Dr. Sreevalsan J. Menon	1	1	Nil	Working at ATIC
3		Language editor		1	Nil	1	
FARM ADVISORY SERVICE							
1	Agron	Professor		1	Nil	1	
2	Agron	Asst. Professor		1	Nil	1	
3	Plant prot	Professor		1	Nil	1	
4	Ent.	Assoc. Professor	Dr. M.K. Sheela	1	1	Nil	DE in charge
5	Plant pro	Asst. Professor	Dr. S. Estelitta	1	1	Nil	
6	Plant pro	Asst. Professor		1	Nil	1	
7	AH	Assoc. Professor	Dr. C.B. Manomohan	1	1	Nil	Working at ATIC
8	AH	Assoc. Professor	Dr. P. Nandakumar	1	1	Nil	
9	Poultry	Assoc. Professor		1	Nil	1	
10	Soil Scie	Asst. Professor	Dr. Jayasree sankar	1	1	Nil	
11	Aqua	Assoc. Professor		1	Nil	1	
12	Hort	Assoc. Professor	Smt. Santha.K.K	1	1	Nil	Head of Office
13	Hort	Asst. Professor	Dr. Jyothi Bhaskar	1	1	Nil	Shifted from CoA, Padannakad
14	Hort	Asst. Professor		1	Nil	1	
15	Extn	Asst. Professor	Dr. Jose Joseph	1	1	Nil	PRO to KAU
16	Extn	Asst. Professor	Dr. S. Helen	1	1	Nil	
17	Extn	Asst. Professor		1	Nil	1	
18	Ag. Eng g.	Assoc. Professor	Dr. Joby. V. Paul	1	1	Nil	Registrar of KAU (Shifted from KVK Manjeswaram)
Administrative and Supporting staff							
1		Sel.Gr. Asst.	Sri. Varghese J. Ollukkarar	1	1	Nil	
2		Sel.Gr. Asst.	Smt. Sujatha Bhai. K	2	1	1	
3		Sr. Grade Asst.		1	Nil	1	
4		Grade I Asst.	Sri. Joby Mathew	2	1	1	
5		Typist Grade I	Miss. Litty Fernandez	1	1	Nil	
6		Peon	KG. Gopala krishnan	3	1	2	
7		Section Officer	Sri. K.Sreekumar	1	1	Nil	

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8	Administrative Asst.	Sri. K. Girish Babu	1	1	Nil	
9	L.D.V. Driver	V.Santhoshkumar	1	on leave	Nil	LWA for 5years
10	H.D.V. Driver					Post shifted to DSW
Technical Staff						
1	Farm manager II	Smt. V.G.Santha	2	1	1	
2	Farm manager II	Smt. Padma Narayana Pillai	1	1	Nil	
3	Technical Supervisor	M.R.Gopinathan	1	1	Nil	
4	Photographer	V.V. Satheesan	2	1	1	
5	Artist		1	Nil	1	
6	Dark room Asst.		2	Nil	2	
7	Malayalam Translator		1	Nil	1	

**AGRICULTURAL TECHNOLOGY INFORMATION CENTRE
MANNUTHY, THRISSUR**

Faculty position

Cadre	Name of Scientist	Sanctioned post	In position	Vacant
Professor	Dr. K Aravindakshan	Nil	On working arrangement from COH	Nil
Associate Professor	Dr. Sreevalsan J Menon		On working arrangement from Communication Centre	

Staff strength

Sl.No.	Name	Designation
1.	Dr. K. Aravindakshan	Professor & Officer on Special Duty
2.	Dr. Sreevalsan J Menon	Associate Professor
3.	U.Divakar	Technical Officer Gr.I
4.	C.A. Mathew	Farm Manager
5.	M.N. Pavithran	Farm Manager
6.	R.Jayanthi	Farm Officer
7.	A.K. Vijayakumar	Farm Officer
8.	Ranjith.M.Ramachandran	Assistant Grade
9.	P.A. Chakochoan	Permanent labour

CENTRAL TRAINING INSTITUTE, MANNUTHY

Faculty Position

Cadre	Name of the Scientist	Sanctioned Posts	In Position	Vacant
Professor	Dr. Joy Mathew	1	1	0
Asst. Professor	Dr. Alexander George	1	1	0
	Mr. Israel Thomas	1	1	(On study Leave)

Staff strength

Scientific:

- 1) Dr. Joy Mathew, Professor of Extension
- 2) Dr. Alexander George, Professor

Administrative:

- 1) Smt. Girija M, Section Officer
- 2) Smt. K.D. Rosily, Office Superintendent

Supporting:
Others (Specify)
Total:

3) Sri. V.C. Sandeepkumar, Sr. Grade Typist
4) Sri. T.P Baburaj, Sel. Grade Assistant
5) Sri.V.J.Paul, Farm Manager
1) Sri. K.P.Davy, Permanent Labour

8 (Eight)

KAU PRESS, MANNUTHY

Staff Strength

Administrative staff	No. of posts			Remarks
	Sanctioned	In position	Vacant	
Administrative Assistant	1	1	-	
Assistants	3	1	2	
Typist	1	1	-	
Peon	1	1	-	
Technical Staff				
Press Manager	1	-	1	
General Foreman	1	-	1	
Senior Foreman	1	1	-	
Junior Foreman	1	1	-	
Proof Reader	2	2	-	One proof reader has given charge of PM
Copy Holder	2	-	2	
Computer	1	1	-	
Printer*	8	2**	6	
Compositor	5	2	3	
Binder	10	4	6	
Helper	1	1	-	

* One DTP operator, Two Printers and Two binders are filled up through contract basis. Their period will be terminated on 3rd September 2008.

** One printer will retire in the year 2008

KRISHI VIGYAN KENDRA, AMBALAVAYAL WAYANAD, KERALA

Faculty position:

Sl. No.	Cadre	Name of the Scientist	Sanctioned Posts	Vacant
1.	Programme Coordinator	Dr. A. Radhamma Pillai	1	0
2.	Subject Matter Specialist (SMS) (Agricultural Extension)	Mr. G. S. Arularasan	1	0
3.	SMS (Agricultural Engineering)	Dr. D. Dhalin	1	0
4.	SMS (Soil Science)*	Ms. Anitha Cherian	1	1
5.	SMS (Home Science)*	Ms. Priya Mariam George	1	1
6.	SMS (Plant Pathology)	Vacant	1	1
7.	SMS (Horticulture)	Vacant	1	1
8.	Farm Manager	Sri. K.S. Rajamani	1	0
9.	Computer Programmer	Vacant	1	0
10.	Training Assistant (Veterinary)*	Dr. K.S. Jayaram	1	1
11.	Superintendent cum Accountant*	Sri. Ranjith		1
12.	Stenographer	Vacant	1	0

13.	Driver-Jeep*	Sri. V.N. Udayachandran	1	1
14.	Driver- Tractor	Vacant	1	0
15.	Supporting staff	Sri. P. Moideen	1	0
16.	Supporting staff*	Smt. Latha	1	1

*** Temporary Staff strength**

Sl. No.	Cadre	Sanctioned	filled
1	Scientific	7	3 (Permanent) +2 (Temporary)
2	Administrative	2	2 (Temporary)
3	Supporting	2	1 (Permanent) 1 (Temporary)
4	Others:		1 (Permanent)
	a. Technical Assistants	3	1 (Temporary)
	b. Drivers	2	2 (Temporary)
Total		16	13

