ANNUAL REPORT

1987-'88

KERALA AGRICULTURAL UNIVERSITY

English

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Directorate of Research
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CONTENTS

General Report

The Executive Committee of the Kerala Agricultural University presents to the General Council its Annual Administration Report for the year 1987-88 (1-4-1987—31-3-1988).

The Report pertains to the General Administration, Education, Research, Extension Education, Works, Estate and Finance and Accounts. List of members of the Statutory bodies of the University, Statute Amendments, Scientific, Administrative and Supporting Staff of various institutions, list of Research Projects and list of publications have been appended.

Dr M J Sebastian, Dean, Faculty of Fisheries was holding charge of the post of Vice-Chancellor till 17-5-1987 as Sri T Madhava Menon, IAS entered on leave. Sri T Madhava Menon, IAS rejoined duty on 18-5-1987 and continued till 6-6-1987. Dr M J Sebastian, Dean, Faculty of Fisheries was holding the charge of Vice-Chancellor from 7-6-1987 to 18-8-1987, till Dr E G Silas assumed the charge. Dr EG Silas continued as Vice-Chancellor from 19-8-1987.

Sri M Mohammed Usman, Joint Secretary to Government and Sri K K Pankajakshan, Deputy Secretary to Government continued as the Registrar and Comptroller of the University respectively.

Sri C Unnikrishnan was the Director of Physical Plant till 10-7-1987 and Sri P O Thomas, Executive Engineer hold charge of the post of Director of Physical Plant from 11-7-87 onwards.

Dr M Aravindakshan, Director, CAS in Humid Tropical Tree Crops and Environmental Horticulture continued to be in additional charge of the Director of Research during the period.

Dr A G G Menon continued as the Director of Extension during the period.

Dr M M Koshy, Director, Centre for Excellence for Tropical Soils continued to be in charge of the Dean (Agri.).

Dr N Sadanandan continued as Director of P G Studies.

Dr K Radhakrishnan, Professor (RC) continued to be in charge of Dean, Faculty of Vety. & Animal Sciences, during the year.

Dr M Krishnan Nair was the Director of Veterinary Research and Education.

Dr M J Sebastian continued as the Dean, Faculty of Fisheries during the period.

Prof T P George, continued as Dean in-charge of Faculty of Agricultural Engineering.

Dr T G Rajagopalan was in-charge of the Director of Students Welfare.

Dr C C Abraham was holding charge of the post of Assoc Dean, College of Horticulture till 15-5-1987 and Dr C Sreedharan, Professor & Head, Department of Agronomy continued to be in charge of Associate Dean of the College from 16-5-1987.

Dr C A Jos, Professor held full additional charge of the post of Associate Dean of the College of Co-operation and Banking during the period under report.

Sri V R Krishnan Nair continued as Special Officer (Forestry) for the Forestry Faculty during the year.

Three meetings of the Academic Council were held during the period under report. 40th meeting on 4-5-1987, 41st meeting on 26-9-1987 and 42nd meeting on 4-3-1988.

EDUCATION

The teaching institutions under the University are College of Agriculture at Vellayani, Trivandrum, College of Horticulture at Vellanikkara, College of Vety. & Animal Sciences at Mannuthy, College of Fisheries at Panangad, the Kelappaji College of Agricultural Engineering and Technology at Tavanur in Malappuram District, College of Co-operation and Banking at Mannuthy, College of Forestry at Vellanikkara and College of Rural Home Science at Vellayani.

Courses leading to Bachelor's degree in Agriculture, Vety. & Animal Sciences, Fisheries, Co-operation & Banking, B Tech in Agricultural Engineering were offered from the respective colleges. Master's and Doctorate degrees in Agriculture, Horticulture and Veterinary & Animal Sciences were offered in the College of Agriculture, College of Horticulture and College of Vety. & Animal Sciences respectively. B Sc. (Forestry) Programme is offered from College of Forestry. B Sc. (Home Science) is offered from the College of Rural Home Science. Master's degree in Agricultural Engineering and Agricultural Statistics were also offered from the College of Horticulture and College of Vety. & Animal Sciences respectively.

Admissions

During the period 363 students were admitted to various courses. The number of students passed out from the constituent colleges are also furnished

	No. admitted	No. passed
B Sc (Ag)	147	110
BV Sc & AH	120	66
B F Sc	19	30
B Sc (C & B)	28	30
M Sc (Ag)	—	39
M Sc (Hort)	—	7
B Tech	20	—
M Sc (Ag Engg)	—	1
M Sc Ag Stat)	—	3
M Sc (FS & N)	—	5
Ph D (Ag)	—	3
Ph D (Vety)	—	1
Diploma in Food Science & Nutrition	13	—
B Sc (Forestry)	16	—
Total	363	295

The number of students who are on the roll at the end of the year is as follows

No. of students on roll	Colleges								
	Agri.	Hort.	Vety.	Fish	Co-op.& Banking	KCAET	Home Science	Forestry	Total
1	2	3	4	5	6	7	8	9	10
UG Courses									
B.Sc.(Ag)	278	269							547
BVSc & AH			559						559
BFSc				81					81
B.Sc(C & B)					143				143
B. Tech						72			72
B. Sc (Home Science)							37		37
B. Sc. (Forestry)								32	32
Total	278	269	559	81	143	72	37	32	1471

1	2	3	4	5	6	7	8	9	10
PG Courses									
M.Sc (Ag)	58	20							78
M.Sc.(Hort)	9	9							18
M. Sc. (Ag. Stat.)		5							5
MVSc.			9						9
MFSc.				14					14
MSc. (C & B)					6				6
M. Sc. (Ag. Engg.)						15			15
M.Sc.(Home Science)							12		12
M.Sc.(Forestry)								8	8
Ph. D. (Ag)	16	1							17
Ph.D.(V&AS)			8						8
Total	83	35	17	14	6	15	12	8	190
Other Diploma Courses									
D.A. Sc.						112			112
DARE						27			27
Total						139			139
Grand total	361	104	576	95	149	226	49	40	1800

The research programme of the University have been drawn out with emphasis on solving location specific, field oriented problems faced by the farmers of the State. In addition to the state funds, the University also secure assistance through ICAR and from the World Bank. Assistance was also received from the Department of Science & Technology, the Department of Environment, Government of India. Under the National Agricultural Research Project, five Regional Research Stations have been set up at Pilicode (Northern Region), Pattambi (Central Region), Kumarakom (Region of Problem Areas) Vellayani (Southern Region) and Ambalavayal (High Range Region). The technical and administrative control of these stations was vested with the respective Associate Directors and the overall control with the Director of Research. Scientists in the research stations were grouped into different divisions viz. Crop Improvement, Crop Production, Crop Protection and Social Sciences according to the field of specialisation.

Seventeen project co-ordination groups in the faculty of Agriculture and seven in the faculty of Vety. & Animal Sciences continued to function during the year. The Faculty Research Committee of Agriculture met twice during the year and 118 projects were cleared for implementation.

The Faculty Research Committee of the Veterinary Science met once and approved research projects for implementation. The Faculty Research Committee of the Fisheries met once and cleared new projects for implementation. The Faculty Research Committee on each Faculty monitored and evaluated all the research programmes regularly.

The Director of Research was assisted by three Associate Directors at the Headquarters. The Associate Directors of Agriculture monitored the research programmes of different stations once in three months and the Director of Research inspected all the research stations at once during the year.

Faculty	Adhoc projects	Co-ordinated projects	ORP	Schemes sanctioned by other agencies	Total
Faculty of Agriculture	8	22	2	12	44
Faculty of Vety. & Animal Sciences	5	5	—	2	12
Faculty of Fisheries	2	—	—	1	3
Agrl Engg. & Technology	1	1	—	1	3
Total	16	28	2	16	62

Scientific and popular articles published

Faculty	Scientific articles	Popular articles	Total
Agriculture	109	29	138
Vety. & Animal Sciences	21	2	23
Fisheries	35	5	40
Total	165	36	201

Students Welfare

Extra curricular activities of the students of all Faculties of Kerala Agrl. University and few of the co-curricular activities are co-ordinated by the Directorate of Students Welfare.

Dr T G Rajagopalan is holding charge of the Director of Students Welfare.

The extra curricular activities of the faculties are co-ordinated through the Physical Education teachers of various faculties of Kerala Agricultural University.

Inter-Collegiate Sports and Games

The Directorate has organised Inter-Collegiate tournaments for various games and sports as an initial step for making the University team.

Results of the Inter-Collegiate Tournaments

	Events	*Results*	
1	Cricket (Men)	I	College of Agriculture
		II	College of Vety. & Animal Sciences
2	Ball Badminton (Men)	I	College of Co-operation & Banking
		II	College of Vety. & Animal Sciences
3	Ball Badminton (Women)	I	College of Fisheries
		II	College of Vety. & Animal Sciences
4	Hockey (Men)	I	College of Horticulture
		II	College of Vety. & Animal Sciences
5	Football (Men)	I	College of Vety & Animal Sciences
		II	College of Agriculture
6	Shuttle Badminton (Men)	I	College of Vety. & Animal Sciences
		II	College of Forestry
7	—do— (Women)	I	College of Horticulture
		II	College of Fisheries
8	Table Tennis (Men)	I	College of Horticulture
		II	College of Vety. & Animal Sciences
9	—do— (Women)	I	College of Vety. & Animal Sciences
		II	College of Agriculture
10	Basket Ball (Men)	I	College of Vety. & Animal Sciences
		II	College of Fisheries
11	—do— (Women)	I	College of Horticulture
		II	College of Agriculture
12	Volleyball (Men)	I	College of Vety. & Animal Sciences
		II	College of Horticulture
13	—do— (Women)	I	College of Vety. & Animal Sciences
		II	College of Fisheries
14	Athletics (Men)	I	College of Vety & Animal Sciences
		II	College of Agriculture
15	—do— (Women)	I	College of Agriculture
		II	College of Vety. & Animal Sciences.

After evaluating the performance of students in various games end sports, the Directorate propose to sent the University teams in Cricket Football, Athletics and Basket ball to the Inter University tournaments.

Membership in Association of Indian Universities

This year Kerala Agrl. University renewed the membership in the Association of Indian Universities after a lepse of six years.

R & V NCC SQN of KAU

The strength of the unit in KAU is 120 including 16 girls.

National camp on Environment and National Integration

The camp was organised at Thirunelli from 20-11-87 to 29-11-87. A total of 100 student volunteers from 19 Universities in India including 25 volunteers from the Kerala Agricultural University were participated in the camp.

EXTENSION EDUCATION

The Directorate of Extension provides technical expertise to the field extension personnel of various development departments in the state, disseminate scientific and technical information to the farmers through different media and offers technical assistance to voluntary service organisations and other educational institutions. These programmes are being implemented through the Training Service Schemes. Farm Advisory Service, Communication Centre, Krishi Vigyan Kendras, National Demonstration Scheme, Lab-to-Land programme, Village Adoption Programme, Tribal Area Research Centre etc. The Extension Education programmes are being implemented by the staff attached to the Colleges and Research Stations. In addition, specific schemes are also functioning under the Directorate of Extension.

The Communication Centre provides information support to the extension personnel of the State Development Departments, voluntary organisations, farmers etc. Feature articles, questions and answers, technical publications, radio programmes, exhibition, correspondence courses etc., constitute the information support programmes of the centre.

Under the publication unit a number of regular periodicals were published which include Agricultural Research Journal of Kerala (half yearly), Kerala Journal of Veterinary Science (half yearly), Kalpadhenu (quarterly) and KAU Newsletter (Monthly). In addition three technical bulletins, three books and five booklets were also published both in English and Malayalam.

The Kerala Agricultural University Press at Mannuthy fulfils the needs of printing works of the entire University. This includes periodicals, books, monographs, technical bulletins, forms, registers, folders, pamphlets, Annual reports, Research report, Research journals, College magazines, Invitation cards, Coupons, etc.

The exhibition and graphic service units conducted major exhibitions at Trichur. In addition mini exhibitions were also conducted in the Lab-to-Land and Village Adoption centres of the University. The Krishi Vignan Kendras at Pattambi, Ambalavayal and Majeswar at Kasaragode district are functioning. The Village Adoption Programmes, the NSS programmes, Lab-to-Land Programmes and All India Co-ordinated programmes on Scheduled Caste and Scheduled Tribe at Nilambur and Amboori are also functioning under the Directorate of Extension.

ENGINEERING WING

The Engineering Wing of the Kerala Agricultural University consists of the Directorate of Physical Plant. Sri C Unnikrishnan was the Director of Physical Plant till 10-7-87 and Sri P O Thomas, Ex. Engineer hold large from 11-7-87 during the year.

The expenditure upto 31-3-88 was Rs. 1,31,88,669.53.

ESTATE

Sri K G Balakrishna Pillai was the Estate Officer till 10-12-87 and Mr T P Ponnan from 11-12-87 during the year. The total area of the Estate is 391.4368 ha.

A total quantity of 24.692 tonnes of rubber was produced during the year and the total receipt from Estate was Rs. 13,67,146.26 and total expenditure was Rs. 18,64,021.11.

FINANCE

Sri K K Pankajakshan, Deputy Secretary to Government continued to be the Comptroller.

For 1987-88 the University had approved a budget of Rs. 19.17 crores. During 1987-88 Government has released Rs. 713.00 lakhs under non-plan and Rs. 250 lakhs under plan.

CHAPTER I

General Administration

The Kerala Agricultural University came into existence from 24th February 1971 under the Kerala Agricultural University Act 1971 (Act 33 of 1971).

The main campus of the University at Vellanikkara is 10 km east of Trichur town on the Trichur–Palghat Highway (NH-47). The College of Horticulture is located in the main campus. The University has four other teaching campuses, namely, the College of Veterinary and Animal Sciences at Mannuthy, the College of Fisheries at Panangad, Cochin, the College of Agriculture at Vellayani, Trivandrum and the Kelappaji College of Agricultural Engineering and Technology, Tavanur in Malappuram district. In addition, the University has 23 research stations distributed throughout the State. Some of the stations are also recognised as centres for post-graduate research of the University. When the National Agricultural Research Project was implemented in the University five of these stations were recognised as Regional Agricultural Research Stations. The five Regional stations are located at Pilicode, Ambalavayal, Pattambi, Kumarakom and Vellayani.

The University receives financial assistance mainly from the State Government and ICAR. Financial assistance was also received from outside agencies under the National Agricultural Research Project, Kerala Agricultural Extension Project (T&V) and from the Department of Science & Technology and Department of Environment, Government of India.

Officers of the University and Administrative set up

The Officers of the University are the Chancellor of the University His Excellency the Governor of Kerala. The Pro-Vice-Chancellor, the Hon'ble Minister for Agriculture and 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 a full time officer of the University and has the immediate overall control of the University.

The general administrative control is vested with the Registrar while the Comptroller is responsible for budgetting, finance, statements of accounts and audit. The co-ordination, direction and administration of research activities in the University is vested with the Director of Research. The Director of Extension is responsible for extension education and public relations. The Deans and Associate Deans of the various faculties are in charge of resident teaching and instruction of the respective colleges. The Director of Physical Plant is in overall 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, Executive Committee, Academic Council, the Faculties and Board of studies of the faculties. The list of members of these bodies is given in Appendix-I.

General Council

The supreme authority of the University is the General Council. It comprises of 59 members of whom 20 are Ex-officio, 18 elected members, 17 nominated members, one representative of each of the three Universities of the State and ICAR nominee. The Council is reconstituted in every three years, the present council was reconstituted with effect from 31-1-86. Ordinarily, the council meets once in four months. The General Council were held on 27-5-87, 12-8-87, 30-12-87, 25-3-88 and 26-3-88.

Important decisions taken by the General Council:

Sri. P. K. Sivanandan, IAS Special Secretary (Agri) has been selected as the nominee of the General Council to the Committee for the selection of Vice-Chancellor. A resolution has been passed to appreciate and congratulate the outstanding contribution made by Dr. P. J. Joy, Associate Professor and his team for the successful Biological control of the African Weed (*Salvinia Molesta* Mitchell). A discussion was held on the report of the Kerala Agricultural University Commission.

Decided to conduct by selection to the General Council for the representation of the teachers of the Agricultural Engineering Faculty. Also decided to make certain amendments to the by-laws of Assurance Committee and to recognise the diploma certificate of M. Sc. in Agriculture with specialisation in Agronomy offered by the Patrice Lumumba people friendship University, Moscow as equivalent to M. Sc. (Agri) of Kerala Agricultural University.

Decided to recommend amendments to statutes SRO No. 447/72. Also decided to request the Government to increase considerably the block grant to the Kerala Agricultural University.

After considering the annual report of the Kerala Agricultural University for the year 1986-87, the General Council resolved to forward the same to State Government. The budget estimates for the year 1988-89 was passed. Decided to submit the audit report for 1981-82 to the Accounts Committee. The report of the Accounts Committee on the Annual Accounts and Audit Report for the year 1979-80 has also been approved.

The Executive Committee

The Executive Committee is the Chief Executive authority of the University. The Committee consists of eleven members with the Vice-Chancellor as the Chairman. The other members include three Ex-officio members, six elected members of the General Council and the ICAR representative of the General Council. During the year, 17 meetings (182nd to 198th) were held.

Important decisions taken:-

Approved the appointment of Sri. M. Mohammed Usman, Additional Secretary to Government as Registrar, Kerala Agricultural University.

Approved the transfer norms of teachers.

Approved the appointment of Labour Officer.

Restored the Statute of College in respect of College of Forestry, and College of Rural Home Science.

Decided to extend the term of appointment of Dr M J Sebastian as the Dean of the Faculty of Fisheries for a further period of 3 years with effect from 21-9-88.

Approved the amendment to Statutes SRO No. 264/72.

Academic Council

The Academic Council is responsible for the maintenance of standards of instructions in different faculties of the University. Three meetings of the Academic Council viz. 40th, 41st and 42nd were held on 4-5-87, 26-9-87 and 4-3-88.

Important decisions were:-

1 Decided to reserve one seat for Anglo Indian Community in any one of the degree programme of Kerala Agricultural University.

2 Minimum marks for admission to Masters degree programme fixed as 2.25/4.00 (52.8% in traditional) and 2.00/4.00 (50%) for reservation category.

3 Decided to reserve one seat for the son/daughter of the freedom fighters for the U G programme offered by any faculty of KAU.

4 Decided to reserve one seat each under Sports quota in B. Tech., B. Sc. C & B, B. Sc. (Forestry) B. Sc. (Rural Home Science) courses offered by Kerala Agricultural University. The selection of candidates to these seats will be conducted by Kerala Agricultural University.

Important engagements of the Vice-Chancellor during the year

Dr MJ Sebastian, Dean, Faculty of Fisheries, was in charge of the Vice-Chancellor till 17-5-1987 as Sri T Madhava Menon, Vice-Chancellor entered on leave. He held meeting to discuss and evolve measures to face the consequences of the drought situation in the State. He presided over the meeting of the Executive Committee on 20-4-1987 and 5-5-1987, the Academic Council on 4-5-1987 and the Works Committee 4-5-1987. He participated in the inaugural function of the KAU Pavilion at the Trichur Pooram Exhibition. He inaugurated the Youth Festival at Kannambadi Tribal Settlement at Idukki.

Sri T Madhava Menon rejoined duty on 18-5-1987 FN. and continued till 6-6-1987 afternoon. He presided over the Adhoc Research Committee of the Forestry College. He participated in the College Day celebrations of the C & B College. Shri Madhava Menon on expiry of his tenure at the Kerala Agricultural University handed over charge of Office to Dr M J Sebastian on 6-6-1987 afternoon.

Dr M J Sebastian delivered felicitation address at the inauguration of the Horticulture College Union. He participated in the meeting of the ICAR Review Committee in New Delhi.

Dr E G Silas took charge of the office of the Vice-Chancellor on 19-8-1987. He participated in the Valedictory function of the Seminar of Veterinary Pathologists. He participated in the meeting on Lab-to-Land Programme in Trivandrum presided over by the Minister for Agriculture. He visited the Colleges and Offices at the Main Campus and at Mannuthy to acquaint himself with the activities and programmes in progress. He presided over a series of meetings to assess the impact of drought and to evolve remedial measures, meeting of the KAU Union Managing Council, and the meeting of the Banana Task Force. He met the Minister for Agriculture and discussed matters pertaining to the University. He delivered the felicitation address at the Veterinary College Day celebrations. He discussed with the Director General, ICAR the problems relating to the University. He presided over the function to hear the special lecture delivered by Dr Harsh Gupta, Vice-Chancellor, University of Cochin. He distributed prizes at the meeting of the World Wild Life Fund at Trichur. He inaugurated the programme of activities of the Indian Medical Association at Trichur. The Vice-Chancellor visited various research stations in the Andaman & Nicobar Group of Islands and initiated action on collaborative programme between the Islands and the KAU.

He discussed with the officers to evaluate the feasibility on the ongoing research programmes. He visited the National Integration Camp, Charalkunnu, Kottayam organised by the Mahatma Gandhi University and spoke to the campers. He participated in the meeting of the Selection

Committees to select scientists at the Agricultural Scientists Recruitment Board in New Delhi, and the Bombay Natural History Society in Bombay. He participated in the Research Advisory Committee meeting of the Bombay Natural History Society at Madumalai. He participated in the Golden Jubilee celebrations of Coconut Hybrid Production at Pilicode. He spoke at the workshop on the Role of Woman in Fisheries at Cochin. He presided over the World Forestry Day celebrations. He spoke to the participants of the Rural Development Officers meet convened by the Syndicate Bank. He was Chief guest at the Seminar conducted by the Pyrites, Phosphates and Chemicals held at Cochin.

During the period the Vice-Chancellor participated in the meetings of the following bodies.

The General Council, The Executive Committee, The Academic Council, The PG Committee, The Works Committee, The Research Council, The Finance Committee, The Extension Advisory Committee, The NSS Advisory Committee, The SC/ST Cell, The National Mangrove Committee in New Delhi and the ICAR Regional Committee at the Sugarcane Breeding Institute, Coimbatore.

Discussion regarding stepping up production in Rabi held in New Delhi.

Andaman Fisheries Research Committee.

The Fisheries Seminar at Mangalore.

Planning discussion with ICAR and Officers of Govt. of India.

Meeting of the Vice-Chancellors of Kerala at the Guest House, Ernakulam.

The Agricultural Seminar at the Tamil Nadu Agricultural University Meeting on Action Programme of Production of Breeders Seeds.

Assurance Committee

This committee was reconstituted with Prof. Alexander Zacharias as Chairman.

Accounts Committee

This sub-committee with Sri S S Potti as Chairman was reconstituted.

Statute Sub-Committee

The statute sub-committee of the General Council was reconstituted with Sri Raghavan Pozhakkadavil, Ex. MLA as Chairman.

University Organisation

Four Faculties, namely Agriculture, Veterinary & Animal Sciences, Fisheries and Agricultural Engineering and Technology have been established. College of Co-operation & Banking, College of Rural Home Science and College of Forestry have been established.

Research Council

In order to advise on formulation of the research programmes of the University, the Research Council, the Research Advisory Committee, the Faculty Research Committee and the Project Co-ordination Committees are functioning. The Research Council also has representatives from the Scientists of the other Agricultural Universities in South India and sister Universities of Kerala, is addition to the Scientists from Kerala Agricultural University.

The extension Advisory Committee renders advice in extension education activities which are organised through the Directorate of Extension.

Faculty Improvement

The staff members were provided with opportunities to acquire higher qualifications by granting deputation, study leave or leave for study purposes. Staff members were also sent for short term training courses, summer institutes etc., in different specialisation and for participating in seminars, symposia, workshops etc. organised by different scientific agencies/ICAR institute or other Universities.

Students' Admission

Admission for undergraduate courses in Agriculture, Veterinary, Fisheries and Agricultural Engineering Technology were made on the basis of a common entrance examination conducted by the Govt. of Kerala. Admission to the various post-graudate courses were given on the basis of marks obtained in the qualifying examinations, experience, number of research papers published and the performance at the interview. A few seats were reserved for ICAR nominees and SC/ST candidates

Labour

Farm labourers constitute a major category of personnel in the farm/research stations under the University. Two categories of workers-casual and permanent-exist in the 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.

The total permanent labour strength in the farms under the University was 1177. In addition to the permanent labourers, there were about 2800 casual labourers and they were given work as and when work was available. In the recruitment of casual labourers a minimum of 10% reservation was allowed to scheduled castes/tribes. In the Regional Agricultural Research Station, Ambalavayal (research station situated in tribal area(20% of the vacancies of permanent labourers were reserved for ST (Adivasis). The University has the largest number of permanent labourers in the Instructional Farm, Vellayani, followed by Regional Agricultural Research Station, Ambalavayal and Regional Agricultural Research Station Pattambi.

Permanent labourers are eligible for pension. A Provident Fund Scheme is also in force and the rate of subscription of worker is 6¼% of the monthly wages. For casual labourers, who are not eligible for pension tha University introduced a contributory Provident Fund Scheme the contribution being 6¼% of the monthly wages by the worker and an equal contribution by the University. Both permanent and casual labourers are eligible for gratuity also. They are also eligible for leave with wages @ 1 day for every 20 day's work, National Festival holidays, sick leave, maternity leave for female labourers etc.

In daserving cases, labourers are sanctioned with ex-gratia payments for meeting medical expenses.

In the Vellanikkara Rubber Estate the University has tappers, factory workers, field workers as well as staff and supervisors, the strength of the Estate staff and workers, being around 100. For the Estate staff and workers, the University is giving all benefits contemplated in the Plantation Labour Act. The University is also following recommendations of Plantation Labour Committee in respect of payment of wages and fringe benefits.

The following are some of the service benefits sanctioned to labourers. (1) Special casual leave not exceeding 12 days per year to those who are members of Panchayaths for attending Board meeting; (2) Special casual leave for appearing before enquiring authority in connection with disciplinary proceedings and (3) special casual leave for anti-rabic treatment was also sanctioned to permanent labourers. Leave benefits such as National and Festival holidays, sick leave and leave with wages admissible to farm labourers were extended to the casual labourers of the Engineering wing and KAU Press.

CHAPTER II

Education and Research

1. FACULTY OF AGRICULTURE

1.1 COLLEGE OF AGRICULTURE, VELLAYANI

The College of Agriculture established in 1955 is located at Vellayani about 11 km away from Trivandrum city. The campus has a total area of 243 hectares including 165 ha of paddy lands in the lake area.

The semester system of instruction was introduced in the College for under-graduate teaching in 1987.

Dr M M Koshy, Director, Centre of Excellence for tropical soils continued to be in full additional charge of the Dean of the College and Head of Institute. Dr N Mohanakumaran continued as Associate Director, NARP (SR) with Headquarters at Vellayani.

Departments

The following departments functioned in the College during the period under review.

Agronomy, Agril. Botany, Plant Breeding, Soil Science and Agril Chemistry, Agril. Entomology, Plant Pathology, Agril. Extension, Agril. Statistics, Agril. Economics, Agril. Engineering, Horticulture, Animal Husbandry and Physical Education. Besides a "Centre of Excellence for Tropical soils was also functioned, headed by a Director.

New Projects/Departments/Schemes started during the year

A participating centre of the All India Co-ordinated Research Project on Oilseeds was located in the Department of Plant Breeding. Breeding trials on groundnut and sesame were undertaken from kharif 1987 onwards.

Another research project on the standardisation of tissue apical meristem culture techniques in horticultural crops (cashew and nutmeg) of Kerala was started in the Department of Horticulture in February 1988 with the assistance of the USDA. The project involves a total financial outlay of Rs. 15.661 lakhs for three years.

Faculty Improvement Programme

One post of Professor of Agronomy, College of Horticulture, Vellanikkara was shifted to the College of Agriculture, Vellayani and one post of Assistant Professor of Agronomy from this College shifted to the College of Horticulture.

In the Department of Plant Breeding one post of Asst. Professor was created under the AICRP (oil seeds) with effect from 1-8-1987.

One post of Assistant Professor and another post of Junior Asst. Professor in Horticulture were created under the Tissue culture scheme during February 1988.

One post of Asst. Professor and another post of Lab. Assistant were created during the year in the Department of Agril. Entomology under AICRP on pesticide residue. In the ICAR adhoc scheme on cyst nematode one post of Research Fellow was also created.

Details of seminars, symposia, training programmes attended by staff

Dr M Achuthan Nair, Assoc. Professor of Agronomy participated in the International symposium on 'Contribution of biological nitrogen fixation to crop production at Boger, Indonesia. Dr V K Sasidhar, Professor of Agronomy attended the seminar organised by the spices Board.

The Department of Agronomy also organised guest lectures on "Malthus to surplus" by Dr K Gopalakrishna Pillai, Scientist, IRRI, on "Photosynthesis in relation to crop production", by Dr Ramanujam, Scientist, CTCRI, on "Watershed Management" by Sri Abdul Aziz of the Department of Soil Conservation, Kerala and on "Recent trends in coconut breeding" by Dr R Gopimony, Professor.

Dr Swarup John, Assistant Professor of Plant Breeding attended the 30th All India Annual Kharif Oilseeds workshop at Akola.

Dr (Mrs) A Visalakshi, Professor of Entomology attended the 3rd Annual Workshop on Pesticide Residues conducted at Haryana Agrl. University, Hissar. Dr. John Kurian attended the biennial workshop of the AICRP on plant parasitic nematodes at Pune.

Dr K I Wilson, Dr M C Nair and Dr S Balakrishnan, of the Plant Pathology discipline attended a joint meeting of the Scientists of KAU, CPCRI and Officers of the Department of Agriculture, Kerala to discuss the strategy of further work on coconut diseases. Dr Bhavani Devi attended and presented a paper on pleurotus at the XII International Congress on Science and cultivation of edible fungi held at Branuschury, West Germany. She also attended a training programme on Mushroom cultivation at the IIHR, Bangalore.

Dr A M Tampi, Professor and Head, Department of Agril. Extension attended the National Seminar on Training strategies for human resource development in Agriculture at Hyderabad. Dr R Prasad, Assistant Professor participated in the Summer Institute at Bangalore. Sri S Motilal Nehru, Assistant Professor attended the training programme on Monitoring and Evaluation of Agricultural Extension at Hyderabad and also organised two extension lectures on "Potassium dynamics in soil" by Dr G Ramanathan, Profesor and Head, Soil Science and Agril. Chemistry, Adulthural and on "Non-verbal Communication Graphology, Transactional Analysis and Stress Management" by Dr S Venugopal, Medical College, Trivandrum.

Academic Programme

i) UG course

a) Strength of students under each course during 1987-88.

	Men	Women	Total
I year	28	43	71
II year	24	39	63
III year	40	31	71
IV year	30	43	73

b) No. of outsida students with details of State/Country programmes etc.

Andhra Pradesh	—	1
New Delhi	—	1
Maghalaya	—	2
Tripura	—	2
Tamil Nadu	—	2
Port Blair	—	1
Total	—	9

c) No. of students who obtained their degree during the year

Men	24
Women	19
Total	43

ii) P. G. course

a) Strength of students in each course

	I year		II year		Total		
	Men	Women	Men	Women	Men	Women	Total
M. Sc. (Agri)	18	11	16	13	34	24	58
M. Sc. (Hort)	1	4	—	4	1	8	9

b) No. of outside students with details of State/Country/programme etc.

Nil

c) No. of students who obtained degree during the year 1987-88

	Men	Women	Total
M. Sc. (Ag)	12	6	18
M. Sc. (Hort)	—	—	—

iii) Ph. D.

a) Strength of students in each course

	Men	Women	Total
I year	5	2	7
II year	3	1	4
III year	3	2	5
		Total	16

Out of the 16, six students are part time candidates.

b) No. of students who obtained Ph. D. during the year

Men	Women	Total
3	2	5

Practical Training Programmes like Earn while you learn, work experience etc.

The work experience programme included cultivation of tapioca, banana, pulses, vegetables, homestead farming and perennial crops. The final B. Sc. (Ag) students cultivated paddy in the Kayal lands as part of their course programme.

Under the field training programme the final B. Sc. (Ag) students were provided with opportunities for getting practical experience under field situations in Agricultural Development projects. Similarly under the farm training programme, the final B. Sc. (Ag) students were sent to various Agrl. Research Stations of Kerala Agricultural University to acquaint themselves with the activities of the stations during the final trimester under the direct supervision of the Officers in charge of the station.

Study tours

Seventy two students of III year B. Sc. (Ag) class accompanied by three members of the staff went on an All India study tour for 28 days in October, 1987. They visited different places of agricultural importance like the College of Agriculture, Coimbatore; CFTRI, Mysore; UAS, Bangalore; APAU, Hyderabad; Agricultural College, Puna; IARI, New Delhi IGFRI, Jhansi, College of Agriculture, Nagpur and RRSFP, Madras.

The second year B. Sc. (Ag) students accompanied by three staff members went on an all Kerala study tour during October 1987.

Details of scholarships, awards and other financial assistantce to the students

		—	16
1.	National Merit scholarship	—	1
2.	National Loan Scholarship	—	28
3.	Educational Concession under KPCR	—	2
4.	ICAR Merit cum means scholarship	—	10
5.	ICAR Junior Research Fellowship	—	7
6.	ICAR Senior Fellowship	—	28
7.	KAU Merit Scholarship	—	27
8.	KAU Junior Fellowship	—	2
9.	District Merit Scholarship	—	3
10.	Educational Concession to Lakshadweep Island students	—	2
11.	Educational Concession to the Students admitted from Tripura	—	2
12.	Educational Concession to the students admitted from Meghalaya	—	2
13.	Merit Scholarship to the children of School teachers	—	3
14.	Stipend to the Village level workers admitted to B. Sc. (Ag) course	—	1
15.	Senior Research Fellowship from the Potash Research Institute of India, Haryana	—	33
16.	Educational Concession to Scheduled Caste students	—	2
17.	Educational Concession to Scheduled Tribe students	—	1
18.	Educational Concession to OBC students	—	1
19.	Sports Talent Scholarship	—	180
	Total		

Extra-curricular Co-curricular activities

Students Union activities

The College union election was held on the 4th July 1987.

The students' union was formally inaugurated by the Hon'ble Minister for Industries, Smt K R Gowri. Dr. George Onakkur, Sri Narendra Prasad and Kumari N Sukanya spoke on the occasion. A cultural programme was also presented by the first year students.

A painting competition was held for the children of the staff on the campus on the Independence Day on August 15 and prizes were awarded to the winners. The students union again co-operated with the Directorate of Extension in conducting another painting competition for the children of the campus on Children's Day on November 14. A quiz was also conducted on the same day and prizes worth Rs. 500 – were given away to the winners.

An exhibition of the paintings by Miss Sajitha was held in the College from 26-29 August 1987. The Arts Festival was held from 24–26 September.

The Athapoovu team of this College won the 3rd prize in the competition held in the College of Engineering on the 3rd September.

Gandhi Jayanti was celebrated with a campus cleaning programme.

A wall magazine "Bodhi" was inaugurated under the auspices of the Editorial Board in November.

The Planning Forum was inaugurated by Sri. E Chandrasekharan Nair, Hon'ble Minister for Food and Civil Supplies. Sri. Alwin B Prakash was the guest speaker.

The students' union presented a one hour entertainment programme at the Farmers' Fair at Poonkulam on the 28th November.

A symposium on "the problems in the agricultural sector and their remedies" was held on the 28th December which was inaugurated by the Hon'ble Minister for Agriculture. Sri. V V Raghavan. Dr. Michal Tharakan and Sri. Aruvipuram Prabhakaran presented papers.

An exhibition of photographs was arranged by the Camera Club.

A Christmas Tree competition was held on the 19th December and cash awards worth Rs. 250/- were given away in prizes.

National Service Scheme

Dr. Skariah Oommen, Associate Professor of Animal Husbandry and Sri. Mothilal Nehru, Asst. Professor of Agrl. Extension continued to be the programme officers in charge of the N. S. S. activities in the College.

The main activities were the following:

The two community centres at Kakkamoola and Palapur were maintained with facilities for reading newspapers and weeklies.

A blood grouping campaign was conducted and a list of blood donors was maintained. Thirty six volunteers donated blood.

Soil samples were collected from 12 coconut gardens in Kakkamoola and arrangements made for soil testing and fertilizer recommendations.

Under the Social Forestry Programme, 25,000 seedlings received from the Forest Department were distributed to the farmers of Palapur Village and another 3,000 seedlings were distributed to the farmers.

Health check up camp was conducted at Kakkamoola and deworming medicines were supplied for 25 calves.

A vaccination campaign for Poultry was conducted at Kalliyoor on 23-5-1987 and 360 birds were vaccinated against Ranikhet disease.

A cattle sterility and vaccination campaign was conducted at Kakkamoola on 30-9-1987.

Volunteers conducted a survey and selected 25 children of Palapur Village for nutritional studies by the Department of Home Science.

The NSS Units of the College conducted a Farmers Day at the College on 17-3-1988. Ninety farmers participated in the seminar.

The NSS volunteers along with the Programme Officer attended the seminar at the House of Soviet Culture, Trivandrum on 24-1-1988 in connection with the festival of USSR in India.

A free medical check-up camp was conducted on 31-1-1988 at the College with the Co-operation of General Hospital, Urban Leprosy Welfare Committee and the Trivandrum East Lions' Club.

Organised a NSS Special Camp at Anad from 11th to 15th February at the premises of Anad Farmers Bank. The camp was inaugurated at a public meeting on 11-2-1988 by the Hon'ble Minister for Agriculture under the presidentship of Sri L. Vijayanathan, Anad Panchayat President.

A seminar on rubber and paddy was inaugurated by Hon'ble Minister for Transport Sri K Sankara Narayana Pillai at 9 AM on 13th February. The valedictory function was conducted in the evening of 15-2-1988. Sri L Vijayanath, President, Anad Panchayat presided over the function. The valedictory address was delivered by Sri K V Surendranath MLA and General Council Member of KAU.

Lab-to-Land Programme

Under the Lab-to-Land Programme a group meeting was organised with the 24 selected beneficiaries of Palapur Village.

A vegetable day was organised on 24-8-1987. An exhibition was conducted in which about 100 farmers participated. The Hon'ble Minister for Agriculture, Sri V V Raghavan visited the vegetable plots and formally inaugurated the vegetable harvest festival.