KRISHI VIGYAN KENDRA, KOTTAYAM

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Professor & Head	Dr. K.I. Joseph	1	1	0
Assistant Professor (SS) (Agronomy)	Dr. Vandana Venugopal	1	1	0
Assistant Professor (Aquaculture)	Dr. K.R. Salin	1	1	0
Assistant Professor (Soil Sci. & AC)	Dr. B. Aparna	1	1	0
Assistant Professor (Horticulture) Upto 24-11-2007	Dr. Deepa S. Nair	1	1	0
Assistant Professor (Horticulture)		1 ✓	0	1
Assistant Professor (Pl. Prot.)		1 ✓	0	1
Assistant Professor (Home Sci.) from 12-6-2007 to 7-12-2007	Smt. Elizabeth Joseph	1 ✓	1	0
Assistant Professor (Home Sci.)		1 ✓	0	1

P.A. - 1
ASP - 8

KVK MALAPPURAM

Faculty position

Cadre	Name of the Scientist	Sanctioned Posts	In position	Vacant
Professor & Head (Agronomy)	Dr. Habeebur rahman P.V	1	1	0
Asst. Professor (Agr. Engg)	Er. Sajeena .S	1	1	0
Assistant Professor (Livestock Production Management)	Dr. Suraj P.T	1 ✓	1	0
Asst. Professor (Agr. Extension)		1 ✓	1	0
Assistant Professor (Home Science)	Dr. G.S Sreedaya	1 ✓	1	0
Asst. Professor (Horticulture)	Smt. Seeja Thomachan	1 ✓	1	0
Asst. Professor (Entomology)	Dr. Deepu Mathew	1	0	1

Staff strength

Scientific	- 6
Administrative	- 2
Supporting	- 1
Others (Specify)	- 5 (D/W)
Total	- 14

P.A. - 1
ASP - 6

**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)	(2)	4
	Dr. R. Ilangoan			

Staff strength

Scientific	:	7 (4 vacant)
Technical	:	3 (1 vacant)
Administrative	:	2
Driver	:	2 vacant
Supporting	:	2
Total	:	16

*- Asst p - 1
Asst p - 6*

**KRISHI VIGYAN KENDRA - THRISSUR
VELLANIKKARA, KAU P.O**

Faculty position

Cadre	Name of the Scientist	Sanctioned posts	In position	Vacant
Professor	Dr. Suman Paulose	Programme Director		-
Assoc. Prof.	Dr. T.N. Jagadeesh Kumar	Subject Matter Specialist	1	-
Assoc. Prof.	Dr. U Sreelatha.	Subject Matter Specialist	1	-
Assoc. Prof.	Dr. Mary Regina F	Subject Matter Specialist	1	-
Asst. Prof.	Dr. G. Javakshmi	Subject Matter Specialist	1	-
Asst. Prof.	Dr. Sabin George	Subject Matter Specialist	1	-
Asst. Prof.	Vacant	Subject Matter Specialist	-	1
Tech. Asst.	-	Programme Assistant	-	-
Tech. Asst.	-	Programme Assistant	-	-
Tech. Asst.	Sri. K.V. Babu	Programme Assistant	-	-
Asst. Gr. I	-	Accountant/Supdt.	-	-
Steno-Typist	Sri. V.O Varghese	Stenographer	1	-
Driver-Jeep	-	-	1	-
Driver-Tractor	-	-	1	-
Supporting Staff	-	-	1	-
Supporting Staff	-	-	1	-

Staff strength

Scientific	- 7 (6 in position)
Administrative	- 2
Supporting	- 3 (1 permanent and 2 on contract)
Others	
Driver	- 2 (On daily wages)
Class 4	- 2 (On daily wages)
Total	- 16

*P - 1
Asst p -
Asst p -*

CENTRAL LIBRARY, KAU, VELLANIKKARA

Scientific/Technical Staff position

Cadre	Name	Sanctioned posts	In position	Vacant
Librarian		01	Mr.K.P.Sathian Assistant Librarian in-charge of Librarian	01
Assistant Librarian		01		01
Reference/Library Assistant	Mr. E.K.Mohanlal Mrs. N.B. Nisha Ms. Ajithakumari V.P Mr. P.A.Pradeep Ms. M.C. Sathi Mrs. R. Saritha	06	06	Nil

Administrative & Supporting Staff position

Cadre	Name	Sanctioned posts	In position	Vacant
Section Officer	Mrs. P.V.Remani	01	01	Nil
Steno		01		01
Assistant		01		01
Senior Grade Typist	Ms. P.M. Gayathri	01	01	Nil
Clerical Assistant		01	vacant	01
Class IV	Ms.C.J. Lissy	02	01	01
Permanent Labourers	Ms. O.A. Santha Ms. P.E. Amina Ms. V.R. Gouri	03	03	Nil

Staff strength

Scientific	:	06
Administrative	:	03
Supporting	:	nil
Others (specify)	:	03 (Permanent Labourers)
Total	:	12

DIRECTORATE OF STUDENTS WELFARE

Staff strength

Scientific	:	2
Administrative	:	4
Supporting	:	20
Others (specify)	:	-
Total	:	26

DIRECTORATE OF PHYSICAL PLANT MAIN CAMPUS, VELLANIKKARA

Staff strength

Post	Sanctioned	Existing	Name of employees
Director of Physical Plant	1	EE Tavanur (i/c)	Sri. K. Suresh Babu w.e.f. 15-05-07 (in charge)
Personal Assistant	1	1	Sri. P.M. Vasudevan (Retired on 31-01-08)
Financial Assistant	1	1	Sri. Sreekumaran. P.V. Sri. Skandakumar. V.S. (21-06-07)
Assistant Engineer	1	1	Sri. Radhakrishnan. E.A.

Overseer			Sri. Anilan. K.K. Sri. V.M. Roy Sri. K.G. Ajithkumar
Section Officer	3	3	Smt. Sobhana. V.K. Sri. Girindra Babu. K Smt. Amminikutty. P.V.
Assistant	10	7	Sarada. T.K. Naveen Narayan Nibin. K.S. Sheeja Rani. A.K. Anithakumari. H. Bindu Ajith Sajeesh. S. Nair Justin. T. Jose
Stenographer (Vacant)	1	Nil	
Typist	3	3	Mumtuz. P.A.(Office Superintendent) Sheena. K Krishnankutty. T.S. Seema. M.C
Class IV	3	1	M.K. Vasudevan
Driver	1	1	P.M. Sudhakaran
Duplicating Machine Operator	1	1	Santhakumari. P.A.

KAU ESTATE, VELLANIKKARA

Staff strength Scientific

Administrative	1) Estate Officer	- 1	Administrative and supporting
Supporting	2) Section Officer	- 1	
Others (specify)	3) Assistants	- 2	(one vacant)
Total	4) Typist	- 1	
	5) Peon	- 2	(one vacant)
	6) F.S	- 1	Technical staff
	7) Driver	- 1	(Vacant -)
	8) Field Officer	- 1	(Plant staff)
	9) Tapping Supervisor	:	„ - 1
	10) Special Grade Miller	:	„ - 1
	11) Tappers	:	„ - 16 (2 posts vacant)

APPENDIX IV						
ONGOING PROJECTS UNDER KAERALA AGRICULTURAL UNIVERSITY						
Sl. No.	Title of Project	PI	Funding Agency	Outlay (Rs. in lakhs)	Date of Start	Duration
Faculty :	Agriculture					
	KAU Headquarters, Vellankkara					
1	Seed production in agricultural crops and fisheries	Rajan S. Dr.	ICAR Revolving Fund	446.99	21-Feb-06	24
	College of Agriculture, Vellayani					
2	Breeding leaf curl virus resistant chilli through inter-specific hybridization	Abdul khader K.M. Dr.	KSCSTE	4.78	14-May-04	36
3	Establishment of a full fledged seed processing unit and seed testing lab	Abdul Wahab M. Dr.	State Horticulture Mission	125.00	23-Mar-07	12
4	Exploitation of the endophytic fungus piriformospora indica, for biotic and abiotic stress management in black pepper (<i>Piper nigrum L.</i>)	Anith K.N. Dr.	KSCSTE	8.09	31-May-05	36
5	Role bacterial endophytes in plant defense mechanisms against phytophthora capsici in black pepper (<i>Piper nigrum L.</i>)	Anith K.N. Dr.	Dept.of Science & Technology (GOI)	10.08	09-May-05	36
6	AICRP on Mushroom	Balakrishnan. B. Dr.	ICAR Co-ordinated	12.00	20-Sep-00	60
7	Evolution of vegetable amaranth (<i>Amaranthus sp.</i>) with high yield quality and resistance to leaf blight caused by <i>Rhizoctonia solani</i>	Celine V.A. Dr.	KSCSTE	4.78	27-Jan-04	36
8	Consumption pattern of carbonated soft drinks of Indian population at different times of the year	Chellammal S. Dr.	Indian Council of Medical Research	8.73	02-May-07	12
9	Conservation and management of Indian Bee (<i>Apis Cerana Indica Fab.</i>) for sustainable apiculture in Kerala	Devanesan S. Dr.	ICAR Adhoc	13.98	11-Feb-04	36
10	AICRP on Honey bee	Devanesan. S. Dr.	ICAR Co-ordinated	85.99	01-Apr-97	12
11	Biointensive management of sucking pest complex infesting coconut bunches	Faizal M.H. dr.	ICAR Adhoc	14.42	19-Nov-04	36

12	Development of Decision Support System software for cereals millets pulses and tubercrops and establishment of an Agricultural Digital Information Centre.	Ganesan V. Dr.	Other Depts. (GOI)	11.80	09-May-07	18
13	Irrigation and shading techniques for vanilla cultivation in the western ghats.	Hajjilal M.S. Dr.	Western Ghat Cell	7.00	26-Apr-04	48
14	Cataloguing of cashew germplasm of Kerala with molecular markers and digitizing the morphological data.	Jayalakshmi V.G. Dr.	KSCSTE	10.23	05-Apr-05	36
15	Identification, isolation and biological evaluation of Phytochemicals from plants of western ghats of Kerala against insect pests of major vegetables.	Krishnakumar R. Dr.	Other Depts. (GOI)	5.00	26-Apr-04	36
16	Sterile insect technique in the management of banana Psuedostem weevil <i>Odoiporus longicollis</i> olives.	Krishnakumar R. Dr.	KSCSTE	3.90	26-Apr-04	36
17	Breeding for novel varieties in monopodial orchids.	Lekha Rani C. Dr.	KSCSTE	8.44	09-May-05	36
18	Bioremediation of inorganic contaminants of rice based wet land eco system of Kuttanad, Kerala.	Manorama thampatti K.C. Dr.	ICAR Adhoc	15.02	31-Mar-05	36
19	Empowering farm women for enhancing quality of life through skill development and income generation by food processing.	Mary Ukkuru Dr.	Dept of Biotechnology (GOI)	9.53	27-May-07	36
20	Adoption of microbial inoculant technology in the farming system for tribal population of Attappady.	Meena kumar K.S. Dr.	AHADS	4.54	07-Jun-07	18
21	Natural resource management for sustainable development of water sheds in western ghats of Kerala.	Meerabai M. Dr.	Western Ghat Cell	5.01	26-Apr-04	36
22	Enhancing productivity of black pepper in the homesteads of western ghats.	Madhulal Nehru S. Dr.	Western Ghat Cell	4.84	29-Jun-04	36
23	Starting of experimental agrometeorological advisory services(AAS) at Vellayani.	Muralidharan Nair. V. Dr.	Other Depts. (GOI)	3.00	17-Apr-97	36
24	Water hyacinth [<i>Eichhornia crassipes (martius) solms laubach</i>] control through integrated management strategy.	Naseema A. Dr.	KSCSTE	9.91	18-Apr-05	36

25	Dynamics of pesticide residues in the rice eco system of Kuttanad (Kerala, India) at a catchment scale and its management by good agricultural practices.	Naseema Beevi S. Dr.	Others	2.88	11-Apr-07	12
26	Biological control of important weeds with fungal pathogens in western ghats.	Nazeema A. Dr.	Western Ghat Cell.	3.60	21-Mar-05	36
27	Soil and water conservation aspects of Zero-tillage cultivation practices on hill slopes of humid tropics.	Noble Abraham Dr.	KSCSTE	4.62	10-Jun-04	36
28	Watershed studies in selected districts of Kerala with special emphasis on tribal settlements -CESS, REC(Calicut), & Kerala Agricultural University.	Rajendran. P. Dr.	Others	1.00	09-Nov-99	120
29	Characterisation of traditional mango (<i>mangifera indica</i> L.) varieties of southern Kerala.	Rajmohan K. Dr.	ICAR Adhoc	16.38	11-Oct-04	36
30	Potential of endemopathogenic nematodes for the management of pest complex in rice ecosystem.	Sheela M.S.Dr.	Dept.of Science & Technology (GOI)	12.31	21-Dec-04	36
31	AICRP on Nematode Pests.	Sheela. M. S. Dr.	ICAR Co-ordinated	14.60	01-Apr-97	12
32	Development of consortium of microbial inoculants for disease management and nitrogen and phosphorous nutrition of black pepper and vanilla.	Sivaprasad P. Dr.	KSCSTE	19.60	13-Jun-05	36
33	Establishment of bio control lab and bio fertilizer production unit.	Sivaprasad P. Dr.	State Horticulture Mission	80.00	27-Mar-07	12
36	Molecular and physiological analysis of banana clones.	Sony K.B. Dr., R V. Dr	Manju KSCSTE	9.05	03-Jun-04	36
37	Impact of partial substitution of murate of potash by common salt in a coconut based agro-ecosystem.	Sudarmaidevi C R. Dr.	KSCSTE	3.70	26-Sep-03	36
38	Biointensive integrated pest management in vegetable cowpea.	Sudharma K. Dr.	KSCSTE	4.62	11-Feb-04	36
39	Induction of invitro flowering of dendrobium.	Swapna Alex Dr.	KSCSTE	7.20	19-May-07	36
40	Assessment of micronutrients in soils of Kerala.	Usha Mathew Dr.	KSCSTE	4.45	25-Mar-04	36
	College of Agriculture, Padannakad					