Village Adoption Programme

A frontline demonstration on oil seeds was organised in an area of three hectares in the adopted village of Palapur during June to September 1987. Thirty two farmers were identified for this demonstration. Critical inputs like seeds, fertilizers and plant protection chemicals were distributed.

Tournaments and Championships

Regular courses in Physical Education were offered by the staff of the Department of Physical Education.

Practice sessions were arranged in all games and athletics for both men and women students.

The annual athletic meet was conducted on the 16th and 17th December, 1987. The overall championships for men and women were won by the III B. Sc. (Ag).

Hostels

Dr M. M. Koshy continued to be the Warden of the three hostels. The Assistant Wardens to the hostels were the following:

Undergraduate Hostel for men	—	Sri S. Pazhania Pillai
Postgraduate Hostel	—	Dr G. Madhavan Nair
Ladies Hostel	—	Smt K. Saradamma

Sri K Gopakumaran Nair and Sri S Satyadevan continued as the Stewards in the UG and PG hostels respectively. Smt L. Kamalakshy was the matron of the Ladies Hostel.

The strengths of the various hostels were as follows as an 31-3-1988.

U. G. Men's hostel	—	94
PG Hostel	—	32
Ladies Hostel	—	136

Other matters

Livestock Farm, Vellayani

This department has a dairy farm, a Poultry Farm and a Veterinary Hospital was also started in 1984. From 1987 onwards artificial insemination for cows was taken up in the Veterinary Hospital. Cattle sterility camps, poultry vaccination campaigns, Antirabies vaccination compaign for dogs, calf rally, cattle health care camps and Animal Husbandry Seminars were organised.

Visitors

Several distinguished persons visited the College during the year. They included Smt K R Gouri, Hon'ble Minister for Industries, Kerala: Sri V. V. Raghavan, Hon'ble Minister for Agriculture, Kerala: Sri E Chandrasekharan Nair, Hon'ble Minister for Civil Supplies, Kerala; Dr M R Sethuraj, Director, Rubber Research Institute of India; Dr V Mariappan, TNAU; Dr M V Reddy, S V Agrl. College, Thirupati; Dr M Mahadevappa, UAS, Bangalore; Dr S Palaniswamy, TNAU, Coimbatore; Dr R Jayarajan, TNAU, Dr C A Jagadish, APAU, Rajendranagar; Dr C R Hazra, Project Co-ordinator (Forage) and Dr R Parameswarappa, Director of Instruction, UAS, Dharwad.

Library

The total number of books as on 1-4-1987 was 20788. 137 new books were added during the year making the total as on 31-3-1988 to 20885. During the year 1987, 108 journals were subscribed to.

Instructional Farm

A brief resume of work

The following activities were continued during the year in the Instructional Farm:

Production and distribution of WCT and Komadan coconut seedlings, grafts and layers of major fruit crops, ornamental plants, fresh vegetables and vegetable seeds; cultivation of Kayal lands with paddy, coconut planting in outside fringes of Kayal land and inland Fish Farming, participation in Agrl. Exhibitions were the major activities

The farm has 75 hectares of garden land and 165 hectares of Kayal lands. The main crops cultivated during the period were paddy, coconut rubber, cashew, banana, guava, sapota, bread fruit, jack, mango, pineapple papaya, vegetables, tapioca, amorphophallus, dioscorea, spices and condiments, cocoa, ornamental plants and other miscellaneous crops.

Farm Revenue/Expenditure

Seeds and planting materials

One hundred and two different kinds of seeds and planting materials covering cereal crops, vegetable crops, ornamental plants, fruit crops and other miscellaneous crops were produced and distributed on payment basis.

Research Programme

Agronomy

The main thrust areas of research included the management of cropping systems. A total of 26 different experiments were in progress and the main achievements of the concluded experiments during the year were as follows.

A study of the cophysiology of azolla and its management for rice production revealed that under a system where medium duration rice varieties are cultivated, substitution of cattle manure by azolla can result in a saving of 25 per cent of fertilizers.

Investigation on integrated weed management for medium duration transplanted rice showed that the highest weed control efficiency was obtained with thiobencarb at the rate of 1.0 kg ai/ha as spray and hand weeding 35 days after transplanting and it was on par with the completely weed free treatments.

When five varieties of maize were compared for their response to graded levels of nitrogen, variety Ganga-5 recorded the maximum grain yield and this was obtained at 140 kg N/ha.

The highest pod yield in vegetable cowpea was obtained for a fertilizer application of 30 kg N and 60 kg P_2O_5 per ha. Potassium had no appreciable influence on the yield of pods Plants grown in the open area produced more pods than those grown under partial shade.

The NPK requirement of short duration tapioca varieties grown in the uplands of Kuttanad was studied and it was found that the maximum tuber yield was obtained from Kaduthuruthy local at a fertilizer level of 50:50:100 kg N, P_2O_5 and K_2O/ha.

Agricultural Botany

The thrust area for research in the department was crop improvement. Five experiments were in progress during the period.

Plant Breeding

The thrust areas were breeding improved varieties of oilseeds (sesamum and groundnut) and pulses, developing high yielding varieties of vegetables and tuber crops for the southern region, breeding for disease resistance in crop varieties and induction of new plant types in different crop plants. To satisfy the above requirements 37 different experiments were in progress. The achievements made in research during the year are summarised below.

The groundnut variety TG-3 was recommended for partially shaded conditions in coconut plantations. In brinjal, the variety PPC was the highest yielder in the wilt prone areas of Trivandrum district while Hybrid-2 recorded the highest yield in the wilt free areas of Quilon district. In amaranthus, Cul. S8 and Cul S1 were found to be superior in the southern region. Out of the varieties of cowpea evaluated in rice fallows, the variety "Charrudi" gave the highest yield of grain and the Selection-16 recorded the highest green pod yield. In rice fallows, the black gram variety CO5G-10 gave the highest grain yield. In sesamum, ACV-2 was found to be the top yielder in rice fallows while Cul 42 recorded maximum yield during rabi season at Vellayani. The sugarcane clones Co. 771, Co. 7219 and S 87 were found to be promising. In sweet potato the variety 'Kanhangad local' recorded the highest yield of tuber. The guinea grass variety PGG-1 the fodder cowpea variety UPC-5286, the fodder bajra variety, PPMP-999 and the Dinanath grass variety IGFRI-56-1 recorded maximum yields in different varietal trials conducted in the southern region of Kerala.

Horticulture

Eleven experiments on various aspects of horticultural crops were in progress.

Agricultural Entomology

The thrust areas of research included identification of selective insecticides and standardisation of spraying equipment and techniques to reduce pesticide hazards and environmental pollution, residue research to fix waiting periods of insecticides and pollution in the human ecosystem and to find out ways and means to reduce the hazards, standardisation of natural products as insecticides, evaluation of newer chemicals and biocontrol agents for pest control, studies on nematodes and post harvest losses and investigation on apiculture, sericulture and harmful soil organisms. Sixty experiments were in progress.

A detailed survey on the incidence of coreid bug attacking coconut was successfully completed in the state. The highest incidence was in

Wynad (23.4%) followed by Kasaragod (5.1%) and Trivandrum (4.8%). Maximum population of the pest was in the months of August to October.

Spraying endosulfan 0.05%, quinalphos 0.05%, dimethoate 0.05% or monocrotophos 0.05% once in July-August and a second time in September-October effectively controlled pollu beetle incidence on pepper. Sweet potato weevil could be effectively controlled by drenching fenitrothion 0.05% emulsion either on the 70th or 80th day after planting.

BHC 0.2 kg ai/m³, aldrin 0.1 kg ai/m³ and heptachlor 0.2 kg ai/m³ recommended to be applied in soil at the bottom of manure pits for the control of rhinoceros beetle of coconut, was found to persist effectively upto 1, 2 and 2 months respectively.

The waiting periods of monocrotophos (0.05%), dimethoate (0.04%), malathion (0.1%), quinalphos (0.05%) and fenthion (0.05%) for the treatment on snakegourd were fixed as 9, 3, 1, 6 and 3 day respectively.

The waiting periods of monocrotophos (0.05%) dimethoate (0.03%), quinalphos (0.05%) and malathion (0.05%) for use on cowpea were assessed as 9, 7, 8 and 1 day respectively. The waiting periods of monocrotophos (0.05%) dimethoate (0.03%) and fenthion (0.05%) on bitter gourd were fixed as 8, 5 and 3 days respectively.

Through field experiments conducted in farmers' fields the waiting periods of quinalphos, dimethoate, methyl parathion and fenthion as 0.05% emulsion and cardamom and quinalphos and dimethoate on pepper were fixed as 3, 5, 4, 5, 9 and 4 days respectively.

For the use of quinalphos, fenthion and mercaptothion on paddy waiting periods required were found as 7, 7 and 3 days respectively.

When compared with a fresh lot of ekalux formulation a stock kept for five years showed the same bioefficacy against *Tribolium castaneum* in the laboratory. The result indicated the need for reconsidering the accepted shelf life of the insecticide.

The results of multilocational field experiments showed that for the control of paddy stem borer prophylactic application of carbofuran followed by a need based application of fenthion or monocrotophos was the best and for the control of dead heart and leaf roller ekalux granules followed by need based application of monocrotophos was the best. Application of carbofuran at later stages of the crop induced leaf roller incidence.

Plant Pathology

Twentyseven research experiments were conducted during the period on various aspects of plant diseases, and their control. The results obtained are given below:

Two fungal species were identified as forming mycorrhizal association. A detailed survey was conducted in different parts of Kerala for the collection of *Pleurotus* and other mushroom flora. For large scale cultivation the collected ones are maintained. Five mycorrhizal fungi were multiplied and used for inoculation studies to investigate the mycorrhizal association of cassava in enhancing nutrient availability.

Soil Science and Agrl. Chemistry

Finding solutions to the practical problems related to soils and their management and fertility aspects formed the major responsibility of the department. Fundamental studies on soils and soil plant relationship were also carried out. Twenty four experiments were in progress during the year. The salient findings of the concluded experiments are as follows:

The investigation made to determine the extent to which the morphological, physical and chemical characters of the forest soils are affected by eucalyptus, teak and rubber plantations showed a higher content of clay in rubber and eucalyptus plantations as compared to teak and natural forests indicating a greater degree of weathering and clay formation. Bulk density, WHC, pore space, CEC etc. were found to be positively correlated with organic matter and were higher in the natural forest soils. It was the found that dry leaf and saw dust could improve the water retention capacity of the soil. It was proved that, lime levels to reduce exchangeable aluminium to below critical level is better than a general recommendation. Drying of submerged Kuttanad soils resulted in a marked and significant decrease in soil pH.

Agrl. Economics

Utilisation pattern of farm information sources by the homestead farmers and the basic socio-economic survey are the main areas of research and two projects were in operation during the period.

Agrl. Engineering

Refinement of bio-gas plant models and development of a package of implements for Kerala farmers are the thrust areas of research. A new design on the existing bio-gas plant models has been made.

Agrl. Extension

Nineteen research projects were in progress. Correlation of perception of the field staff and farmers about the effectiveness of soil conservation practices, study of the extent of adoption of messages by contact farmers in T & V system, studies on the utilisation of soil test recommendations by farmers in Trivandrum district and constraint analysis of training and visit system in Kerala were the main research areas.

Agrl. Statistics

The main thrust areas of research were crop-weather relationships modelling and forecasting, standardisation of field-plot techniques, multivariate techniques and response surface methodology, estimation of losses due to insects, disease, flood and drought, and econometrical studies. Five research programmes were taken up during the year.

Centre of Excellence for Tropical Soils

Special problems of some of the soil groups of Kerala was the main thrust area of study. Three projects were concluded and four other projects are in progress.

1.2 COLLEGE OF HORTICULTURE, VELLANIKKARA

The College was established on 28th October 1972 and was temporarily located at Mannuthy. It was shifted to the main campus during November 1977.

The College has an area of 95.3 ha and is utilized for imparting practical training to students and for undertaking research by staff and students.

Dr C C Abraham, Associate Director of Research was holding additional charge of the post till 16th May 1987. Dr C Sreedharan took charge of the post of Associate Dean on 16-5-87 and continued in the post.

Semester system of education was introduced from 1986-87. From 1972-73 to 1987-88, 205 students obtained B. Sc. (Hort) degrees and the number of students who secured B Sc. (Ag) Degree were 286.

Masters Degree Programme was started during the academic year 1976-77 in six disciplines viz. Horticulture, Agronomy, Agrl. Botany, Agrl. Chemistry, Entomology and Plant Pathology. Ph.D programmes in Horticulture, M.Sc. programmes in Agrl. Economics, Plant Pathology and Agrl. Engineering were commenced during 1979-80. So far 210 students took their masters degrees and 10 students obtained Ph.D degree from the College.

The PG Syllabus was revised and finalised under the semester system of education.

The College has 15 departments and 18 research schemes.

Academic Programmes

i) U G. Course

a) Strength of students under each course during 1987-88

	Men	Women	Total
I Year	30	43	73
II Year	32	35	67
III Year	38	25	63
IV Year	32	34	66
	132	137	269

b) No. of outside students with details of State Country Programmes etc

State/Country	Men	Woman	Total
Andaman Island	1	—	1
Manipur	1	—	1
Bhutan	3	—	3
Lakshadweep	1	—	1
Meghalaya	—	1	1
Mizoram	1	—	1
Arunachal Pradesh	1	—	1
Andhra Pradesh	1	3	4
Tamil Nadu	1	—	1
Total	10	4	14

c) No. of students who obtained their degrees during the year

	Men	Women	Total
1983 admission	23	21	44
1982 admission	3	2	5
1980 admission	1	—	1
Total	27	23	50

ii) P G. courses

a) Strength of students in each course

	I Year		II Year		III Year	
	Men	Women	Men	Women	Men	Women
M.Sc. (Ag)	5	8	8	12	13	20
M.Sc. (Hort)	4	4	2	5	6	9
M.Sc. (Ag Stat)	3	1	1	4	4	5
Total	12	13	11	21	23	34

12 students obtained their post-graduate degrees during 1987-88.

The six students admitted for the 1st year did not register during the year. There was only one full time student for Ph. D. One student obtained Ph.D degree during the year.

Practical training programme like earn while you learn, work experience, Instructional farm activities for students etc.

The B Sc. (Ag) students are undergoing the work experience programme attached to the Department of Agronomy, Department of

Pomology & Floriculture, Olericulture, Processing Technology, Plantation Crops & Spices, Entomology and Plant Pathology. The students are given field work in rice, tapioca, farming systems, perennial crops, vegetables, fruit crops, fruit and vegetable preservation, plant protection at College of Horticulture, Instructional Farm, Vellanikkara and RARS, Mannuthy. The students are allowed to work on annual crops on 'earn while you learn' basis. The final year students are sent for training for a period of one month in research stations and Krishi bhavans.

Study tours – Details

The II year B. Sc. (Ag) students were taken to tour to research stations in Kerala under Kerala Agrl. University, CPCRI, CTCRI, NRCS etc. The III year B. Sc. (Ag) students went on All India Study tour. The final B. Sc. (Ag) students who had undergone elective course on Coffee Plantation Management were taken on tour to Coffee Board, CCRI Balehannur and curing works at Chickmangalur.

The III B. Sc. (Ag) students were taken to Sugarcane Breeding Institute, Coimbatore and the Co-operative Sugars Limited, Chittoor as part of the course programme.

Scholarships, awards and aids to Students

Name of Scholarships/award/aid	*No. of receipients*
1) National Merit Scholarship	35
2) District Scholarship	4
3) KAU Merit Scholarship	25
4) KPCR Educational Concession	132
5) KAU Junior Fellowship	8
6) Annual Lumpsum Grant	1
Total	205

Students Union Activities-

Details of Extra and Co-curricular activities

The College Union election was conducted on 14-5-87. The students union was inaugurated by Hon: Minister for Agriculture, Sri VV Raghavan on 27-6-87. A magazine 'Kavimalika' was released by Dr KK Rahulan at the function.

The arts club conducted a 'Pookala Malsaram' on 28-8-87 and participated in Yuvavani Programme conducted by AIR, Trichur. Inter-class quiz competition was arranged by the students union on 1-9-87.

Sastra Sahithya Parishad conducted a programme on 3-7-87 in connection with the memory of Dr Salim Ali, the famous Ornithologist. Dr VS Vijayan, Senior scientist, Bombay Natural History Society presided over the function.

The fresher's day was celebrated on 13-11-87. Nature study-cum-tribal welfare programme was conducted at Attappady on 17-11-87 under Planning Forum. Under the auspices of Arts Club, a silpapradarshanam was arranged on 17-11-87.

Under the programme 'The world around us' started by the Planning Forum, Dr Sukumar Azhikode and Smt KB Sree Devi gave speeches. Literary Club conducted speeches by Kunjunni Master and 'Vilasini'.

The students union gave a warm reception to Hon'ble Minister for Agriculture and the Pro-chancellor of the University, Sri VV Raghavan on 20-1-88.

N. S. S. Activities

The N. S. S. volunteers of the College were in close contact with the farmers of the adopted village, Payyanam.

The volunteers arranged a cleaning campaign in the main campus of the University. They also cleaned the premises of the harijan colony, Nadathara. They also took active part in the cleaning of Thekkinkadu Maidanam at Trichur.

The kitchen gardens were laid out and maintained by the NSS volunteers of the college at the following places.

1. Vimala College, Trichur
2. Govt. School, Ramavarmapuram
3. Don Bosco High School, Mannuthy

The N. S. S. Volunteers planted 250 seedlings of matty in the main campus of the University. They also distributed 1500 matty and cashew seedlings in the Girijan Colony, Payyanam and Harijan colony, Mullakkara.

Seventy NSS volunteers donated blood to the patients in the medical college hospital.

Republic day, Independence day, Gandhi Jayanthi day, International literacy day, Human Rights day were celebrated in a befitting manner.

Tournaments

The college organised intercollegiate tournaments in Football (Men) and Hockey (Men) in November 1987. Intercollegiate tournaments were also conducted on volley ball (Men & Women), Table Tennis (Men & Women) and Badminton (Men & Women) in February 1988.

The College participated in Intercollegiate touranaments on Cricket (Men) at College of Agriculture, Vellayani in May 1987 and won second place. The students of the college played Hockey (Men) conducted at College of Veterinary and Animal Sciences, Mannuthy in May 1987 and

got third place. The college participated in the inter-collegiate matches on Basket ball and Volley ball (Men & Women) held at College of Agriculture, Vellayani in November 1987 and won the first place

Hostel

Dr (Mrs) Sosamma Jacob, Asst. Professor continued as the Asst. Warden, Women's Hostel. The Hostel had a strength of 207 students.

Dr S Rajan, Asst. Professor continued as the Asst. Warden of Mens Hostel. The strength of students during the year was 203 in the Men's Hostel.

College Institute Library Books/Journals:

A total of 222 books were purchased during the year. The total number of titles as increased to 22,453. During the year the subscription to foreign journals was reduced to 69 due to financial constraints.

Instructional Farm

Introduction

The Instructional Farm was functioning as a part of Regional Agricultural Station, Mannuthy. The Instructional Farm now functions as independent unit under the overall control of the Associate Dean.

Farm Revenue/Expenditure

The receipts from the farm during the year was Rs. 69,719.53

Posts shifted/abolished

1 One post of Associate Professor (Agron) was shifted temporarily to College of Agriculture, Vellayani along with the incumbent from 10-8-87.

2 ICAR Adhoc Schema on marketing of coconut and cocoa was terminated on 30-9-87.

3 One post of Assoc. Professor (Pl.Br) and one Assistant Professor (Microbiology) were shifted from CAS to Cadbury's Cocoa Project w. e. f. 23-11-87.

4 One post of Asst. Professor (Soil Science) was shifted from CAS to Instructional Farm, Vellanikkara with effect from 21-1-88.

Details of seminars/symposia/training programmes attended by the staff

Dr GS Nair attended a group meeting at Rubber Board, Kottayam to discuss about the possibility of medicinal plants as intercrops in rubber plantations.

Dr TV Viswanathan, Assoc. Professor attended the VII All India Co-ordinated Research Projects on Medicinal and Aromatic Plants Biennial Workshop held at Rajasthan, College of Agriculture, Udaipur in November 1987.

Dr AR Subramaniam, Professor and Head, Department of Meteorology and Oceanography, Andhra University, Waltair, delivered a lecture on the topic "Water balance studies" to the PG students of the College of Horticulture.

Training programme conducted

Two Farm Assistants working in the Research Stations were given training in handling meteorological instruments and recording data. Two Agricultural Seminars were conducted in the adopted village "Nadathara" under the suspices of National Service Scheme.

Mr VK Raju, attended the Summer Institute on "Prospects of utilisation of Plant Genetic Resources of North Eastern India "at Assam Agricultural University, Jorhat in June 1987.

Mr. PG Sadankumar attended the 11th Integrated Seed Improvement training course held at N. S. C. New Delhi from January to March 1988.

Dr K V Peter delivered a lecture on "New vegetable varieties and their prospects of cultivation" to the officers of State Bank of Travancore in April 1987.

Dr K V Peter delivered a talk on "Prospects of vegetables in a rural development plan proposal" at a round table conference organized by P. D. D. P Central Society, Kalady.

New projects/departments/schemes started during the year

All India Co-ordinated Research Project on medicinal and aromatic plants.

Cadbury—KAU Co-operative Cocoa Research Project

ICAR Ad-hoc scheme on shade studies on coconut based inter-cropping situation

Scheme on eco development of Vellanikkara campus

Nutritional deficiency symptoms and follar diagnosis in tree crops

Research Achievements

Alley cropping of Coconut + Eucalyptus, Coconut + Casuarina, Coconut + Subabul and Coconut + ailanthes with cassava, elephant foot yam, colocasia and greater yam were found successful and profitable.

Soil erosion from a slopy land (25% slope) put under eucalyptus + cassava 'tanngya' system can be effectively controlled by strip cropping with pineapple in 10% of the area.

Department of Agrl. Botany

Ganma rays and EMS produced viable mutants involving changes in growth habit, leaf size and shape. The mutagenic effectiveness in including chlorophyll mutation was at the highest dose of both mutagens.

Department of Agrl. Entomology

In an experiment to evaluate the different synthetic pyrethroids against major pests of brinjal, it was found that all synthetic pyrethroid formulations were more effective in the control of *Leucinoides orbonalis* compared to carbaryl. Among the synthetics, Cypermethrin @ 0.02% was found to be the most effective.

In a study conducted on the bioefficiency, persistence and residue dynamics of carbofuran in bittergourd, it was observed that only plants treated with carbofuran @ 0.75 kg ai/ha was safe for consumption.

Department of Agrl. Economics

It was found that smaller farmers have received relatively larger amounts of short term co-operative loans than larger farmers in Palghat district.

Average cost of production of coconuts in Calicut district was Rs. 1.12 per nut and net return per hectare was Rs. 14,000/- per year.

Net margins of commission agents and retailers in respect of marketing of banana in Malappuram district were found to be higher.

Department of Agrl. Extension

In a case study conducted on Integrated Rural Development Programme, it was found that majority of the respondents had medium awareness about the schome, low awareness about the benefit of the scheme and all beneficiarios had low or medium awareness about the implementing agencies.

The results point out vividly to the prime need for a more systematic and effective functioning of the programme with better co-ordination and supervision at all levels in order to have a better image of the programme in the rural areas.

Department of Pomology and Floriculture

Epicotyl grafting in mango was standardised and this method is commercially accepted.

Propagation studies conducted in pepper showed that IBA 1000ppm under mist condition resulted in maximum rooting percentage. The studies indicated that in the case of laterals there was no rooting in March and maximum rooting was observed in June.

From the collection of 42 fruit species maintained by the department one early bearing jack and one early bearing sapota were identified.

Department of Olericulture

In F_1 hybrid trial in watermelon, the results indicated that Arka Jyothi and Madhu recorded significantly superior yield.

In a screening trial conducted agninst bacterial wilt in brinjal, it was found that BWR-12, BWR-45 and Pant Bituraj were free from bacterial wilt.

IIHR Sel. 10 and IIHR Sel. 4 were found to be tolerant to yellow vein mosaic of bhindi.

LE-79 of tomato recorded the lowest incidence of bacterial wilt during the year.

In a fertilizer trial conducted on tomato for 3 years from 1985-86 it was found that the most economic dose was worked out to be 25:25:25 kg ha of N, P and K respectively.

The department maintains germplasm collections of 27 accessions of dolichos bean, 25 snakegourd types, 63 genotypes of winged bean, 39 amaranth lines, 20 ashgourd types, 97 genotypes of pumpkin, 20 lines of oriental pickling melon, 30 types of tomato and 100 lines of cowpea.

SM 6-7 Surya was recommended for release in wilt prone areas.

Department of Plantation Crops and Spices

Among the types of cuttings, hardwood was better in comparison to semi-hardwood in terms of sprouting and the cuttings kept in a mist chamber improved the percentage of rooting. Growth regulators were found to be effective in rooting of cuttings especially with IBA 300 ppm.

Irradiation studies in clove indicated that maximum germination was recorded at 0.5 kg (94.2%) followed by control (92.2%) and 1 kr (91.8%).

Department of Plant Pathology

The diagnostic symptoms of Kokkan disease of banana were described.

Most of the fungi present in the Virgin forest soils of Kerala have shown good antagonistic property against the soil borne pathogens *Pythium myriotylum*, *Phytophthora palmivora*, and *Rhizoctonia solani*. The organisms such as *Trichoderma harzianum*, *T. koningii*, *T. longibrachiatum*, *Aspergillus niger*, *Penicillinum citrium*, *P. simplicissinum*, *Basillus subtilis* and allied species of bacteria are found to be very powerful antagonistic and antibiotic producing organisms, which can be successfully utilized for the biological control of the major soil borne plant pathogens of Kerala.

Department of Processing Technology

The processing department has initiated work on 12 projects on post harvest utilization of jackfruit for preparation of various products like jam, jelly, juice, candy, flour wine etc.

Department of Soil Science and Agrl. Chemistry

An investigation on the root activity pattern of coconut and influence of long term application of NPK fertilizers conducted showed that the major portion of the active roots of coconut were within 2 m radius around the palm. The vertical distribution of active roots was mainly confined to a depth of 30-50 cm and the root activity decreased sharply at 90 cm depth. The surface 25 cm soil layer is practically devoid of roots. Root activity was positively correlated with organic carbon, available P, available K, Mn and Zn and negatively correlated with exchange acidity.

A study was conducted to establish relationship between available P and K extracted by the common extractant (tri-acid) evolved by KAU and the available P and K extracted by using Bray-1 and ammonium acetate respectively, in the soil testing laboratories of Kerala and to classify the soils of Kerala into various fertility classes based on available P and K values estimated using the common extractant. A significant close relationship was observed between tri-acid P and Bray-1 P and between K extracted by triacid and by ammonium acetate.

Department of Agrl. Statistics

A procedure to determine the optimum size of plots in multivariaite case was evolved.

A study was conducted to determine the optimum size of plots in cocoa in multivariate case. Optimum size of plots was determined using the three different methods. Two tree plots were found to be optimum in multivariate case and four tree plots in univariate case.

Department of Agrl. Meteorology

Monthly meteorological data for the period 1901-80 were collected from 11 stations of Kerala Agricultural University, 7 stations of Indian Meteorological Department and 82 stations maintained by the State Government and other agencies like Idukki, Edamalayar and Parambikulam projects.

1.2.1. CADBURY KAU CO-OPERATIVE COCOA RESEARCH PROJECT

The project, located at KAU-Main Campus, Vellanikkara, started functioning with effect from 1-4-1987, which is fully financed by M/s Hindustan Cocoa Products Ltd. with a total financial outlay of Rs. 33 lakhs for a period of 10 years. With the inception of the project the existing cocoa area (planted from 1979 to 1986 under KADP) was brought under it with the ongoing long term experiments on management and breeding. The main objectives of the project are to strengthen the existing breeding programme on Cocoa, to continue the long term experi-

ments on management and to take up work on diseases of the crop. Dr. R. Vikraman Nair, Professor of Agronomy continued to be the head of the project during the period.

Highlights

The suspected symptoms of witches broom disease at Kottayam District was proved to be due to the deficiency of the micronutrient, boron. The symptoms vanished upon spraying Borax 0.05%.

Farm Revenue

Receipts from the sale of cocoa beans is Rs. 8,228.05

Action taken for improving farm revenue

A sprinkler irrigation unit is proposed to be installed by about September 1988. Irrigation will considerably enhance the cocoa yield and more area will also be brought under cultivation.

1.2.2 ALL INDIA CO-ORDINATED RESEARCH PROJECT ON MEDICINAL AND AROMATIC PLANTS

During VII Plan Period All India Co-ordinated Research Project on Medicinal and Aromatic Plant (AICRP on M & AP) was sanctioned by the ICAR, with a financial outlay of 6.44 lakhs. The project started functioning at College of Horticulture, Kerala Agricultural University, Vellanikkara from 1-4-1987 onwards.

The thrust areas of Research identified are,

1 Exploration for Medicinal plants in Palghat district

2 Intensive collection and standardisation of cultivation practices for mandatory crops like *Piper longum Sida spp. Alpinia calcarata* (galangal)

3 Biochemical investigation of the collected medicinal plants

Research Achievements

1 Five different geographical races of *Piper longum* were collected and put under initial evaluation trial

2 Two important races of Sida Spp. of high Ayurvedic value and one common adulterant were collected and put under observational trial.

3 Twelve vetiver germplasm were collected and maintained and seed set pattern studied. The following exploration studies were made during 1987-88

a) Exploration of Amboori forests (Trivandrum district)

b) Exploration to Taliparamba area (Cannanore district)

Dr K Kumaran, Professor was in charge of the project till 16-7-1987 and thereafter Dr. T. V. Viswanathan took over the charge.

Dr T V Viswanathan, Associate Professor and Project Leader attended VII India Co-ordinated Research Project on Medicinal and Aromatic Plants biennial workshop held at Rajasthan College of Agriculture, Udaipur during November 1987.

Twelve Vetiver germplasm were collected and maintained. The seed set pattern and the pollen fertility of these entries are under study. Several rare plants like *Drocera neliata*; *Narvilia plicata*; *Holostamma adakodien*; *Sarcostamma acidum*; *Gymeema sylvestris*; *Anamirta cocculus*; *Enicostamma littorale* and different types of *Terminalia chebula* were collected during exploration trips for medicinal plants.

1.3 COLLEGE OF CO-OPERATION AND BANKING, MANNUTHY

The College functioned as a constituent College of Faculty of Agriculture. The B. Sc. (C&B) degree programme commenced in 1981 continued during the year under report. The College started Post-graduate programme in Co-operation in 1986.

Dr C A Jos held charge of the Associate Dean of the College.

The semester system of teaching was introduced from 1986.

Post graduate programme

Post graduate programmes in Rural Marketing Management and Rural Banking and Finance were started.

Thrust areas of research

Resource management, land utilization and crop planning malady and remedy analysis of agro and rural based industries.

Faculty Improvement programme

Sri Philip Sabu, Asst. Professor has secured a fellowship for undergoing Management Development Programme for University teachers in Management at the Indian Institute of Management, Ahmedabad during 1987-1988.

Details of Seminars/Symposia/Training Programmes attended by staff

Sri M Mohandas, submitted a paper 'Women and Co-operative Development in Kerala' in the National Convention of Women Co-operatives April 1987, New Delhi.

Sri A M Jose, attended National Workshop on organization and Management of irrigation cc-operatives at Vaikunda Mehta National Institute of Co-operative Management in May 1987.

He also attended a seminar on 'Rural Development Programme and role of Women—a case study' at Hindu College, Machalipatnam, UGC workshop in February 1988.

Sri K Satheesh Babu, E, Vinaikumar, and Shaheena underwent a Training programme in preparation and presentation of research papers at the College of Agriculture, Vellayani.

Sri M Mohandas attended a seminar on 'Measurement of Poverty' at Hindu College, Machalipatnam, UGC workshop in February 1988.

Dr C A Jos participated in the National Symposium on the role of scientific research and its management in accelerating socio economic transformation, New Delhi in September, 1987 organised by NCERT.

Academic programme

i) U G Strength

Years of Admission	No. of students		
	Men	Women	Total
1987	17	13	30
1986	7	18	25
1985	16	14	30
1984	16	6	22
1983	14	13	27
1982	5	3	8
1981	—	1	1
Total	75	68	143

No. of outside students—Nil

No. of students who obtained their degrees during the year

Year of admission	No. of students passed		
	Male	Female	Total
1982	3	3	6
1983	12	12	24
Total	15	15	30

ii) P G Course

Strength:	I Year		II Year		Total	
	M	F	M	F	M	F
M Sc (Co-operation and Banking)	2	—	2	2	4	2

Study tours

The All Kerala study tour of the 1985 and 87 admission was conducted from 18-4-1988 to 24-4-1988. Co-operative and other institutions of academic interest were included in the itinerary.

Scholarships, awards etc

These constituted National Merit Scholarship, District-wise meri scholarship, ICAR post metric scholarship KAU merit, and other educational concessions.

Extra curricular activities

Students Union

The College celebrated its second college day on 3-6-1987. Chief guest on the occasion was Hon. Minister of Agriculture Sri V V Raghavan. The Arts Club, Quiz club and Planning forum conducted competitions, debates, symposium, surveys etc. on suitable occasions.

Sports and games

College sports was held on 29-1-1988.

NSS

The NSS Unit participated in Vanamahotsva

Hostels

The students are admitted to the Horticulture College Hostels, Vellanikkara. At present there are 40 boys and 39 girls in the hostels.

Library

The students and staff make use of College of Horticulture Library, Vellanikkara. A sectional library cum reading room for the College is maintained.

Book bank scheme

The budget provision under the book bank scheme for the year 1987-88 was Rs. 8,000/-. The students were supplied books at 43.5% of the cost covering all subjects. The total amount spent was Rs. 7,354.05.

Research Programmes

Since the beginning of the Co-operation and Banking Programme the faculty has undertaken 8 research projects so far. One project was completed during the year under report.

The only ongoing project in the College is 'Spatial Micro level planning for rural development. An exploration into the potentialities of an alternative data base.

1.4 COLLEGE OF RURAL HOME SCIENCE, VELLAYANI

College of Rural Home Science, Vellayani was started during 1986-87.

An applied Nutrition Programme scheme was started in 1965 in the College of Agriculture to impart training in human nutrition to the undergraduate of Agriculture and also to organise inservice trainings for the personnel of various departments.

During 1986-87 Government of Kerala accorded sanction for starting a college of Rural Home Science under Kerala Agricultural University and this College is offering U. G. Course in Rural Home Science and P. G. Course (Food Science & Nutrition).

Dr. (Mrs) L. Prema continued to be the Professor and Head of this College.

Academic Programme

i) Undergraduate course

Strength of students under each course during 1987-88:

	Men	Women	Total
I Year	3	9	12
II Year	7	18	25

ii) P. G. Course

Strength of students:

M. Sc. (Food Science and Nutrition (Women candidates only)

II Year (1986-88 batch) 7 (completed)

I Year (1987-89 batch) 5

(1988-90 batch) 2

No. of students who obtained degree during 1987-88 — 4 students

Ph. D. — not started during the period under report.

Scholarships/Aids to students

II Year B. Sc. Rural Home-Science—National Merit scholarship sanctioned to Jaya Jacob, II B. Sc. Student

Lumpsum grant to SC/ST students: I B. Sc. (RHSc.)—2 students

II B. Sc. (RHSc.)—2 ,,

Details of seminars/symposia/training programmes attended by staff

Smt Girija Devi, Sr Research Fellow attended a Seminar on 'Consumer Consciousness' sponsored by Kerala Consumer Protection Council on October 9th to 11th 1987 at V J T Hall, Trivandrum.

Dr (Mrs) L Prema, Professor, Food Science and Nutrition attended a Seminar for the benefit of Voluntary Organisation Organised by CARART and Mitraniketan in November 1987 at Mitraniketan.

Extra curricular activities

NSS activities

The students of B. Sc. Rural Home Science attended All India NSS Camps of College of Agriculture Vellayani at Tirunelli, Wynad District from 22nd to 25th November 1987 and a camp held at Anad in Trivandrum from 11-2-1988 to 12-2-1988.

The students of B Sc Rural Home Science participated in the Inter collegiate Athletic meet held in November 1987 at Mannuthy, and also in the Inter Collegiate athletic meet in August 1988.

1 5 REGIONAL AGRICULTURAL RESEARCH STATION, PILICODE

Coconut Research in India started in the West Coast of the erst-while Madras State with the establishment of four Research Stations in 1916 – one each at Kasaragod and Pilicode and two at Nileshwar. When the Indian Central Coconut Committee was established, the Kasaragod station was taken over by the committee in 1947 and in 1970 it became the CPCRI under ICAR. With the formation of Kerala State in 1956 the remaining three stations came under Kerala Agricultural Department. In 1972 when the Kerala Agricultural University came into being one of the stations at Nileshwar (Nileshwar-II) and the station at Pilicode were transferred to Kerala Agricultural University with headquarters at Pilicode. Under the NARP Scheme, this station was reorganised as the Regional Research Station for the northern region comprising the Districts of Kasaragod, Cannanore, Kozhikode and Malappuram with effect from 1-6-1980. The present area of RARS, Pilicode is 57.87 ha and that of Nileshwar, 17.25 ha.

Dr R Ravindran Nair was in charge of the station till 1-7-87 and later Dr K P Rajaram, Associate Director continued as the head of the station.

The main objectives of the station are to perform a statewide lead function for research on coconut and to serve as a commodity verification testing centre for rice, pulses and oil seeds and to supervise and guide the work at Panniyur and Tavanur centres in the Northern Zone of Kerala.

Thrust areas of research

In the begining the activities were centred around introduction of coconut cultivars from different parts of India and other countries, selection, hybridisation, identification of superior local and hybrid varieties and their distribution among farmers. After the implementation of NARP, apart from research on coconut and coconut based farming systems rice, pepper, vegetables, pulses and tubers etc. were also initiated.

Research achievements

Coconut

The hybrid LO x GB has been released as a high yielding coconut variety under the name Lakshaganga. This variety has an average nut yield of 108 per annum with a copra content of 195 g, yields 21.06 kg copra per palm per year.

The hybrids T x GB and AO x GB have been nominated for consideration in the variety release committee as high yielding coconut

varieties based on the performance for the last 20 years. These hybrids also have average nut yields of 100 per annum having a copra yield of 20 kg/annum palm.