41	Establishment of nursery for spawn production of mushroom under public sector.	Govindan M. Dr	State Horticulture Mission	3.00	30-Mar-07	12
42	Carbon isotope discrimination as a signature for shade tolerance in black pepper (<i>Piper nigrum L.</i>).	Krishnaprasad, B.T. Dr.	KSCSTE	10.00	23-Jun-05	36
43	Induction of variability in vanilla through invitro culture and onfarm evaluation of vanilla tissue culture plants in north Kerala.	Pradeepkumar C. Dr	KSCSTE	6.11	17-May-04	36
44	Use of parapheromones and kairomones in different types of traps for the management of cucurbit fruit fly <i>Bactroera cucurbit</i> Coquillett.	Kamesha B.	KSCSTE	6.93	18-Apr-05	36
✓ 45	Validation of indigenous technical knowledge and farmer innovations in north Kerala	Sreekumar K.M. Dr.	State Planning Board	10.00	10-Aug-07	12
46	Justification of endemopathogenic fungi for the biological control of coconut root grub <i>Lucophloe conialora</i> Burmeister	Sreekumar K.M. Dr.	KSCSTE	4.40	17-May-04	36
	College of Horticulture, Vellanikkara					
47	AICRP on Weed Control	Abraham, C.T. Dr.	ICAR Co-ordinated	36.00	01-Apr-97	120
48	Induction of variation invitro and screening for resistance to disease and quality in ginger. Improvement of induced polyploids in ginger (<i>Zingiber officinale</i> Rosc.) through invitro techniques.	Alice Kurian Dr	Dept. of Biotechnology (GOI)	15.60	27-Nov-06	36
49	Evolution of popular black pepper cultivars of north and south Kerala for growing as bush pepper.	Arya K. Dr.	KSCSTE	4.29	20-Jan-04	36
50	Documentation and characterisation of Palakkad Matta rice as a geographical indication.	Uy C.R. Dr.	KSCSTE	4.55	14-Mar-06	36
51	Establishment of a National Centre for medium-range weather forecasting on experimental basis at KAU main campus-Start of Agrom- et Services on exptl basis under NCMRWF	G. S. G. H. V. Prasada Rao Dr.	Dept. Science & Technology (GOI)	1.00	08-Mar-91	120

52	Women empowerment networking in Kerala through science & technology	Geethakutty P.S. Dr.	Dept. of Biotechnology (GOI)	26.74	09-Mar-04	36
53	Microbial diversity and identification.	Girija D. Dr.	ICAR Co-ordinated	30.85	30-Aug-06	36
54	Application of micro organisms in agriculture and allied sectors.	Girija D. Dr.	ICAR Co-ordinated	30.85	30-Aug-06	36
55	Exploration of the molecular diversity and insecticidal spectrum of the isolates of bacillus thuringiensis of the western ghats of and the NE hill region, establishment of repository at UAS Dharwad and cloning novel insecticidal genes.	Girija D. Dr.	Dept. of Biotechnology (GOI)	21.00	12-May-05	36
56	AICRP on Soil test Crop response correlation.	Hassan. M. A. Dr.	ICAR Co-ordinated	63.75	01-Apr-02	60
57	Pesticide use and crop productivity on food crops of Kerala.	Indiar Devi P. Dr.	KNCSTE	3.79	29-Sep-06	36
58	Technology dissemination and capacity building among women groups for use of bio inputs in agriculture.	Jayasree Krishnaakutty Dr.	Dept. of Biotechnology (GOI)	8.57	01-Jan-05	36
59	AINP on Agricultural Ornithology.	Jim Thomas Dr.	ICAR Co-ordinated	59.91	01-Apr-97	12
60	Distributed Information Centre.	Kesava Chandran R. Dr.	Dept. of Biotechnology (GOI)	122.50	15-Jul-05	60
61	Establishment of a leased line Internet connectivity of a minimum of 2 Mbps speed at the BioPharmacies centre.	Kesavachandran R. Dr.	Dept. of Biotechnology (GOI)	18.00	28-Feb-06	12
62	Establishment of model nutrition gardens in homesteads and schools of Kerala	Krishnakumary K Dr	State Horticulture Mission	1.40	09-Jan-08	12
63	Cocoa research collaboration project between KAU and Hindustan Cocoa Products Limited.	Mallika. V/ Vikraman Nair Dr.	CAD India Ltd.	109.00	01-Apr-97	60
64	Demonstration studies on Jeevakum (<i>Seidenfia recdii</i>) Part II.	Mimi Raj Dr.	KNCSTE	6.87	23-Feb-08	36
65	Isolation and characterization of genes encoding disease resistance (TLCV and bacterial wilt).	Nazeem P.A. Dr.	Dept. of Biotechnology (GOI)	50.80	05-Sep-05	36
66	AICRP on BCCP.	Pathummal Beevy Dr.	ICAR Co-ordinated	9.28	01-Apr-97	12
67	AICRP on meteorology.	Prasada Rao G.H.S.L.V. Dr.	ICAR Co-ordinated	7.68	01-Apr-97	60

68	Development of weather based agro advisory in relation to cardamom and black pepper over the high ranges of Kerala .	Prasada Rao G.S.L.H.V	Other Depts. (GOI)	5.51	27-May-07	24
69	Collection and characterisation of cucurbit and legume vegetables .	Prasanna.K.P.Dr	Western Ghat Cell	7.80	05-Jan-08	36
70	Comparative evaluation of red and white flowered ecotypes of sacred lotus (<i>Nelumbo nucifera</i> Gaertn).	Prasannakumari K.T. Dr.	KSCSTE	11.00	03-May-05	36
71	Process optimization for production of value added products from snap melon (<i>Cucumis Melo Var Mordica</i>) and water melong (<i>Citrullus lanatus</i>).	Pushpalatha P.B. Dr.	KSCSTE	4.95	03-May-05	36
72	Commercial rice hybrids for Kerala - Evolution of two line hybrids by using WC genes and TGMS lines.	Radhakrishnan V.V. Dr	KSCSTE	5.01	20-Jan-04	36
73	AICRP on Medicinal & Aromatic Plants .	Radhakrishnan V.V. Dr.	ICAR Co-ordinated	57.00	01-Apr-97	120
74	Establishment of a centre for large scale production of vegetable seeds .	Rajan. S Dr	ICAR Revolving Fund	16.00	01-Sep-99	84
75	AIC Vegetable Improvement Project.	Rajan. S. Dr.	ICAR Co-ordinated	14.00	01-Apr-90	120
76	Product diversification in Floriculture .	Rajeevan P.K. Dr.	State Horticulture Mission	9.27	10-Feb-07	36
77	AIC Floriculture Improvement Project ,	Rajeevan. P. K. Dr.	ICAR Co-ordinated	12.00	01-Apr-90	120
78	Development of bio-agents Consortia for Plant disease management and commercial application.	Sally K Mathew Dr.	Dept. of Biotechnology (GOI)	20.08	08-Jul-05	36
79	Biocontrol consortium for the management of bacterial wilt of chilli and phytophthora rot of black pepper and vanilla .	Sally K. Mathew Dr.	KSCSTE	5.66	09-May-05	36
80	Farmer participatory research on vegetable Cowpea (<i>Vigna unguiculata</i> L. Walp.) based intercropping system .	Saivkuttu Joseph Dr.	University Grants Commission	5.15	08-Dec-04	36
81	Investigations on variability, vegetative propagation and fruit drop in bread fruit (<i>Artocarpus alpinus</i> Park) .	Sara. T. George Dr	KSCSTE	4.68	23-Sep-04	36