The evaluation of Tall x different Dwarfs and the reciprocals revealed that WCTxMDY topped the list in the case of production of female flowers and cumulative nut production followed by WCT x CDG and WCT x CDO.

Preliminary study on WCT x GB showed that application of 0.5:0.5.1.5 kg NPK/palm/year and an irrigation level of 600 litre/palm at IW/CPE. 1.0 is best for vegetative growth as well as flowering of the 6 years old hybrid.

A new disease of coconut—coconut leaf blight—caused by *Pestalosphaeria elaeidis* was reported. It caused serious damage to the foliage.

Evaluation of fodder grasses and legumes in coconut garden revealed that the fodder grass *Panicum maximum* var. Mackueni and legume *Stylosanthes guianensis* cv. Scholield produced maximum fodder under the shaded condition of coconut garden.

Rice

Culture 23332-2 recorded the highest grain yield among the five cultures tried under varietal trial on rice during the last 3 years and the culture has been suggested for inclusion in the package of practices as a suitable variety for the northern region of Kerala.

Pooled analysis of grain yield from the study on the fertilizer management and economics of Koottumundakan practice of rice has confirmed that a fertilizer dose of 20:10.10 kg/ha of NPK to the stubbles of second crop partner to be the most economical nutrient dose.

When planted during the first week of June, the local variety Allikkannan was observed to be superior to Jaya and IR 8.

Details of Seminars/Symposia/Training Programmes attended by Staff

Dr GSLHV Prasada Rao, Associate Professor attended the National convention on Agrometeorology, Calcutta University, Calcutta from March 6-8, 1988 and Workshop on short term and long term measures to combat drought situation in Kerala held at KAU Vellanikkara during April 1987.

Smt Sumangala S Nambiar, Assoc. Professor attended National Symposium on Integrated pest management, held at College of Agriculture, Vellayani, Trivandrum, 15-17 March 1987.

Sri M. Govindan Jr.Asst. Professor and Dr Shyam S Kurup, Jr. Asst. Professor attended the IX International Symposium on Tropical Ecology, Banaras Hindu University, Varanasi in December 1988.

Dr K P Rajaram, Assoc. Director and Prof. Sathiarajan attended the Seminar on rootwilt disease at Iritty on 4-7-87. It was presided over by Minister for Agriculture.

Research Activities

A total number of 49 research projects are implemented during the year.

Under the coconut dry land production programme, the hybrid LOxGB with an average nut yield of 108 nuts per annum and copra productions of 21 06 kg/ha/year has been released under the name Lakshaganga by the state variety release committee. The hybrids AO x GB and WCT x GB were found to perform equally as LOxGB and have been nominated for release as hybrid coconut varieties under the name Ananda-Ganga and Kera Ganga respectively. The evaluation of WCT x Different dwarfs and their reciprocals revealed that regarding number of nut production and leaf productions WCT x Dwarf hybrid are better than D x T hybrids and West Coast Tall, under rainfed conditions. The hybrid WCT x MDY ranked top regarding total number of nut productions and was on par with WCT x CDG and WCT x CDO studies on irrigations cum manurial aspects of WCT x GB showed that application of 0.5: 0.5: 1.5 kg NPK/palm/year and an irrigation level of 600 litre/palm at IW/CPE 1.0 is best for vegetative as well as flowering of the 6 year old hybrid. The growing cocoa as an intercrop in coconut gardens favoured the population build up of beneficial micro-organism (*Diazotrophs, Beijerinckia & Azotobacter*) in the root environments of coconut as also in the interspace of coconut. Total bacteria and fungi were also found to be favoured by intercropping of cocoa.

The experiment to study the varieties and seasonal variation in the oil content of coconut has revealed that maximum oil content (72.8%) was recorded during the post monsoon (October and November) followed by the winter (December to February) (71.3%) and the minimum (66.6%) during the summer (March to May).

Investigations on stem bleeding disease of coconut revealed that the palms treated with Calixin showed only 0.5% increase in the disease symptoms compared to the general mean of 1.14 to the control. Significant reduction in the incidence of rhinoceros beetle attack was observed after the release of the predator *Platymeris Laeivicollis* under field conditions.

Evaluation of fodder grasses and legumes in coconut garden revealed that the fodder grass *Panicum maximum* var Makueni and legume *Stylosanthus guianensis* cv. Schofield produced maximum fodder under the shaded conditions of coconut garden.

Varietal trial on rice conducted with 4 cultures and Jaya as control from 1985-86 onwards were concluded during the period under report. The pooled analysis data showed that the culture 23332-2 recorded the maximum grain yield among the cultures tried and has been recommended for inclusion in the package of practice recommendations as a culture suitable for the northern region. The performance of the three cultures

received from Mon compu viz., Cul. 204, 200 and 153–1, during the 5 seasons tried at this station were found to be inferior to that of the local check and the high yielding varieties Bharathi and Jyothi. Among the five O.D cultures tested under the saline conditions of Northern region with Kondotty as local check revealed that O.D.72 produced the maximum grain yield. Under the studies for evolving high yielding rice varieties suitable for northern Kerala 9 promising lines were selected for conducting preliminary yield trial. Pooled analysis of the grain yielded from the study on the fertilizer management and economics of Koottumundakan practice of rice crop confirmed that a fertilizer dose of 20:10:10 kg/ha of NPK to be the economic dose for the tall indica Mundakan partner of the Koottumundakan practice. Trials conducted on nitrogen management of ratoon rice indicated that Cul. 1727 is capable of giving fair ratoon yields to nitrogen application. When planted during the first week of June, the local variety Allikkannan was observed to be superior to Jaya and IR 8. Field studies on the influence of lime and different forms of P for rice showed that Superphosphate influenced the productions of tillers, height of plant, grain and straw yield than Musseriphos. Studies were conducted for screening rice varieties against major pests. Varieties Sakthi and Bhadra and Cul. 1065 recorded lowest incidence of silver shoot. In cultures MO 5 and 1744, the incidence of leaf roller was maximum during 1982-83, 134 entries of rice were screened for the major diseases in the first crop season and 73 entries in the second crop. None of the entries showed resistance to sheath blight disease. From the above, 36 first crop varieties and 25 second crop varieties which showed relatively low level of infections were selected and subjected to further screening from 1985 onwards. During the 1st crop seasons of 1987, Cul. 7944, Mala and M 22-65-2-3-1 gave maximum yields. Among them Mala had the least incidence of sheath blight and brown spot.

The project for scheduling irrigation for banana cv. Nendran grown in clay loam soils, started during 1985 was concluded during the year under report. The pooled analysis of the results revealed that basin irrigation with 20 mm water (40 litres/plant) on alternate days resulted in production of bunches with maximum weight. Among the various methods of irrigation tried, basin irrigation at IW/CPE ratio 0.5 (irrigation at 4-5 days interval) was found to be the best economic irrigation schedule. Fruit rot disease of banana caused by *Fusarium Pallidoroseum* was reported. This is the first report.

Cashew seedlings in the nursery were found affected by severe nursery blight. Its casual organism was identified as *Aspergillus niger*. This forms the first report of the disease. Spraying Bordeaux Mixture (1%) or Bavistin (1%) was found effective in controlling the disease.

The farm revenue of the station was Rs. 9,13,352 during the year as against 5,31,502 during 1986-87.

Important visitors

Following notable personalities visited the station during the year under report.

M De N Co De Lamothe, Paris, EEC Consultant

Hon Justice K Sukumaran, High Court, Kerala

His Excellency Sri P. Ramachadran, Governor of Kerala

Sri E K Nayanar, Hon'ble Chief Minister of Kerala

Sri V V Raghavan, Hon'ble Agricultural Minister.

1.6 PEPPER RESEARCH STATION, PANNIYUR

The Pepper Research Station, Panniyur is located in the Village of Panniyur in Taliparamba Taluk of Cannanore District. The nearest Railway Station is Cannanore (31 Km.) from where the station can be reached by taking the Road to Alakode, (Via) Taliparamba.

The station was started in 1952-53 The total extent of the farm is 26.13 hectares.

This Research Station is also a sub centre of NAKP Phase II of the Northern zone under the control of the Associate Director, RARS Pilicode and has the lead function of Research on pepper.

The station celebrated its Silver Jubilee in December 1978.

Sri V Sukumara Pillai, Professor is the head of the station.

Research Highlights

Period taken for maturing of berries in different cultivars varied widely. It is suggested that the pepper cultivars can be grouped into three categories viz, Early maturing, late maturing and intermediary.

Among the local varieties, Karimunda types, Kuthiravaly, Poonjar munda, Balankotta types and Arakulam munda gave maximum yields.

One culture (No. 5128) with extraordinarily bold berries was located.

In the PYT of promising cultures culture Nos. 331, 141 and 239 gave higher yields than the other cultures and check varieties.

Intensity of rotting disease in pepper nursery was found to be correlated with intensity of shade. The disease can be effectively contained by spraying and drenching with 1% Bordeaux mixture or 0.1% Difolatan.

Research activities

Germplasm Collection and Screening of Pepper genotypes

At the beginning of the year under report, there were 79 cultivars and 117 wild accessions in the germplasm. During the year, 3 more

cultivars and ten wild types were acquired and thus, at present there are 73 cultivars and 127 wild accessions in the collection. The new cultivars added are Kouching, Billi-Malligasara and Vokkale.

Collection of wild types was done from Agasthyakoodam hills in Trivandrum District Periya Forests in Wynad and Bhagamandala and Thalacauvery forest ranges in Kodagu District.

During the year under report, 49 cultivars in the germplasm have flowered and harvested. The yield data and spike characters have been recorded As regards yield, the Karimunda types, Kuthiravaly, Arakulam Munda, Poonjar munda Balankotta types and Kumbhakodi are showing better performance.

Breeding—Intervarietal Hybridisation in Pepper

Intervarietal hybridization involving 14 parental combinations were carried out during July-August, 1987. A total number of 171 hybrid and open pollinated seedlings obtained from previous year's hybridisation programme were transplanted to the main field. In the main field, 315 seedling progenies flowered during the year and of these 98 vines were harvested.

Under the hybridisation programme, some of the cultures identified earlier as promising ones were put in a P. Y. T. planted during 1987. Eight promising cultures as tried in this experiment along with Panniyur 1 and Karimunda as check varieties. There are ten plants under each type.

Though this first yield data do not permit us to draw any definite conclusion, it is indicated that Culture 331, 141 and 239 have higher yield potential than the others. Yield data for 2-3 years more are necessary to draw any definite conclusion.

Multilocational Trial of promising cultures of black pepper

The experiment aims to evaluate seven promising cultures produced at Pepper Research Station, Panniyur, at two locations viz, Panniyur and Peruvannamuzhi.

The cultures under evaluations are the following:

1. Culture 54 — Karivally OP
2. Culture 211 — Taliparamba VI OP
3. Culture 239 — Perumkodi OP
4. Culture 331 — Uthirenkotta x Cheriyakaniakadar
5. Culture 406 — Karivilanchi x Cheriyakanlakadar
6. Culture 1171 — Perumkodi OP
7. Culture 1199 — Kuthiravaly OP
8. Karimunda — As check variety
9. Panniyur 1 — As check variety

In the trial the total number of 30 plants flowered during the year.

Multilocational trial of cultivars in black pepper

The experiment aims to evaluate nine cultivars at three centres viz. Ambalavayal, Chinthappally and Panniyur. At Panniyur, the experiment was laid out in 1984.

Cultivars under evaluation are the following:

Aimperian
Arakkulam munda
Kalluvally
Karimunda
Kottanadan
Kuthiravaly
Narayakodi
Neelamundi
Panniyur 1

In the trial, the total number of 24 plants flowered during the year.

Neelamundi — 1
Panniyur 1 — 5
Kalluvally — 3
Aimperian — Nil
Kottanadan — 4
Narayakodi — 2
Kuthiravaly — 3
Arakkulam munda — 3
Karimunda — 5

Irrigation-cum-fertiliser experiment

An irrigation-cum-fertilizer experiment on two cultivars of black pepper was laid out and planted in 1997.

Treatments will be started from the third year ie 1989. Fertilizers will be applied in two splits.

The pepper vines were planted in July 1987 and gap filling was done in July 1988.

Evaluation of cultures/cultivars for shade tolerance

It is estimated that 80% of pepper plants grown in the state are in homestead gardens. These gardens are characterised by moderate to heavy shade due to the presence of various tree species such as coconut, arecanut, jack, mango etc. Pepper usually prefers an open area and so types of pepper plants which can give satisfactory yields even under such shaded condition is a felt need. So, an experiment to locate shade tolerant types was started in 1982. Under this experiment 34 cultivars/ promising cultures are planted in a shaded plot. Some of these plants have started bearing during 1987 and the yield data has been recorded.

As the plants have not yet started steady bearing, the present yield figures have only very little relevance, but, still, some indications are brought out by the data.

More number of plants have flowered under c. c. Neelamundi (8) followed by culture 239, 557 and Panniyur 1 (6 each) showing their precocity even under shaded conditions.

Maximum spike length was observed in culture 1171 (17.0 cm) followed by cultures 818 (16.6 cm) and 231 (16.5 cm) and maximum single plant yield was recorded in Arakulam munda (3.767 kg) followed by Kalluvally (2.84 kg) and culture 818 (2.680 kg).

Obeervational trial with different tree standards for pepper

On observational trial using seven tree species viz. *Glyricidia maculata, Erythrina indica, Garuga pinnata, Ailanthus malabaricum. Pajnelia rheedi* and two varieties of Subabool was laid out in 1982. The tree seedlings/cuttings were planted in 1982 and pepper was planted to them in 1986. The period from 1982 onwards had experienced three severe drought years and even in this unfavourable situation, Ailanthus came up well, whereas, the growth of the other tree species were retarded due to the drought

Evaluation of pepper genotypes in arecanut garden

With the objective of identifying the most suitable genotype of pepper for an irrigated arecanut garden, an experiment was started in 1984. Ten cultures/cultivars of pepper.

35 plants have started flowering during the year under report.

Morphological studies on pepper varieties

The objective of the experiment is to describe the morphology of all pepper varieties maintained in the germplasm collection in order to prepare a key for the identification of the varieties.

The spike and berry characters of those plants in the germplasm which flowered were recorded.

Field experiment for the control of slow wilt disease of pepper

As per the recommendation of the VII workshop of the All India Coordinated Research Project on spices held at Trivandrum during 1985, a field experiment for the control of slow wilt disease of pepper at cultivators' field was started during 1986.

The treatments were applied at two times in an year, one during June before the onset of South-West monsoon and the other during November after the end of North-East monsoon.

Thimet is applied at the base of the vine and ranked in. The fungicides are applied as drench at the base.

The data in general, shows that a combination of Thimet with a Copper fungicide can reduce disease symptoms considerably.

Observational trial for the control of quick wilt disease of pepper

It was decided in the VII workshop of the AICRP for spices held a Trivandrum during 1985 to start an observational trial for the control of quick wilt disease. An experiment was laid out at two places at Eramom and Pacioichal in Cannanore District during the year 1986.

The result indicate that application of neemcake and lime has got a positive effect on yield.

Ecological studies on quick wilt disease of pepper

This experiment was started during 1976. An isolated plot at the station, where the disease has been frequently and continuously appearing was selected for the experiment. The plants in the plot were observed for the incidence of quick wilt at weekly intervals and recorded.

The data for the last 10 years (1976-1985) were statistically analysed and results are as given below:

Generally, the maximum incidence (39.08 vines) was noticed in July. However, during the years when the monsoon was late, the period of heavy incidence varied from middle of July to middle of August.

Correlation studies between the different weekly weather variables and the number of diseased vines indicate that a significant positive correlation exists between the weekly diseased vines and rainfall, number of rainy days and ralative humidity, whereas a negatively significant correlation exists in the case of maximum temperature and sunshine hours.

Increase in the quantity of rainfall, number of rainy days and relative humidity were conducive for increase in the incidence of the disease as these factors favour disease initiation, development and spread. It can also be seen that maximum temperature drops when the rainfall was high and continuous.

Control of nursery disease of pepper

The results indicate that spraying and drenching with 1% Bordeaux mixture reduced the infection significantly. Spraying only of Bordeaux mixture was the best treatment followed by drenching and spraying of Difolatan 0.1% at fortnightly intervals. The latter two treatments were on par statistically.

It was also found that the intensity of the disease increased with the intensity of shade.

1.7 REGIONAL AGRICULTURAL RESEARCH STATION, AMBALAVAYAL

The Regional Agricultural Research Station originally called as the Horticultural Research Station was established in 1946 as a part of the Wynad Colonisation Scheme under the post-war rehabilitation

project. With the formation of Kerala State in 1956, it came under the Kerala State Agricultural Department. Subsequently it was upgraded to the status of a Central Horticultural Research Station in September 1966. With the inception of Kerala Agricultural University, the station was brought under the University in February 1972 and the name was changed as Horticultural Research Station. In November 1983, it was further upgraded to the status of a Regional Agricultural Station for high range region under the National Agricultural Research Project with Cardamom Research Station, Pampadumpara as the sub station.

The station has the lead functions for research on citrus, mango and other fruits like pomogranite, hill paddy and paddy based farming systems and verification function for crops like pepper, essential oils and medicinal plants.

Prof. P Chandras kharan, Associate Director i/c continued to be in charge of the station upto 10-8-1987 and thereafter Dr G Raveendranathan Pillai, Associate Director from 11-8-1987.

Research

Thirty six research projects were in operation during the year.

The research Programmes include crop improvement, identification of varieties of crops suitable for growing under pure and mixed stand, agro techniques for their cultivation, control of major pests and diseases, water management etc.

The major highlights of the experiments conducted during the year are given below.

Mango

The mango varieties Prior, Amritham, Pairi, Banganappally and Chandrakaran have been classified as early season, Dasheri, Kalappady x Himayuddin, Himayuddin and Nanipasand as mid season and Neelum and Neelum x Baneshan as late season varieties based on their time of flowering and harvest. The above varieties have also been grouped as high yielders (75 kg – Dasheri and prior), medium yielders (25-75 kg – Bennet Alphonso, Neelum, Kalappady, Kalappady x Himayuddin and Pairi) and low yielders (25 kg olour, Neelum x beneshan, Himayuddin, Amritham, Chandrakaran, Benganappally and Nanipasand).

Banana

Evaluation of Banana under irrigated conditions showed that Bodles Alta Fort, Grosmichel and Chenkadali were high yielding varieties possessing comparatively longer duration. Nendran types were shorter in duration.

Vegetables

Studies on cool season vegetables indicated that Special Eclipse Drum Head and Pusa Drum Head among cabbage varieties and Pusa

Deepali, Selected Tight Maghi and Snow Main Crop Patna among cauliflower varieties were promising and the second fortnight of September was found to be the best time of planting.

Rice

Comparative yield trials with different rice varieties indicated that Edavaka possessing higher yield to grain and straw are suitable for cultivation during first and second crop seasons.

The cold tolerant rice cultures 745 and 796 were found to be promising for the second crop season.

Ginger

The incidence of bacterial wilt of ginger was found to be reduced by soil drenching and foliar application with 1% Bordeaux mixture at monthly intervals commencing from two months after planting.

Seed treatment with Captan 0.2% a. i. was effective in controlling pre-emergence rhizome rot of ginger.

Cashew

Among the three types of planting materials tried in cashew epicotyl grafts and seedlings were found to be better with respect to establishment of growth.

1.8 CASHEW RESEARCH STATION, ANAKKAYAM

The Cashew Research Station at Anakkayam was started in 1963 under a scheme included in the Third Five Year Plan. Research station is situated in Anakkayam Village in Ernad Taluk in Malappuram District. Location of the station is on the western side of the Malappuram-Manjeri Road at a distance of about 9 km for Malappuram.

The station occupies an area of 9.92 hectares.

Soil in the Research Station is red laterite. The elevation of the station is 105.8 meters above M S L. The land is sloppy and of uneven terrain.

The prime objective of the station is to evolve materials, methods and means to increase the yield of cashew. This is achieved through breeding and selection to evolve promising types, by recommending proper manurial schedules and cultural practices and measures to control pest and diseases. The evolution of suitable vegetative propagation methods and distribution of quality planting materials also form part of the activities of the station. Smt P V Nalini, Jr Assistant Professor was in charge of the station.

Research achievements

Collection and maintenance of types

47 clonal and 43 seedling types collected and planted in the station are under observation. On analysing the yield data BLA-139-1, K-19-1,

K-10-2, K-25-2, NLR-2-1, K-28-1, K-26-1, BLA-39-4 and K-22-1 are found to be promising.

Breeding improved varieties of cashew by hybridisation

216 hybrids were evolved under 18 parental combinations. These progenies are being evaluated for the characters like vigour, earliness of bearing, flowering, sex ratio, yield potential and size of apple. The hybrids H-3-12, H 3-7, H-3-4 H-3-9, H-15-6, H-8-10 and H-7-1 are found high yielding during the period.

Comparative yield trial

Air layers of 16 promising types of this station are being tested for comparative yield trial. The yield data showed that the high yielding types like H-3-17, BLA-39-4, BLA-139-1 maintained their yield potential.

Study of promising clonal progenies

Clonal progenies of 31 types planted were maintained. H-3-6 gave the maximum yield of 18.75 kg followed by H-3-9 (11.22 kg) and K-10-2 (10.89 kg).

19 REGIONAL AGRICULTURAL RESEARCH STATION, PATTAMBI

With the establishment of the Kerala Agricultural University in 1972, the Pattambi station was brought under its control as one of the major station for research on rice and for post graduate work. Consequent on the implementation of National Agricultural Research Project in 1931, this station was made the Regional Agricultural Research Station for the Central Region with centres at Mannnthy, Chalakudy and a Sub-Centre at Eruthempathy. This station has been allotted the lead function for research on rice, pulses and oilseeds, tuber crops and vegetables and rice based farming systems.

A Seed Testing Laboratory is attached to the Station for the analysis of seed samples. A Dairy unit is also attached to the Station.

The thrust area identified for this station is rice and rice based farming systems.

Research achievements during the year

Red Triveni, the red kernelled selection from Trivani was found to be highly promising which records yields upto 7-8 tonnes/ha in the farm trials conducted in Malappuram District. Culture 871 was another promising selection which was derived from the cross Triveni/Co 25/ Vellanikkara Kulappala.

M 210, a dwarf mutant and Cul-8666, a medium tall red kernelled culture from the cross Ptb 28 x 23332-2 also were found promising.

Seedling root dip in 0.02 per cent Chlorpyriphos 20 EC for 12 hours before transplanting was found to be highly effective against gall midge.

Low, medium and high volumes of spray fluid with knapsack sprayer were found equally effective in controlling rice pest.

Seminars/Symposia Training programmes attended by staff

Professor N Rajappan Nair, Associate Director attended a group discussion on rice germplasm held at National Bureau of Plant Genetic Resources, New Delhi.

Dr K Karunakaran, Professor (Botany) attended annual AICRIP workshop at Patna from 24-28th April, 1987.

V P Sukumara Dev, Professor of Plant Pathology attended the XXII Annual Workshop at Patna during April 1987. He also attended the Rice Pathologist group meeting on 'Current status of blast and sheath blight diseases of rice in India' held at Hyderabad in January 1988.

Research activities

In rice, a total of 50 projects were taken up during the period.

The details of the concluded projects during the year are given below.

Uniform Variety Trials (AICRIP Trials)

Two UVT-2 trials with 18 entries were conducted one each in Kharif and rabi season. During Kharif the highest yield of 8821 kg/ha was recorded by the local check Red Triveni followed by entry number 10202 with a grain yield of 2616 kg/ha. In the rabi trial, the highest grain yield of 3395 kg/ha was recorded by entry number 10204.

Preliminary Variety Trials (AICRIP Trials)

Two PVT-2 trials with 49 entries were conducted one each in kharif and rabi season. During kharif season the highest yield of 3313 kg/ha was recorded by the entry number 11022 and 11038. During rabi season, entry number 11039 recorded the highest grain yield of 3961 kg/ha.

Breeding high yielding tall, photosensitive rice varieties with good straw yield specifically suited for the Mundakan season of Kerala (KAU Trials)

The 60 single plant selections were yield tested in three groups during rabi 1987-88. From the first group with cultures from crosses involving PTB-20, five red kernelled cultures were selected. In the second group from fourteen red riced cultures from crosses involving Co-25, five cultures were selected for further evaluation. In the third group, out of eleven cultures from crosses involving Co-25, three cultures were selected for further evaluation.

Breeding rice varieties for the ill drained and temporarily flooded areas in Kerala

This project was started with the objective of isolating rice varieties suited to the ill drained and temperorily flooded areas in Kerala. After

four years screening the selected materials were yield tested and two cultures BR 51-315-4 and BR-52-96-3 were selected. The plants are sturdy and the ratooning ability of the cultures are also high giving about 1/3 rd of the yield of the main crop.

Evolution of an awnless and high yielding type of the rice variety, "Parambuvattan" for the Virippu cultivation in Palliyal land (KAU Trial)

Out of the 17 cultures put under PYT during kharif season, nine awnless cultures which recorded grain yields above 3000 kg/ha were selected for further evaluation.

Breeding lodging resistant, fertilizer responsive medium height rice varieties suited for dry sown Virippu season in uplands of Kerala

Out of the 52 cultures put under PYT, six cultures were selected for further trials.

Breeding cold tolerant varieties of rice for the high altitude region of Kerala (KAU Trial)

The objective of this project was to breed cold tolerant rice varieties by crossing Jaya and IR 8 with the cold tolerant variety CH 1039. Screening for cold tolerance and yield trials were conducted at RARS Ambalavayal and two promising cultures 745 and 796 were given for farmers' field days and mean plant height of 75-80 cm gave an yield of 4.5 to 5.5 t/ha.

Breeding high yielding rice varieties resistant/tolerant to sheath blight

Three cultures with lower scores were selected from eight selected single plants from the cross Bhadra x 24331 raised during kharif. During Punja, these three cultures were put under trial and from the segregating population 36 single plants showing low score were selected.

Improvement of rice varieties BR-51 and IR-36 for consumer acceptability — IR-36 improvement

After PYT, 6 cultures which were on par and significantly superior to check were proposed for further yield testing.

BR-51 improvement

Out of the seventeen cultures tried, two cultures, which recorded grain yields significantly higher than BR-51 have been selected for further testing.

Breeding high yielding rice varieties with pigmentation at some plant parts

i) Short duration white kernelled cultures

Four cultures, with grain yields of 3000 kg/ha and above were selected for yield testing out of the 12 cultures put under PYT with Rohini and Triveni as checks.

ii) Short duration red kernelled cultures

Six cultures, were selected from the preliminary yield trials with twelve red kernelled cultures with Jyothy and Annapoorna as checks.

iii) Medium duration red kernelled cultures

Preliminary yield trial with seven cultures (Sabari and Bharathy as checks) revealed a highly segregating population and hence these are to be further purified and yield tested.

Completely purple red kernelled medium duration cultures:

Two cultures on par with check Pavizham and significantly superior to IR 1552 were selected for further evaluation.

Performance evaluation of new rice mutants

In the comparative yield trial of two mutants (M_2 and M_{210}), conducted during kharif season, N_2 recorded highest grain yield of 5162 kg/ha followed by N_{210} with a grain yield of 4653 kg/ha.

Performance evaluation of the rice culture, 'Red Triveni'

This trial aimed to evaluate the rice culture Red Triveni for its performance, in comparison with the original variety, Triveni. On testing with Triveni, Annapoorna and Rohini, Red Triveni gave significantly higher grain yield than the check varieties and was found promising in farmers' fields also. It different from Triveni in Kernel colour only, the plant stature, duration etc. being the same.

Performance evaluation of photo insensitive mutants of "Oorpandy" for their performance

Three selected cultures viz. 25331, 25333 and 25335 were put under comparative yield trials with Jyothy, 23332-2 and Swarnaprabha as checks. Cul-25335, with a grain yield of 5034 kg/ha was found significantly superior. The trial will be repeated for confirmatory results.

AICRIP Trials

Weed Control trial for dry sown rice under lowland conditions

Benthiocarb (Saturn), Butachlor (Machete and Delchlor) and Pendimethalin (Stomp) were tried @ 2 kg ai/ha and 1.5 kg ai/ha followed by one hand weeding. Results revealed that all the weedicide treatments gave yields on par with hand weeded treatments. Grasses and sedges were effectively controlled by Saturn (2 kg ai/ha) and Stomp (1.5 kg ai/ha). Broad leaved weeds could be controlled by Butachlor (2 kg ai/ha) and Stomp (1.5 kg ai/ha).

NARP Trials

Chemical manipulation of growth and yield in tall and dwarf rices

Efficacy of plant growth regulators, Mixtalol (1600 ml/ha), Mixtalol granules (20 kg/ha) Cycocoel (1000-1500 ppm) and Miraculan (250 ml/ha) were tested on Jaya and PTB-20 representing the Dwarf and Tall Indica rice varieties respectively. The results showed that none of the plant growth regulators could exert a significant influence on grain or straw yields of these two varieties. Cycocel treatments on PTB-20 showed a moderate decrease in plants height (5-7.7 cms).

Studies on the water flux phenomena of the different rice growing soils

Factors responsible for the water flux density variations in 7 rice growing soils of Kerala were studied. Among the 17 physico-chemical characteristics studied, fine sand had no influence on the flux characteristics of different soils while pH had the least significant influence followed by available N. Sandy soil followed by laterite transmitted water most rapidly. Maximum capillary intake and retention was shown by *Karappadam* soils while *Pokkali* soil showed minimum rates of evaporation.

Studies on the water requirements of rice

Lysimeter studies revealed that Jaya, with a better water use efficiency performed better than Triveni during both seasons. The total water requirement of Jaya and Triveni were 1128.7 mm and 930.25 mm respectively during kharif season. During Rabi season, their respective water requirements were 1625.8 mm and 1337.10 mm. Controlling water by means of submergence from planting to maturity brought about an increase in grain yield and water use efficiency to the extent of an average of 33.3% and 16.52% during kharif and rabi respectively over no water control.

AICRP Trials

Screening for leaf blast resistance

The reaction of 189 test entries of rice varieties to leaf blast were tested under National Screening Nursery. Ten entries were rated as moderately resistant under a high disease pressure while none were rated as highly resistant. Two KAU cultures 93 and 126 recorded a score of 4 and 6 respectively.

Evaluation of seed dressing fungicides on blast disease incidence

The aim of the experiment was to find out effective seed dressing fungicides against rice blast for protecting seedlings both under wet and dry sown conditions.

Beam 75 WP (4 g/kg seed) was the most effective fungicide followed by Fongorene 50 WP and Bavistin 50 WP (4 g/kg seed of each).

Screening for sheath blight resistance, NSN and MRSN entries

In this project to evaluate NSN and MRSN entries to sheath blight reaction under transplanted field conditions, none, out of the 196 NSN entries, 75 MRSN entries and ten local cultures, was found as highly resistant or resistant, while 15 NSN entries recorded a low score of 3 (moderately resistant).

New fungicide evaluation trial for blast disease control (granular formulation)

The objective of this trial was to test the efficacy of granular formulations and compare with their corresponding WC/WP formulation in controlling blast disease. But the fungicides could not be compared due to the low disease pressure for blast disease during the crop period resulting in a very low incidence of leaf blast and neck blast.

Chemical control of sheath blight disease of rice

In this experiment to test the efficacy of different fungicidal formulations for the control of sheath blight disease of rice, Validacin 3L (2 ml/L) continued to be the best fungicide in checking sheath blight disease, followed by Bavistin, Topsin M and Rizolex respectively.

AICRIP Trials

Spray volume evaluation trial

In this trial to evaluate the effect of different volume of spray fluid on the insecticidal efficiency using hand compression and knapsack sprayer, low, medium and high volumes of Ekalux 25 EC and Nuvacron 40 EC were tested. The results indicated that low ie., 100 litres at 30 days after transplanting (DAT), 150 litres at 30–60 DAT and 200 litres at 60 DAT and after, medium, ie., 150 litres at 30 DAT, 300 litres at 30-60 DAT and 400 litres at 60 DAT and after and high volumes ie., 250 litres at 30 DAT, 450 litres at 30-60 DAT and 650 litres at 60 DAT and after are equally effective in controlling major insect pests of rice. Among the insecticidal tried, Nuvacron was better than Ekalux.

Insecticide Evaluation Trial

This trial was conducted to study the effectiveness of promising insecticides at lower dosages and new insecticides at higher dosages against major insect pests. Padan 4 G @ 1.5 kg ai/ha effectively controlled leaf folder and stem borer and produced higher grain yields. Application of Furadan 3G in main field induced the population of rice leaf folder.

Neem oil evaluation trial

Dosages upto 4 per cent neem oil concentration were tested to study effectiveness of neem oil in controlling rice insect pests using high volume sprayer. None of the neem oil concentration reduced the pest damage in the field.

Light trap data collection

Observations were recorded every day to select the fluctuations of insect pest populations over a period of time using the chin-shura model light trap. The populations of gall midge, green leaf hopper and rice leaf folder are maximum during the month of August and stem borer, white jassid and rice bug during January.

Stem borer screening

Eighty five entries were evaluated for resistance to stem borer in this trial. Though early resistance was noticed in some entries, none were found resistant at later stages when the damage rate was as high as 38 per cent.

Rice hispa screening trial

Fifty entries were planted in the field to identify promising donors and cultures against rice hispa. Though no rice hispa damage was noticed, rice leptispa damage was severe. Scoring for rice leptispa showed that T-1477, Kakatiya and Veluthacheera were almost free from rice leptispa damage

Leaf folder screening trial

This trial was taken up to screen selected varieties against leaf folder to identify resistant donors and breeding lines. The damage was very high in almost all the entries. The variety Choorapandy was the least affected while entries belonging to RP series, TNAULER series, ARC series, T-2005, Gorsa and salam showed lesser damage.

KAU Trials

Chemical conrol of rice gall midge

Seedling root dip in 0.02 per cent Chlorpyriphos 20 EC was tested against nursery and mainfield protection, with other insecticides to formulate an effective chemical control of rice gall midge at low costs. Compared to other chemical methods tested seedling root dip was found as a more effective and low cost technology.

Cataloguing rice varieties/cultures of Kerala against major pests of rice

Reaction of Kerala rice varieties and cultures and other common varieties were screened for resistance to insect pests. Cul-25100 (Resmi) was found to be leaf folder resistant and gall midge tolerant variety. Cul-1-5-4 was found resistant to leaf folder. PTB-28 and PTB-32 scored resistance against stem borer.

Meteorological related data collection of insect pest damage

This trial was taken up to monitor the pest damage during different stages of crop growth. The gall midge damage was high by the sixth or seventh week of planting while stem borer damage was very high in the

first week of January. The leaf folder population slowly increases from August reaching the maximum by January and then decreases by the onset of dry weather

Recommendations to the package of practices

The variety Reshmi was designated as a leaf folder resistant and gall midge tolerant rice variety.

PULSES AND OIL SEEDS

PULSES

AICRIP Trials

Blackgram Co-ordinated Varietal Trial

The trial was started during 1983-84 to estimate the yield potentials of different blackgram varieties and to select varieties suitable to the locality. During Kharif 1987 the variety B-3-8-8 was the highest yielder (1794 kg/ha) followed by PDV-5 (1773 kg/ha). Out of the eleven varieties tested during Rabi 87-88, the variety UH 80-9 with a grain yield of 2024 kg/ha out yielded others followed by UH 80-4 (1621 kg/ha).

Cowpea Co-ordinated varietal trial

Among the twelve varieties tested during kharif 87, the variety GC 82-7 recorded the highest grain yield of 1780 kg/ha followed by V-240 (1590 kg/ha) and UPC-124 (1516 kg/ha).

Co-ordinated varietal trial on Mung

During kharif 87, the variety MH-309 recorded the maximum grain yield of 1881 kg/ha which was statistically superior to other varieties followed by MUG-125 (1700 kg/ha) and MC-131 (1600 kg/ha). Out of the twelve varieties tested during Rabi 87-88 the variety Pusa 103 recorded the highest grain yield of 1561 kg/ha followed by PDM 84-145 (1511 kg/ha).

KAU Trial

Breeding high yielding short duration cowpea varieties with better grain quality

The trial was started during 1983 to evolve varieties through crosses to improve the grain quality of Krishnamani (PTB-2) to make it more appealing to farmers by changing the dark black colour of the seed.

During kharif 87 culture 9 recorded the maximum grain yield of 1984 kg/ha and during Rabi 87-88, Culture 7 was the highest yielder (1224 kg/ha). After conducting the preliminary yield trial and comparative yield trial the seeds of culture 9 and culture 7 along with the check PTB-2 have been given to the Agricultural Department for conducting farm trial.

AICPIP Trials

Agronomic evaluation of promising genotypes of mung bean

Among the fourteen green gram varieties tested during kharif 86, the variety ML-131 recorded the highest yield of 716 kg/ha followed by MH 309 (700 kg/ha) followed by PPM 84-139 (634kg/ha). During kharif 87 the variety PDM 84-139 recorded the highest grain yield of 829 kg/ha followed by PDM-54 (776 kg/ha).

Response of cowpea genotypes to dates of planting

In this trial, started during kharif 86 to find out the optimum date of planting for cowpea genotypes during kharif five varieties at four different dates of planting were tested. July 15th planting recorded the highest grain yield of 1981 kg/ha and 733 kg/ha during kharif 86 and kharif 87 respectively. This was followed by June 30th planting which recorded a grain yield of 843 kg/ha during kharif 86.

Agronomic evaluation of promising genotypes of cowpea

Pooled analysis of the three years results of this trial showed that varieties tested differed significantly with RC-48 and RC-19 being the highest yielders giving 1175 kg/ha and 1177 kg/ha respectively.

OIL SEEDS

Evolution of a high yielding sesamum variety for the uplands of Kerala by pureline selection in the 'Pattambi Local' variety

Seven selected cultures were put in comparative yield trials during rabi and summer seasons of 1987-88. During rabi, Cul-1 with a grain yield of 1240 kg/ha was significantly superior to all other varities and the check PTB local. Cul-4 recorded the highest oil content (46.42%). During Punja, Cul-5 with a grain yield of 522 kg/ha was on par with all other cultures except Cul-4 which gave a mean yield of 389 kg/ha.