82	Standardization of minimal processing techniques for selected fruits and vegetable *	Sheela K.B. Dr.	KSCSTE	6.38	03-May-05	36
83	Enhancing yield and quality of vanillathrough improved technologies *	Shylaja M.R. Dr.	KSCSTE	5.22	23-Sep-04	36
84	Onfarm evaluation and characterization of somaclones in ginger (<i>Zingiber officinale</i> Rose.) .	Shylaja M.R. Dr.	Dept. of Biotechnology (GOI)	12.15	27-Nov-06	36
85	Popularisation of less exploited potential ornamental crops of Kerala through rural women,	Sobhana A. Dr.	Dept. of Biotechnology (GOI)	20.34	13-Feb-07	36
86	Standardisation of planting material and regulation of flowering in bush jasmine (<i>Jasminum sambac.L.</i>) ²	Sobhana A. Dr.	KSCSTE	5.78	04-May-07	36
87	Development of plant growth promoting micro organisms consortia technology for ex-vitro establishment of micro propagated vanilla (<i>Vanilla planifolia</i> Andr.) and ginger (<i>zingiber officinale</i> Rose.) .	Surendra Gopal K. Dr.	KSCSTE	6.16	30-Mar-05	36
88	Macromanagement scheme on identification of location specific vegetable varieties of Kerala .	Suresh Babu K.V. Dr.	Dept. of Agriculture, Thiruvananthapuram	3.00	07-Jun-06	12
89	Investigation on the nutritional aspects of tapping panel dryness syndrome in rubber*	Sureshkumar P. Dr.	Other Depts. (GOI)	1.00	19-May-07	12
90	Setting up of a central laboratory for soil and leaf analysis laboratory .	Sureshkumar P. Dr.	State Horticulture Mission	20.00	27-Mar-07	12
91	Vermitechnology for organic seed production and rural employment generation .	Sushama P.K. Dr.	Dept. of Biotechnology (GOI)	7.68	29-Apr-04	36
92	Standardisation and quality evaluation of banana based probiotic fermented food mixtures *	Usha V. Dr.	Dept. of Biotechnology (GOI)	26.65	29-Dec-05	36
93	Crop improvement and extension of post harvest longevity of commercial flowers and foliage plants through the use of radition ,	Valasalakumary P.K. Dr.	BARC/BRNS	7.32	21-Mar-05	36
94	Induction of variability in Zingiberaceous crops (Ginger, turmeric and kacholam) through invitro fertilization *	Valsala P.A. Dr.	Dept. of Biotechnology (GOI)	21.10	03-Nov-04	36

95.	Microclimatic relations in the commercial production of cut flowers and foliage in humid tropics	Rajeevan P.K. Dr.	Dept. of Science & Technology (GOI)	10.38	03-Mar-04	36
✓ 96	Network project on application of modified atmosphere package (MAP)	Krishna Kumari K. Dr.	ICAR Network	8.86	06-Jul-05	36
✓ 97	Network project on improvement of underutilized vegetable crops	Gopalakrishnan T.R. Dr.	ICAR Network	11.80	23-Apr-04	36
98	Scheme for establishment of a biotechnology based self contained floriculture unit by rural women	Vaisalakumary P.K. Dr.	Dept. of Biotechnology (GOI)	18.41	13-Mar-06	36
✓ 99	Survey and surveillance of cocoa disease in Kerala	Koshy Abraham Dr.	Directorate of Cashew & Cocoa Development	2.50	17-Mar-06	24
✓ 100	Setting up of a model organic farm	Lalithabai E.K. Dr.	Other Depts. (GOI)	4.00	15-Dec-05	36
✓ 101	Frontline technology demonstration-Cocoa	Lalithabai E.K. Dr.	Directorate of Cashew & Cocoa Development	1.48	12-Jun-06	12
✓ 102	Exploration, collection, evaluation and standardisation of quality planting materials of important medicinal plants of Kerala	Radhakrishnan V.V. Dr.	Other Depts. (GOI)	10.00	12-Jan-05	36
	College of Forestry, Vellanikkara					
103	Inter and intra provenance variation in wood quality of Acacias grown in Kerala	Anoop E.V Dr	Kerala Forest Development Fund	4.18	20-Sep-07	36
104	Potential growth in sandal (<i>Santalum album</i>) on farm lands - Hemi - parasitic interactions of sandal with crop plants and selected host plants	Asokan P.K. Dr.	KSCSTE	5.01	29-Apr-05	36
105	Niche area of excellence - functional dynamics of tropical home gardens under the plan scheme "strengthening and development of agricultural education"	Mohankumar B. Dr.	ICAR Adhoc	116.00	27-Oct-06	12
106	Establishment of Gene Sanctuary for jack in Kerala	Narayanankutty.C.Dr	Kerala Forest Development Fund	14.92	29-Sep-07	36

107	Sceheme for the development, testing and implementation of a farming system based cyber extension model for Wayanad district of Kerala State	Santhoshkumar A.V.	Others	15.00	17-Mar-07	18
108	Development, testing and implementation of a farming system based cyber extension model for Wayanad district of Kerala state	Santhoshkumar A.V.	Other Depts. (GOK)	15.00	17-Mar-07	18
109	Enhancing yield and quality of vanilla (<i>Vanila planifolia</i> Andrews) through improved technologies	Shylaja M.R. Dr.	KSCSTE	5.22	23-Sep-04	36
110	Development of an online manual for the forest tree seeds of Kerala	Sudhakara K. Dr.	Kerala Forest Development Fund	4.73	02-Mar-07	24
112	Structural analysis and plant diversity of natural and protected areas of Attappady	Vidyasagan K. Dr.	AHADS	3.50	19-Dec-06	18
113	Production and demonstration of high quality planting material of <i>Jatropha curcas</i>	Vijayakumar N.K. Dr.	Dept. of Biotechnology (GOI)	7.78	02-Nov-04	36
	NARP SR, Vellayani					
114	Rhizosphere modulation for commercial medi culture	Anit kumar A.S. Dr.	Western Ghat Cell	4.30	29-Mar-06	36
115	Demonstration cum seminar at Vazhkulam and Pookot	Assoc. Director	Coir Board	3.00	11-May-06	12
116	Collection, identification, evaluation and popularization of edible/medicinal mushrooms of western ghatts of Kerala	Geetha D. Dr.	Western Ghat Cell	5.50	29-Mar-06	60
117	Re-domestication and popularization of true Kasthuri turmeric (<i>curcuma aromatica</i> Salisb) an endangered cosmetic cum medicinal plant	Jayachandran B.K. Dr.	National Horticultural Board	7.12	22-Apr-06	36
118	A heuristic community participatory action programme for rational water resource conservation and utilization in the drought prone areas of western ghat	Kumari Sushama N.P. Dr.	Western Ghat Cell	5.89	24-Mar-06	36
119	Strategies for eco frinedly exploitation of arrow root in the western ghat region of Kerala for mini agri business	Kumari Swadija O. Dr.	Western Ghat Cell	5.50	22-Mar-07	36