HORTICULTUARAL CROPS

Collection and evaluation of tapioca varieties suitable for rice fallows

The five tapioca varieties selected in the previous year were yield tested twice during kharif (5 months after planting and 6 months after planting), and once during summer (5 months after planting). H 12/77 and 11/76 gave the highest yield in kharif, both in 5 month crop as well as 6 month crop. In summer, Co-2 and Malayolla were the highest yielders.

Collection and evaluation of Sweet Potato varieties

Five sweet potato varieties viz. H-4021, OP-57, IR-8, 76-OP-219 and Kanjangad local selected earlier, were yield tested during kharif and summer. Their mean tuber yields ranged from 8.7 to 19.0 t and from 7.0 to 10.4 t per hectare during kharif and summer respectively. H-4021 and Kanjangad Local were significantly superior to other varieties during kharif while 76-0-219 performed best in summer.

Screening brinjal varieties for rainfed garden buds and summer rice fallows

Four selections were yield tested in 2 yield trials during kharif and summer. During kharif incidence of bacterial wilt resulted in poor yields while during summer the yield ranged between 7.8 to 13.27 t/ha. Cul-1 and Cul-2 were statistically superior to others in both the seasons.

Selection of a suitable variety of chillies for garden lands and summer rice fallows

On yield testing the four varieties selected during previous years, were high yielders giving yields ranging from 2.3 to 2.57 t/ha during kharif 87. During summer 88 these varieties were superior to others with a green pod yield ranging from 3.9 to 6.7 t/ha.

1.9.1. OPERATIONAL RESEARCH PROJECT, OZHALAPPATHY

The Operational Research Project was started in November 1984 at Ozhalapathy in the Vadakarapathy Panchayath located in the rain shadow region of the Palghat District of the Kerala State as a fully financed project of the ICAR for an initial period of 3 years. This project was super imposed on the sub watershed.

The main objectives of the project are:

To optimise the productivity of all the available resources in the watershed; Verification of available alternate farming system for efficient utilization of available natural resources; Identification and analysis of gaps and constrains in adoption of resource development programme on Watershed basis; and Creation of additional employment potential for small and marginal farmers and agricultural labourers.

Ozhalappathy comes under the low rainfall drought prawn areas of the state. The annual precipitation is very low and is often below 100 cm. Rainfall even received in less amounts is highly erratic and do not have a definite pattern. Most of the crops grown are rainfed and majority of the farmlands are single cropped. During kharif season groundnut, vegetables, pulses and rice are the main crops grown. Cotton, groundnut, millets, pulses and fodder sorghum are grown in the rabi season. The soil is mainly loamy and sandy loam with neutral to alkaline reaction.

Mr PH Latheef, Assistant Professor (Agron) continued to be incharge of the project.

Research achievements

Adaptive trials as well as demonstrations were conducted in the seven watersheds using promising varieties of cotton, groundnut, maize and transplanted ragi. Soil samples from all the seven watersheds were collected and analysed for the major nutrient content soil reaction and texture.

Adaptive trials on cotton

Among the four cotton varieties tried, DCH 32 found to give the highest yield and it out yielded the existing high yielding varieties MCU-5 and MCU-9.

Crop demonstration

Crop demonstration with HYV of ragi, groundnut and Maize were conducted in different watersheds. Co-12 transplanted ragi was appreciated more by the cultivators. Co-12 recorded an yield of 3325 kg/ha against 1955 kg ha yielded by local variety.

1.10 LIVESTOCK RESEARCH STATION, THIRUVAZHAMKUNNU

The Livestock Research Station is located at Thiruvazhamkunnu Village in Mannarghat Taluk of Palghat District. The Farm was started in the post-war development scheme of Animal Husbandry Department of Madras State in the year 1950, with its office at Perinthalmanna. By the formation of Kerala State the farm was transferred to the Department of Animal Husbandry, Kerala and then to the Kerala Agricultural University. It was converted to a Livestock Research Station with effect from 14-8-1978. All India Co-ordinated Research project on Agroforestry was started in this station on 8-12-1983.

Dr P C Saseendran, Assistant Professor is in-charge of the station.

Main objectives

The main objectives of this station was to improve the non-descript breed in Malabar by Scientific breeding and management.

The present objectives are to evolve an elite breed of cattle by Scientific breeding and management; to conduct adaptive research to reduce cost of fodder production; to hold problem oriented research projects in the field of animal production and management; to advice local farmers on Scientific management of Livestock and to provide artificial insemination service to local breeds of cattles of farmers.

Objectives of AICRP on Agro-forestry

Collection screening and selection of promising germplasm of indigenous and exotic spp. from analogue ecological regions.

Breeding and genetic improvement of trees, crops and fodder species to develop compitable associations in consonance with the cultural practices of local population.

Developing techniques of cultural practices, spacing, cropping and harvesting systems for different agroforestry systems acceptable to local populace.

Developing sequential system of inter cropping as that the inter and under space is utilized as long as possible by crops and latter till rotation by shade bearing fodder, shrubs and grasses with appropriate management practices.

Replacing shifting cultivation with stable cultivation.

Evaluating the economics of different agro-forestry systems and establishing its correlation with the aims and objectives of resource management viz. conservation development and utilization.

The area enjoys a warm humid tropical climate with average annual rain fall of 2518 mm. The mean maximum and minimum temperature is 31·37° and 23.90° C. respectively.

Research Report on AICRP on Agroforestry

The All India Co-ordinated Research Project on Agroforestry was started at Livestock Research Station, Thiruvazhamkunnu during the month of December, 1983.

Three ICAR Projects were taken up under this scheme:

Diagnostic survey and appraisal of existing farming systems and Agroforestry practices.

Collection and evaluation of promising spp./cultivars of fuel fodder and small timber trees.

Studies on Management Practices of Agro-forestry systems

The experiments are in progress and results will be available in due course.

1.11 AGRICULTURAL RESEARCH STATION, MANNUTHY

This station was originally established during 1957 as the Rice Research Station, Mannuthy in then Central Farm as a separate research unit to study the various problems confronting rice cultivation in the middle lateritic region of Trichur and Ernakulam districts under the administrative control of the Rice Specialist. During 1963, the head-quarters of the Rice Specialist was shifted to Pattambi and this station continued as one of the Regional Rice Research Station. With the formation of the Kerala Agricultural University, ths station was taken over from the Department of Agriculture. In the year 1976 this station was converted to the Research Station and Instructional Farm of the College of Horticulture.

The Research Station and Instructional Farm, Mannuthy was renamed as Agricultural Research Station, Mannuthy and the Vellanikkara unit was re-named as the Instructional Farm, Vellanikkara in the year 1983-84. From 1-2-1988 onwards Instructional Farm Vellanikkara is functioning as a separate unit under the control of Associate Dean, College of Horticulture. The Agricultural Research Station, Mannuthy forms a sub centre of the Central Region of the NARP and the NARP Special Zone

for problem areas covering the Kole lands of Trichur. Apart from the projects undertaken under NARP, experiments under All India Co-ordinated Rice Improvement Project are also being implemented at this station. Total area of the station — 38.34 ha.

Prof T F Kuriakose, Project Coordinator (Rice), continued to be the head of station till 31-8-1987. Dr K Pushpangadan, Professor from 1-9-1987 to 19-1-1988 and later Prof P A Varkey from 19-1-1988 as head of the station.

Research achievements

A fertilizer recommendation for Kole land paddy was formulated based on three year's trial in the farmers field both for short and medium duration paddy. The recommendation for short duration paddy is 90:35:45 NPK kg/ha and for medium duration paddy it is 110:45:55 kg/ha.

The following pulse varieties were recommended for the upper reaches of Trichur Kole lands based on the three year's experimental data from the trials in the cultivators field.

Cowpea	—	Krishnamany
Greengram	—	88
Blackgram	—	Co2
Groundnut	—	TG3, TG14

For snakegourd a fertilizer doze of 90:10:40 NPK kg/ha was found to be the best in terms of fruit yield

Research activities

The total number of ongoing projects of this station comes to 25 of which 20 experiments were conducted during the period. Among this seven were AICRIP, eight were NARP and five were KAU projects. Four projects were concluded during the period.

Rice

Fertilizer management for kole land paddy

Trials were conducted for short duration rice (CV Annapoorna) in Kanjani in the single crop kole lands and for medium duration variety (CV Jaya) in Kattukampal Kole, for three consecutive Punja seasons (1985, 1986 and 1987). From the three years data it is recommended to apply a fertilizer dose of NPK @ 90:35:45 kg/ha for short duration varieties and 110:45:55 kg/ha for medium duration varieties in Kole lands. This recommendation has been accepted in the Package of Practices Workshop 1988.

Pulses

Evaluation of pulses for their performance in kole lands

In order to explore the possibilities for the economic utilization of the upper reaches of kole lands were there is no scope for a paddy

crop, feasibility for raising crops other than paddy was taken up under the NARP (Special zone) research programme. As such replicated trials with four pulses viz. Cowpea, Green gram, Black gram and Groundnut were laid out in the upper reaches of Pullazhi, Adat and Vadookkara commencing from 1985. Based on the results obtained Cowpea, Green-gram, Blackgram and Groundnut are selected for adoption in this area.

This station had produced large quantities of vegetable for Onam vegetable market during the period by pooling the produce from different stations also.

A short term field training in nursery techniques was offered to nominees from Save a Family Plan (India) a Christian voluntary organisation as part of the training offered by Central Training Institute.

Important visitors

Sri V V Raghavan, Hon'ble Minister for Agriculture visited the farm and appreciated very much the Onam Vegetable cultivation and distribution programme during the period.

1.12 INSTRUCTIONAL FARM, VELLANIKKARA

Instructional Farm, Vellanikkara comprising an area of 95.35 ha. is located at the newly acquired estate of Kerala Agricultural University. Until 14-1-1988, it was functioning as a part of Agricultural Research Station, Mannuthy and since, that date it was ordered to function an independent unit under the direct administration contrd of Professor of Agronomy, subject to the overall control of the Associate Dean, College of Horticulture. As an adhoc arrangement staff members were redeployed from other station of Kerala Agricultural University.

The main objective of the farm is to serve as an instructional unit for the agricultural students and farmers. Adoption of improved agri-cultural practices, cultivation and maintenance of all possible crop species production and distribution of improved plant, propagation materials, conducting work experience courses for agricultural students are other objectives of the farm.

1.13 CASHEW RESEARCH STATION, MADAKKATHARA

The Cashew Research Station at Madakkathara in the Vellanikkara campus of the University was established on 1-5-1973 under the All India Co-ordinated Spices and Cashew Improvement Project of the Indian Council of Agricultural Research. The Station is located in the western boundary of the Vellanikkara Campus about eight kilometers from Trichur town. The total area of the Station is 18 hectares.

The major objectives of the projects are:

Maintenance of cashew germplasm and description of types to evolve new cashew types through hybridisation; to standardise the technique of

vegetative propagation in Cashew suited to local conditions; to work out manurial schedule for cashew by conducting fertiliser trials; to conduct comparative yield trials with types collected from different cashew growing areas in order to identify types suited to Kerala State; to evolve effective control measures against the major pests and diseases affecting cashew; to produce and distribute nucleus seed and planting materials of high yielding cashew varieties suited to Kerala conditions.

Sri P G Veeraraghavan, Professor of Agronomy continued to be in charge of the station during the period.

Research Achievements

Germplasm collection and maintenance of types

The evaluation of 93 accessions collected between 1976 to 1979 was completed. Out of these, only 8 accessions were found promising. The accession numbers M-1-2, A-6-1 and A-26-2 recorded the highest yield in the 7th year of orchard life with 17.00 kg, 16.90 kg and 17.50 kg per tree per year respectively. The nuts are medium sized (6.35 to 7.75 grams) and the shelling percentage range between 25.83 to 27.50 percent. The kernal grade is W 280. The above promising accessions will carried over to the clonal germplasm conservation bank.

Hybridisation

The hybrid 1598 recorded the highest mean yield of 12.831 kg per tree per year for 12 years (1976-77 to 1987-88) followed by H-1608 (10.66 kg) and H 1610 (10.619 kg). The hybrids 856, 1591, 1596 and 1602 have kernal grade of W 180 followed by 1597, 1608 and 1610 with W 210. The shelling percentage of the 14 hybrids ranged between 26.09 to 40.28 and nut size between 5.80 to 10.85 grams. The hybrid 1591 recorded the highest nut weight of 10.85 grams while the hybrid 719 recorded the lowest of 5.80 grams.

Insecticidal trial against Tea mosquito (Helopeltis antonii) in Cashew

Results of four years study revealed that the insecticides, quinalphos, endosulfan, dimethoate consistantly performed better than the other insecticides compared in controlling tea-mosquito, leaf miner and inflorescence thrips. Quinalphos followed by Dimethoate was better in terms of nut yield.

Stemborer control studies in cashew

Stem padding with monocrotophos (30 ml per tree) recorded up to 93 per cent mortality of the grubs when applied in the early stages of borer attack.

Details of seminar symposia workshop attended

Sri P G Veeraraghavan, Professor of Agronomy and Sri D Sitarama Rao, Assistant Professor (Entomology) attended the Eighth biennial workshop of All India Co-ordinated Cashew Improvement Project held at Bhubaneswar (Orissa) during 24th to 27th October 1987.

The following experiments were concluded during the year as per recommendations of the eighth biennial workshop hald during October, 1987.

1 Comparative yield trial (layers) of 16 Anakkayam

2 Selections and hybrids

This trial was laid out in 1975 to assess the performance of 16 high yielding selections of Cashew Research Station, Anakkayam under Madakkathara conditions.

Three types have been recommended for inclusion in the Package of Practices for 1987 as new varieties of Cashew for Kerala State.

The total expenditure of the station during the period was 2 876 lakhs.

Important visitors

The following were the important visitors to this station during the year under report.

1 Dr M R Thakur, Vice-Chancellor of Dr Yeshwant Singh, University of Horticulture and Forestry, Solan.

2 Sri V V K Raman, Chairman, Indian Cashew Development Council, Government of India.

1.14 BANANA RESEARCH STATION, KANNARA & PINEAPPLE RESEARCH STATION, VELLANIKKARA

Banana Research was started initially at the Agricultural Research Station, Mannuthy during 1958, which was subsequently shifted to the present site at Marakkal which is situated 3 km west of Kannara and 24km east of Trichur during 1963. During 1970 the research efforts were further strengthened by the launch of All India Co-ordinated Fruit Improvement Project. In 1974 the venue of Pineapple Research was shifted to Vellanikkara. The major objectives of the Centre are:

Collection maintenance and evaluation of banana and pineapple for further selection and improvement; to evolve better varieties of banana and pineapple by breeding; to develop better agro-techniques for banana and pineapple and to develop suitable plant protection measures for banana and pineapple.

The Station is located at an elevation of 55–60 M above MSL and falls under 10.5°N latitude and 76 17 E longitude. The total area of Banana Research Station is 13.7 ha. and Pineapple Research Centre is 6 5 ha.

The soil is mostly lateritic loam and black loam in low lying areas in Banana Research Station, whereas it is laterite in Pineapple Research Centre. The average annual rainfall is around 250 cm.

The thrust area identified for the stations is increasing yield of rainfed and irrigated banana and also to improve banana based farming system.

Research Achievements

While ratooning banana variety Palayankodan retention of 2 suckers with manuring both the suckers individually @ 200:200:400 g NPK per clump during the first ratoon and at half the above dose in the second ratoon was found to be optimum for higher economic yield.

Paired row planting of banana var. Nendran doubled the yield from intercrops without affecting the yield of banana, the main crop, thereby increasing the income from unit area considerably.

Based on the studies on 'kokkan' disease it could be recommended that the suckers should not be taken for planting from the affected mother plants which showed the necrotic streaks or abnormal colour of the bunch (pale green to ashy green). When the young banana plants are expressing the symptom of pinkish streaks, they should be uprooted and destroyed.

Research activities

During the period under report, a total of 33 experiments were undertaken both in banana and pineapple.

In banana the projects concluded during the year are:

Effect of number of suckers retained on the performance of ratoon crop of banana

The trial was conducted in banana var Palayankodan. One plant crop followed by two ratoons were studied. The number of suckers retained per clump varied from 1 to 3 and the 2 different spacings were adopted—2.31 x 2.13m and 2.13 m x 4.26m. Three different levels of fertilizers were also tried as per package of practices recommendations, half the recommended dose and double the recommended dose. The results of the three years trial indicated that while ratooning Palayankodan variety of banana retention of two suckers with manuring both the suckers individually @ 200:200:400 g NPK per clump during the first ratoon and at half the dose in the second ratoon was the optimum for maximum economic yield

Action taken for improving farm revenue

As a measure to increase farm income, the entire area of the farm is being put under cultivation of one crop or other. Vegetable seed production programme has been started and rooted pepper cuttings were prepared for sale by utilising the vines available in the farm. Considering the high demand for suckers, rapid sucker multiplication of elite varieties of banana has been started. Arecanut was planted along the border, coconuts wherever possible and pepper in the interspace of coconuts as well

as trailed on coconuts and other trees available in the farm. Three plants having timber value and those which can be used as props for banana were planted along the border and in packets which are not suited for growing crop plants.

Other matters

Village Adoption and Lab-to-Land programme were implemented by the staff members of the farm. Under the Village Adoption Programme 25 families in the Poovanchira Malayan Colony were selected and seeds, planting materials and agricultural implements were given to each family. Intercropping groundnut in banana garden was demonstrated in an area of one hectare in farmer's field as a part of Lab-to-Land Programme.

Important visitors

The Hon. Minister for Agriculture, Sri. V. V. Raghavan visited the Pineapple Research Centre on 20-6-1987.

1.15 AGRONOMIC RESEARCH STATION, CHALAKUDY

The Agronomic Research Station, Chalakudy was originally established by the Kerala State Department of Agriculture in 1962 at Pariyaram near Chalakudy in 2 ha of leased land to carry out studies on water requirement and cropping patterns for the irrigated areas. The scheme was wound up in 1970. Later on, the research station was re-established at the present site in 1972 in an area of 8.95 ha acquired by the Department of Agriculture. The station along with the staff was taken over by the Kerala Agricultural University in 1973 for implementing the Co-ordinated Project for Research on Water Management sponsored by ICAR, and the scheme started functioning from July 1974 onwards. The NARP sub project for water management studies in the central region of Kerala has started functioning at this centre from 1983-84 onwards. In addition to ICAR sponsored projects, agronomic studies which have relevance to irrigated agriculture has also been implemented at this station as University projects.

The research station is situated in the northern side of the Chalakudy-Sholayar road about 400 metres away from the Chalakudy town. The station is located at 10° 20' North altitude and 76° 20' East longitude at an altitude of 3.25 m above MSL.

The total area of the farm is 8.95 ha comprising of 7.05 ha of wet land and 1.90 ha of upland. The area runs to a fine gradient to south west and the wet lands are terraced.

Thrust areas of research

The station has the mandate on water management in crops. Various aspects of water managements are studied.

Dr G R Pillai, Professor continued to be the head of station till 31-7-1987 and from 1-8-1987.

Smt G Santhakumari, Associate Professor is in charge of the station

Research achievements

Studies on farm irrigation water management in the command of an irrigation minor.

The results of the onfarm trial conducted revealed that rice yields in fragmented farm holdings of Kerala could be remarkably improved by adopting scientific water management and other cultural operations which can be effectively and economically carried out through farmers group organisation. A comparison of the yield data from study and control area shows that in Kharif, Rabi and Summer seasons of the year the increase in yield over control was 75%, 123% and 165% respectively.

Studies on rice based cropping pattern under constraints or irrigation water

The study indicated that there was no residual effect of cropping sequences on the growth and yield of the succeeding crops. The influence of water management in the grain yield during second crop was not significant which enables postponing irrigation upto 3 days after the disappearance of ponded water.

Effect of varying water regimes on yield of rice under varying levels of soil fertility

The experiment was to study the optimum water regimes for wet sown rice in relation to nitrogen levels and it was observed that during the rabi season, irrigation can be prolonged upto one day after the disappearance of ponded water without any reduction in yield. Maximum yield was obtained when nitrogen was applied at the rate of 50 kg/ha in short duration variety Thriveni.

Studies on the effect of irrigation schedules on the growth and yield of coconut

In sandy clay loam soils irrigating the crop with 500 litres of water through basins taken at 1.8 m radius at CPE values of 50 mm (approximate interval of 12 days) was most economical.

Response of colocasia to varying levels of irrigation under different nitrogen levels

The results revealed that the effects due to levels of nitrogen was significant and maximum yield was recorded by nitrogen applied @ 40 kg/ha. The effect of irrigation was not significant during the year, which may be due to the availability of frequent rains.

Water management practices for bittergourd under graded doses of nitrogen

Irrigating bittergourd at 15 mm CPE (at an approximate interval of 4 days) was found to be more economical than the farmers' practice of

irrigating once in two days considering the yield, total water use and number of irrigations. The economic dose of Nitrogen was found to be 60 kg N/ha

Details of Seminars Symposia training programmes attended at staff

Dr G R Pillai attended the 9th Zonal Workshop of NARP AT Pattambi.

Prof P Chandrasekharan attended the Chief Scientists workshop at Navasari in June 1988.

Sri C S Gopi Assistant Professor (Soil science) attended the extension mangement in command areas for Irrigation projects during June 1988 at National Centre for management of Agricultural Extension, Rajendranagar.

Training camps, seminars and Karshaka melas were organised during the year under report at Thuravoor. Farmers were taken to the different research stations to study the activities of the research station.

Research activities

Twelve experiments were conducted in the station during the year.

Projects concluded during the year

Coconut

'Studies on the effect of irrigation schedules on the growth and yield of coconut'.

The experiment was started in a farmer's field at Kodassery with a view to formulate a suitable irrigation schedule for coconut during summer season and to work out the economics of irrigation in coconut. The treatment comprised of five levels of irrigation with four palms per treatment.

From the four years' data it can be concluded that irrigating coconut with 50 mm of water at an interval of 12 days (50mm CPE) is optimum

Rice

Effect on varying water regimes on the yield of rice under varying levels of soil fertility

The results revealed that during second crop season, irrigation can be prolonged upto one day after the disappearance of ponded water without any reduction in grain and straw yields. Maximum grain yield was obtained when nitrogen was applied at the rate of 50 kg per ha.

Cropping pattern and farming systems

Input requirement of rice based cropping pattern

A study with four rice based cropping pattern and seven fertilizer levels was carried out for the 10th year, to identify the most economic

rice based cropping pattern for the locality and to estimate the input reduction in terms of chemical fertilizers that could be achieved by following different cropping patterns.

The residual effects of the third crop of cowpea raised in the summer rice fallows significantly influenced the grain yield of rice during the first crop season but not during the second crop season. Considering the additional income obtained from the third crop of cowpea by way of its grain yield and the favourable influence of the crop on the grain yield of the succeeding rice crop which may enable the farmers to reduce the fertilizer dose by 25 per cent. It is inferred that among the crops tried, cowpea is ideal after two crops of rice than daincha or sesamum or keeping the field fallow.

This indicates the possibility of reducing the existing recommendation of fertiliser dose (90:45:45 NPK kg/ha) for rice to its 75 per cent when appropriate cropping patterns are followed.

Coconut and Arecanut

Comparative study on drip and basin irrigation in coconut

The experiment was started in 1985 to evaluate the comparative merits of drip and basin methods of irrigation on water use and yield response in coconut var. West Coast Tall. The experiment has to be continued upto the age of stabilization of yield.

Vegetables and tuber crops

Water management practices for bittergourd (*Momordica Charantia* L.) under graded doses of nitrogen

The objective of the experiment is to study the response of bittergourd to graded doses of nitrogen under different moisture regimes and to work out the economics of irrigation and fertiliser application

The results of the study revealed that the effects due to nitrogen and irrigation were significant on the yield of bittergourd.

Among the irrigation levels, the farmers' practice of irrigation of once in two days and irrigating the crop at 15 mm CPE (at an approximate interval of 4 days) were superior to other treatments.

Among the nitrogen levels, 90 kg/ha recorded the highest yield and was on par with 60 kg N/ha.

Response of colocasia (Colocasia esculenta) to varying levels of irrigation at different levels of nitrogen

The experiment has been conducted with a view to study the response of colocasia to various irrigation levels and nitrogen. The effects of irrigation was not significant during the year under report, which may be due to the availability of frequent rains.

Soils and Agronomy

Evaluation of long term effect of canal irrigation on changes in physical and chemical properties of soil

The study has been initiated during 85-86 in collaboration with the staff of the Soil Survey Department of Kerala in the command area of Periyar Valley Irrigation Project to evaluate the long term effect of canal irrigation on changes in the physical and chemical properties of soil. The major garden soil series viz. Thodupuzha (Tpa) and the wet land soil series viz. Kothamangalam (Klm) were selected for this study. Periodic soil sampling to monitor the changes in profile characteristics is to be done from various locations upto 120 cm depth or upto water table or upto the depth impermeable layer, if any, at an interval of 30 cm.

During the year under report samples were collected at a depth of 60 cm at an interval of 15 and 30 cm. The particle size distribution of the samples collected during the year 1985-86 was determined. The hydraulic conductivity, bulk density and chemical properties like pH, EC and organic carbon of the samples collected during 1986-87 were estimated. This project will be continued for 10 years and hence on conclusion can be drawn.

Studies on soil moisture retention and release characteristics of laterite soils of varying percentages of gravel

The study was undertaken to asses the water storage capacity of laterite soil containing high among of gravel (25-60%) which is useful for scheduling irrigation in laterite soil which is the major soil group of the state. The work also aims at the development of regression equations to predict moisture retention at different tension values from the knowledge of the graval content in laterite soils.

During the year under report, the percentage of moisture retained in 2 mm sieved soil unsieved soil upto a depth of 60 cm of 6 profiles at tensions of 0 3, 1, 3, 5, 10 and 15 bars was determined. In all the cases, the moisture retention was low in unsieved soil samples.

Farm economics and extension

Studies on onfarm irrigated water management in the command of an irrigation minor

A compact area of 25.3 ha of paddy fields was selected for conducting the onfarm irrigation water management in the command of the Chalakudy irrigation project at Thuravoor Village near Angamaly in Ernakulam District. This project was commenced from the year 1984-85 and is being continued.

It was observed from the results that in all the seasons, maximum yield of grain and straw was obtained from the study areas as compared to control area. The grain yield of 2800, 2500 and 3450 was obtained

for Kharif, Rabi and Summer season and in each season the increase over control was 77%, 123% and 165% respectively. Hence it can be proved that the yield in fragmented holdings could be increased by adopting scientific cultivation and water management practices as group management.

Probability analysis of rainfall data of Eruthiampathy (low rainfall area)

Rainfall data for 18 years were analysed statistically and the following conclusions were drawn

Among the two rainy seasons, the South west monsoon contributes the maximum quantity of 788 mm while the Nort East monsoon contributes only 244 m Only 12 per cent of the total rainfall was received during summer and 1 per cent during winter. With regard to the rainfall distribution, the months January and February received practically no rain and the months June and July are more dependable for cultivation.

Recommendations given from the station

The findings of the water management studies in the station were included in the package of practice recommendation of the Kerala Agricultural University for the year 1987.

Pineapple

Pineapple during summer months has to be irrigated at 0.6 IW CPE ratio (50 mm depth of water). It requires 5 to 6 irrigations during dry months at an interval of 22 days. Mulching the crop with dry leaves @ 6 t/ha will considerably improve the fruit yield

Irrigation scheduling and water use by crops

Cropping system

Studies on the rice based cropping pattern indicated that there was no residual effect of cropping sequences on the growth and yield of succeeding crops. During rabi season rice requires irrigation at 3 days after the disappearance of ponded water and in the summer season one day after disappearance of ponded water. Other crops in the sequence viz. bhindi, cowpea and groundnut requires frequent irrigation.

Coconut

Results of the study on scheduling irrigation to a standing crop of coconut in a sandy clay loam soil indicated that the crop responded well to irrigation during dry months (January to May) from the 3rd year onwards. Irrigating the crop with 500 liters of water through basin taken at 1.8 m radius at CPE value of 50 mm (approximate interval of 12 days) was most economical.

1.16 RICE RESEARCH STATION, VYTTILA

Rice Research Station, Vyttila was started in the year 1958 in leased land in Kunnara area in Ernakulam District and the station started

functioning in the present site in 1963 by acquiring 11.375 acres of land. Subsequently in 1973, additional area of 10.150 acres and during 1981 an area of 0.770 acres were also acquired thus making the total area to 22.30 acres or 8.91 hectares. The utilization of the land is as follows.

Area used for rice cultivation is 4.2500 ha and area used for fish ponds is 3.0552 ha and dry land area used for cultivation of coconut and buildings, roads etc. is 1.6082 ha.

Thrust area

The main objectives of the station is to evolve high yielding saline resistant rice varieties suited for the low lying coastal areas (Pokkali areas) and to find out suitable agronomic practices for the cultivation in such types of lands in the state and to evolve culture practices for various types of fishes and prawns and to identify fish varieties suitable to culture in the paddy fields with and without rice and in the ponds and other water areas.

Pokkali soils are acid saline soils frequented by the sea water inundation due to tidal currents. The lands are submerged during monsoon periods. It is poor in phosphorus medium in nitrogen and high in potash.

One unit of the schema for investigation of coconut root wilt disease is being functioning in this station from 1981. This station is included under National Agricultural Research Project for special region. On the termination of All India Co-ordinated Research Project on Brackishwater Fish Farming functioning in this station, a fish unit is established to carry out the projects under Fisheries Faculty. A project under Asian farming system net work is being implemented in this station from the year 1985-86.

Sri TU George, Professor (Ag. Bot) continued to be in-charge of the station.

Prof T U George, Professor of Botany attended the 18th Annual Workshop of All India Co-ordinated Research Project conducted at CSA University of Agricultural Technology, Kanpur on 19th to 21st March 1988.

Research Achievements

A total number of 12 experiments were taken up during the year under report.

Breeding for earliness in varieties H_4 and SR 26 B by induced mutation

A comparative yield trial of five mutant cultures namely Cul. 709, 708, 704, 703, 701 was conducted with Vyttila-1, Vyttila-3 and Cul. 53

as control All the five mutants have desirable duration and plant height suitable for pokkali area and Cul 701 gave higher grain yield than the control.

Breeding high yielding rice varieties suitable for pokkali area by hybridization

Six cultures (Vyttila-2 x IR-5) from the replicated yield trial and six cultures (Vyttila-1 x IR-5 and Ponkuruka x IR-5) from the unreplicated trial were selected for conducting further trials.

Breeding for earliness in the variety mashuri by induced mutation

All the six mutant cultures (88-12-59, 88-2-49, 87-5-42, 88-3-50, 88-2-55, 88-10-56) have desirable duration. Though the crop was very badly affected by salinity the cultures gave fairly good yield comparable to the yield of control varieties (Vyttila-1 and Vyttila-3).

Hybridization programme—Improvement of Pokkali Rice

All the three cultures namely 904, 905 and 906 gave higher yield than the control varieties (Vyttila 1 and Vyttila-3). Moreover the cultures have very good desirable plant characters such as duration, plant height and grain size.

Collection, maintenance and utilization of saline resistant rice varieties

Forty three saline resistant rice varieties and types were collected and maintained under this project.

Permanent manurial trial of rice in acid saline soils under flooded condition (Pokkali Tract)

The results revealed that grain yield indicated no significant difference between treatments. However, highest yield was recorded in control but followed by T4 (N:P-20:40).

Evaluation of fertiliser response and production potential of promising saline tolerant cultures of rice

The analysis of grain yield showed that there was no significant difference between the level of fertilisers and interaction. But varieties are found to be significant. Variety Vyttila 3 is superior to all the varieties except culture 53, Vyttila 2, CSR-4 and C-23-2-1.

Effect of granular pesticides for control of rice pests on fish in pokkali fields

There was no yield difference in paddy due to the different treatments (Basudin 10 G, Carbofuran 3 G and control).

Tidal effect on the properties of pokkali soils

The results revealed that the pH of water samples ranged from 3.69 to 8.20 the lowest value recorded during the month of May and highest

value during September. The salinity of water samples also started decreasing from June and maintained normal values throughout the cropping period. pH values of soil samples ranged from 3.10 to 4.99. Available nitrogen percentage ranged from 0.0078 to 0.0147 highest values recorded during June-July months. Available phosphorus percentage ranged from 0.0036 to 0.0095, the highest value recorded on 27-6-87 (NM). Exchangeable potassium percentage ranged from 0.0105 to 0.061.

Cropping System Research Project—Integrated production trial

Selective stocking of tiger prawns *Penaeus monodon* in treatments T2 and T3 was economically superior to traditional prawn filteration (T1).

Studies on the growth performance and disease tolerance of coconut cultivars and hybrids under disease stress conditions of Vyttila

The highest No. of nuts was produced by Andaman Giant (56.3) followed by D x T (55.3). Highest intensity Root (wilt) was observed in LO followed by T x D (NCD) and Ao. Cochin China was completely free from the disease followed by D x T. Highest No. of leaves were affected by leaf rot in AO, T x D (NCD), LO and AG. D x T, T x YD and Cochin China were completely free from leaf rot.

Response of diseased and apparently healthy palm to fertiliser levels and organic manuring (in reclaimed soil type)

In apparently healthy palms, all treatments except in L7 an increase was noted in total No. of leaves. The highest increase in L5 with regard to yield of nuts in all the treatments except L3 a decrease was noted. In diseased palms there was a decrease in disease intensity in al the treatments. Maximum decrease in disease intensity was noted in L5. There was a decrease in the yield of nuts in all treatment. Maximum decrease was noted in L7 followed by L2.

Concluded project

Effect of granular pesticides for control of rice pests on fish in Pokkali fields

The objective of the experiment was to evolve simple technology and safe chemical for control of major pests in Pokkali rice namely stem borer, leaf roller and rice bug without harm for fish and prawn. There are 3 treatments namely Basudin 10 G,-10 kg ha; Carbofuran 3 G-18 kg/ha; Control-No insecticide.

There was no significant difference in yield between different treatments. This indicate that granular pesticides applied on mounds with growing paddy seedlings on it has no residual effect on controlling the pests like stem borer and leaf roller. Highest mortality in fish and prawn was noticed in Basudin treated plots followed by carbofuran. The least was in control plots.

Important visitors

The interdisciplinary team consisting of Dr MP Singh, Director of Extension, Pantnagar and Dr SK Dalal, Extension Officer, Government of India visited the station on 24-7-1987.

Dr B Mishra, Head, Division of Genetics and Plant Breeding, CSSRI, Karnal visited the station on 28-9-87.

1.17 AROMATIC & MEDICINAL PLANTS RESEARCH STATION, ODAKKALI

With the establishment of Kerala Agricultural University in February 1972 the Lamongrass Research Station was transferred from the Department of Agriculture, Government of Kerala to the University and renamed as Aromatic & Medicinal Plants Research Station, Odakkali in 1982. The total area of the station is 12.4 ha.

The objective of the station is to conduct investigation on crop improvement, crop management processing and biochemical studies of various tropical aromatic and medicinal plants.

This station is engaged in research and extension activities of many aromatic crops. The research is oriented in line with recent industrial trends.

The major thrust areas of research are modernisation of distillation unit, crop improvement aimed at high yielding varieties having better oil quality and standardisation of agro-techniques like water, weed and nutrient specifically secondary and micronutrients, management on various aromatic crops.

Dr J Thomas, Assistant Professor continued to be in charge of the station during the year under report.

Assistant Professor and Head attended 7th All India Co-ordinated workshop on Medicinal and aromatic plants held at Udaipur, Rajastan during the period under report. He also attended the meeting of variety Release Committee, held by Kerala Agricultural University. Assistant Professor and Head attended seminar on drought management of important crops held at State Co-operative Bank, Kuruppampady.

Research activities

The Station has four main Kerala Agricultural University projects and four main ICAR projects. Altogether there are 17 on going experiments at this station.

Details of concluded projects

Studies on seed germination and viability on lemongrass

Lemongrass

From these studies it was concluded that lemongrass fluff collected during last week of January expressed an initial partial dormancy upto

the month of March and from April onwards there is a sudden increase in germination percentage. The maximum germination percentage was expressed during the month of July and from September onwards there is a substantial reduction in germination percentage which indicates loosing viability of seeds. So the best time for sowing of lemongrass fluff collected during January-February is May-June and the seeds should be sown latest by August.

The seed rate for transplanted crop of lemongrass is 3-4 kg ha.

Long term storage studies in lemongrass

A trial on effect of long term storage on the quality of lemongrass oil was conducted for a period of five years. The results showed that oil quality is not affected upto three years when stored in aluminium containers, filled to the brim, thus excluding air and then sealed air tight using wax and kept it in darkness.

Effect of antioxidants on the keeping quality of lemongrass oil

Among the various anti oxidants tried, sodium chloride 2%, and betal leaves extract 3% were found to be effecting in increasing the storage life of lemongrass oil.

Studies on seed germination and viability in palmarosa

Palmarosa fluff collected during December/January pressed an initial partial dormancy during January and from February onwards there is a sudden increase in germination percentage. The maximum germination percentage was expressed during the month of May and from July onwards there is a substantial reduction in germination percentage. So the best time for sowing of palmarosa fluff collected during December/January is May and the fluff should be sown latest by June.

For transplanted crop of palmarosa the recommended seed rate is 4-5 kg/ha.

The results of the above concluded project except for the trial on antioxidants are accepted to be included as recommendation in the package of practices for 1988.

Visitors

Sri. V V Raghavan, Hon'ble Minister of Agriculture, Government of Korala and Dr. Rajendra Gupta, Project Co-ordinator (M&AP) NBPGR, New Delhi were the visitors to the station during 1987-88.

1.18 CARDAMOM RESEARCH STATION, PAMPADUMPARA

This station was started in the year of 1956 with a view to under taken research programmes on various agronomical, entomological and phytopathological problems of cardamom cultivation. The station is situated in the highrange of Idukki District at Pampadumpara in the Udumbanchola Taluk at an elevation of 1100 m above sea level. It is 35 km away from Jumily in the Kumily-Munnar Road. The total area of the station is 46.44 ha

All India Co-ordinated Spices and Cashew Improvement Project of ICAR was started functioning at the Station during 1972 and NARP on 1983–84. Till 1972, the station was under the control of Department of Agriculture, Kerala and thereafter under Kerala Agricultural University.