120	Analysis of homestead based fodder production system and intervention for economic milk production in Trivandrum district of the western ghat region of Kerala	Lakshmi S. Dr.	Western Ghat Cell	5.10	22-Mar-07	36
121	Exploration of western ghat tract for diazotrophs of P solubilizers	Meenakumari K.S. Dr.	Western Ghat Cell	5.20	22-Mar-07	36
122	Adoption on microbial inoculant technology in the farming system of tribal population of Attappady	Meenakumari K.S. Dr.	AHADS	4.54	20-Jan-07	18
✓ 123	Management of foot rot and bacterial leaf spot of betel vine (<i>Piper betle</i>) with microbial inoculants	Meenakumari.K.S.Dr	Dept. of Biotechnology (GOI)	11.80	09-Nov-07	36
124	Monitoring of pesticide residues at national level	Naseema Beevi A. Dr.	Dept. of Agri. & Cooperation (GOI)	10.00	31-Oct-06	36
125	AICRP on pesticide residues	Nazeema Beevi S. Dr.	ICAR Co-ordinated	13.88	01-Apr-97	12
126	Traditional practices for conservation of medicinal plants in the homesteads of western ghats regions of southern Kerala - a participatory analysis	Prakash R. Dr.	Western Ghat Cell	5.20	29-Mar-06	36
127	Effect of exogenous application of gibberellic acid on the growth and yield of paddy	Roy Stephen Dr.	Others	1.32	09-Oct-06	18
128	Source efficacy of organic manures and microbial inoculants for nutrient scheduling in vegetable based cropping systems of western ghats	Sajitharani T. Dr.	Western Ghat Cell	7.00	22-Mar-07	36
129	AICRP on forage crops	Suma Bai D.I. Dr.	ICAR Co-ordinated	100.46	01-Apr-97	60
130	Developing on participatory settlement based animal farming model to enhance the income and employment opportunity of tribal women folk of western ghats regions of Kerala	Vijayan R. Dr.	Western Ghat Cell	5.17	22-Mar-07	36
131	Survey of street food imported food and indigenous food product and consumers	Vimalakumary N.K. Dr.	Ministry of Health & Family Welfare (GOI)	8.00	01-Dec-05	36
	CSRC, Karamana					
132	AICRP - Project Directorate of Cropping Systems Research - Karamana & ECF Unit, Alathur sub centre	Head, Karamana	ICAR Co-ordinated	64.00	01-Apr-97	60

133	Nutrient budgeting, bio-resource recycling disease maps, PGPR etc.	Jacob John Dr.	Other Depts. (GOK)	30.00	14-Nov-06	12
134	Modelling of nutrient flow and recommendation of sustainable enterprise combinations in integrated farming systems of Sreekrishnapuram and Mannarkkad blocks of Palakkad district, Kerala	Jacob John Dr.	Other Depts. (GOK)	18.45	15-Jul-05	24
	Farming System Research Station, Kottarakkara					
135	Black pepper cultivar Karuvilanchy - survey, characterisation, conservation and genetic improvement	Ajithkumar K. Dr.	KSCSTE	1.57	22-Apr-02	36
	Soil Conservation Research Centre, Konni					
136	Impact assessment of land use practices and studies on sustainable development in western ghats of Kerala	Noble Abraham Dr.	Western Ghat Cell	5.50	23-Mar-07	36
	RARS, Kumarakom					
137	Establishment of organic pepper plots in Idukki district	Ambikadevi D. Dr.	State Horticulture Mission	4.25	23-Mar-07	12
138	Establishment of nursery for spawn production of mushroom under public sector	Mathew A.V. Dr.	State Horticulture Mission	3.00	28-Mar-07	12
139	Yield prediction models in banana	Sajan Kurian Dr.	Dept. of Science & Technology (GOI)	17.46	10-May-05	36
	RRS, Moncompu					
140	AICRP - Double Cropping Main Centre	Head	ICAR Co-ordinated	9.80	01-Apr-97	60
	RRS, Vyttila					
141	Invitro and invivo mutagenesis in rice and screening for tolerance to abiotic stresses	Shylaraj K.S. Dr.	BARC/BRNS	17.39	25-Jun-05	36
	SRS, Thiruvalla					
142	Product diversification and value added products in sugarcane	Sosamma Cherian. Dr.	KSCSTE	6.97	15-Sep-04	36

143	Conservation and utilization of biodiversity in Erianthus and Saccharum Spontanum in Kerala for the genetic improvement of sugarcane	Sreekumar K. Dr.	KSCSTE	6.11	15-Jan-04	36
144	AICRP on Sugarcane	Station Head	ICAR Co-ordinated	11.24	01-Apr-97	12
	Onattukara RARS, Kayamkulam					
145	AICRP on sesame and niger	Sverup John Dr.	ICAR Co-ordinated	5.72	01-Apr-97	12
146	Survey and identification of root wilt disease free palms and evolution resistant genotypes in coconut through	Swarup John Dr.	Coconut Development Board	34.87	30-Jan-04	60
	RARS, Pattambi					
147	AICRIP - Double Cropping Main Centre	Associate Director	ICAR Co-ordinated	21.50	01-Apr-90	120
148	Establishment of a small nursery for the production of planting materials of pineapple	Associate Director	State Horticulture Mission	3.00	21-Mar-06	12
149	AICRP on Arid Legumes (Guar)	Associate Director	ICAR Co-ordinated	15.60	01-Apr-97	12
150	Participatory technology development for rice nad rice based cropping system	Beena C. Dr.	Others	17.00	23-Jul-04	36
151	Possible diversifications and restructuring of coconut based homesteads	Helen S. Dr.	ICAR Adhoc	9.50	19-Sep-05	36
152	Rehabilitation of tissue culture laboratory	Jyothy M.L. Dr.	State Horticulture Mission	8.00	27-Mar-07	12
153	NSP -Breeder Seed Production Unit NSP - BSP Project	I. ecnakumari. S. Dr.	ICAR Adhoc	21.00	01-Apr-90	120
154	Farmers participatory action research programme	Shanmugasundaram.B.Dr	Other Depts. (GOI)	25.00	31-Oct-07	18
155	AICRP on Long term fertilizer experiment	Subramania Iyer M. Dr.	ICAR Co-ordinated	44.86	01-Apr-95	60
	AMPRS, Odakkali					
156	Investigations on anti-inflammatory properties of selected under exploited medicinal plants	Ancy Joseph Dr.	KSCSTE	10.98	19-May-07	36

157	CSS - National Horticulture Mission - Aromatic plants component	Baby P. Scaria Dr.	Directorate of Arecanut & Spices Development	10.56	31-Jan-06	12
158	Development of agro techniques in selected medicinal trees of Kerala	Gracy Mathew Dr.	KSCSTE	9.13	07-Apr-05	36
159	Study of selected adaptogenic plants and ayurvedic drugs with special reference to polyphenolic composition and antioxidant activity	Samuel Mathew Dr.	Other Depts. (GOI)	30.00	27-May-07	36
	ARS, Chalakudy					
160	Need based farmer participatory research in Jasmine (<i>Jasminum sambac</i>)	Devadas V.S. Dr.	KSCSTE	5.17	30-Mar-05	36
161	KAU Rubbermark Collaborative Project Centre for Crop Nutrition	Devadas V.S. Dr.	Other Depts. (GOK)	21.17	28-Oct-06	60
162	AICRP on Water Management	Head, ARS, Chalakkudy	ICAR Co-ordinated	39.00	01-Apr-90	120
163	Nutrition management and processing qualities of vanilla (<i>Vanilla planifolia</i> Andrews)	Mini Abraham Dr.	KSCSTE	2.59	27-Jan-04	36
164	Design, construction, performance and evaluation of low cost naturally ventilated green house suitable for humid tropical climate	Suseela P. Dr.	KSCSTE	7.32	26-Oct-04	36
	ARS, Mannuthy					
165	Setting up of a model organic farm at ARS Mannuthy	Head	Other Depts. (GOI)	4.00	18-May-06	36
166	Upgradation of tissue culture facilities for large scale production of quality planting materials	Narayanan kutty C. Dr.	State Horticulture Mission	8.00	30-Mar-07	12
167	Pilot project on demonstration of vermicompost production from coconut leaves	Narayanankutty C. Dr.	State Horticulture Mission	4.50	17-Oct-06	36
168	Establishment of a model nursery (mango) under public sector	Narayanankutty C. Dr.	State Horticulture Mission	18.00	23-Mar-07	12
169	Breeding for value addition in rice (<i>Oryza sativa</i> L.)	Rosamma C.A. Dr.	KSCSTE	7.48	07-Dec-04	36
	BRS, Kannara					