Dr C K Peethambaran, Associate Professor (PP) was the Head of the station during the period under report. The main thrust is on cardamom Research.

Brief Report on the Research Achievements of the year

Screening technique against Azhukal disease of Cardamom was standardised. For this purpose partially matured capsules were initially inoculated with *Phytophthora meadii* in the laboratory.

Three days after inoculation, seeds were collected and they were used for artificial inoculation in the field. This technique was found to be useful in inoculating all plants parts in the field during all seasons.

The performance of Decamethrin (Decis 2.8% EC) and Ethion 50 EC (MIT 505) in comparison with Quinalphos (Ekalux 25 EC) for the control of cardamom pests was tested. No conclusive results was obtained in the trial.

Germplasm collection in cardamom consisting of 54 cultivated and 18 wild relatives of cardamom were maintained in the station.

In the multilocational trial PV–1 continued to be the best yielder.

Screening in cardamom was taken up to identify high yielding type One Malabar type, S-1 was found to be high yielding type. One Malabar type, S-1 was found to be high yielder than PV-1.

NPK Trial on cardamom

Three levels of each NPK are being tried. Shade is given artificially using coir mattings. In the different harvests different effects are noted. The data have to be statistically analysed to have a clear picture of the effect.

Effect of soil stirring and leaf mulching in cardamom

This trial was laid out to find out the effect of soil stirring and leaf mulching in cardamom. But the yield obtained so far was far below average yield, and it is decided to discontinue this trial.

Details of Seminars, Symposia, Training etc.

The scientists attended the following seminars, symposia training programme etc.

Monthly T&V workshop
Workshop on Package of Practices, Vellanikkara
Research Co-ordination committee meeting
Symposium on 'Drought of perennial crops' organised by Union Bank, Trivandrum

Pepper seminars at Nedumkandom organised by Spices Board
Pepper Seminar at Peruvanthanam organised by Spices Board.
Monthly diagnostic team visits under T&V programme
NARP Zonal workshop

Achievements

Artificial shade was found to suitable for cardamom cultivation and recorded higher yield.

PV-1 (selection from Malabar) was found superior to all other types of cardamom.

Capsules infected with *Phytophthora* was found suitable for screening PV-1 cardamom seedling.

Important visitors

Hon'ble Minister for Agriculture Sri V V Raghavan visited the station in May 1987. He went round the farm and appreciated the activities of the station.

1.19 REGIONAL AGRICULTURAL RESEARCH STATION, KUMARAKOM

The Regional Agricultural Research Station, Kumarakom was established in the year 1947 by the Department of Agriculture with the financial assistance of the Indian Central Coconut Committee. In 1958, the station was taken over by the State Department of Agriculture and from 1972 onwards the station is functioning under the Kerala Agricultural University.

A new programme 'Integrated Research Project on mixed farming of coconut, livestock and fish' was initiated in 1978. During 1980-81, a scheme for the investigation on the coconut root (wilt) disease was started at this station. The station was upgraded as a Regional Research Station for the problem areas of Kerala in 1982. The sub-stations under this station are: Rice Research Station, Moncompu, Rice Research Station, Kayamkulam, Rice Research Station, Vyttila and the Kole region research unit of Agricultural Research Station, Mannuthy.

After the aquisition of an additional area of 21.49 ha of wet lands from the Department of Agriculture in 1980, the total area of the station now is 44.72 ha. Out of this, about 18 ha are channels and low lands. Coconut, banana and cocoa are the main crops grown on the uplands and the low lands are under paddy or fish production. The water channels are also used for fish farming.

The main objective of the station was originally to conduct research on coconut and coconut based farming systems with special reference to coconut root (wilt) disease. With the implementation of NARP, the broad objective of the station is to conduct problem oriented location specific research on all crops in the problem regions of Kerala.

Sri U Mohammed Kunju, Professor of Agronomy continued to be incharge of the station up to 24-6-87 and thereafter Dr R R Nair, Assoc. Director continued as head of the station.

Research achievements

A number of experiments on coconut root (wilt) disease is in progress. The observations made during the year show that copra recovery, moisture, total protein and amino acid, fibre ash, oil and mineral contents of coconut endosperm are not significantly affected by root (wilt) disease. But it is found that reducing sugars and phosphorus content are high and amino acid content low in the nut water of mature nuts of palms having high root (wilt) disease index.

Studies on coconut pests indicate that bromadiolone baits are effective in checking rodent menace in coconut gardens.

Weed control studies show that in rice fields application of 500 g ha of 2,4-D sodium salt 20-25 days after sowing is effective for the control of sedges and broad leaved weeds.

Preliminary studies indicate that fish-cum-duck farming is a viable system under Kuttanadan conditions.

Details of seminars symposia/training programmes attended by staff

Dr K Vasanthakumar, Asst Professor (Hort) and Sri K A Inasi, Jr. Asst. Professor attended the training programme on the use of radiation and radio isotopes and the Radio Tracer Laboratory, Vellanikkara from 8th to 10th March, 1988.

Prof K Chandrasekharan Nair, Dr Sosamma Cheriyan, Sri K A Inasi Sri K Sreekumar and Dr PJ Joy attended the 'Seminar on Molecula Biology and Bio technology' at the Sophia Centre, Kottayam during January 18 to 20th, 1988.

The resource personnel from this station attended the monthly T & V workshops of Kottayam and Idukki districts.

Dr K G Padmakumar, Asst Professor attended the Seminar on 'Fisheries Research and Development in Kerala' organised by the Department of Aquatic Biology and Fisheries, University of Kerala during 28th and 29th April 1987.

Dr P J Joy attended the National Symposium on Integrated Pest Control at Trivandrum during October 15th to 17th, 1987.

Guest Lecture

Dr P M Room, Scientist, CSIRO, Australia gave a talk on 'Biological control of Aquatic Weeds'' on 4th May, 1988 at the seminar hall, RARS, Kumarakom.

Projects conducted during the year

Eight projects have been concluded during the year

Research Highlights

Coconut

Effect of growing and incorporation of different green manure crops and its influence on diseased and apparently healthy coconut palms

A general reduction in the disease intensity was noticed. The reduction was more evident in palms with a pre-treatment disease intensity of above 20. Higher yields recorded from both the diseased and apparently healthy palms when sesbania was incorporated in the basins.

Quality analysis of coconut endosperm obtained from palms of varying intensities of root (wilt) disease.

The results show that copra recovery, moisture, protein, amino acid, fibreash, oil and mineral contents of coconut endosperm are not significantly affected by the root (wilt) disease.

Reducing sugar, amino acid and phosphorus contents of coconut water in mature nuts vary with the root (wilt) disease intensity. Reducing sugar and phosphorus content are high and amino acid content low in palms having high root (wiit) disease index. Ash and mineral contents are not affected.

The protein fractions differed between healthy and diseased palms.

Light fluorescent microscopy of root (wilt) infected coconut palms and suspected collateral hosts

The results of special staining of thin sections of plants showing suspected MLO disease symptoms are negative in respect of all the samples tested. So it is unlikely that these plants are collateral hosts of root (wilt) pathogen.

Studies on the arthropod fauna in the rhizosphere of coconut palms

The soil population of both micro and macro arthropods are not high enough to inflict any serious injury to coconut palms. Moreover, the difference in population of these arthropods between apparently healthy and diseased palms are insignificant.

Control of rodents infesting coconut palms

Trials using bromadiolone cake, a single dose anticoagulant, indicate that it is an effective rodent bait against coconut rats.

Evaluation of different attractants for the control of red palm weevil Rhynchophorus ferrugineus

Coconut stem splits with cocoa pulp have been found to be the ideal attractant against Red palm weevil.

Survey on the incidence of disease of oil palm in Kerala

A new leaf rot disease incidence was noticed in about 2.5 percent oil palms in Chithara estate, Quilon district. The causal organism was identified as *Colletotrichum gloeosporiodes* Penz.

Rice

All India Co-ordinated Rice Improvement Project—Multilocational trial of Moncompu rice cultures

Culture 310 gave maximum grain yield of 2787.5 kg/ha.

Optimisation of doses and time of application of 2-4, D to reduce phytotoxic effects in rice.

For the control of sedges and broad leaved weeds in rice fields, 500 g ha of 2, 4-D sodium salt is sufficient instead of the present practice of applying 1.0 kg ha. The optimum time of application is 20-25 days after sowing.

Pulses and oilseeds

Cowpea

Evaluation of vegetable type cowpea for intercropping in the coconut gardens of Kuttanad:

Manjeri Red Plain gave the highest yield of 13,581.25 kg/ha in terms of green pods.

Varietal evaluation of grain type cowpea under partially shaded conditions in the reclaimed soils of Kuttanad:

Variety Pkh-1 recorded the maximum dry pod yield of 2842 kg/ha.

Effect of different levels of fertilizers on the growth and yield of vegetable cowpea grown as intercrop in the coconut gardens of Kuttanad. Application of fertilizers gave a significantly higher pod yield over control. But among the different levels of fertilizers, there was no significant difference in yield. This is attributed to the high fertility status of the Kuttanad soils. This is attributed to the high fertility status of the Kuttanad soils. So a fertilizer combination with lower levels of NPK (10:20:10) is identified as the best NPK combination for the crop in the reclaimed alluvial soils of Kuttanad.

Bhindi

Varietal trial in Bhindi (observational trial)

The variety AE-126 recorded the maximum yield (14722.2 kg/ha).

Effect of different levels of fertilizers on the growth and yield of Bhindi grown as intercrops in the coconut gardens of Kuttanad

The field trial was conducted for three consecutive seasons. The yield response to different levels of nitrogen was significant in all the three seasons and the highest dose of 75 kg N/ha effects due to different dose of P & K were not significant.

Brinjal

Effect of different levels of NPK on the yield of brinjal in the uplands of Kuttanad

Application of NPK at the rate of 75:20:40 (kg/ha) is found to be optimum for brinjal.

Sweet Potato

Nutritional studies on sweet potato in the uplands of Kuttanad

The experiment was conduced for three consecutive seasons. All the treatment combinations of different levels of fertilizers gave significantly higher tuber yield over control However, among the different levels of the three nutrients, there was no significant difference, possibly due to the high fertility status of the reclaimed Kuttanadan soil

Studies on the performance of tubercrops as inter-crop in coconut gardens

In the initial evaluation trial of *Dioscorea alata*, NBPGR-35 recorded the maximum yield of 4.98 kg/plant. The accession DEC-24 recorded maximum number of tubers/plant (33 Nos) and maximum tuber yield/plant (3 35 kg) in the IET of *Dioscorea esculenta*.

Tapioca

Evaluation of short duration tapioca cultures for reclaimed soils as intercrop in coconut gardens:

Culture 4/84, a short duration tapioca variety, gave higher yield of 27.46 tonnes/ha.

Studies on VAM association on tuber crops

The varieties Ramanthala and Ambakkadan were found to be the best responding ones to VAM inoculations with respect to yield. VAM inoculation showed an enhanced tuber yield of 43% over control in the case of variety Ambakkadan.

Bamboo and Reeds

Investigations on the diseases of bamboo and reeds in Kerala

The important diseases recorded during the year are leaf and branch blight of bamboo caused by *Ascochyta phaseolarum*, *Fusarium semitictum* and *Curvularia lanata*, Grey blight of culmns by *Geotrichum* sp., abnormal defoliation and withering of culmns by *B. vulgaris* and *Taphrina deformans*, rotting of growing culmns by *Fusarium* sp., shrinking and withering of basal culmns by *Ganoderma lucidum* leaf and culmn blight (thread blight) of reeds by *Pellicularia salmrincolor*.

Mushroom

Mushroom culture

It was observed that *Eleochris plantaginea*, R. Br., a common wet land weed of Kuttanad (locally known as 'Chelly') could be successfully

substituted for paddy straw for the cultivation of *Pleurotis* sp. It was also found that this substitute reduces the contamination chances and also reduce the incubation period of beds.

Fisheries

Assessment of productivity and ecology of fish ponds, channels and open water in and around RARS, Kumarakom

The study is in progress and samples are being drawn at monthly intervals from various locations in Kuttanad.

Fish-cum-duck farming in ponds and channels of coconut gardens in Kuttanad

Preliminary studies indicate that the fish-cum-duck farming is a viable system under Kuttanad conditions. The fish yield was 214.8 kg/0.04 ha and biomas production was 207.91 kg 0.04 ha in 302 days.

Studies on the culture of fishes and prawns as a follow up crop in paddy fields

Three trials were conducted under this programme. Fish yield registered 537.82 kg/ha, 1005.56 kg/ha, and 555.61 kg/ha during first, second and third seasons, respectively. Period of rearing varied from 158 days to 184 days. These results indicate that rotational rice-fish integrated farming is ideal for Kuttanad.

All India Co-ordinated Agronomic Research Project —Rice based fish culture

In addition to paddy field, fish yield ranging from 383 kg/ha to 600.03 kg/ha were obtained. It shows that with suitable modification in the layout pattern fish and paddy could be raised simultaneously under Kuttanad conditions.

Paddy-cum-fish culture—Simultaneous production of rice and fish

Trials were conducted in two 0.18 ha plots of RARS, Kumarakom. The study showed that by increasing the height of the outer embankment and thereby increasing the height of the water column, fish yield could be enhanced. In these studies, fish yield ranged from 240.40 kg/ha/150 days to 586.45 kg/ha/180 days.

Experimental culture of common carp and giant fresh water prawn

Preliminary observations indicate that under the prevailing acidic water conditions, cage culture of carp and prawns are not feasible.

Culture of the giant fresh water prawn Macrobrachium rosenbergii

Preliminary studies indicate that both cowdung and cow urine are useful for the culture of fishes like catla, rohu and mrigal.

Other matters

T&V workshop of Kottayam district was conducted at this station during 1987-88.

The IX NARP-KAEP zonal workshop for the problem zone was organised during September, 1987.

Training in mushroom culture was offered to twentyone unemployed youths of the state during April-May, 1987. Thereafter regular supply of mushroom spawns and technical services in mushroom growing are done in this station.

Important visitors

Dr P M Room, Scientist, Australia, visited the station on 4th May, 1987.

1.20 RICE RESEARCH STATION, MONCOMPU

The RRS, Moncompu was established in the year 1940. In 1963 it became a full fledged Regional Station to handle Plant Breeding and problems connected with Agronomy, Soil Science, Agricultural Entomology and Plant Pathology.

RRS Moncompu is located in Champakulam Village of Kuttanad Taluk in Alleppey District. The station is mid-way between Alleppey and Changanacherry and is located on the northern side of Alleppey, Changanacherry road. The total area of the farm is 8.7 ha. of which 2 ha comprises of garden lands and the remaining area constitute double crop paddy lands.

Dr C A Joseph, Professor (Pl Br) is the head of the station during 1987-88.

To take up work on the location specific research needs of rice cultivation in Kuttanad.

Research achievements

Proposals for the release of three promising cultures viz. Culture-93, Cul-126 and Cul-170 were forwarded to the Variety Release Committee for approval. Another short duration semitall culture 153-1 is in the final stages of evaluation. All these culture are now under Mini-kit trials. Breeding for resistance to major pests and diseases, adverse soil conditions, seed dormancy, etc. are in progress and the progenies are under various stages of selection and evaluation. The best varietal combinations for the Koottumundakan area was found to be PTB. 9 and H_4 for the first crop and PTB. 20 and Resmi for the second crop.

Crop Management

In areas where split application of 'N' is not feasible due to water stagnation, application of full dose of 'N' as basal in the form of coated urea (Neem or coal tar coated) was found to be on par with split application of prilled Urea. This has been recently included under the Package of Practices. Varieties Rohini and IR-8 were found to be comparatively tolerant to high acidity salinity conditions of Karumady area.

Sowing calcium peroxide coated seed (20% w/w) in standing water of 10-15 cm. in the puddled field and maintaining the water level for 12 days was found to decrease the weed population, especially wild rice and Echinochloa. This has recently been included in the Package of Practices. Application of 60:30:30 kg NPK/ha. for Virippu and 60:0:30 kg. NPK/ha for Mundakan season was found to give significantly higher yields in the Koottumundakan crop of Shertallai area. Culture 153-1 showed significant fertilizer response compared to culture-200 and 204.

Evaluation of different herbicides for the direct sown crop showed that Butachlor @ 1 kg ai/ha and 1.5 kg ai/ha and Benthiocarb @ 1.5 kg ai/ha were on par with hand weeding twice giving superior yield. This has been recently included in the Package of Practices. Anilophos and Dowco-356 were found to be very efficient for the control of weeds in transplanted crop. Application of 2, 4-DEE 4 G. @ 0.8 kg ai/ha under proper water management was found to be the cheapest compared to other weedicides and manual weeding fetching the highest yield.

Crop Protection

Basudin 10 G @ 1.5 kg ai/ha. Furadan 3 G. @ 1 kg ai/ha and Coroban 10 G @ 1 kg ai/ha were effective against gall midge and stem borer. Nuvacron was found superior to synthetic pyrethoids, Sumicidin and Ripcord for the control of gall midge, stem borer and leaf roller of rice.

Difolatan (3 g/l) sprayed at 60 DAS gave the minimum grain infection of stack burn disease followed by Fytolan (3 g/l) and Bavistin (1 g/l) sprayed at 80 DAS, whereas Hinosan (1 ml/l.) sprayed at 40 DAS recorded the minimum leaf infection of the disease. Validacin (2ml/l.) treated plots showed the minimum incidence of sheath blight disease followed by Difolatan (1.25 g/l).

Fisheries

Induced breeding by giving pituitary injections was successfully attempted in the Mrigal variety of fish at the Station. The fishes spawned and about 50,000 eggs were produced and a nursery of about 20,000 fry could be made.

T & V Workshop

T & V Workshops of Alleppey District were convened at the Station/ District Agricultural Farm, Mavelikkara on the Tuesdays and Wednesdays of third week of every month.

Research Activities

A total of 57 experiments are being handled in this station during the period of which 17 under Crop Improvement, 16 under Crop Management, 17 under Crop Protection, 3 under Farm Economics, Extension and Statistics, 3 under Fisheries and one under Operational Research Project.

Of the 57 project now handled in the station, 2 projects under Crop Improvement (NARP), seven under Crop Management, two under Crop Protection (AICRIP) and two under Farm Economics, Extension and Statistics are new projects taken up during the period.

Crop Management

Agronomy

Fertilizer management in Koottumundakan area was concluded 40:20:20 kg NPK ha for first crop + 40:0:20 for the mundakan (ratoon crop) was found to be the best economic level of fertilizer application for Koottumundakan area.

Agricultural Chemistry

Two AICRIP Projects were concluded during the period in the Agricultural Chemistry viz. 'N' management for low land rice in pest and disease endemic areas and evaluation of Mussoorie Phos coated urea for 'N' efficiency in low land rice. In areas where split application of 'N' is not feasible due to water stagnation after planting or sowing of the crop, full dose of N_2 as basal dressing may be preferred in the form of Neem coated Urea, Coal tar coated Urea or Mussoorie phos-coated as against no 'N' application. Application of Mussoorie phos coated Urea basal at the rate of 90 kg N/ha. was on par with the split application of prilled Urea, at the same rate (included in the Package of Practices).

Crop Protection

Entomology

Two projects viz., Trial on Synthetic pyrethroids and Evaluation of Plant Products for pest management were concluded during the period Synthetic pyrethroids were ineffective against tissue borers.

Other Matters—Extension activities

The Rice Day and Krishi Darshan 1983

Rice Day and Krishi Darshan, 1988 was conducted at the Station on 19th March, 1988. The Seminar involving about 450 participants was inaugurated by Dr K C Joseph, MLA, Kuttanad. Discussions were led by a team of experts from Kerala Agricultural University and Central Institutes under the moderation of Dr M Aravindakshan, Director of Research, KAU. An exhibition was also conducted in connection with this programme in which the various input agencies participated.

Radio talks

Dr C A Joseph, Professor of Plant Breeding broadcasted a talk on 'Economic use of pesticides' under the Farm and Home Programme of All India Radio in December 1987. Dr L Rema Devi, Professor of Plant Pathology participated in a discussion in the 'Farm and Home' Programme of All India Radio on 'Problems facing Punja cultivation in Kuttanad' in January 1988.

Campaigns

A 'Rodent Control Campaign' was organised by the Operational Research Project Scientists during April, 1987 at Ramankari Village.

Farm Advisory Service

A Farm Advisory Clinic is being operated in the Station and a number of farmers who approach the station with various problems were given proper advices. Occasional farm visits were also undertaken by the Scientists of the Station to solve field problems when found necessary.

Important visitors

Sri R L Wallal, Sri Ramakrishna Kaul and Sri M C Tickow, Sub-divisional Officers, Department of Agriculture, Kashmir visited the Station to study the work done at the station.

Dr Yella Reddy and Dr Narayana Reddy, Professor of Agricultural Extension, Andhra Pradesh Agricultural University visited the Station during the period under report.

1.21 AICRP ON AGRICULTURAL DRAINAGE ON WATERSHED BASIS UNDER ACTUAL FARMING CONDITIONS, KARUMADY

The All India Co-ordinated Research Project on Agricultural Drainage under Actual Farming conditions on watershed basis is being implemented in "Kavilthekkumpuram padasekharam' as a part of Kuttanad situated in Ambalapuzha village and Taluk of Alleppey district. The scheme has come into effect from 1-12-88. Sri E K Mathew, Assistant Professor (Ag. Engg) is in-charge of this project.

The objectives and thrust areas of research are given below:

To comprehend the effect of a surface and sub-surface drainage system on the movement of soil liquids. To study the pattern of hydrological cycle occuring in the watershed area and its importance and influence on the drainage. To develop a feasible technology for the lay out of sub-surface drainage system suitable to peat and muck soils; To develop criteria for design parameters of surface drainage; to develop drainage pattern required for different crops; to evaluate the feasibility of using the return flow from drainage for irrigation in relation to water quality rating; to evaluate the socio-economic benefits accrued from the drainage projects.

Research Achievements

The weekly monitoring of quality of irrigation and surface drained water during this year indicated that the adoption of surface drainage alone cannot improve the soil health by reducing the acidity or salinity.

The water table fluctuations in the project area showed that there is no definite pattern of ground water movement in the soil and that the

water movement is greatly influenced by outside water level, intermittent flooding and draining.

There was a significant increase in grain yield by the adoption of sub-surface drainage system and was found to be as 2.1 tons/ha over control. The analysis of quality of subsurface drained water revealed that it could reduce the acidity to a considerable extent. It has also been estimated that during the years 1985-86, 1986-87 and 1987-88 a quantity of 125 kg, 145 kg and 36 kg of salts/ ha/cm on drained water respectively have been washed off from the experimental area which reflect the effect of sub-surface drainage in leaching salts from the soil.

The periodic analysis of the soil samples collected from prefixed points shows that there is significant drainage of different toxic elements viz. water soluble Fe, SO_4, Ca, Mg and Cl in the title drained areas over control. The pH and EC values as well as different ionic concentrations were found to increase as soon as the drainage pumping was stopped.

Research Activities

There were five exoeriments under the co-ordinated project during the year under report. The experiment viz monitoring of periodical changes in quality of surface and sub-surface water in the project area has been concluded during the year. The pooled data for the last five years show that the optimum conditions for growing paddy in Kari soils of Kuttanad is from August to November when the pH and EC of irrigation water remain in the favourable limits. This may be recommended for Kari soils of Kuttanad wherever single cropping is practised.

1.22 SUGARCANE RESEARCH STATION, THIRUVALLA

Sugarcane Research under the Kerala Agricultural University was started in 1976 with the total assistance from ICAR under the All India Co-ordinated Research Project on Sugarcane. Subsequently in 1978 the Kerala Agricultural University started supplementing the Research efforts under the scheme on Intensification of Sugarcane Research. In 1983 a centrally sponsored scheme on 'Survey, appraisal and control of Major Sugarcane Diseases' started functioning in the station.

The Sugarcane Research Station, Thiruvalla is located at Kallunkal in the Nedumpuram Village of Thiruvalla Taluk, situated at 9.6 North latitude, 76 5 Longitude and at an elevation of 25.14 meters above M.S.L.

The research efforts envisages to increase the production and productivity of Sugarcane in the command area of Travancore Sugars and Chemicals, Thiruvalla, Mannam Sugar Mill, Pandalam and Chittur Co-operative Sugars, Menonpara by evolving high yielding high sugared sugarcane varieties and formulating optimum crop management practices and by proper pest and disease management.

Both Travancore Sugars and Manam Sugar Mill areas benefitted from South west and North east Monsoons. Sugarcane is grown in the tract under flood prone and garden land situations. The incidence of red rot disease was found to be a serious problem in this tract. Research projects were formulated for the evolution of varieties suitable for the flood prone and garden land situations with special emphasis for red rot resistant varieties. Crop management projects are also in progress.

Research achievements

From the Zonal varietal trials series I&II, two genotypes Co 7704 and Co 7405 were identified as high yielding high quality canes and moderately resistant to red rot. These varieties were released as state varieties.

Hybridization work involving seven cross combinations in KAU State Crosses and three combinations of zonal crosses were made at National Hybridization garden at the Sugarcane Breeding Institute, Coimbatore and the fluff obtained were sown in the nursery.

The crop management experiments indicated that plant crop of Sugarcane have a linear response to NPK at high dose of 250:125: 125kg/ha in increasing the yield without affecting the quality over the lower doses of 150 kg, 75 kg, 75 kg/ha, and 200 kg, 100 kg, 100kg NPK/ha.

From the project on the effect of nitrogen levels and moisture conservation practices on the yield of rain fed sugarcane the ratoon crop data showed that with respect to moisture conservation practices, hoeing at monthly intervals and application of atrazin as pre emergent weedicide in addition to $CaCO_3$ spray in intervals were found to be on par and superior to trash mulching. The recommended dose of Nitrogen 165 kg was found to be superior to all other levels of nitrogen and hence the present package of practices recommendation of Nitrogen was found to be sufficient. The experiment was conducted during the year.

The adhoc scheme for "Survey, appraisal and control of major sugarcane diseases of Kerala" revealed that in both the Command areas of Travancore Sugars and Chemicals and Mannam Sugar Mill area the major disease of sugarcane is red rot disease and in the Chittur Co-operative Sugars area the major problem is grassy shoot disease. Lack of field sanitation and indiscriminate use of disease effected setts as planting material are the cause for the disease spread. The programme revealed the need for a well defined varietal programme and a nursery programme to manage these diseases.

Details of Seminar Symposia attended by staff

Dr. N. N. Potty, Professor, Sri K. C. Chandy, Associate Professor and Sri Sajan Kurian, Jr. Asst. Professor participated in the International

Seminar on Sugarcane and Annual workshop of AICRP on Sugarcane at the Sugarcane Breeding Institute, Coimbatore during September, 1987.

The district level T & V workshop of the Pathanamthitta Dist was conducted and attended by Dr N N Potty as Chairman and Sri K C Chandy as resource personnel.

Sri K C Chandy, Associate Professor participated in the Mini Workshop and State level Package of Practices Workshop.

There are three Research Schemes functioning at this station. The All India Co-ordinated Project on Sugarcane, Kerala Agricultural University Research Scheme and an ICAR Adhoc Research Project for Survey Appraisal and Control of Major Sugarcane Diseases of Kerala. Under the AICRP there are three Research Project under crop improvement and two under crop management. The crop improvement projects consists of Fluff Exchange Programme and Evolution of varieties with nine experiments and two Zonal Varietal Trials for the peninsular sub zone for early and Mid-late group of Sugarcane.

Under the Kerala Agricultural University Scheme a crop improvement project for the Evolution of Sugarcane varieties for the different agro-climatic tracts of Kerala with 9 experiments and one crop management experiment are in progress. In addition six observational trials are also in progress under the University Scheme. The crop improvement projects for the Evolution of varieties under the Kerala Agricultural University Scheme and the Fluff Exchange Programme and evolution of varieties under the All India Co-ordinated Project were combined together to form one major project "Evolution of Sugarcane varieties for different agro-climatic tracts of Kerala and Fluff Exchange Programme" and treated as a single project with 9 experiments. The ICAR Ad hoc scheme for the Survey Appraisal and Control of Major Sugarcane Diseases of Kerala form the other project in progress.

Dr S C Srevasthava Project Co-ordinator, AICRP visited the the Station during June, 1987.

1.23 RICE RESEARCH STATION, KAYAMKULAM

Rice Research Station is located at Kayamkulam in Alleppey District, one km east of Kayamkulam town on the northern side of Kayamkulam-Punalur Road.

This station was established in 1937, under the University of Travancore. It was transferred to the Department of Agriculture in 1958. With the formation of Kerala Agricultural University, this institution was transferred to the Agricultural University with effect from 1-2-1972.

In 1981 this station was declared as a Sub Centre for conducting research on root (wilt) disease of coconut. In 1982 it has become a sub centre under special problem zone of NARP to tackle problems of major

crops in Onattukara region. An adhoc scheme for the rapid improvement of Sesamum and Groundnut in Onattukara has been sanctioned by ICAR in 1985 to this station.

The main objectives of the station are evolving high yielding varieties of rice, pulses and sesamum suitable to the Onattukara and similar sandy regions of the State; formulating improved agronomic practices and plant protection measures for the cultivation of rice, pulses and groundnut and sesamum; tackling problems peculiar to Onattukara in the cultivation of major crops; conducting training to the farmers and officials of the Agricultural Department to impart latest agro-techniques in the cultivation of rice, pulses and oilseeds and organising demonstrations of improved cultural practices and research results in cultivator's fields.

Soil here is sandy loam and acidic in reaction having a pH of 5.6. The water holding capacity of the soil is very poor and the organic matter content is little. The nitrogen and potash levels are low while that of phosphorus is high.

Mandate of the station

The lead function is oil seed and pulses and testing function is rice. Besides conducting experiments in these crops, the station is intended for production and distribution of breeders seed of rice, oil seeds, pulses and vegetables.

Research achievements

In rice under the crop improvement programme four major projects were implemented involving seven field experiments. Under crop management four projects were taken up on manurial and cultural practices. In coconut, four projects were implemented in the station as sub-projects under CRWDP. Out of these, two are under crop management and three under crop protection. In oil seeds one project each was implemented in groundnut and sesamum under plant protection and in pulses one major project was implemented under crop improvement programme consisting of five field experiments in cowpea and four in blackgram. An ICAR adhoc scheme is being implemented in the station from 1985 onwards for the development of improved varieties of sesamum and groundnut suited to the rice follows in Onattukara region. The work is mainly concentrated on crop improvement aspects in which three experiments has been taken up in groundnut and three in sesamum.

No project has been concluded during the year under report. The salient achievements on the projects implemented in rice under crop improvement include identification of five short duration cultures of rice which yield more than 5000 kg/ha suitable for the first crop season, mutation breeding of the popular first crop variety PTB-23, spotting out nine photosensitive cultures, yielding more than 4000 kg/ha suitable for

the second crop season, initiating mutation breeding of the popular variety PTB-20 and genetic refinement of the deep water saline tolerant variety Oorumundakan by mass selection.

Under crop management, studies on the permanent manurial trial have again proved that application of organic matter in combination with the inorganic manures is a must for getting satisfactory yield. Imbalanced application of nutrients is found to very adversely affect in crop production. In an experiment conducted on the rice legume dual culture it was observed that cowpea is the most suitable legume. Among the legumes tried namely cowpea, sunhemp, daincha and sesbania, daincha and sesbania are found to be unsuitable as they failed for self decaying. The weedicidal trial conducted during the virippu season revealed that Butachlor can be recommended as an effective weedicide excepting for *Echinochloa* spp. It was observed that during the first crop season dibbling of seeds in plough furrows is better than the broadcasting method of sowing.

Results of the studies on the response of diseased and apparently healthy coconut palms to fertilizer levels and organic manuring gave an indication that a reduction in disease index and an increase in yield over pretreatment disease index was noticed when 75% of the fertilizer dose (.5 N, 0.32 p and 1.2 k) was given in the inorganic form and 25% in organic form. In a trial to study the effect of growing and incorporation of different green manure crops and their influence on apparently healthy and diseased coconut palms it was observed that in plots where daincha, sunhemp and sesbania were grown there was a general trend to increase the yield of nuts in both healthy and diseased palms. However a positive influence of disease index was not seen in the healthy palms when these leguminous crops were grown in the basins.

Attempts made on the control of quick yellow decline in coconut has given an indication that the treatment combination of soil application of copper, manganese and stem injection of oxytetracycline could reduce the disease index in the leaf and inflorescence. The leaf rot disease of coconut was found to be controlled by spraying 1% Bordeaux mixture thrice a year or by sequential spraying of Bordeaux mixture followed by 0.3% Dithane M-45 and 0.5% Phytolan.

Work done using 16 varieties of cowpea variety to be grown in coconut gardens, a variety namely V-118 recording grain yield of 771 kg/ha was found suitable. In blackgram, 10 varieties with short plant type and medium to tall plant type were identified to be grown in coconut garden.

In sesamum and groundnut, hybridisation programmes for developing high yielding short duration varieties for rice fallow cultivation in Onattukara region have been taken up and are in different stages of experimentation.

1.24 CROPPING SYSTEMS RESEARCH CENTRE, KARAMANA

The station is situated at Karamana about 3 km south east of Trivandrum Central Railway Station at an altitude of 29m above MSL. It was established in 1955. The area of the stations is 7.65 ha of which double cropped wet land occupies 7.25 ha and garden land 0.40 ha. The soil is sandy loam.

Dr. E. Tajuddin was the head of this station during the period under report.

Datails of seminars symposia training programmes attended by staff

Dr E Tajuddin Sri S M Shahul Hameed, Sri P Yageen Thomas and Dr N Saifudeen have attended the group meeting of AICARP scientists held at Bangalore during April 1987.

Sri P Yageen Thomas has attended the IX annual conference of Indian Society of Probability and Statistics held at New Delhi during November 10-13 of 1987 and presented a paper.

Dr E Tajuddin and Sri P Yageen Thomas have attended the XVIII annual workshop of All India Co-ordinated Agronomic Research Project held at C. S. Azad University of Agriculture and Technology, Kanpur during March 1988.

Research activities

During the period under report four AICARP projects, one Project under PL-480 scheme and three KAU projects were under taken in this centre.

AICARP Projects

Economics of crop sequence and their effect on soil fertility and crop productivity over years

From the results obtained, it was found that rice-rice-cowpea systems of treatment given in the previous year has given largest grain yield in 1987-88 kharif and on par with rice-rice-groundnut treatment.

Permanent plot experiment on integrated nutrient supply in a cereal based crop sequence

During both seasons, the best treatment was with 50% NPK through FYM + 50% NPK chemical fertilizer in kharif and 100% NPK chemicals fertilizers during Rabi may be practiced for getting better Rice yields.

Long range effect of continuous cropping and manuring on soil fertility and yield stability

In this experiment phosphorus applied plots have been noticed to have yielded more in the long run. No effect due to potash was noticed in the long run.

Introduction of green manure crop in rice based cropping systems

This experiment was started during kharif. Two different green manures namely sunhemp and daincha was raised in different plots according to treatments. The crop was severely affected due to water shortage. The performance of sunhemp was very poor. So the results were vitiated.

PL-480 experiment

Fate and efficiency of urea based fertilizer nitrogen for rice

The treatments are applied only in kharif season and during rabi the experiment without these treatments conducted in the same layout for studying the residual effect.

In both Kharif and Rabi seasons, the plastic coated urea has given the highest grain yield followed by urea super granules. In the Rabi season, the plastic coated urea treatment applied at the rate of 75 kg N/ha during kharif season has resulted with the highest residual effect.

KAU Projects

Evaluation of synthetic pyrethroids for the control of rice ear head bugs

It is reported that the synthetic pyrethroids are having high insecticidal activity with low residual toxicity. This study is intended to evaluate the efficiency of four synthetic pyrethroids at two doses in comparison with Methyl Parathion as check for the control of rice bug.

The experiment was conducted during 1987 kharif. The culture 304 recorded maximum yield and is on par with culture 310 and jaya.

Other matters

The farmers around the station and those visiting the station with problems were given technical advice on plant protection and other aspects of rice cultivation.

The vocational higher secondary students of Agriculture from Parassala school were given the practical training at this centre. Imparted practical training to the Final year B. Sc. (Ag) students of Agriculture College, Vellayani.

1.24 E.C.F. UNIT QUILON (NOW TRICHUR UNIT)

The ECF Unit is an Externally Aided Project. It is now operating in Trichur District with Headquarters at Mannuthy and has been operating in Quilon District with Headquarters at Kavanadu, Quilon till April 1985 from May 1985.

The AICARP (All India Co-ordinated Agronomic Research Project) of which ECF is a component seeks to test continuously on cultivators' fields, the technology developed for various crop based farming systems

and the component technology developed for individual crops. For this purpose cropping patterns best suited for different agroecological zones will be tested under different farming situation.

Areas of research identified

During the tenure in Quilon district two types of experiments as suggested by ICAR had been conducted in farmers' fields at various locations.

1. Type N_0: Studies on rationalisation of inputs in crop production under irrigated/assured rainfall conditions.

To evaluate the national use of inputs by evolving a proper blend between monitory and low monitory inputs in crop production. In this experiment spacing fertilizers and weedicides in paddy were the factors tested.

1. Type N_1: Testing of urea super granules, urea large granules, and Rock phosphate coated urea in rice based cropping sequences

To study the relative efficiency of slow release nitrogen fertilizers and modified urea materials in influencing the grain yield and N use efficiency of rice.

Research achievements in the year 1987-88

Experiments were conducted in farmers fields at different locations in Quilon District viz. Chadayamangalam, Vettikavala, Sastharncotta, Kundara, Quilon, Karunagappally, Anchal and Punalur.

Based on the data it has been proved that Rock Phosphate at P 120 during kharif was better because of residual effect on the following Rabi crop

1.25 NATIONAL AGRICULTURAL RESEARCH PROJECT (SOUTHERN REGION)

The National Agricultural Research Project (Southern Region) with its lead station located at the college of Agriculture, Vellayani is one of the five sub-projects sanctioned by the ICAR with the objective of strengthening the research capability of the Kerala Agricultural University. The project continued as a KAU Plan Scheme during the year under report.