170	Establishing tissue culture facilities	Head of Station	Dept. of Agri. & Cooperation (GOI)	31.45	27-Oct-06	12
171	Biology and management of root mealy bug of banana cultivars	Mercykutty P. Mathew	KSCSTE	3.68	30-May-07	36
172	Characterisation and classification of banana varieties of Kerala using molecular marker	Rema Menon Dr.	KSCSTE	4.66	24-Sep-03	36
173	Rehabilitation of tissue culture lab	Rema Menon Dr.	State Horticulture Mission	8.00	28-Mar-07	12
174	AICRP on tropical fruits (Banana)	Rema Menon, Dr.	ICAR Co-ordinated	48.08	01-Apr-97	60
175	Banana fibre extraction and utilization for income generation and women empowerment	Suma A. Dr.	State Horticulture Mission	10.35	12-Feb-07	36
	CRS, Madakkathara					
176	AICRP on Cashew (Madakkathara & Pilicode)	Head	ICAR Co-ordinated	14.00	01-Apr-92	96
177	Study on productivity forecast of cashew (2007 season) of Malappuram and Palakkad districts	Head	Directorate of Cashew & Cocoa Development	0.19	28-Feb-07	12
178	Demonstration and refinement of technologies for cashew apple processing	Mini C. Dr.	State Horticulture Mission	39.80	30-Mar-07	12
179	Commercial production of hybrid vegetable seeds	Mini C. Dr.	National Horticultural Board	3.36	30-Jun-04	48
180	Establishing cashew model nursery at CRS Madakkathara	Mini C. Dr.	State Horticulture Mission	18.00	30-Mar-07	12
	Centre for Gender Studies in Agriculture					
181	Evaluation of the Women in Agriculture Programme (MOU)	Geethakutty P.S. Dr.	Dept. of Agriculture, Thiruvananthapuram	1.80	12-Mar-07	12
182	Promoting bio-resource based pilgrim need as a livelihood option by the rural women of Kerala	Geethakutty P.S. Dr.	Dept. of Biotechnology (GOI)	15.99	19-Jan-07	36
	PPNMU, Vellanikkara					
183	Systems of rice intensification: A pilot study	Anitha S.	KSCSTE	7.53	24-Feb-06	36
	LRS, Thiruvazhamkundu					

184	AICRP on Agroforestry (Functioning at I.R.S., Thiruvazhamkunnu)	Mohankumar. B, Dr.	ICAR Co-ordinated	78.52	01-Apr-90	120
	PRS, Vazhakulam					
185	Establishment of a plant health clinic at PRS Vazhakulam	Kuriakose K.P Dr	State Horticulture Mission	20.00	18-Sep-07	12
186	Establishing disease and pest forecasting unit in pineapple	Kuriakose K.P. Dr.	State Horticulture Mission	4.00	18-May-07	12
187	Establishment of a small nursery for production of quality planting material of improved varieties of pineapple	Kuriakose K.P. Dr.	State Horticulture Mission	3.00	23-Mar-07	12
188	Establishment of disease and pest forecasting unit in pineapple	Kuriakose K.P. Dr.	State Horticulture Mission	4.00	24-Mar-07	12
	RARS, Ambalavayal					
189	Establishment of model nursery for pepper	Associate Director	State Horticulture Mission	18.00	17-Nov-06	36
190	Starting of experimental agrometeorological advisory services (AAS) at RARS Ambalavayal	Iype. K. C. Dr.	Dept. of Science & Technology (GOI)	1.00	02-Mar-96	48
191	Collection, conservation and management of bio diversity in commercially important ornamental plants available in western ghats and developing a livelihood for tribal population in Wayanad district	Rajendran P. Dr.	Western Ghat Cell	5.69	05-Apr-05	36
192	Establishment of a small nursery for ginger	Rajendran P. Dr.	State Horticulture Mission	3.00	29-Mar-07	12
193	Establishment of an ornamental fish rearing and fingerling supply units for Wayanad district	Raju V.K. Dr.	Rashtriya Sam Vikas Yojna	9.10	28-Jun-07	12
194	Establishment of a small nursery for mango under public sector	Raju V.K. Dr.	State Horticulture Mission	3.00	23-Mar-07	12
195	Establishment of fodder museum and a large scale fodder production unit	Raju.VK.Dr	Rashtriya Sam Vikas Yojna	38.87	01-Sep-07	12
196	Strengthening of facilities of plant biotechnology centre	Raju.VK.Dr	Rashtriya Sam Vikas Yojna	82.15	01-Sep-07	12
	CRS, Pampadumpara					

197	Establishment of a small nursery for pepper under public sector	Backiyarani S. Dr.	State Horticulture Mission	3.00	27-Mar-07	12
198	Establishment of a model floriculture nursery in 4 hectares	Head	State Horticulture Mission	18.00	31-May-06	12
199	AICRP on Spices	Head	ICAR Co-ordinated	32.44	01-Apr-90	120
200	Establishment of a biocontrol lab unit	Sivakumar G. Dr.	State Horticulture Mission	81.80	26-Mar-07	12
	RARS, Piliicode					
201	Starting of experimental agrometeorological advisory services at RARS Piliicode	Prasada Rao, G. S. L. H. V Dr.	Dept. of Science & Technology (GOI)	1.00	01-Apr-95	60
	PRS, Panniyur					
202	AICRP on Spices		ICAR Co-ordinated	45.39	01-Apr-97	60
203	Breeding for phytophthora foot rot resistance in black pepper (<i>Piper nigrum</i>)	Vanaja T. Dr.	KSCSTE	4.60	11-Feb-04	36
	KVK Thrissur					
204	Establishment of a small nursery for pepper under public sector	Head	State Horticulture Mission	3.00	23-Mar-07	12
205	Characterization, evaluation and conservation of <i>Exacum</i> species in Kerala with emphasis on ornamental medicinal and dye value	Sreelatha U. Dr.	Dept. of Biotechnology (GOI)	9.43	12-Nov-04	36
206	Establishment and maintenance of a herbal garden	Sreelatha U. Dr.	Other Depts. (GOI)	1.80	28-Mar-07	36
Faculty : Veterinary & Animal Sciences						
	College of Vety. An. Sc., Mannuthy					
207	Genetic variability analysis of Indian elephants (<i>Elephas maximum indicus</i>) using micro satellite markers	Aravindakshan T.V. Dr.	ICAR Adhoc	13.60	17-Jan-05	36
208	Network Project on Ethno Veterinary Medicine under AP Cess Fund	Baby P.G. Dr.	ICAR Network	24.83	04-Jan-06	36