The lead function of the Regional Research Station at Vellayani is research on tapioca and other tubers, and that of the Special Station at Kottarakkara is research on homestead farming. The leadership for the Kottarakkara station is provided by the Regional Station at Vellayani. Conducting location specific research aimed at crop improvement, crop management, crop protection, post-harvest technology etc. of tuber crops,

developing suitable technology for the prevalent farming systems and modelling multi-storied cropping systems for homesteads are the main research responsibilities of the sub-project, in addition to location-specific research (testing and verification) on pulses, oil seeds, cereals (rice) and rice-based cropping systems.

Besides the Regional Research Station at the College of Agriculture, Vellayani and the Special Station at Kottarakkara, the Kerala Agricultural University has two more research stations in the southern region viz. the Coconut Research Station at Balaramapuram and the Cropping systems Research Centre at Karamana, both situated in Trivandrum district. Conducting manurial and agronomic trials on different high yielding rice varieties, and evolving suitable rice-based cropping system (s) are the lead functions of the latter. The All India Co-ordinated Projects on Forage Crops, Plant Parasitic Nematode Pests with Integrated Approach for their Control, oil seeds (started during the year) and Pesticide Residues; the DST projects on "Mycorrhizae and Forest Eco-systems" (terminated on 31-12-87) and "Mushroom Flora of Kerala"; the ICAR *ad hoc* project on Rice Cyst Nematode and the scheme on *Pleurotus* funded by the Kerala State Committee on Science, Technology & Environment were attached to the Regional Station.

During the year under report, a project on "Standardisation of tissue/apical meristem culture techniques in horticultural crops of Kerala" was sanctioned under the US-India funds (Rs. 15.661 lakhs). Under this project, tissue/apical meristem culture techniques are to be standardised for cashew and nutmeg.

Objectives of the Station are:

To formulate and undertake research on tapioca and other tubers and on homestead farming system as the lead functions, and on rice and coconut-based farming systems as the verification functions.

To supervise and co-ordinate research work at the Regional Station, the Special Station and the Sub-Stations in the region.

To conduct regional workshops for each season (Kharif and Rabi) to establish an effective institutional net work for ensuring feed back between research scientists and extension personnel.

To adopt villages (two or three villages) so that the scientists themselves can work with farmers in different resource situations, study the constraints and find out measures to overcome these constraints.

To undertake extension work by participation in field work, training etc. thus making research more purposeful and the transfer of technology more rapid.

To maintain a catalogue of problems referred to by the extension personnel and the farmers, and those observed by the scientists and

To take part in the training of extension personnel working in the T&V system of Agricultural Extension.

Thrust areas of research identified in the region

Homestead farming with crop-livestock mix is the characteristic feature of Kerala. The size of farm holdings in Kerala is proverbially small and it progressively decreases year after year due to fragmentation of holdings. Hence, the main thrust in farming system research is on homestead farming system aimed at increasing the production and productivity of the homesteads of different sizes and the net return per unit time to the extent possible so as to bring about improvement in the standard of living of our small and marginal farmers.

Other thrust areas of farming system research are cassava-based farming system, coconut-based farming system, rice-based farming system and banana-based farming system. Thrust areas on vegetable improvement, land use planning, drought management, Biotechnology-rapid multiplication of tree crops agricultural chemicals and environmental pollution Agrostology have also been identified.

Brief report on the research achievements of the year under report

Rice

In the project "screening rice varieties and cultures for tolerance/ resistance to BPH, sheath blight and yield potential", it was observed that the varieties differed significantly with respect to sheath rot and grain yield. No sheath blight disease was observed in Karthika and Vyttila-3. Sheath rot was low in Vyttila-3.

Vegetables and tubers

Waiting periods for important insecticides on vegetables like bhindi, cowpea, brinjal, bittergourd and snakegourd were fixed for both washed and unwashed samples during the rainy and summer season. The mean residue of monocrotophos on snakegourd fruits on the first day after application was 2.66 ppm in the unwashed samples and 2.42 ppm in the washed samples. The residues got reduced to 0.06 and 0.04 ppm, respectively in the unwashed and washed samples by the 10th day after the application. In the case Dimethoate (0.05%), initial residue was 2.24 and 2.14 ppm in the washed and unwashed samples. For Malathion the initial residue was 0.69 ppm which got reduced to 0.21 ppm on the 5th day after the application whereas it was 0.68 ppm and 0.20 ppm respectively for the washed samples.

Plant protection

In the studies on the population build up of nematodes in homestead gardens the homesteads having coconut alone in three types of soils recorded the minimum nematode population, both in soil

and roots. In homesteads having coconut and banana, the nematode population was maximum in banana (compared to coconut). Regarding the percentage frequency of occurrence of various nematode species, *Helicotylenchus* sp. ranked first (65%), followed by *Rotylenchus* sp. (60%) and *Tylenchorynchus* sp. (53%).

Results of the pot culture experiments conducted with seven different insecticides to find out the efficacy of different granular nematicides revealed that in all the characters except root weight and nematode population, the effect of the treatment was not significant and consistent. Residue analysis of bhindi fruits showed that the residues were at non-detectable levels from the first harvest itself (ie. 47th day after the application of Furadan and Thimet). The Quinalphos residues on the first day of application was 2.38 ppm in the unwashed samples and 2.14 ppm in the washed samples. The residue got reduced to 1.63, 0.64 and 0.018 ppm on the 3rd, 5th and 7th day, in the unwashed samples. In the washed samples, the corresponding residues were 1.42 ppm, 0.40 ppm and 0.012 ppm, respectively. In the case of Fenthion, the initial residue was 1.96 ppm in unwashed samples and 1.69 ppm in the washed samples. The residues got reduced to 0.15 ppm and 0.10 ppm respectively on the 5th day after application.

Pulses and Oil seeds

Evaluation of groundnut varieties under partially shaded conditions in coconut plantations revealed that the varieties different significantly from each other with respect to their dry pod yield. TG-3 had the maximum dry pod yield. The mean dry pod yield from 1984 to 1987 was 511 kg/ha. TMV-2 recorded the second highest dry pod yield (313 kg/ha). Since TG-3 was found to be consistantly superior in yield (under partially shaded conditions) than the recommended varieties TMV-2 and Pollachi-1, it was recommended for cultivation by the State Level Workshop on Package of Practices.

Fodder crops

The experiment to assess the fodder production potential of grass-legume mixture in coconut gardens revealed that green fodder yield of legumes was maximum (2.38 t/ha) for Setaria and Stylo combination. Maximum dry fodder yield of grass was 4.84 t/ha and legume, 1.04 t/ha. The total dry fodder yield was 5.88 t/ha.

Leaf: stem ratio of grasses was maximum for guinea grass (2.39). For legumes, the highest ratio was 0.97, recorded by Stylosanthes. For all the legume combinations, Congosignal grass recorded the maximum number of tillers per plant, the highest being in Congo and and Centro combination (35.20).

Frontline demonstration (Short duration tapioca variety with vegetable cowpea (companion crop)

One of the lead functions vested with NARP (SR) is conducting research on tapioca and other tuber crops. A bench mark survey was conducted in the adopted village, Palappur, during August–September, 1987 covering 250 farmers. It revealed the majority of the farmers were cultivating tapioca in their homesteads, mostly local varieties. Hence, it was proposed to conduct one frontline demonstration with the following objectives:

To popularise among the farmers the short duration tapioca variety (Sri Prakash) released by the CTCRI

To compare the yield performance of this short duration tapioca with special reference to duration and intercropping, with the existing local HYV.

To introduce vegetable cowpea as a companion crop to tapioca.

Twenty tapioca farmers, each with five cent plots identified, and they were given tapioca setts and cowpea seeds. To educate the farmers about the short duration variety (Sri Prakash) and companion cropping with vegetable cowpea, one seminar-cum-discussion was arranged on 17-3-1988 at the Seminar Hall, Department of Agricultural Extension, College of Agriculture, Vellayani. On 19-3-1988 the tapioca setts were planted in the demonstration plots and basal dose of fertilizers applied. The cowpea seeds were also dibbled in between the mounds on the same day.

Details of seminars workshop symposia summer institutes training programmes attended by the staff

Dr N Mohanakumaran, attended the National Workshop on Utilisation of Cashew Apple at Vellanikkara on 29-4-1987.

Dr K John Kurian attended the workshop of AICRP on Plant Parasitic Nematodes at College of Agriculture, Pune, on 9th to 12th June 1987.

Sri K M Abdul Khader, attended the workshop of the AICRP on Forage Crops at IGFRI Jhansi at 7 and 8th September 1987.

Dr N Mohanakumaran, Dr A Visalakshi and Sri P A Rajan Asari, attended the IX Zonal Workshop NARP KAEP at RARS Kumarakom, at 6-7 September 1987.

Dr N Mohanakumaran, attended the meeting on "Suvery to assess the economic impact of drought on crops and livestock in Kerala" at KAU Headquarters on 19-9-1987.

Dr N Mohanakumaran, Dr K John Kurian, Dr A Visalakshy, Smt T. Nalinakumari, Sri Arthur Jacob, Smt S Naseema Beevi, Smt M S Sheela,

and Smt Hebsi Bai attended the National Symposium on Integrated Pest Control: Progress and Perspective at Trivandrum on 15 to 17 October, 1987.

Dr Sverup John attended the III annual rabi/summer groundnut workshop Group Meeting at Rajendranagar on 17-20 October, 1987.

Dr N Mohanakumaran attended the meeting on the evaluation of on-going projects of KAU at Vellanikkara, on 21-12-1987.

Dr N Mohanakumaran, attended the feed back mechanism of the Lab to Land Programme at Communication Centre at 22-12-1987.

Dr N Mohanakumaran attended the Variety Evaluation Committee at Vellanikkara on 30-1-1988.

Dr N Mohanakumaran attended the Lecture by Dr. Hari Easwaran, Programme Officer SMSS, Washington at Trivandrum on 1-2-1988.

Research Activities

Number of research projects as on 31-3-1988 —64
KAU Projects – 56
ICAR Projects – 5
USDA Project – 1
Science and Technology Projects – 2

Highlights

Under rice-based farming systems, there were eight research projects, two in crop improvement, four in crop management, and two in plant protection. In "screening for rice varieties and cultures for tolerance/resistance to BPH, sheath blight and yield", it was observed that the varieties differed significantly with respect to sheath rot and grain yield. No sheath blight incidence was observed in Karthika and Vyttila-3.

The four projects on coconut-based farming system focussed attention on plant protection. The results of the project on the control of rhinoceros beetle showed that BHC, Aldrin and Heptachlor gave a complete control of grubs, one and two months after the treatment, respectively. Aldrin and Heptachlor gave good mortality upto the 3rd and 4th months after the treatment.

In spices, survey and control of pollu beetle in pepper was undertaken. A trial to study the effect of Endosulfan 0.05% spray when applied at different periods to control the pollu beetle showed that the spray during May, July and September is best in controlling the pest.

In fruit crops, research was mainly focussed on banana. The project on crop management studies on Red Banana and the two projects on plant protection (one on bunchy top disease control and the other on the control of nematodes using organic wastes/green leaves) progressed

In vegetables and tubers 17 projects were on-going and mainly centred on sweet potato, cassava and vegetables in homesteads. The results of the experiment on "genetic improvement of vegetable crops cultivated in the southern district of Kerala suited to summer rice fallows" showed that the amaranthus culture 5-8, the bhindi variety Pusa Savani and the brinjal hybrid H2 (SM 6 x PPL) were superior to other varieties. The project on "standardisation of the techniques for growing vegetables in pots" progressed during the period and an experiment was laid out with tomato (L.E 79), bhindi (A.E I) and brinjal (Pusa Purple Cluster). The results of the project on "efficacy of different granular nematicides for the control of root-knot nematode in bhindi", showed that the three treatments Phorate, Carbofuran and Aldicarb were on par and superior to the control.

In pulses and oil seeds 11 projects continued In the "varietal evaluation for cowpea under partially shaded conditions in coconut plantations", the variety "Charodi" had the highest grain yield (228kg ha) In "screening of cowpea varieties for resistance against collar rot and web blight disease", it was found that the cowpea variety S-488 was highly susceptible to collar rot disease in the field, followed by the varieties V-59 and C-152.

In post harvest technology and nutrition, the main work carried out was with reference to mushroom cultivation. In the project to identify suitable species of *Pleurotus* for large scale cultivation in Kerala a number of collections of *Pleurotus* was made from different parts of the southern districts of the State. The main species identified were *P. citrinopileatus, P ostreatus, P. drysnus P. cornucopiae* and *P. opuntiae*.

In the project on "improving the bee keeping practices in the homesteads", different pollen substitutes were tried as a lean season management practice. It was observed that honey, yeast, skimmed milk powder and green gram powder mixed in a semi solid consistency was acceptable to the bees. Wax moth and mite infestations were observed in the bee colonies. The mite seen infesting the colonies and feeding on the combs was identified as *Klemannia* sp.

In Farm Economics, Extension and Statistics, a series of frontline demonstrations with the short duration tapioca variety Sri Prakash and vegetable cowpea as companion crop, was laid out in the adopted village Kalliyoor. A bench mark survey conducted among 250 farmers of the village revealed that majority of the farmers cultivate local varieties of tapioca. Hence, the demonstration was taken up with the short duration tapioca variety and as a companion crop, vegetable cowpea was introduced in the interspaces of tapioca plants.

Other matters

Seminars conducted

One seminar-cum-discussion was held at the Department of Agricultural Extension on 17.3.1988 to educate the farmers of the adopted village about the cultivation of short duration tapioca variety Sri Prakash along with vegetable cowpea as companion crop.

Workshops conducted

The IX Zonal Workshop of the Southern Region was held on the 29th and 30th June, 1987 at the College of Agriculture, Vellayani.

T & V Monthly workshops conducted

The T & V pre-coordination meetings six and two monthly bi-monthly workshops for Trivandrum district conducted during the year under report were chaired by Dr N Mohanakumaran, Associate Director.

Extension lectures/special lectures/endowment lectures organised by the Department/Project

Topic	*Lecturer*	*Venue & Date*
"From Malthus to surplus"	Dr. K. Gopalakrishna Pillai, Regional Co-ordinator, Inter National Rice Testing Programme, East Africa.	College of Agriculture, Vellayani on 12.1.88

Conduct of exhibition/farmers' days, field days etc.

To educate the farmers of the adopted village, Kalliyoor, about the short duration tapioca variety Sri Prakash, a seminar-cum-discussion was arranged on 17.3.88 at the Seminar Hall, Department of Agricultural Extension, College of Agriculture, Vellayani. Fifty farmers from the village attended the seminar. The scientists held detailed discussions with individual farmers. Classes on various aspects of tapioca cultivation and companion cropping with cowpea were handled by Dr V K Sasidhar, Professor and Head, Department of Agronomy; Sri P Reghunath, Assistant Professor of Entomology and Dr S Balakrishnan, Professor of Plant Pathology. Dr A M Thampi, Prof. and Head, Department of Agricultural Extension distributed various inputs like tapioca setts, fertilizers and cowpea seeds to the selected farmers.

Visits of Dignitaries Scientists Officials Experts

Name	Station to which attached	Date of visit
Dr Bidappa Dr Mohammed Yousef Dr C Kailasam	CPCRI	26 6 87 finalise the report of the work group on coconut.
Dr Robert Jackson, Director	FERRO	1.7.87 and 2.7.87 for negotiation of the USDA project on tissue culture
Dr S C Adlakha, A D G	ICAR/KAU	
Dr Raghul Raturi, Economist	FAO/World Bank Co-operative Programme investment Centre	3.7.87
Dr Clement E Tapoe, Agrl. Officer		
Hon'ble Minister for Agriculture	Karnataka	23.7.87
Mrs Aruna Bagchee, Director (EN)	Government of India	30.8.87
Dr C R Hazra Project Co-ordinator	IGFRI-Jhansi	23.2.88

1.26 COCONUT RESEARCH STATION, BALARAMAPURAM

The Coconut Research Station was established in 1948 to cater to the needs of the typical red loam soils of Southern Kerala with an area of about 32,000 hectare distributed in Nemom, Athiyanoor and Parasala blocks of Neyyattinkara Municipality. The station was established at Kattachalkuzhy, 4 kms south of Balaramapuram on the Balaramapuram-Vizhinjam road early in 1963-64 under the Department of Agriculture. The Kerala Agricultural University took over the station in February, 1972. The area of this station is 13.14 ha.

Research Achievements

Trials initiated in 1964 on young coconut seedlings (WCT) revealed good response to N, P and K as evidenced from the analysis of the cumulative average yield data for 12 years from 1976 to 1987. Though the main effect of P showed non-beneficial effect in increasing the dose of P from 225 to 450 g P_2O_5 per palm per year, interaction effects showed the importance of keeping a balance among these individual nutrient elements for increased production. The yieldest yield of 73 nuts per palm per year was obtained from palms treated with 680 g N, 450 g P_2O_5, 900 g K_2O ($n_2p_2k_2$)

Analysis of the cumulative average yield data per palm for a period of 12 years from 1973-'77, recorded from the spacing-cum-manurial trial showed significant interaction between spacing and manuring. The yield

increased by 457 and 621 nuts respectively by the application of 340 g N, 225 g P_2O_5 and 450 g K_2O and double the above level of nutrients per palm per year. An increase in spacing was also found to increase the individual palm yield but to decrease the per ha production. The yield increased by 307 and 373 nuts when the spacing was kept as 7.5 x 7.5 m and 10 x 10m respectively in comparison with 5 x 5 m spacing. In the absence of manuring no significant difference in nut production was observed at the three spacings tried.

The research programmes undertaken in this station is of a long term nature. Three long term experiments are in progress as detailed below:

NPK Fertilizer trial starting from young seedlings

This experiment started in 1964 is to study the performance of palms from seedling stage to application of N, P and K at different levels.

Spacing-cum-manurial trial

The experiment was started with young seedling in 1964 to study the effect of different levels of fertilizer and spacing on the growth and productivity of coconut.

Progeny row trial for comparison between T x D and T x GB seedlings

The experiment started with young seedlings in 1970 is to evaluate the performance and yield of progenies of T x D and T x GB.

Increasing the yield potential of the bulk crop from the present 60 nuts/palm/year

Husk burial for moisture preservation undertaken in a phased manner @ 150 palms/year; Replanted quality seedling in place of old and unproductive palms; Underplanting undertaken wherever possible; Increased the area under pepper by planting 50 vines during the period; Cultivation of intercrops undertaken; Auction sale of grass in the plantation as a measure to save labour and increase revenue.

Important Visitors

Team from the European Economic Community comprising of Mr Michel de Nuce de Lamotha Director, Coconut Division, Research Institute for Oil and Oil seeds, Paris and Nur U P Schuman, Economist came to review the cultivation of coconut in this region and the economics of coconut farming during April 1987.

Dr C C Bidappa, Dr M Yusuf and Mr C Kailasam of CPCRI visited the station in 6/1987.

1.27 NARP SUB CENTRE, ERUTHEMPATHY

The NARP Sub Centre, Eruthempathy started functioning at the Integrated Seed Development Farm of the Department of Agriculture, Kerala State from 1st June 1985. An area of 1.75 ha land in the ISD Farm itself was placed at the disposal of the Kerala Agricultural Uni-

versity for the experimental purpose. The administrative and technical control of this centre is vested with the Associate Director Regional Agricultural Research Station, Pattambi.

The objective of starting the centre was to assist the farmers in the drought prone area of the Palghat district viz. Kozhinjampara by way of

i) Identifying better varieties of crops grown in the locality and recommending them to the farmer for adoption.

ii) and suggesting suitable agronomic management practices for each of the crops.

The thrust areas identified for tackling are (i) Moisture stress experienced during the growth period of almost all the crops grown in the locality and (ii) Non availability of better planting material especially the non availability of ground nut variety having a dormancy of a short period.

Research Achievements

1) Six black gram varieties viz. Co-2, Co-3, Co-4, Co-5, T-9 and local varieties were evaluated for the performance. Co-2 variety gave the highest yield. The same trend was observed during the previous year also. This is an indication that the performance of Co-2 variety black gram is superior to other varieties though the yield does not show any statistical superiority.

2) Two cultures of Horse Gram varieties evolved at the Regional Agricultural Research Station, Pattambi were compared with the Pattambi local and other popular variety of this locality. There was significant difference in grain yield with varieties. The local variety was superior to other varieties tried.

Involvement of staff in the Academic Programmes

Shri V Ramachandran Nair, Professor continued to be the member of the advisory committee of Miss Beena Maheswari and Mr Soman, M. Sc (Ag) student of the Agricultural College, Vellayani.

Research Activities

During the year ten experiments were conducted. The name of experiments are given here under.

Evaluation of upland rice varieties for their drought tolerance and performance

This experiment was laid out during the kharif season. Due to the heavy drought experienced during the growth period, the crop completely dried out beyond recovery.

Evaluation of ragi varieties for their adaptability for dry farming condition

This experiment laid out during the kharif season was lost due to drought

Comparative performance of black gram varieties under dry farming conditions

This experiment was conducted in both the season viz kharif and rabi with six and eight varieties respectively. The experiment of the first season was a success while the experiment of the second season failed. The yield data of the first crop season showed no significant difference in grain yield between varieties. However Co-2 variety yield the maximum.

Comparative performance of Horsegram Varieties under dry farming conditions

Four varieties of horse gram tried during the Rabi Season showed significant difference in grain yield. Local variety yielded 597 kg per hectare while the lowest yield of 43[illegible] kg/ha was obtained from P. T. B. Local. However the cultures 2 and 3, the selections of the P. T. B. Local were better than their progenitor. Among the cultures, culture 3 was superior to culture 2.

Nutritional requirement of Groundnut under rainfed conditions in dry farming regions

This experiment was laid out in both the seasons. But it was successful only in the second season. The result indicates that nitrogen @ 20 kg/ha have significant response over no nitrogen with regard to ground nut yield. But between 10 kg and 20 kg per hectare no difference in yield was noted. However phosphorus and potash did not show any significant effect on yield.

Evaluation of Groundnut varieties under dry farming conditions

This experiment was laid out with fifteen varieties during the kharif season. But it failed because of drought. During the Rabi season this experiment was laid out as a three row trial with thirteen varieties. Statistical analysis of the varieties revealed no difference between varieties as far as yield was concerned.

2: FACULTY OF VETERINARY AND ANIMAL SCIENCES

2.1 COLLEGE OF VETERINARY AND ANIMAL SCIENCES, MANNUTHY

The College of Vety. and Animal Sciences was established in 1955 at Mannuthy. The College became a constituent unit of the Kerala Agrl. University in February, 1972. The College has associated with a Livestock Farm, Poultry Farm and Pig Breeding Farm. There is also a goat farm in the campus attached to the All India Co-ordinated Project. The College and the residential campus cover in area of 195 hectares

The following 19 departments viz., 1) Anatomy, 2) Animal Management, 3) Animal Reproduction, 4) Animal Breeding and Genetics 5) Clinical Medicine, 6) Dairy Science 7) Extension 8) Microbiology 9) Nutrition 10) Parasitology 11) Pathology 12) Pharmacology and Toxicology 13) Physiology 14) Poultry Science 15) Preventive Medicine 16) Surgery, 17) Veterinary Public Health 18) Statistics and 19) Animal Production Economics continued to function during the year. All the departments are offering post-graduate course at Masters level. All except Anatomy, Clinical Medicine Extension, Pharmacology and Toxicology, Preventive Medicine, Surgery, Vety Public Health, Statistics and Animal Production Economics are offering Ph. D. Programmes.

Two Veterinary hospitals one at Mannuthy and the other at Kokkalai, Trichur along with the Livestock Farm, Poultry farm, Pig breeding farm and A. I. Centre served as Instructional units of the College.

Dr K Radhakrishnan, Professor(Research Co ordination) continued to hold charge of the Dean of the Faculty of Veterinary and Animal Sciences. Dr M Krishnan Nair continued as Director of Veterinary Research and Education.

Faculty improvement programme

Dr C K Sreedharan Unni, Asst. Professor, Department of Anatomy continued on deputation for Ph. D in Haryana Agricultural University, Hissar. Dr S P Sureshan Nair, Dr Kuttynarayanan, Dr Stephen Mathew, Dr Leo Joseph, Dr Manomohan, Dr Amritha Viswanath, Dr Sabu Kuruvilla and Dr K S Sebastian continued on study leave during the period. Dr V Prasad, Dr J Abraham, Dr V S Balakrishnan and Dr K Venugopal rejoined in the College during the period after their Ph D Programme.

Details of seminars, symposia, training programmes attended by staff

Staff members of the Department of Microbiology participated in the national seminar on Immunopathological responses and diagnosis of emerging diseases from 17th to 19th August, 1987.

Dr S Sulochana participated in the seminar on Rinderpest and presented a paper on diagnosis of Rinderpest with special reference to counter immuno electrophoresis in September, 1987.

She also attended animal disease seminars at nine districts during the year. She also attended the state level animal disease committee and task force committee at Veterinary Biological Institute, Palode, Trivandrum.

Dr E Sivaraman attended the national symposium on "Latest research trends in livestock and poultry nutrition" at Banaras Hindu University, Varanasi from 23–26 March, 1988.

He also attended the workshop on Indo-USAID project on Biodegradable animal waste for livestock feed at ICAR New Delhi from 22nd to 23rd February, 1988.

Dr K P Sadanandan and Dr Sisiliamma George also attended the society of animal physiologist of india conference held at Ranchi in September, 1987 and presented a leadpaper.

One day orientation training programme on diagnosis and treatment of infertility in cross bred animal was conducted during September, 1987 for the Asst. Directors working in the field.

Dr K M Alikutty and Dr P G Baby attended National symposium on "Strategy for ensuring effective health care for the exotic and cross bred animals" at Assam Agricultural University, Guwhati between 21st-23rd December, 1987.

Dr Jacob V Cheeran attended International conference of Zoological and Avian Medicine at Hawai, U.S.A. during September, 1987. He also visited the conservation research centre Smithsonian Institute Frontnajal, Virgina' U.S.A. during September, 1987.

Dr N Gopakumar, attended summer institute on Neuropharmacology at Haryana Agricultural University, Hissar from 22-6-87 to 11-7-87.

Workshop/Training/Seminar/Symposia/Exhibition conducted

Conducted a training programme on chemical immobilization for field veterinarians from 8-2-1988 to 12-2-1988. Livestock Inspectors training from 10-11-1986 to 9-10-1987 two batches completed the training and was relieved on 9-10-1987.

Academic Programme

i) UG Course

Strength of students under each course during 1987-88

Year of admission	Men	Women	Total
1979	2	—	2
1980	5	—	5
1981	15	2	17
1982	51	13	64
1983	42	11	53
1984	77	30	107
1985	72	29	101
1986	70	29	99
1987	72	39	113
	406	153	559

No. of outside students with details of state/country/programme etc.

Men	Women	Total
41	5	46

No. of students who obtained their degree during the year

Year of admission	
1979	1
1980	2
1981	63
	66

ii) P G Course:

Strength of students in each course

	Men	Women	Total
1985	0	1	1
1986	1	1	2
1988	4	2	6
	5	4	9

Number of outside students—

Female—1

No. of students who obtained degree during the year 1987-88

Year of admission	No. passed
1984	4

iii) Ph D.

Strength of students	8
No. of outside students: Male	1

No. of students who obtained Ph. D. during the year:

Year of admission	No. passed
1979	1
1981	1
1984	1

Study tours conducted

All india study tour during March-April, 1987, South India Study tour during March-April 1987. All Kerala study tour, study tour to Indo-Swiss Project, Mattupatty, Parambikulam Wild Life Sanctuary, Veterinary biological Institute, Palode; Kerala Drugs and Pharmaceuticals, Alleppey and Dhoni farm, Malampuzha are the other tours conducted.

Scholarships, awards and aids to students

1	Fee concession under KPCR	—	82
2	KAU Merit Scholarship	—	50
3	ICAR Merit-cum-means scholarship	—	9
4	Scholarship by KLD & MM Board	—	4
5	District wise merit scholarship	—	6
6	Kerala Labour Welfare fund scholarship	—	2
7	Scholarship under Indo Sudan Cultural exchange programme	—	1

8	KAU Junior Fellowship	—	2
9	General cultural Scheme Scholarship	—	1
10	ICAR Senior fellowship	—	1
11	ICAR Junior fellowship	—	6
12	Stipend to Goa students	—	3
13	Stipend to students from Arunachal Pradesh	—	5
14	Educational concession to Lakshadweep Students	—	12
15	Edn. concession to SC students	—	57
16	Edn. concession to OBC/X'ian convert students	—	10
17	Educational concession to ST students	—	4
18	National Merit scholarship	—	30
			285

Extra curricular activities, Students Union and NSS activities

Students Union

The College day was celebrated by the students union on 19th September, 1987 and Sri E Chandrasekharan Nair, Hon'ble Minister for Animal Husbandry inaugurated the function. The inauguration of the new students union was conducted on 10th October, 1987. The film club screened two feature films and three technical films. The hobby centre conducted a painting competition for school children. The Arts Club conducted a special programme for the newly admitted students and the interclass dramatics during the period.

N. S. S.

The N. S. S. Unit of the college participated in National Integration Camp at Thekady from 20-11-87 to 29-11-87 along with 5 volunteers of the College, organised a special camp with 120 NSS volunteers at Tribal colony in Wynad District from 31-10-1987 to 5-11-1987. This is in addition to the regular activities like Social forestry camp, health camp and Drought survey conducted at Vellanikkara during the year.

Hostel

Hostel	Warden	Asst. Warden	Steward/ Matron	Strength M	W	Total
UG Hostel	K Radhakrishnan	Dr V S Balakrishnan	Mr. Surendran P	200	—	200
UG Hostel (Annex)	..	Dr M Gopalakrishnan Nair	—	54	—	54
PG Hostel (Men)	..	Dr S Raveendran Nair	—	74	—	74
UG Hostel (Women)	..	Dr Sicilianma George	Sicily, T P	—	132	132
			Total			460

Chemical Immobilization activities

During the period under report 14 cases of control and translocation of captive elephant in musth were successfully attended in addition to the immobilization of captive wild animals in the local zoo. A wild panther was successfully tranquilized and returned back into the forest. Technical assistance was extended to the tranquilization and translocation of wild elephant in the state of Karnataka.

Veterinary Hospital, Mannuthy

Veterinary Hospital, Mannuthy was started during the year 1958–59. A total of 10727 cases (156 equine, 7626 bovine and 2945 others) were treated during the period. Eight castrations, seventy five major surgical operations and 742 minor surgical operations were attended to. A total of 6722 RD vaccinations. 170 foot and mouth vaccination and 3 antirabic vaccinations were conducted during the period.

A total of 258 clinical samples was analysed in the laboratory attached to the hospital.

A. I. Centre	Total A. I.	Revenue
Mannuthy	6298	30524
Kokkalai	4128	17642
Total	10426	48166

Field Laboratory Examination of Animals and Materials

A total of 1400 specimens of animal/human origin were subjected to cultural/biological/serological/virological/mycological tests and the results communicated.

Number of cases treated in the Department of surgery — 60
No of X-ray taken for clinical and Research work — 220
Receipt during the year — 1525

Milk samples: Meat samples and Toxicological Analysis were conducted.

Research Achievements

Swine, Elephant and other species

The Karyotypes of three groups of elephants studied viz. Tusker, Makhna and cow elephant revealed a diploid chromosome number of 56 comprising of 54 autosomes and 2 sex chromosomes. Tusklessness in Makhna was found to be not associated with either euploidy or aneuploidy.

Among the different body measurements which influence the body weight of elephants chest girth was found to be the most important (X-0.97) followed by body length (from base of forehead to base of tail).

Predtious equation was also derived to assess the body surface area from body weight alone and also by using body weight and height

Cattle and buffaloes

Rumen degradability studies with some of the common feeds and fodder fed to cattle indicated that coconut oil cake, tamarind seed, maize, rice bran, black gram bran, paddy straw, guinea grass and leucaena fodder recorded a lower drymatter and nitrogen disappearance rate when compared with other feeds.

Based on the physiological reactions and haematological values crossbred bullocks were found to be under some degree of thermal stress during summer and exercise increase this stress resulting in a lower work performance than indigenous bullocks.

Animal Reproduction

Anoestrum in postportum cows was found to be an important cause for infertility.

Animal Diseases:

Ochratoxin induced nephrosis was demonstrated to be an important problem in livestock.

Employing chicken embryo as the model it was shown that ochratoxin could induce various teratalogical abnormalities. It was clarified that ochratoxin has significant adverse biological effect on the embryonesis of the bone and the eye.

Hypothyroidism was identified to be responsible for certain cases of non-infectious subfertility and infertility in livestock.

Employing broiler rabbits as a model by experimental studies it was shown that tapioca flour is a weak goitrogen. It could be used in the ration advantageously for obtaining more weight gain for rabbits.

Intradermal hypersensitibility test and haemolysis inhibition tests were found to be of value in the diagnosis of Caseous lymphadenitis in goats.

Infectious Bursal disease, Inclusion body hepatitis and Gangrenous dermatitis were identified in the state for the first time.

Breakdown of immunity was seen associated with IBD and IBH and severe outbreaks of Coccidosis, Mareks' Disease and Ranikhet disease were recorded in the flocks.

Hepatosis in ducks was shown to be an important single factor responsible for high mortality.

Influenza virus A type was shown to be pathogenic to adult quails

2.1.1 CENTRE OF EXCELLENCE IN PATHOLOGY

The Department of Pathology in the College of Veterinary & Animal Sciences was upgraded to the status of Centre of Excellence in

June 1987. The Centre is offering M. V Sc. and Ph. D. programmes. The Centre is offering M.V.Sc. and Ph. D. programmes. The department offers courses in pathology for the undergraduate students (14 credits) and post-graduate students in the field of pathology. The trimester system is followed now. Dr A Rajan is the Director and head of the centre.

Service activities

The department undertakes regular diagnostic service. Clinico-pathological examination, postmortem examination and diagnosis of Rabies. Analysis of Mycotoxins in feed are some of the routine activities of the department.

Mycotoxicosis, Hypothyroidism, Animal Cancer and diseases of poultry were taken as priority area for research.

Research Achievements

By survey studies it was demonstrated that 25% of the feed samples contained aflatoxin more than the permissible level. Aflatoxin induced hepatosis was the most important single factor which was responsible for high morbidity and mortality in livestock and poultry. It was demonstrated by experimental studies that aflatoxin is a powerful immunosuppressant and this was responsible for disease outbreaks in the field and breakdown of immunity even after vaccination.

Various types of aflatoxin induced cancer was observed in ducks. Hepatomas were also recorded in remote locations like the air sacs clarifying the remot carcinogenicity of the aflatoxin.

Ochratoxin was the other important mycotoxin identified. It was clarified that most of the cases of visceral gout were due to ochratoxin. By experimental studies it was demonstrated that ochratoxin has significant adverse biological effect on the organogenesis of bone and eye. Ochratoxin was also shown to be immunosuppressive.

It was established that non-specific anoroxia syndrome in cattle was caused by aflatioxin.

The histogenesis of preneoplastic changes in the duck liver induced by aflatoxin was identified and histological features were described.

It was demonstrated by experimental studies that tapioca flour is a weak goitrogen in broiler rabbits.

For the first time incidence of inclusion body hepatitis and infectious bursal disease was recorded in chicken in the state. Their pathogenesis and pathology were worked out. These viral diseases caused severe immunosuppression and this caused severe outbreaks of coccidiosis, Ranikhet disease and Marek's disease in vaccinated chicken.

Control measures were recommended. The incidence of ethmoid carcinoma was on the increase in this year. Cyclophasphomide therapy gave promising results in early cases of ethmoid carcinoma.

Gangrenous dermatitis in broiler was also recorded for the first time in the state.

An electron microscope unit was established in this department. Transmission and scanning electron microscopes were purchased.

2.1.2. *CENTRE FOR ADVANCED STUDIES IN POULTRY SCIENCE, MANNUTHY*

The Centre for Advanced studies in Poultry Science was established in November, 1986. The major thrust areas identified for implementation by Centre are,

to develop suitable hybrids of poultry suited to different managemental practices; To augment research in duck, quail, turkey, pigeons etc. To formulate and organise training programmes in different aspects of poultry production.

Research achievements

In the AICRP on Poultry breeding the IWN x IWP strain cross which was doing esceeing well in the Anand testing Centre, was also exposed to all India Random Sample test at Hesserghatta centre. This hybrid excelled in performance all other entries which participated in the test recording a hen-housed production of 267 eggs. The livability feed conversion efficiency and return over food cost were also best.

In the ad hoc scheme on ducks the testing and selection in white Pekin stock of duck was continued. The third generation (S_3) progenies have been hatched out. Based on the information in S_0 and S_1 generation the response to selection was calculated and it was found that the realized response out-weighed expected response.

In the AICRP on Poultry Nutrition the IWN x IWP cross developed in the AICRP on Poultry breeding were hatched out in April, 1988 The birds have come to layer stage.

The centre also involved itself in offering the two training programme:

a) Advanced training in poultry breeding and genetics to senior officers of Animal Husbandry Department, Kerala.
b) Short term training in Poultry Management for pre-release defence personnel

2.1.3. *CENTRE FOR ADVANCED STUDIES IN ANIMAL GENETICS AND BREEDING*

The Department of Animal Genetics & Breeding was raised to the status of Advanced centre and Dr G Mukundan, continued to be the Director and Head of the centre.

Research Highlights

Karyological studies in cattle of different genetic groups viz. local, non-descript, half bred Jersey & half bred Fresion were karyotyped using peripheral blood leucocyte culture technique. Examination of Karyotypes of animals with reproductive disorders revealed (1) A sterile cow with underdeveloped ovary and utesas exhibited 60 61 mosaicism (2) A free martin and with xx/xy chemeuism (3) Non descript local bullock with diploid undeploid chemeuism (mixoploidy) was delicted.

Blood groups and biochemical polymorphism in cattle

Using isoimmunization technique monovalent area have been produced for blood group typing. Animals were screened for Haemoglobin, Albumin and Transferien polymorphism.

Breeding rabbits for meat production

Tores breeds of broiler rabbits namely Newzealand white, Soviet chinchella and Grey giant were crossed by diallele pattern studies on growth traits, reproduction traits survivability, feed efficiency and carcass traits were studied under superhumid tropical climate prevalent in Kerala. The genetic groups were found to influence the average daily gain in body weight significantly.