209	Establishment of a commercial broiler hatchery	Jalaludeen A. Dr.	ICAR Revolving Fund	25.00	03-Mar-98	84
210	AINWP on Haemorrhagic Septicaemia	Krishnan Nair. G. Dr.	ICAR Co-ordinated	4.00	14-Mar-01	12
211	Evaluation of quality of market milk with special reference to quality assurance programme in Kerala	Nanu E. Dr.	ICAR Adhoc	19.34	24-Jan-05	36
212	AICRP on Poultry	Narayanankutty K. Dr.	ICAR Co-ordinated	266.30	01-Apr-97	60
213	AICRP on Goat Improvement	Raghavan K. C. Dr.	ICAR Co-ordinated	75.50	01-Apr-97	60
214	Tribal indigenous knowledge systems and practices in livestock based livelihood	Rajkamal P.J. Dr.	AHADS	3.00	17-Mar-07	18
215	Immune response of the chicken to environmental stress	Rammath V. Dr.	ICAR Adhoc	14.55	16-Oct-04	36
216	DST-FIST Project	Saradamma T. Dr.	Dept. of Science & Technology (GOI)	8.30	27-Jul-05	60
217	Evaluation of azola - a potential feed for goat production	Saseendran P.C. Dr.	ICAR Adhoc	9.73	15-Apr-05	24
218	Study of livestock economy of Kerala	Saseendran P.C. Dr.	ICAR Adhoc	12.89	14-Jan-05	36
219	Field progeny testing scheme	Stephen Mathew Dr.	ICAR Adhoc		01-Apr-97	60
220	Molecular characterization of local pigs of Kerala using micro satellite markers	Usha A.P. Dr.	ICAR Adhoc	14.00	14-Dec-04	36
221	AICRP on improvement of feed resources and nutrient utilization for raising animal production	Viswanathan T.V. Dr.	ICAR Network	69.21	01-Apr-97	120
222	Investigation on the role of dogs in the transmission of brugian filarian infection to humans and molecular epidemiology of filarian infections	Reghu Raveendran Dr.	KSCSTE	7.04	05-May-07	36
223	AICRP on Pigs	Viswanathan. T. V. Dr.	ICAR Co-ordinated	30.00	01-Apr-97	12
	Veterinary Hospital, Kakkalal					

224	Anaesthesia and operation theatre management	Narayanan M.K. Dr.	Dept. of Animal Husbandary, (GOK)	5.50	30-Mar-07	36
	College of Veterinary & A.S., Pookot					
225	Development of meat Goat strains suited to humid Tropics of kerala	Anil Kumar K .Dr	AHADS	3.60	29-Dec-07	24
226	Livestock based production based production system for rurallivelihood security	Balakrishnan.P.P.Dr	Rashtriya Sam Vikas Yojna	102.33	18-Aug-07	12
227	Revised deworming schedule for ruminants in Kerala State	Lucy Sabu Dr.	Dept. of Animal Husbandary, (GOK)	3.09	04-May-07	12
228	Genetic evaluation of milk production and composition units of cattle in Wayanad district	Radhika Dr,	Dept. of Animal Husbandary, (GOK)	2.32	30-Mar-07	12
229	Improving livelihood security of women self help groups involved in livestock rearing through capacity building in gender awareness	Rajeev T.S. Dr.	Others	1.50	24-May-07	12
230	Techno-economic feasibility and sustainability of dairying and allied animal husbandry activities among the beneficiaries of land distribution project to land less tribals by the government of Kerala (TRDM project) with special emphasis to Wayanad district.	Rajeev T.S. Dr.	Dept. of Animal Husbandary, (GOK)	5.00	03-Aug-07	12
231	PCR based detection of haemoprotozoan and haemoricketisial diseases of cattle of northern Kerala	Reghu Ravindran Dr,	Dept. of Animal Husbandary, (GOK)	0.98	30-Mar-07	12
	Cattle Infertility Scheme, Calicut					
232	Assessment of the fishery resources of Kadalundi estuary and impact of stake nets on its ecology	Narayanan G.S. Dr.	KSCSTE	5.02	02-Apr-04	36
Faculty :	Fisheries					
	College of Fisheries, Panangad					

233	Captive development of brood stock of giant fresh water prawn <i>Macrobrachium rosenbergii</i> (de MAN) for year round production of quality seed in hatcheries	Aneykutty Joseph, Dr.	KSCSTE	4.26	23-Jan-04	36
234	Stock assessment and development of captive breeding technology of <i>pintius</i> Denisonii	Anna Mercy T.V.	Others		24-May-07	
235	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	Anna Mercy T.V. Dr.	Dept. of Biotechnology (GOI)	20.00	28-Mar-07	36
236	Development of a detection kit for white tail disease of <i>macrobrachium rosenbergii</i> by loop mediated isothermal amplification (LAMP)	Devika Pillai Dr.	Dept. of Biotechnology (GOI)	26.59	29-Mar-06	36
237	Characterization of different stocks of <i>Macrobrachium rosenbergii</i> and development of genetically improved strain through selective breeding	Mohanakumaran Nair .C.Dr	Dept.of Fisheries, (GOK)	9.54	03-Nov-07	36
238	Environmental and socio-economic impacts of aquaculture in pokkali fields of Kerala	Mohanakumaran Nair C. Dr.	Agency for Development of Aquaculture Kerala	8.41	17-Mar-06	24
239	Impact of one crop paddy - one crop prawn rotational farming on environment and socio economics in Kuttanad	Mohanakumaran Nair C., Dr.	Agency for Development of Aquaculture Kerala	5.06	18-Mar-06	24
240	Isolation purification and characterisation of anti bacterial and anti cancer agents from the accessory nidamental gland and Ink of the cutting fish <i>Sepia pharaonis chremberg</i>	Sherief p.M. Dr.	Dept. of Biotechnology (GOI)	22.73	18-May-04	36
241	Studies on feasibility of ranching in Chalakudy river for empowering tribal communities of the Vazhachal forest division - Western ghats	Dinesh K. Dr.	Dept.of Science & Technology (GOI)	4.28	05-Apr-06	18
	RARS, Kumarakom					

✓242	Fish culture in cage enclosures in tidal wetlands development of a participatory farming model	Padmakumar K.G. Dr.	KSCSTE	10.56	08-Mar-06	24
	KVK Kottayam					
✓243	Biodiversity of cultivable air breathing fishes in kerala and development of appropriate culture strategies for	Salin.K.R.DR	Dept.of Fisheries, (GOK)	20.78	17-Oct-07	36
Faculty :	Agricultural Engineering					
	KCAE&T, Tavanur					
244	Financial assistance for human resource development and infrastructure development	Dean	Other Depts. (GOI)	32.25	17-Oct-05	24
245	Establishment of plasticulture development centre at Tavanur. Dept.of Agri.& Co-op.,Min.of Agriculture,	John Thomas. K. Dr.	Other Depts. (GOI)	14.00	01-Apr-95	72
246	Farm machinery production and popularisation .	Muhammed. C. P.	ICAR Adhoc	12.00	15-Sep-00	120
247	A study on coconut oil as lubricant for IC engine.	Ramachandran V.R. Dr.	Dept. of Agriculture, Thiruvananthapuram	19.00	01-Jan-03	24
✓248	AICRP on Farm Implements & Machinery .	Sivaswami. M. Dr.	ICAR Co-ordinated	45.00	01-Apr-97	120
249	Study relating to formulating long term mechanization strategy for each agroclimatic zone/state.	Sivaswamy M. Dr.	Dept.of Agri.& Cooperation (GOI)	2.02	01-Apr-01	12
250	Front line demonstration of agricultural implements and machinery in selected regions of the country.	Sivaswamy. M. Dr.	ICAR Co-ordinated	3.00	02-Nov-00	24
251	AICRP on post harvest technology ,	Santhi Mary Mathew Dr.	ICAR Co-ordinated	147.29	01-Apr-04	60
252	Development of technology for the use of agricultural byproducts as matrix in high rate ethane bioreactors rice varietal improvement under abiotic stress.	Shaji James P. Dr.	KSCSTE	9.82	08-May-06	36

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