Progany testing scheme

Milk recording was done in different centre. Overall predicted yield was 1374 5 wt. Fat percentage evening milk was joined to be higher compared to morning milk. A total of 14 165 artificial insemination was carried in different centre.

Cytogenetic profile of Indian elephants

The Karyotypes of three groups of elephants studied viz. Tuskes makhna and cow elephant revealed a diploid chromosome of 2n : 56 composing of 54 autosomes and 2 sex chromosomes study concluded that elephants exhibit xx xy sex chromosome mechanism, and that tusk lessness in makhna is not associated with either ouploidy or aneuploidy.

2.1.4 AICRP ON AGRICULTURAL BYEPRODUCTS UTILISATION IN LIVESTOCK FEED

The thurst area of the station is the AICRP on determination of availability of Animal feed resources and their utilisation for livestock and poultry.

The main achievements of the station is as following.

Animal nutritional survey was started in 3 selected village clusters namely Tiru (Trichur Dt). Nilambur and Eswaramangalam 48 farmer families were selected in each village cluster and the animal feeding pattern followed by them are recorded. The study is for a period of one year from August 1987.

Shrimp shell, a marine by-product was incorporated in pig ration replacing fish meal. Preliminary findings indicated that pigs fed shrimp shell had low body weight gains than control animals.

2.1.5 VETERINARY HOSPITAL, KOKKALAI

This hospital was started 62 years back and is situated on the south western side of Trichur Town. The area of this hospital compound is about 0.5 hectares.

The main objective of this hospital is to give all kinds of Veterinary aid to animals in and around Trichur and to give them protection vaccination against infectious diseases. The modern trends in the field of diagnosis and treatment are practiced in this hospital. Specialists from different clinical/paraclinical departments ofVeterinary College are attending this hospital for this purpose regularly.

A clinical laboratory and an artificial insemination centre are also functioning in this hospital premises.

Dr K Ramadas, Professor continued as the Head of this station during the period of report.

Training programme

Students of B.V.Sc. & Animal Husbandry classes were given practical training in various aspects of clinical diagnosis and treatment of Animal diseases.

696 operations, 28 castrations were conducted. 9019 birds were treated and vaccinated. 304 PAR vaccinations were given.

2.1.6 CATTLE BREEDING FARM, THUMBURMUZHY

The farm was started in the year 1957 by the Animal Husbandry Department of Kerala. The farm has 25 hectares of land.

The main objective of Cattle Breeding Farm, Thumburmuzhy are:

Cattle Breeding Farm, Thumburmuzhy is only a calf rearing station and functions as a supporting station for the University Livestock Farm, Mannuthy. Calves born at University Livestock Farm, Mannuthy are being transported to this station after 3 months of age. The calves are reared to maturity and impregnated artificially with semen collected from the bulls in this station. The animals are transported back to U L F. Mannuthy when they are in advanced stage of pregnancy.

To extend the facilities of Veterinary aid, artificial insemination of cattle, supply of improved varieties of fodder slips, etc. to the farmers of the surrounding area.

Dr. Joseph Mathew, Assistant Professor is in charge of the farm.

Extension activities: 362 artificial inseminations were conducted and 214 animals were treated, 5950 fodder slips were supplied. Eight batches of Livestock inspectors were trained from the farm.

3. FACULTY OF FISHERIES

3.1 COLLEGE OF FISHERIES, PANANGAD

The Fisheries College was started during the academic year 1979–80, with the approval of ICAR and the Government of Kerala. To begin with, the College started functioning at Mannuthy, but was shifted to its permanent campus at Panangad, Cochin in the year 1981. The College offers a four year degree programme leading to the degree of Bachelor of Fishery Science (BFSc). The intake capacity is 20 per year and the system of teaching has been changed to the semester. Post graduate course (M.F.Sc.) is also being offered in the disciplines of 'Aquaculture' and 'Fisheries Extension'.

Dr. M. J. Sebastian is the Dean of the College and head of the Institution.

Departments

The College has seven departments, viz. Department of Aquaculture, Fishery Biology, Fishery Hydrography, Fishing Technology, Fishery Engineering, Processing Technology and Management Studies. A separate section for Fisheries Research is also functioning under the Professor of Fisheries Research.

Academic programme

UG Course

Strength of students during 1987–88

	Men	Women	Total
I Year (1987)	11	8	19
II Year (1986)	10	5	15
III Year (1985)	14	3	17
IV Year (1984)	21	9	30

No. of outside state students

Men	State/Country
1	Srilanka
7	Manipur
2	Pondicherry
1	West Bengal
2	Minicoy
Total 13	

No. of students who obtained the degree during the years

Men	Women	Total
23	8	31

P. G. Courses

M. F. Sc. (Aqua)

Batch	Men	Women	Total
I	3	2	5
II	1	1	2
III	2	1	3

M. F. Sc. (Extn)

I	2	2	4

Practical Training Programme

Work experience in Aquaculture was given to students of BFSc final trimester. Besides, farm training was given in integrated farming of fish-livestock and crop. Field trips on board M. V. Matsya were arranged in connection with the courses on physical and chemical Oceanography, marine fisheries and fishing technology.

Study tours

1982 and 83 batch B. F. Sc. students visited places of fisheries importance in Mangalore, Bangalore and Mysore during April 1987

Scholarships, awards and aids to students

Name of scholarship	No. of receipts		
	B. F. Sc	M. F. Sc.	Total
SC/ST	36	3	39
K. P. C. R.	18	—	18
Fisherman	8	—	8
N. M. S	3	—	3
Total	65	3	68

Extra curricular/co-curricular activities

Students' Union

Students' Union 1986-87 was inaugurated by Hon'ble Minister for Finance, Sri V Viswanatha Menon on 16-10-1987. The Arts Club and Planning Forum were also inaugurated on the same day respectively by Prof M K Sanu, M L A and R P G Kurup, Head of the Department of Oceanography, Cochin University. The Science Forum was inaugurated by Dr A Parthasarathi on 10-12-87. Fisheris day of 1987 batch was held on 25-11-1987. Students of the college participated in the Fisheries Exhibition-cum-cultural programme organised by Matsyafed in February, 1988 at Kattoor. Interclass Literary Competition and sports Quiz were held on 7-6-1988 at Kattoor. Interclass Literary Competition and sports quiz were held respectively on 7-6-1988 and 14-6-1988. The union also arranged a painting exhibition-cum-demonstration by Master Nitin K David on 16-6-1988.

The College Day was celebrated on 1-9-1987. Merit Evening was held on 1-9-1987. Hon'ble Minister for Agriculture, Sri V V Raghavan was the Chief Guest of the function.

N. S. S. Activities

Two blood grouping camps were organised by the NSS Wing of the college during the year. A free eye camp was organised at the campus to benefit about 250 patients in the locality.

Five volunteers and Programme Officer participated in the National Camp at Thirunelli, Wynad.

Tournaments and Championships

The College teams participated in the KAU Inter Collegiate tournaments in Volley ball, Table tennis, Shuttle, Ball badminton, Basket ball, Hockey and Cricket. The College teams won the Ball badminton (women) and were runners up in Volley ball (women), Basket ball (men) and Hockey tournaments.

Hostel (Men)

Student strength. 93

Warden — Dr M J Sebastian, Dean

Asst. Warden — Dr I S Bright Singh, Jr Asst Professor

Steward — Sri A M Kareem,

The College is not having its own Ladies Hostel and hence the lady students were accommodated at Y. W. C. A. and Athurashram Working Women's Hostel, Ernakulam at University expenses subject to realisation of hostel fee from the students at the University hostel rates. There were 23 women students in these hostels.

Other matters

A one week training programme on prawn culture was conducted for the officers of Kerala State Co-operative Agrl. Development Bank during December, 1987.

College library

There are 7574 books and 22 journals are subscribed.

Instructional Farm

Campus area is 28 ha. This comprises an approximate area of 10 ha of wet lands and the rest garden lands. In garden land coconut is the main crop and there are about 1500 yielding trees.

Out of the wet lands 5 ha was leased out for prawn filtration. 0.5 ha was used for experimental paddy-cum-fish culture. Rest of the area is mainly occupied by fish ponds.

Research achievements

Successful hatchery rearing of *Macrobrachium rosenbergii* was achieved with survival rate as high as 72.4%. 64,000 Nos. of post larvae were obtained from a berried female. From the survey conducted in nine rivers of Kerala *Labeo dussumieri* was found available in rivers Pampa, Manimala and Meenachil. The Punnamada region of Vembanad lake also was seen to harbour the species. The middle reaches of Pampa around Kozhencherry was found as the best fishing ground.

Immersion of one hour air dried clams in a solution containing 0.5% magnesium chloride and 0.5% ammonium chloride kept at 40°C for one hour followed by an electric shock for 1 to 2 seconds and maintaining in the same solution for 30 minutes showed 77-91% gaping in clams. The treatment was found to effect a better deputation of the animals as was evidenced by the decrease in ash content

Prawn infusion agar, AC medium and nutrient agar have been found ideal for enumeration and isolation of bacteria and Sabarand's agar for fungi from various stages of *M. rosenbergii* larvae and corresponding water samples. Design and fabrication of a photoflow device to separate healthy prawn larvae from unhealthy ones have been made.

A specific media comprising of peptone 0.01%, sodium chloride 1.0% shell powder 1.0%, agar 1.0% and distilled water 100ml with pH 7 was formulated to detect decalcifying organisms.

Selective culture of *Penaeus indicus* in pokkali fields during the fallow saline period has been found to give better production than the traditional prawn filtration. The respective production rates were upto 486 kg/ha/61 days and 231 kg/ha/84 days in the two systems. Culture of fishes along with paddy in these fields gave fish production upto 368 kg/ha/130 days, in addition to paddy.

Large scale seed production of important ornamental fishes *Pterophyllum* sp. and *Carassius auratus* was achieved. Glass acquarium tanks were found better suited for the rearing of gold fish spawn compared with the cement tanks.

Research Programmes

Development of technologies for the culture of fresh and brackishwater fin and shellfish, so as to maximise fish production from unit area is being attended to the thrust area being the culture and seed production of the giant freshwater prawn, *Macrobrachium rosenbergii*. Successful rearing of prawn larvae was achieved in the hatchery and survival rate as high as high as 72.4% was achieved.

Reproductive endocrinology of some economically important fishes of Kerala and the population characteristics, bionomics and culture of *Labeo dussumieri* are the main areas of research under Fishery biology. From the survey conducted in nine rivers of Kerala *L. dussumieri* was found available in rivers Pampa, Manimala and Meenachil.

In the Department of Processing Technology Product development from bivalve meat, preparation and shelf life of fish pickles, investigations on the cause of mass mortality of the larvae of *Machrobrachium rosenbergii* in hatchery, estimation of nutrient and feed requirement, and microbial transformation of Chitin waste are the research programmes being carried out. From eight different combinations of fruit Juices, organic acid and oil used for making fish pickle, organoleptic acceptability was found to be the best for the combination of corn oil and acetic acid.

Prawn infusion agar, AC medium and nutrient agar have been found ideal for enumeration and isolation of bacteria and Sabarand's

agar for fungi from various stages of *M. rosenbergii* larvae and corresponding water samples. Design and fabrication of a photoflow device to separate healthy larvae from unhealthy ones has also been made.

Integrated farming of fish and paddy in Pokkali fields and culture and seed production of ornamental fishes are the major areas of research under the section. Selective culture of prawn *Penaeus indicus* in Pokkali fields during the fallow saline period gave prawn production of 305 kg ha 68 days to 486 kg ha 61 days. Traditional system of 'Prawn filtration carried out simultaneously in one field gave a production of only 231 kg ha 84 days showing the advantage of selective culture.

Large scale seed production of important ornamental fishes *Pterophyllum* sp. (angel fish) and *Carassius auratus* (gold fish) was achieved.

Microbial transformation of Chitin watte

The project is to identify potent chitinolytic microorganisms and to work out optimum conditions for their growth and chitinolytic activity.

Population characteristics, bionomics and culture of Labeo dussumieri (Cuv)

The main objectives of the project are assessment of the racial characters, bionomics and optimum environmental requirements for spawning of *L. dussumieri*. It is also proposed to develop technologies for its culture and seed production.

Utilization of Zanthoxylum rhetsa seed to eradicate fishes from aquaculture ponds

The feasibility of using the seed of *Zanthoxylum rhetsa*, a locally available species, as a piscicide is attempted in this project.

Details of seminars/symposia/training programmes attended by staff

Dr. M J Sebastian, Dean, Dr D M Thampy, Professor and Dr P M Mathew, Professor, attended First Indian Fisheries Forum, Asian Fisheries Society, Indian Branch, College of Fisheries, Mangalore, in December 1987.

Dr M J Sebastian, Dean, Dr M K Mukundan, Professor, Dr Susheela Jose, Associate Professor and Dr B Madhusoodana Kurup, Assistant Professor, participated in the Symposium on Tropical Marine Living Resources, Marine Biological Association of India, Cochin in January 1988.

Dr M J Sebastian, Dean, and Dr M K Mukundan, Professor attended All India workshop on Gainful Employment for women in Fisheries Field, Cochin in March 1988.

Dr D M Thampy, Professor, Dr P M Mathew, Professor, Sri P S Mrithunjayan, Asst Professor and Dr J Rajasekharan Nair, Assistant Professor participated in the Seminar on Fisheries Research and Development in Kerala, Department of Aquatic Biology and Fisheries, Trivandrum in April 1987.

Dr P M Mathew, Professor, attended the National Symposium on Research and Development in Marine Fisheries, Central Marine Fisheries Research Institute, Mandapam (T N), in September, 1987.

Sri T M Sankaran, Associate Professor attended five day refresher course for NSS Programme Officers, NSS Training and Orientation Centre, Kalamassery, in July 1987.

He also underwent a one week training on "Manpower issues in Agricultural Sector", Institute of Applied Manpower Research, New Delhi, in January 1987.

Dr I S Bright Singh, Jr Asst Professor, participated in the Third group Monitoring Workshop of Young Scientists programmes, Department of Science and Technology, University of Jammu in October 1987.

3.2 FISHERIES STATION, PUDUVEYPU

The Fisheries Station, Puduveypu started functioning in 1979. It is an instructional farm for brackishwater fish and prawn culture. The farm area is partially marshy with lot of mangrove vegetation, low lying water logged canals, ditches and also with sandy soil. Out of the 325 coconut trees and 180 seedlings, 28 nos. of coconut trees and 47 nos of seedling have been damaged due to the severe drought during last year.

Sri K S Purushan, Associate Professor is the Head of the station.

Details of seminars/symposia/training programmes attended by staff

Sri K S Puurshan, Associate Professor attended the symposium on "Tropical Marine Living Resources" under the auspices of JMBA, Cochin in January 1987. He also participated in the seminar on Fisheries Research and Development under the auspices of Kerala University and presented paper in April 1987 and also in Agricultural Seminar at Karthedom Service Co-operative Bank, Malippuram under the auspices of District Co-operative Bank, Ernakulam in February 1987.

Involvement of staff in the Academic programmes

Theoretical and practical training classes were offered frequently on different aspects of brackishwater fish farming to the UG and P G students visited the station as part of their programme, under the auspices of Fisheries College, Panangad.

The seasonal influence on the commercial fish seed recruitment, the beneficial effect of organic manuring in limited doses on prawn and fish growth and the prospects of enhanced fish production by poly-culture of suitable brackishwater species were made known to the fish farmers

By sale of fish seed on amount of Rs. 20,991/- was obtained during the year. Total expenditure of the station was Rs. 3,86,998/-. Several measures were adopted to increase from revenue.

Other matters

Lab to Land Programme was successfully implemented. 24 homestead farmers of the locality and Govt. UPS, Puduveypu were benefited by the programme. Various input items such as agricultural implements, fertilizers, feeds, feed trays, lambs, poultry cage, fishing nets and smokeless chooles were distributed to the homestead farmers. The beneficiary farmers also reported that the input items supplied to them were helpful to find gainful employment which in turn ameliorated their poverty.

Training classes on agricultural farming techniques and animal husbandry methods were organised on three days and 123 farmers attended the programme

The nutrition garden set up at the Govt. Upper Primary School, Puduveypu attracted much public attention.

The station took all efforts to cater to the fish seed requirement of farmers. There were considerable improvement in the collection and distribution of fish seed than that of previous year. A quantity of about 1015 kg. of fishes and 120.0 kg of prawns were realised for experimental fish culture carried out in 1.2 ha area.

There was surprising reduction in the coconut yield during 1987-88 owing to acute drought situations.

With the co-operation of Social Forestry Department, Regional Officer, Ernakulam, arrangements made for planting of about 2 lakhs *Casurina sp* seedlings on the western and southern boundaries of the campus area.

Research Achievements

The efforts of the station enabled to locate quality fish seed concentration centres during season.

The seed of *Mugil cephalus* were available during the intensity of monsoon while other Mullet seed occurred year round. However a decreasing trend in the availability of quality fish seed is noticed which is indicative of stressful environmental factors prevailing at this place.

The premonsoon months of March-June were found to be the best season for *Chanoi fry* recruitment.

The failure of monsoon had its adverse impact on the quality fish seed recruitment in general, and that of *Lates calcarifer* in particular.

Of the different treatments tried manuring with cowdung seemed to promote prawn growth during the season than other periods.

In the polyculture of fishes maximum survival was recorded in the case of *Mugil macrolepis* while better growth was seen in *M. cephalus*.

Considering the yield from unit area *Chanos chanos* is found to be the most suitable species at this place for short term culture.

The extremely slushy inherent characteristic of the bottom and the overlying colloidal water with excessive turbidity and pH adversely affected the generation of primary and secondary producers which reflected in the qualitative and quantitative aspects of fish production.

Important visitors

Sri M S Rajagopal, Senior Scientist Environmental Division of CMFRI, Cochin visited on 28-4-87.

KAU General Council members visited the station on 11-2-1987.

Sri C D Mattle Spence, Pestalozzi International Children's Village, Battle, E. Sussey, England visited on 5-3-1988.

Sri Nguyen Ba Cue, Neuyen Vu Jhanh Tran Le Phieu, Tran Huu Toam, Huynh Trang Le Thi Nhu Y, Vo Dinh Tana Vice-of Director of Nohia, Binsi Fishery Division, Vietnam, visited on 24-3-88.

4.0 KELAPPAJI COLLEGE OF AGRICULTURAL ENGINEERING & TECHNOLOGY, TAVANUR

The Institute of Agricultural Technology was upgraded and named as Kellappaji College of Agricultural Engineering and Technology when the Faculty of Agricultural Engineering was formally started from 2nd October, 1985.

Dr A G G Menon continued as the Adviser and Dean i/c till 19-8-1987 F N. Sri T P George, Professor & Head of the Department of Land & Water Resources and Conservation Engineering has been placed in full additional charge of the Dean with effect from 19-8-1987.

Faculty Improvement Programme

Sri Jobi V Paul, Assistant Professor who was in-charge of the Department of Agrl. Processing and Structures is on study leave to undergo Ph D Programme.

Sri M Sivaswami, Asst Professor, Dept. of EPME, Sri Alexander Seth, Jr Asst Professor, Dept. of L W R and Sri Jippu Jacob, Associate Professor, Dept of EPME are on study leave to undergo Ph D Programme.

Sri Muhammad C P, Professor, Head of the Department of Farm Power Machinery and Energy attended the XXIV Annual Convention of Indian Society of Agrl Engineers at P V K Akola, during 21st to 23rd, January, 1988.

He also attended the Vth Annual Workshop of renewable energy sources for agriculture and agrobased industries, held at U A S Dharwar, during 9th to 12th February, 1988.

Sri Mathew John, M, Jr Asst Professor attended the XXIV Annual Convention of the Indian Society of Agrl. Engineers held at P V K, Akola, in January, 1988 and the XVII Annual Workshop of the FIM Scheme, held at CIAE, Bhopal, in February, 1988.

Sri Hajilal, M S Jr Asst Professor attended a training programme on pressure system of irrigation held at H A U, Hissar in May 1987 conducted by the Water and Power Consultancy Services (India) Ltd., and sponsored by the Government of India and United State Agency for International Development.

Academic Programme

Diploma in Agricultural Science

Strength	Men	Women	Total
I Year	55	—	55
II Year	57	—	57

No of outside students:

I Year—5 students from U T of Lakshadweep

II Year—5 students from U T of Lakshadweep

No. of outside students

Diploma in Agrl. and Rural Engineering

Strength	Men	Women	Total
I Year	15	—	15
II Year	12	—	12

12 students obtained their Diploma during the year.

B Tech (Agrl. Engineering)

Strength	Men	Women	Total
I Year	17	16	33
II Year	13	5	18
III Year	14	7	21

No. of outside students

I Year—2 students (men) from Nepal

II Year—2 students (men) from Manipur

III Year—2 students (men) from Assam

No. of students obtained degree during the year—Nil

M Sc (Agrl. Engineering)

Strength	Men	Women	Total
I Year	3	5	8
II Year	3	4	7

1 student (men) obtained the degree during the period

7 students of the B Tech (Ag Engg) course and 12 students of the Diploma courses are in receipt of educational concessions from the Harijan Welfare Department. 3 students of the B Tech course received the National Merit Scholarship. 8 students of the Diploma courses get the KAU Merit Scholarships.

Name of Hostel	Warden	Asst Warden	Strength
B Tech Boys Hostel	Dean	Prof C P Muhammed	43 (men)
B Tech Ladies Hostel	Dean	Dr E Komala Amma	27 (women)
Diploma Hostel	Dean	Sri M Velayudhankutty	42 (men)

Extra Curricular and Co-curricular Activities

The activities of the students Union was formally inaugurated by Prof V Aravindakshan on 7th October 1987.

A Sahithya Sayahnam was conducted by the Union on 5th November, 1987.

An inter-class quiz competition was conducted on 19th November 1987.

A 'women's eve' was conducted under the auspices of the Womens Forum on 15-1-1988.

A 'Kaviyarangu' was conducted on 3rd March, 1988.

The College team participated in the KAU inter-collegiate tournaments in various games and athletics. The College team also participated in the Malappuram Dist. Championship in Volley ball and Basket ball.

College Library

The total No. of books in the Library was 15,426 as on 1-4-1987. 24 Nos. additionally procured during the period under report and the total No as on 31-3-1988 is 15,450. The number of journals as on 1-4-1988 is 48.

Instructional Farm

A brief resume of work

Most of the cultivable area of the farm, which extends nearly to 29.65 ha, was cropped during the year. Some area under paddy fields and some dry land was left uncultivated for want of irrigation water.

Paddy, fodder, gingelly, and vegetables are raised regularly, and coconuts, arecanut and pepper are occupied in drylands; seeds and seedlings and other farm produces are being sold as revenue.

Vegetables

Under Onam vegetable production programme, bhindi and cowpea were raised in 0.2 ha.

Under vegetable seed production programme, bhindi, cowpea, bittergourd, snakegourd, bottlegourd, ashgourd, cucumber, amaranthus and brinjal were cultivated in an area of 0.7 ha and seeds collected.

Other activities

In order to augment irrigation facilities, one 2" filter point well has been installed to irrigate vegetable during summer.

Veterinary Hospital, Dairy and Poultry farm

Vet. Hospital, Dairy & Poultry farm is functioning in the campus, and 53 animals are maintained 200 birds in Poultry are maintained. Per day yield of milk is 87 litres. 31,762 litres are totally produced. Egg production per day is 87 Nos 1264 animals were treated in the hospital.

Research achievements of the year

Basic trial on the manurial requirement of betelvine

The data collected and analysed from this trial gave a lot of basic informations which were not available hitherto.

Organic manuring is just enough to support betelvine cultivation and inorganic manuring is not essential.

An average yield of 305.53 lakh leaves can be expected from one hectare of Koottakkodi crop of betelvine.

Use of Mussorie Phosphate as a source of Phosphorous to transplanted rice

It is inferred that Phosphate fertilizer application does not have any possible effect on the paddy in the particular type of the area, which is predominantly sandy-clay loam. Rock phosphate shall be considered as suitable substitute to single super phosphate in the manuring of paddy.

Design and development of economic and durable propping method for banana (Vendran)

From the investigation for two seasons it was evident that Horizontal Hook ring method and Horizontal Coir net method are the cheapest methods of propping for Banana.

The Research Programmes of various departments are given below.

Power, Machinery & Energy

The feasibility trials of the IRRI-6 row rice transplanter, improved sickles, TH-8 thresher and Jyothi planter were conducted.

A low cost 5M dia sail wing type wind mill with deflector augmentor for higher efficiency was also made.

A low cost bio-gas plant of 4 m^3 capacity costing about Rs. 3500/- is being constructed. The gas holder is completed and the plant will be operated soon.

The prototype paddy dibbler was designed and developed for dibbling of paddy for I crop.

A wide boom sprayer for the near ground level applicator for control of BPH in paddy was developed and field tested.

5.0 COLLEGE OF FORESTRY

The College of Forestry was formerly inaugurated under the faculty of Forestry on 27th October 1986, but subsequently the status of the Faculty has been changed to that of College of Forestry.

The original suggestion was to start PG course alone with major objectives of imparting Forestry education and strengthening research in the field of Forestry. Based on this, M. Sc. (Forestry) course was started in the University on 20-6-86. Subsequently, at the interest of the ICAR the 4 year B.Sc. (Forestry) course was started during October 1986.

The draft statute envisages the formation of five departments. But departments as such have not been formed yet. However, all the courses of the M.Sc. (Forestry) programme under the semester system have been grouped under five major fields of specialization, viz. Silviculture Agro-forestry, Tree Physiology, Improvement and Timber Mechanics; Forest Management and Utilization, Wildlife Science and Anthropology of Forest Dwelling Tribal Communities; and Forest Protection.

Apart from the Research programmes of the P. G. Students the College could not take up any new research project owing to lack of infrastructural facilities like well equipped laboratories, a full fledged library and dearth of qualified personnels.

Prof. S M A Aslam, Special Officer (Forestry) was incharge of the college. He relinquished the charge on 1-5-1987. Since then Shri V R Krishnan Nair, Special Officer (Agro-Forestry) is holding full additional charge of the college.

The post of two Associate Professors, 2 Assistant Professors and four Jr Asst. Professors have been sanctioned and persons were posted.

At present two Assistant Professors, Dr C Pythal and Dr K V Satheesan are working in this college on working arrangement from the Faculty of Vety. and Animal Sciences and from the Faculty of Agrl. Engg and Technology.

Faculty Improvement Programme

Dr Luckins C Babu (Associate Professor), Dr N K Vijayakumar (Associate Professor) and Dr K Sudhakara (Assistant Professor) were deputed for one year training programme in Forestry in U S A under the USAID programme.

Details of seminars symposia training programmes attended by staff

Mr V R Krishnan Nair, Special Officer (Forestry) i/c attended a workshop on Agro-forestry sponsored by ICAR and ICRAF, held at Nairobi, Kenya from 6th to 16th December 1987.

Academic Programme

UG Course

(a) Strength of students under each course during 1987-88

	Men	Woman	Total
I Year	16	—	16
II Year	16	—	16

PG Course

Strength of students in each course

	Men	Woman	Total
I Year	2	—	2
II Year	6	—	6 | 8

Study tours-Details

The I Batch of B Sc (Forestry) students were taken to Nilambur on a study tour of four days during the semester break in October 1987.

The M Sc (Forestry) students (both 1985 and 1986 admissions) were taken to Dehra Dun on 1st November 1987.

Scholarships awards

Five M Sc Students of (1985 admission) and one M. Sc. Student of 1987 Admission have been awarded with KAU Junior Fellowships. Two SC students of B. Sc (1986 Admn.) are receiving educational concessions from the District welfare Office for scheduled Caste. Another B. Sc. (Forestry) students is awarded National Merit loan Scholarship.

All the students participated actively in Sports and Games on each working day of this period. Fifteen students of this college participated in KAU intercollegiate cricket tournament held at Vellayani from 20th to 23rd of June 1987. Coaching camps for cricket, volleyball and shuttle badminton were conducted by NIS Field Station coaches. The college team won the KAU shuttle badminton championship.

The No of books purchased during the year is 644.

CHAPTER III

The Directorate of Extension

The primary role of the extension education wing of The Kerala Agricultural University is to give technical support to the State Development Departments and other Agencies involved in Agricultural Development. All extension education programmes in the University are planned, organised, conducted, monitored and co-ordinated by the Director of Extension at the University level.

The extension education programmes of the University are guided by the Extension Advisory Committee with the Vice-Chancellor as Chairman.

Dr A G G Menon continued as the Director of Extension. Dr G R Nair continued as the Associate Director of Extension.

The following Extension Education programmes of the University are operated through the extension stations/units, educational institutions and research stations of the University.

1. Central Training Institute
2. Farm Advisory Service
3. Communication Centre
4. Krishi Vignan Kendras
5. Tribal Area Research Centre
6. National Demonstration Scheme
7. Scheduled Caste Area Research Centre
8. Lab-to-Land Programme/Land-to-Lab Programme
9. Village Adoption Programme

1. Central Training Institute (CTI)

The CTI was established in September 1986 with a sub unit Training Service Scheme at the College of Agriculture, Vellayani as a part of the Special sub-project II under National Agricultural Extension Project (NAEP)-I, financed by the World Bank/Government of India/State Government. In addition to these a Training Unit was functioning with University funds at RARS, Pilicode.

Objectives

This centrally co-ordinate all the training programmes conducted for the benefit of the senior level extension personnel working under the T & V system in the State.

To organise specialised training programmes in Agricultural Journalism, Communication and media management audiovisual and infrastructural technology, for the extension personnel of Kerala and other states.

To strengthen the training capabilities of the research stations and educational institutions under KAU.

To act as the nucleus unit to identify training needs and to organise training programmes for tribal people in collaboration with Department of Agriculture, Forests, Tribal Welfare, KIRTADS etc.

2. Farm Advisory Service (FAS)

The Farm Advisory Service is the field wing of the University.

Thirty five seminars were organised during the period under report by the FAS at District and Taluk levels in collaboration with the voluntary organisations, Service Co-operative Banks and the State Development Departments. Various subjects cutting across faculties such as Agriculture, Animal Sciences and Fisheries were covered in these seminars.

Farm Clinics

The Farm Advisory Service staff regularly visited Nadathara Centre for Farm Clinic, once in a week for giving advice on various subjects.

Diagnostic field visits

The scientists of FAS visited thirty five centres as a diagnostic team for identifying the problems faced by the farmers and recommended suitable solutions.

Sales Counter

The sales counter of the Kerala Agricultural University at Mannuthy Centre functioned under the supervision of the Farm Advisory Service.

The counter continued to service the public by way of sale of publications and vegetable seeds. The total turn over in the counter was Rs. 90,794/- during the year.

3. Krishi Vignan Kendras (KVK)

Following three Krishi Vignan Kendras were functioning during the period under report:

i) KVK at Regional Agrl. Res. Station, Pattambi, Palghat District — ICAR funded

ii) KVK at Regional Agrl. Res. Station, Ambalavayal, Wynad District — ICAR funded.

iii) KVK at Manjeswar, Kasaragod District — KAU funded

The jurisdiction of each Kendra is the District in which it is situated.

The objective of KVK is to impart skill-oriented, need based short and long duration training programmes, in the fields of Agriculture, Animal Husbandry, Fisheries and Home Science to farmers farm youth and farm women with special emphasis on small scale farmers, tribal youths etc. The Kendras are conducting on-campus off-campus training. The number of trainees per batch is restricted to 10 to 16. This small group approach helps to maximise the efficiency of training and to have personal attention to each trainee. Crop production techniques, Animal Husbandry, fish farming, and Home Science are the major fields in which trainings are organised. Training programmes conducted during the period under report at various KVK Centres are as follows:

KVK Pattambi

180 training programmes (106 on-campus and 74 off-campus) were conducted and 2800 participants trained.

KVK Manjeswar

23 training programmes at various places in Kasaragod district were conducted and 718 participants trained.

KVK Ambalavayal

A total No. of 208 training programmes in Crop Production, Crop Protection, Animal Production and Home Science were conducted. No. of participants was 3538 out of which 2438 were female.

4. National Demonstration Scheme (NDS), Sadanandapuram, Quilon District

This ICAR funded scheme is implemented with the specific objective of transfer of technology to achieve maximum production and net return per unit area of land per unit time was operated in Quilon District during the year under report.

The National Demonstration Unit introduced following technologies through crop demonstrations and by conducting field days and seminars

Popularisation of high yielding varieties of paddy, cowpea, sesame etc.
Importance of liming
Fertilizer recommendation based on soil test data
Split application of fertilizers based on critical crop growth periods
Foliar spray of urea plus dimecron to pulses and sesamum
Use of chemical weedicide
Growing pulses and sesamum in summer rice fallows
Use of rat-trap 'Moncompu trap devised by KAU'

The scheme conducted front line demonstration during the year under report are as detailed below:

Taluk	Location	Number
Pathanapuram	Elampal	20
Karunagappally	Adinadu	17
Kottarakkara	Puthoor	34
		71

Cropping Scheme

Paddy—Paddy—Cowpea	—	54
Paddy—Paddy—Sesamum	—	17
		71

Thirty five training and field days involving 563 farmers were conducted. Two seminars. Kisan Melas were conducted at Adinadu and Puthur. 206 farmers participated.

5. Tribal Area Research Centre (TARC)

The Tribal Areas Research Centre (TARC) at Amboori, Trivandrum District started in the year 1983 with the financial support from the ICAR. The project envisages multi-disciplinary research and integrated development of the 'Kanikar tribals of Kerala'.

The general objectives of the project are research oriented developmental activities and to integrate the programme under various disciplines with a view to testing the viability of new technologies under the specific situation of the tribal area for encouraging the people to adopt them in their day to day living.

Agriculture

As a part of popularising Rubber cultivation among 'Kanikkars' a group of 'Kanikkars' was selected and budding in rubber was done utilising local skilled labour. A total of 1232 non descript rubber plants were successfully budded *in situ* in this way.

A performance trial on the growth of Karimunda variety of pepper was laid out in one of the settlements. The trial involved 80 plants planted in 4 replication of 2 each and biometric observations were continuously monitored.

For the purpose of establishing a viable unit of pepper in each homestead a pepper nursery was established in the centre.

One year old West Coast Tall seedlings of coconut were distributed to 175 farmers at 10 per farmer.

The seeds of bhindi, bitterguard, snakegourd, and cucumber were distributed to tribal farmers during October, 1987 for raising kitchen garden. Necessary training was also imparted on the cultivation aspects of the above vegetables.

A cashew nursery of improved variety was raised at the field office at Karikuzhy for the purpose of large scale planting of cashew as a tree crop. The seedlings were distributed to 15 tribal farmers for organised planting and the rest are being maintained in the nursery.

A performance study of different planting materials of rubber was initiated with a view to identifying the best planting material suitable in the area.

Animal Husbandry

A massive vaccination campaign was organised as part of the disease free zone programme against many of the infectious and contageous diseases of livestock and poultry in collaboration with the State Department of Animal Husbandry.

A massive fodder cultivation programme was introduced in the tribal settlement in an area of 40 hectares in collaboration with the Dairy Development Department.

A training on calf management was given to a selected group of'Kanikkars' with the aid of audio-visuals in collaboration with the livestock training centre of the State Animal Husbandry Department.

A limited trial on broiler rabbit rearing was carried out in the selected 'Kanikkar' house holds.

For the Animal Husbandry Programmes of the year TARC has collaborated with sister concerns such as Disease Free Zone project of the Animal Husbandry Department, the Livestock Training Centre at Kodappanakkunnu and the Dairy Development Department.

Tests of intelligence on pre-school children on tribal families to find out the extent of environmental influence

The study was initiated to find out the extent of environmental influence on the intelligence of pre school children of tribal families and their performance. There is a close relationship between low socio-economic status and intelligence. The socio-economic status of 50 pre-school children from different hamlets and their socio-economic status, education etc. were monitored.

6. Scheduled Caste Area Research Centre, Nilambur

The All India Co-ordinated Project on Scheduled Caste area research sponsored by ICAR has been implemented at Nilambur, Malappuram Dist. since November, 1982. The project envisages to develop and disseminate appropriate technology modules, so that the benefits of the

new and advanced technology already generated and being effectively employed with considerable economic advantage elsewhere, would be available to the weaker sections of the society.

Modules on year round production of vegetables, introduction of sweet potato, intercropping banana with vegetables, nursery for short duration vegetables, training on agricultural implements and livestock management, genetic upgradation of goat and poultry, meat rabbit rearing, introduction of lay box, smokeless choola, soak pits, training on various aspects of health, hygienic and nutrition, handicrafts, artistic pottery etc. were implemented during the year under report.

7. Village Adoption Programme

The Kerala Agricultural University has adopted villages in different parts of the State. These adopted villages are attached to the constituent institution of the Kerala Agricultural University located in the respective areas and serve as field laboratories for the staff and students of the University.

Front line demonstrations on technologies developed at these centres were tested at these villages for its adaptability, economic viability.

Frontline demonstration on oil seeds groundnut as an intercrop with tapioca was conducted at Panancherry, Chalakudy and Velayani. An average yield of 950 kg groundnut per hectare, was obtained at three centres where the demonstrations were conducted The village adoption programme was implemented in thirteen centres during the period under report.

8. Communication Centre

The Communication Centre located at Mannuthy is established to provide information technology support to Development Departments, voluntary agencies and Co-operative societies in the State and to transfer the latest technologies to the innovative farmers through different media. In addition to the Farm Advisory Service the Communication Centre has Publication and Information Unit.

Publication Unit

The following publications were brought out during the year under report.

Periodicals

1.	Kalpadhenu	— 5 issues
2.	KAU News letter	— 11 issues

Non-periodicals

Books-

1. Outlines of Diary Husbandry
2. Package of Practices (Livestock)
3. [illegible]

Booklets

1. KAU today
2. Agricultural situation in Tribal Colony
3. Radio tracer Laboratory
4. [illegible]
5. [illegible]

Technical Bulletins

1. [illegible]
2. [illegible]
3. Nutrition garden

Leaflets

1. [illegible]
2. [illegible]
3. [illegible]
4. T X D [illegible]
5. Regional Agrl. Research Station, Pilicode
6. Pests of coconut
7. Disease management in coconut
8. Lakshaganga—Hybrid coconut
9. Management of root wilt affected coconut plantations
10. Coconut cultivars

Press

The KAU Press at Mannuthy caters to all the printing requirements of the University. The items include periodical publications, books, monographs, technical bulletins, folders, pamphlets, registers, annual reports, research reports, research journals, magazines, forms, invitation card, coupons etc.

Information Unit

The information unit attends to the exhibitions, radio, TV and newspaper programmes.

Newspaper programmes

Under this programme, feature articles, titbits and agricultural news were published in 16 leading Malayalam dailies and two English dailies. A total number of 180 feature articles of topical interest covering the disciplines of Agriculture, Animal Sciences and Fisheries were published during the year. These include 168 Malayalam articles and 12 articles in English. In addition to this, questions from farmers were answered through leading Malayalam dailies. 206 press release also were issued.

Radio Programmes

Weekly News

Salient research findings, other activities and important developments in the University are broadcast every Friday from 6.40 to 6.45 AM from the Trichur Station of the All India Radio. This is exclusively for

the University. As this programme is relayed from all the stations in the state the farmers all over the state are covered in this Programme. Apart from this, news items were regularly fed to the All India Radio everyweek.

Farm School on All India Radio

The University collaborated with the All India Radio for the conduct of two farm school on AIR during the year under report.

T. V. Programme

Teaching, research and extension education activities of the University were telecast over TV in collaboration with the Doordarshan kendra, Trivandrum.

A State level agricultural quiz for the students in Agriculture of the vocational Higher Secondary Schools was telecast on 17-3-1988 from the Doordarshan kendra, Trivandrum by the University.

Farm News Service

The exension workers in the field are to be kept informed of the latest technological developments to tackle the field problems. Farm News Programme is a step in this direction. Three issues of farm News were prepared and communicated to all the Junior Agricultural Officers in the State.

Instructional Technology support—Graphic support: Under this programme, Audio Visual aids including colour slides, charts, graphs, posters and photographs were prepared and supplied to the institutions under the University and to the State Departments.

Audio Visual Laboratory

The Audio Visual Laboratory was further strengthened with modern equipment. The PA system was arranged for all University functions, seminars, workshops etc.

Exhibitions

Major exhibition

The University participated in the All India Industrial and Agri-cultural Exhibition conducted in connection with the pooram festival at Trichur during April-May 1987. Over 7 lakhs of people visited the pavilion.

Mini exhibition

The University participated in three Mini exhibitions at Thriprayar,, Puranattukara and Pilicode.

Other Programmes

Horticultural Thereapy programme started during 1986-87 was continued.

Krishi Darsan Programme for taking the farmers to the institutions of the University was also continued.

National Service Scheme

The National Service Scheme with the full financial support of the Government of India continued to operate in the University during the period under report. Dr A G G Menon, Director of Extension continued as the Programme Co-ordinator.

The total student volunteers in the constituent colleges of KAU during the period is 991 in eight units, comprising of 570 boys and 421 girl students.

At University level following programmes were undertaken.

i) A youth meet was organised from 9-5-87 to 18-5-87 in collaboration with the Directorate of Students Welfare at Kanhampady in Idukki District. Thirty student volunteers of KAU participated in the meet.

ii) A ten day National Camp on Environment & National Integration was conducted at Tirunelli, Wyanad District from 20-11-87 to 29-11-87. Sixteen Universities from all over India participated in the camp. 100 student volunteers and 50 youths participated in the camp.

iii) Conducted a reception programme for visiting Russian Youth as part of USSR Festival in India, in collaboration with the NSS Units in other colleges in Trichur District on 23-12-1987.

The NSS Units undertook the following activities:

Management of pests and diseases of major crops by way of group meetings at Kakkamoola and Palappur. Plant protection chemicals were distributed to the farmers.

Soil sample collection campaign
Vegetable cultivation
Agricultural Seminars
Social forestry programme

Vegetable Day (on 24-8-'87). The Hon'ble Minister for Agriculture, Sri V V Raghavan participated in the programme and distributed prizes.

Karshaka Mela and farmers day
Health camp for calves
Cattle sterility campaign at Kalliyoor

Vaccination campaign against Rinder pest and Foot and mouth disease at Kakkamoola, Kalliyoor, Palappur and Vellayani.

294 NSS volunteers donated blood during the year and Blood grouping camps were conducted and free Eye camps were organised.

Two community centres were maintained at Kakkamoola and Palappur with facilities for reading newspapers and weeklies.

60 illiterates were enrolled and supplied with education Kits.

750 patients were examined and medicines were distributed.

The NSS Unit celebrated International Literacy Day, Gandhi Jayanthi, World Food Day, and Celebration of 40th Anniversary of Indias' Independence.

Some of the farmers were motivated by providing necessary help in cleaning the available ponds and stocking fish seed.

Celebrated Vanamahotsava and distributed saplings in the Harijan colonies

Nine Animal Health Camps were conducted during the period. □

CHAPTER IV

Engineering wing

The Engineering wing of the Kerala Agricultural University consists of the Directorate of Physical Plant Vellanikkara with one division at Panangad and six sub-divisions at Vellayani, Tavanur, Mannuthy and Vellanikkara. The control of the construction and maintenance of the buildings, roads, procurement of equipments, vehicles, machinery etc. are the responsibilities of the Director of Physical Plant. Sri C Unnikrishnan was the Director of Physical Plant till 10-7-87 and Sri P O Thomas, Ex. Engineer hold charge from 11-7-1987 and continued during 1987-88.

Budget provision for the year is Rs 201 50 lakhs under works and maintenance and repair. Actual expenditure incurred under civil works during the period under report is Rs.1,31,88 670/-

During the year the following major works have been completed.

A. Road

Formation of 'B' Road—Balance works—Vellanikkara

B Water supply

Protected water supply—construction of ground level water tank, Mannuthy

C College and Lab building

Additional civil works connected to meat technology, lab. building, Mannuthy, construction of Effluent treatment Plant, Mannuthy. Construction of Dairy technology building, Mannuthy. Extension to Pathology lab. to Vety. College, for Electron microscope. Construction of creche building for new KAU School, Vellanikkara.

D Instructional farm

Construction of rearing house for ducks, Mannuthy. Construction of fish ponds 10 nos. Puduveypu. Construction of an insectory at Instructional Farm, Vellanikkara.

E. Staff quarters

Construction of type V quarters (Addl 2 nos) at Main Campus, Vellanikkara.

Construction of type II quarters at KCAET, Tavanur and Type V quarters at RRS, Vyttila.

Construction of type I & II quarters af RARS Pattambi and type II and IV quarters at CRS, Pampadumpara.

Major works arranged

Construction of a semi-permanent shed for PG students and library at Fisheries College, Panangad and Construction of cage house, Mannuthy.

In addition to the above all the works which were taken up earlier are nearing completion. ❑

CHAPTER V

Estate

KAU Estate have an area of 391.4368 hectares, out of which an area of 149.3 hectares earmarked for the schemes under Cashew, Pineapple, Pepper, Floriculture and Instructional Farm, Vellanikkara for Horticultural College. An area of 14 hectares have been allotted for KADP and 60 hectares of land for the Botanical Garden. An area of about 20 hectares have been utilized for buildings and roads.

During the period under report, the planting materials required for the Rubber Board experiment for the year 1988-89 have been raised. In addition, about 7000 poly baged high yielding variety of rubber have also been raised. Teak Nursery was also raised during the period. Tapping in the newly planted area (Priyardarsini Block) has been started on 13-10-1987.

Details of activities

During the year under report tapping of an area of eight hectares have been started. Clonal varieties of rubber brought by the Rubber Board have been raised as a Nursery for the experimental planting in collaboration with the Rubber Board. Nursery plants of high yielding variety was also taken up during the period under report. For the experimental planting, the area of 27.67 acres have been clearfelled and prepared for replanting.

Expenditure and receipts

A quantity of 24.692 tonnes of rubber was produced during the period under report. The total expenditure during the year was Rs.18,64,021.11 and the total receipt from the estate was Rs.13,67,146.26.

CHAPTER VI

Finance and Accounts

Sri K K Pankajakshan, continued to be the Comptroller of the University.

The budget estimate 87-88 envisaged an expenditure of Rs. 19.17 crores by assuming a grant of Rs 13 80 crores from State Government and the balance from other sources like ICAR, University's own income, Department of Science and Technology, Department of Environment, Ministry of Agriculture, NSS, UNICEF etc. The opening balance as on 1-4-1987 was fixed at Rs. 49 50 lakhs and the closing balance on 31-3-1988 was estimated at Rs. 24.15 lakhs. The allocation earmarked for Research was 38%, Education 39%, Administration 13% and Extension 10%.

Receipt from State Government

The State Government released a sum of Rs. 963 lakhs to the University as grant-in-aid which comprises of Rs. 250 lakhs under Plan and Rs. 713 lakhs under Non-Plan.

Receipt from ICAR and other agencies

The receipt from ICAR and other financing agencies amounted to Rs. 239.27 lakhs.

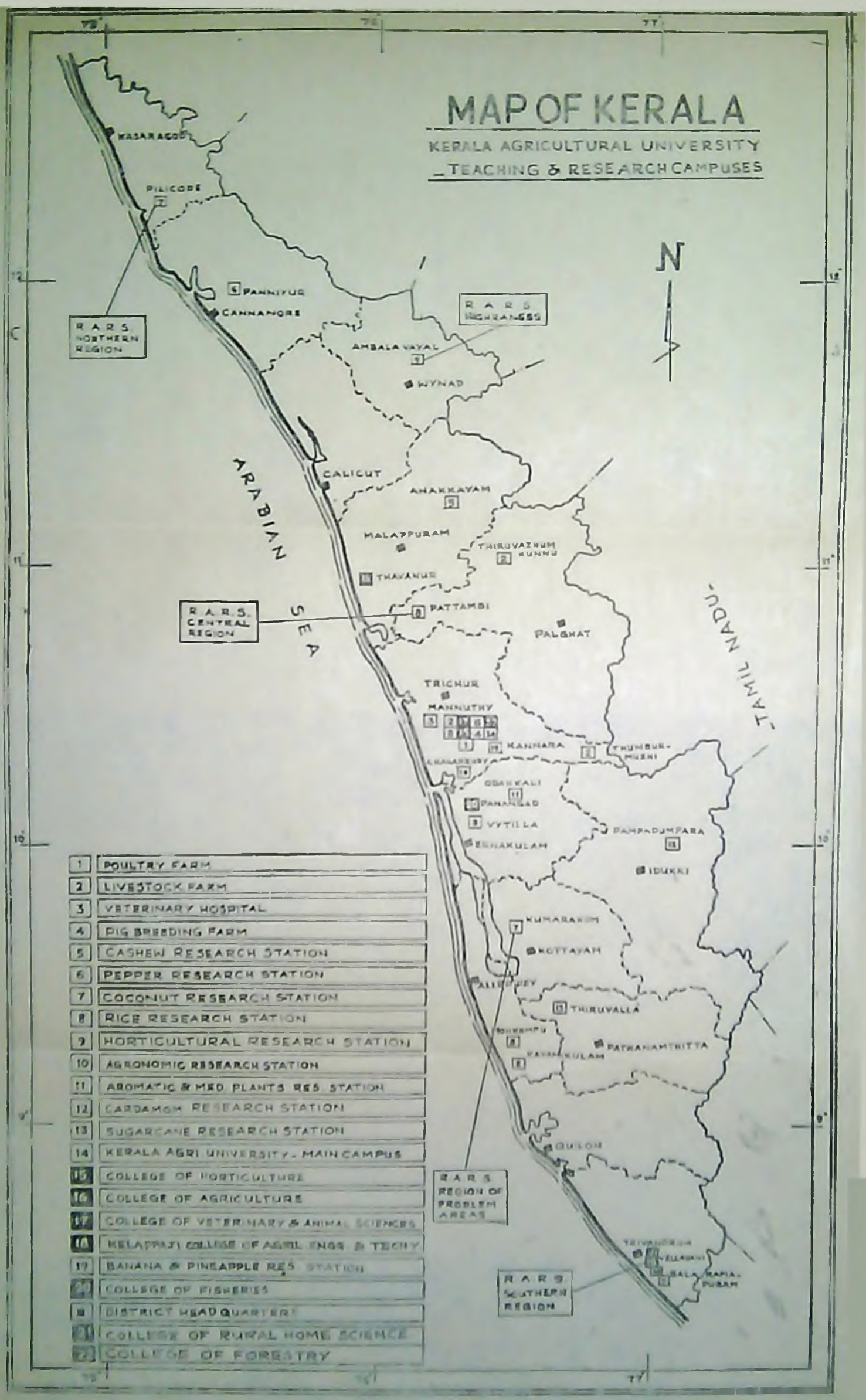
Internal Revenue

During 1987-88 an amount of Rs. 124.58 lakhs was realised from the University's own sources.

The total expenditure of the University for the year came to Rs. 1259 68 lakhs. This comprises of Rs 509.40 lakhs under plan and Rs. 750.28 lakhs under non-plan. □

MAP OF KERALA

KERALA AGRICULTURAL UNIVERSITY
_TEACHING & RESEARCH CAMPUSES



1	POULTRY FARM
2	LIVESTOCK FARM
3	VETERINARY HOSPITAL
4	PIG BREEDING FARM
5	CASHEW RESEARCH STATION
6	PEPPER RESEARCH STATION
7	COCONUT RESEARCH STATION
8	RICE RESEARCH STATION
9	HORTICULTURAL RESEARCH STATION
10	AGRONOMIC RESEARCH STATION
11	AROMATIC & MED. PLANTS RES. STATION
12	CARDAMOM RESEARCH STATION
13	SUGARCANE RESEARCH STATION
14	KERALA AGRI. UNIVERSITY - MAIN CAMPUS
15	COLLEGE OF HORTICULTURE
16	COLLEGE OF AGRICULTURE
17	COLLEGE OF VETERINARY & ANIMAL SCIENCES
18	KELAPPAJI COLLEGE OF AGRIL. ENGG. & TECHY.
19	BANANA & PINEAPPLE RES. STATION
20	COLLEGE OF FISHERIES
	DISTRICT HEADQUARTERS
21	COLLEGE OF RURAL HOME SCIENCE
22	COLLEGE OF FORESTRY

Appendix I

MEMBERS OF THE STATUTORY AUTHORITIES

GENERAL COUNCIL

EX-OFFICIO MEMBERS

The Chancellor
The Pro Chancellor
The Vice-Chancellor
The Secretary to Government (Agri)
The Secretary to Government (Finance)
The Director of Agriculture
The Director of Animal Husbandry
The Director of Dairy Development
The Director of Fisheries
The Chief Conservator of Forests
The Registrar of Co-operative Societies
The Dean, Faculty of Agriculture, KAU
The Dean, Faculty of Fisheries, KAU
The Dean, Faculty of Veterinary and Animal Sciences, KAU
The Dean, Faculty of Basic Sciences and Humanities, KAU
The Dean, Faculty of Agricultural Engineering and Technology, KAU
The Director of Extension, KAU
The Director of Research, KAU
The Director of Student's Welfare, KAU

ELECTED MEMBERS

Members of Legislative Assembly (4 nos)

Sri S Govinda Kurup, Member, Legislative Assembly,
Kalakkad Veedu, Adinad North, PO Karunagappally.
Sri ET Mohammed Basheer, Member, Legislative Assembly upto
23-6-87 — Soumyam, Mapram PO, Cheruvayoor, Malappuram Dt.
Sri KP Aravindakshan, MLA, Kapprassery, Peruvanna Veedu,
Choondal PO, Trichur Dt.
Sri KC Joseph, Member, Legislative Assembly, Congress House,
Sreekantapuram
Sri KV Surendranath, Member, Legislative Assembly,
Indian Communist Party, Kerala State Council Office,
Thycaud Trivandrum

Representatives of Students of Post Graduate Courses (2 nos)

Anil Kumar, KS (84-11-34), P.G. Student, Department of Soil Science and Agricultural Chemistry, College of Horticulture, Vellanikkara upto 11-12-87.

R Prakash (84-21-10), Ph.D. Student, Department of Agricultural Extension, College of Agriculture, Vellayani PO, Trivandrum upto 11-12-87.

Representatives of Students of Graduate Courses (2 nos)

Jacob, PK (81-03-78), BVSc & AH Student, College of Veterinary & Animal Sciences, Mannuthy PO, Trichur

Najeebkhan, A (84-03-78), BVSc & AH Student, College of Veterinary & Animal Sciences, Mannuthy, Trichur

Representatives of the Students of Diploma Courses and Certificate Courses (1 no.)

Sajeevan, PB (84-Da-19), DASc Student, Kelappaji College of Agricultural Engineering and Technology, Tavanur, Malappuram Dt. upto 11-12-1987

Representatives of Teachers of Faculties (Other than Deans)
(Not more than 4—One from each faculty)

Faculty of Agriculture

FMH Khaleel, Assistant Professor, Inservice Training Scheme, Mannuthy PO, Trichur.

Faculty of Agricultural Engineering and Technology

Sri CP Mohammed, Professor and Head, Department of Farm Power Machinery and Energy, KCAET, Tavanur, Malappuram Dt.

Faculty of Veterinary and Animal Sciences

Dr V Raju, Assistant Professor, College of Veterinary and Animal Sciences, Mannuthy PO, Trichur upto 1-1-1988.

Faculty of Fisheries

Dr PM Mathew, Professor (Fisheries Research), College of Fisheries, Panangad, Ernakulam.

Representative of non-teaching staff (1 no)

Sri V Balagopalan, Section Officer, Directorate of Physical Plant, KAU, Vellanikkara, Trichur.

Representatives of Presidents of Panchayaths (4 nos.)

Vacant

Representative of Mayors of Municipal Corporations and Chairman of Municipal Councils (1 no.)

Vacant

MEMBERS NOMINATED BY THE CHANCELLOR

Agricultural Scientists (2 nos.)

Sri P Mukunda Menon, Rubber Production Commissioner, Rubber Board, Kottayam

Dr KV Peter, Professor of Olericulture, College of Horticulture, Vellanikkara 680 654

Farmers (5 nos.)

Sri Raghavan Pozhakkadavil, Ex MLA, PO Karalam, Irinjalakuda, Trichur Dist.

Prof Alexander Zachariah, St. Joseph's College, Devagiri, Calicut.

Sri Thiruppuram Thankayya, Teacher, Erayanvila House, Thirupuram PO, Trivandrum Dist.

Sri Therambil Ramakrishnan, Ex. MLA, 'Krishna Kripa', Trichur.

Sri C Haridas, Ex MP, 'Swapna', Ponnani, Malappuram Dist.

Non-official Representatives (3 nos.)

Co-operation

Sri O Lukose, Ex MLA, Kappumthala, Kaduthuruthy, Kottayam Dist.

Fisheries

Sri VT George, Retd. Director of Fisheries, XLVI/972, Chittoor Road, Pachalam, Cochin–12.

Animal Husbandry

Sri AV Hamza, Athakka Veedu, Ponnani Nagaram, Malappuram Dt.

Non-Official Representative of Plantation Industry (1 no.)

Sri Kunhabdulla Haji, Valayil House, Kaniyampaka, Wynad Dist.

Women Social Worker (1 no.)

Smt Jameela Ibrahim, Advocate, Quilon

Engineer who has specialised in Agricultural Engineering or Irrigation (1 no.)

Sri KG Chandrasekhara Pillai, Retd. Deputy Chief Engineer, 'Karthika' Valappally, PO, Changanacherry, Kottayam Dist.

Educationist (1 no.)

Prof. KJ Kurien, Poovathungal House, Thudanganad, PO (Via) Thodupuzha, Idukki Dist.

Representatives of Agriculture Labour (2 nos.)

Sri KP Chelli, Mankada PO, Malappuram Dist.

Sri MR Kottara, Kuyinakkad, Quilon

Representative of Plantation Labour (1 no.)

Sri KA Kurien Master, Alakode, PO, Cannanore Dist.

OTHER MEMBERS

Representatives of University Senates (3 nos)

Calicut : Vacant
Cochin : Vacant
Kerala : Sri S Subramonyan Potti,
TC 14/1680, Sanskrit College Road,
Trivandrum

Representatives of Indian Council of Agrl. Research (1 No.)

Dr Vellayuthum, Assistant Director General, ICAR Krishi Bhavan, Dr Rajendra Prasad Road, New Delhi-1.

ACADEMIC COUNCIL

Members

The Vice-Chancellor, Kerala Agricultural University
The Dean, Faculty of Agriculture, KAU
The Dean, Faculty of Vety. & Animal Sciences, KAU
The Dean, Faculty of Fisheries, Panangad, KAU
The Dean, Faculty of Agrl. Engg and Technology, KAU
The Associate Dean, College of Horticulture, Vellanikkara
The Associate Dean, College of Co-operation & Banking, Mannuthy
The Director, Post-Graduate Studies, KAU
The Director, Veterinary Research & Education, Veterinary College, Mannuthy
The Special Officer, (Forestry), College of Forestry, KAU
The Professor & Head, College of Rural Home Science, Vellayani
The Director, Kerala Forest Research Institute, Peechi
The Director of Research, KAU
The Director of Extension, KAU
The Director of Agriculture, Vikas Bhavan, Kerala, Trivandrum
The Director of Animal Husbandry Vikas Bhavan, Kerala, Trivandrum
The Registrar, Kerala Agricultural University
The Director of Students Welfare, KAU

Members nominated by the Chancellor from among the Heads of Departments of the Faculties (6 nos)

Dr V Gopinathan Nair, Prof. & Head, Dept. of Plant Breeding, College of Agriculture, Vellayani
Prof. S Balakrishnan, Associate Director of Research (Plg), Kerala Agricultural University, Vellanikkara, Trichur
Dr V Radhakrishnan, Prof. & Head, Dept. of Agrl. Economics, College of Horticulture, Vellanikkara
Prof. CP,Neelakanta Iyer, Prof. & Head, Department of Animal Reproduction, College of Vety. & Animal Sciences, Mannuthy
Dr KM Alikutty, Prof. & Head, Department of Clinical Medicine,

College of Vety. & Animal Sciences, Mannuthy

Prof. CP Muhammed, Head, Department of Farm Power & Machinery, Kelappaji College of Agrl. Engg &Technology, Tavanur, Malappuram Dist.

Members nominated by the Chancellor from the staff of the Research Stations of the University

Dr R Raveendran Nair, Associate Director, RARS, Kumarakom, Kottayam Dist.

Dr KP Rajaram, Associate Director, RARS, Pilicode, Kasargode.

Prof. N Rajappan Nair, Associate Director, RARS, Pattambi, Palghat Dist.

Members nominated by the Chancellor from among those connected with service in Agriculture, Animal Husbandry, Forestry, Fisheries, Dairy Development, Co-operation & Community Development Departments (not more than 5 members)

Most Rev. Benedict Mar Gregorios Arch Bishop of Trivandrum.

Sri E Gopalakrishna Menon, 'Rohini', Poothole, Trichur-

Sri KPP Kurup, Milk Marketing Federation, Arkanilayam, Vazhuthacaud, Trivandrum

Sri G Sreekumaran Nair, Chief (Agriculture Division), State Planning Board, Trivandrum

Dr PG Nair, (Retd. Dean, College of Vety. & Animal Sciences), 'Tripthi' Jawahar Road, Chempukkavu, Trichur.

Members nominated by the Chancellor from among the Scientists from the ICAR or its institutions, from other Universities in India or from among well-known Scientists in India

Dr Kaul, Assistant Director General (Hort), ICAR New Delhi

Dr Rajammal Devadas, Hon. Director, Sri Avinashalingom Home Science College, Coimbatore

Dr MK Nair, Director, Central Plantation Research Institute, Kasaragode.

Sri MR Nair, Director, Central Institute of Fisheries Technology, Cochin

Dr Vellayudham, Assistant Director General, ICAR, New Delhi

Elected Members—One member each from among the post graduate students and the Research students of the University

Shri V Rasheed Sulaiman (86-11-29), PG Student, Department of Agrl Extension, College of Horticulture, Vellanikkara, Trichur

Elected members—One member elected by the Teachers

Faculty of Agriculture

Sri TU George, Professor (Agri. Botany), Rice Research Station, Vyttila, Ernakulam Dist.

Faculty of Agrl. Engg & Technology

Vacant

Faculty of Fisheries

Dr J Rajasekharan Nair, Asst. Professor, College of Fisheries, Panangad, Ernakulam Dist

Faculty of Veterinary & Animal Sciences

Vacant

BOARD OF STUDIES

FACULTY OF AGRICULTURE

Dean, Faculty of Agriculture, KAU — Chairman

Heads of Department under the Faculty — Members

Agronomy
Agricultural Botany
Agricultural Entomology
Agricultural Economics
Agricultural Engineering
Agricultural Extension
Agricultural Statistics
Horticulture
Plant Pathology
Soil Science & Agricultural Chemistry
Plant Breeding
Plantation Crops
Pomology, Floriculture & Landscaping
Olericulture
Processing Technology

Two specialists

Dr T Kumaraswamy, Dean (Retired), III Vakil Street, Kovilpatti-627 701.

Dr NP Jayasankar, Joint Director, Central Plantation Crops Research Institute, Regional Station, Kayamkulam, Krishnapuram-690 533.

Such other members

Dr RR Nair, Assoc. Director of Research, RARS, Kumarakom
Sri FMH Khaleel, Assistant Professor, Inservice Training Scheme, Mannuthy

Student Representatives

Sri MJ Joseph, Ph.D student, College of Horticulture, Vellanikkara
Sri Sankaranarayana Sarma, M.Sc. (Ag) Student, College of Agriculture, Vellayani.

Special Invitees

Director of Agriculture, Trivandrum
Dean i/c, KCAET, Tavanur
Associate Dean, College of Horticulture, Vellanikkara
Assoc Dean, College of Co-operation & Banking, Mannuthy
Prof. & Head, College of Rural Home Science, Vellayani
Special Officer (Forestry), College of Forestry, Vellanikkara

FACULTY OF VETERINARY & ANIMAL SCIENCES

Dean, Faculty of Vety. & Animal Sciences — Chairman
Heads of Departments under the faculty — Members
Anatomy
Animal Management
Dairy Science
Preventive Medicine
Microbiology
Parasitology
Pharmacology
Poultry Science
Surgery
Animal Breeding & Genetics
Animal Reproduction
Extension
Nutrition
Pathology
Physiology & Bio-Chemistry
Statistics
Clinical Medicine
Veterinary Public Health

Two Specialists

Dr A Ram Mohana Rao, Dean of Post Graduate Studies, Andhra Pradesh Agrl. University, Rajendranagar, Hyderabad-500 030.
Dr M Krishnan Nair, Director, Veterinary Research & Education, College of Vety. & Animal Sciences, Mannuthy

Such Other Members

Dr K Radhakrishnan, Professor (RC), College of Vety. & Animal Sciences, Mannuthy
Dr T Prabhakaran, Professor of Animal Production Economics, College of Vety. & Animal Sciences, Mannuthy

Student Representatives

Nil

Special Invitees

Director of Animal Husbandry, Trivandrum
Director of Dairy Development, Trivandrum

FACULTY OF FISHERIES

Dean, Faculty of Fisheries — Chairman
Heads of Departments under the Faculty — Members
Aquaculture
Fishery Biology
Fishery Hydrology
Processing Technology
Fishing Technology
Fisheries Engineering
Management Studies

Two Specialists

Dr MJ George, Joint Director (Retd) 120-Giri Nagar, Cochin-682020,
Dr PU Varghese, Project Director, Prawn Farm Project Complex, Marine Products, Export Development Authority, 36/563 T D Road Cochin-682 011

Such other members

Dr PM Mathew, Professor (FR), College of Fisheries, Panangad
Sri FMH Khaleel, Assistant Professor, Inservice Training Scheme, Mannuthy

Student Representatives

Nil

Special Invitees

Director of Fisheries or his nominee
General Manager, Matsyafed or his nominee

FACULTY OF AGRICULTURAL ENGINEERING

Dean, Faculty of Agrl. Engineering & Technology — Chairman
Heads of Departments under the Faculty — Members

Specialists

Prof. RK Sivanappan, Director, Water Technology Centre, Tami Nadu Agrl. University, Coimbatore
Dr CM Jacob, Visiting Professor, Department of Agrl. Engineering, University of Nairobi, Kenya.

Such other members

Dr KC George, Professor & Head, Department of Agricultural Statistics, College of Veterinary & Animal Sciences, Mannuthy
Dr TG Rajagopalan, Director of students welfare i/c, Kerala Agricultural University Headquarters, Vellanikkara

Student representative

Nil

Special Invitees

Mr KR Saxena, Director, Central Board of Irrigation & Power, Government of India, New Delhi.

Mr Vasudevan Pillai, State Agrl.Engineer, Department of Agriculture, Government of Kerala, Trivandrum.

Mr VAP Naik, Chief Engineer, Kerala Agro Industries Corporation. Trivandrum.

Mr TP George, Professor i/c of Post-Graduate Programmes in Agrl. Engineering. College of Horticulture, Vellanikkara

Dr Raghavan Nambiar, Professor of Civil Engineering, Regional Engineering College, Calicut.

Director of Agriculture, Trivandrum or representative

Dr DM Thampi, Profassor, College of Fisheries, PO Panangad Cochin

Dr C Sreedharan, Professor, College of Horticulture, Vellanikkara

Dr R Gopalakrishnan, Head, Division of Extension & Education, CWRDM, Calicut.

EXECUTIVE COMMITTEE

EX-OFFICIO MEMBERS

The Vice-Chancellor, Kerala Agricultural University, Vellanikkara, Trichur.

The Secretary to Government, Department of Agriculture, Secretariat Trivandurm

The Secretary to Government, Development Department, Secretariat, Trivandrum,

The Secretary to Government, Finance Department, Secretariat, Trivandrum.

Other Members – Members representing the ICAR

Dr Vellayutham, Assistant Director General, Indian Council of Agricultural Research, Krishi Bhavan, Dr Rajendra Prasad Road, New Delhi-1.

Elected Dean of Faculty

Dr MJ Sebastian Dean, Faculty of Fisheries, College of Fisheries, Panangad PO, Cochin

Elected Teacher

Sri FMH Khaleel, Assistant Professor, Inservice Training Scheme, Mannuthy PO, Trichur

Elected Non-Official Members

Sri Therambil Ramakrishnan, MLA, Krishna Kripa, Trichur

Sri AV Hamza, Athakka Veedu, Ponnani Nagaram, Malappuram District, Pin 679 583.

Sri Raghavan Pozhakkadavil, Ex. MLA, PO Karalam, Irinjalakuda, Trichur District.

Sri O Lukose, Ex. MLA, Arukuzhuppil, Kappumthala, Kaduthuruthy, Kottayam Dist.

Appendix II

SUB COMMITTEES OF THE EXECUTIVE COMMITTEE

FINANCE COMMITTEE

Vice Chancellor	Chairman
Secretary, Finance	Member
Secretary to Government (Agriculture)	"
Sri Therambil Ramakrishnan, Ex MLA	"
The Comptroller	Member-Convenor

PLANNING AND DEVELOPMENT COMMITTEE

Vice Chancellor	Chairman
Secretary to Government (Agriculture)	Member
Sri Raghavan Pozhakadavil, Ex MLA	"
Sri Therambil Ramakrishnan, Ex MLA	"
Sri O Lukose, Ex MLA	"
Sri AV Hamza	"
The Comptroller	Member-Convenor

RESEARCH REVIEW SUB COMMITTEE

Vice Chancellor	Chairman
Sri Raghavan Pozhakadavil Ex MLA	Member
Sri Therambil Ramakrishnan, Ex MLA	"
Sri O Lukose, Ex MLA	"
Sri AV Hamza	"
The Director of Research	Member-Convenor

ESTABLISHMENT COMMITTEE

Sri Raghavan Pozhakadavil, Ex MLA	Chairman
Sri Therambil Ramakrishnan Ex MLA	Member
Sri AV Hamza	"
Sri O Lukose Ex MLA	"
Dr MJ Sebastian, Dean, Fisheries	"
Sri FMH Khaleel	"
The Registrar	Member-Convenor

STUDENTS WELFARE COMMITTEE

Sri AV Hamza	Chairman
Sri Raghavan Pozhakadavil Ex MLA	Member
Sri Therambil Ramakrishnan, Ex MLA	"
Sri O Lukose, Ex MLA	"
Director of Students Welfare	Member-Convenor

WORKS COMMITTEE

Vice Chancellor	Chairman
Sri AV Hamza	Member
Sri O Lukose Ex MLA	,,
Dr MJ Sebastian, Dean, Fisheries	,,
Director of Physical Plant	Member-Convenor

SUB COMMITTEES OF THE GENERAL COUNCIL

STATUTE SUB COMMITTEE

Sri Raghavan Pozhakkadavil, Ex MLA	Chairman
Sri Therambil Ramakrishnan, Ex MLA	Member
Sri O Lukose Ex MLA	,,
Sri AV Hamza	,,
Sri FMH Khaleel	,,
Dr V Raju	,,
Dr PM Mathew	,,
Sri PK Jacob	,,
The Registrar.	Member-Convenor

ASSURANCE COMMITTEE

Prof Alexander Zacharias	Chairman
Sri C Haridas Ex MP	Member
Smt Jameela Ibrahim	,,
Sri MR Kottara	,,
Sri Tirupuram Thankayya	,,
Sri KG Chandrasekhara Pillai	,,
Sri VT George	,,
The Registrar.	Member-Convenor

ACCOUNTS COMMITTEE

Sri SS Potti	Chairman
Prof KJ Kurien	Member
Sri KA Kurien Master	,,
Sri KP Chelly	,,
Dr KV Peter	,,
Sri V Balagopalan	,,
The Comptroller	Member-Convenor

RESEARCH COUNCIL

Vice Chancellor	Chairman
Director of Research	Secretary

MEMBERS

Director of Extension, KAU, Vellanikkara
Dean, Faculty of Agriculture, College of Agri., Vellayani

Dean, Faculty of Fisheries, Panangad
Dean, Faculty of Vety & Animal Sciences, Mannuthy
All Directors, Centre for Advanced Studies/Centres of Excellence
Dean i/c, Kelappaji College of Agri. Engineering & Technology Tavanur
Associate Dean, College of Horticulture, Vellanikkara
Associate Dean i/c, College of Co-operation & Banking, Mannuthy
Officer i/c of the Faculty of Forestry, College of Forestry, Vellanikkara
Professor i/c, College of Rural Home Science, Vellayani
Dr CTS Nair, Director, KFRI, Peechi
Director, CPCRI, Kasaragod or his nominee
Sri Raghavan Pozhakkadavil, MLA, PO Karalam, Irinjalakuda
Prof KJ Kurien, Nirmala College, Moovattupuzha (Povathumkal House, Thundanganad PO., Muttom, Idukki Dist)
Sri FMH Khaleel, Assistant Professor, Inservice Training Scheme, Directorate of Extension, Mannuthy

CO-OPTED MEMBERS (AGRICULTURAL FACULTY)

Professor (RC) College of Agriculture, Vellayani
Director of Agriculture, Kerala State or his nominee, Vikas Bhavan, Trivandrum
Managing Editor, Agrl. Research Journal of Kerala, College of Horticulture, Vellanikkara
Associate Director, Regional Agricultural Research Station, Pilicode, Kasaragod Dist.
Associate Director, Regional Agricultural Research Station, Pattambi, Palghat Dist.
Associate Director, Regional Agricultural Research Station, Ambalavayal, Wynad Dist.
Associate Director, NARP (SR), College of Agriculture, Vellayani, Trivandrum Dist
Associate Director, Regional Agricultural Research Station, Kumarakom, Kottayam Dist
Associate Director of Research (M&E), Directorate of Research, KAU Vellanikkara
Associate Director of Research (AR&T), Directorate of Research, KAU Vellanikkara
Associate Director of Research (Plg), Directorate of Research, KAU Vellanikkara

CO-OPTED MEMBERS (VETERINARY FACULTY)

Professor (RC), College of Veterinary & Animal Sciences, Mannuthy
Director of Animal Husbandry, Vikas Bhavan, Trivandrum
Director of Dairy Development, Pattom, Trivandrum
Associate Director of Research (V&AS), Directorate of Research, KAU Vellanikkara
Editor, Kerala Journal of Vety. Research, College of Vety. & Animal Sciences, Mannuthy

CO-OPTED MEMBERS (FISHERIES FACULTY)

Professor (Fisheries Research), College of Fisheries, Panangad

Dr KH Alikunhi, Retd. Fisheries Advisor to Govt. of Kerala

Crescent Hatchery & Prawn Farm, Alamanar, Eriad, Kodungalloor, Trichur Dist.

CO-OPTED MEMBERS (OTHERS)

Dr K Raghavan Nambiar, Department of Civil Engineering, College of Engineering, Trichur

Sri KK Nair IFS Retd. Chief Conservator of Forests, Komath House, Cannanore Road, Calicut

Dr TG Alexander, Head of the Division of Soil Science, Kerala Forest Research Institute, Peechi

Dr Thomas Issac, Centre for Development Studies, Ullor, Trivandrum

Dr AN Namboodiri, Director, Tropical Botanical Garden Research Institute, Palode, Trivandrum

Mr Joseph Alappat, Thoppil, Green Gardens, Karanchira PO.

Dr BS Keshavamoorti, Director, Institute of Animal Health and Vet Biology, Hebbal, Bangalore

Professor and Head, Department of Applied Chemistry, University of Science and Technology, Cochin

The Director, Central Tuber Crops Research Institute, Trivandrum.

FACULTY RESEARCH COMMITTEES

AGRICULTURE

Chairman	Director of Research, KAU
University Officers & Head of Institution (3)	Director of Extension Kerala Agricultural University, Mannuthy The Dean, College of Agriculture, Vellayani
Associate Directors (8)	Associate Dean, College of Horticulture, Vellanikkara Assoc. Director of Research (AR&T), Directorate of Research, Vellanikkara Assoc. Director of Research (M&E), Directorate of Research, Vellanikkara Associate Director of Research (Plg), Directorate of Research, Vellanikkara Associate Director, NARP High Range Region, Regional Agrl. Research Station, Ambalavayal Associate Director, RARS, Pattambi Associate Director, NARP (Southern Region), College of Agriculture, Vellayani Associate Director, RARS, Kumarakom Associate Director, RARS, Pilicode

Project Coordinators (17)

Rice	Prof TF Kuriakose, Professor of Agronomy, Agrl. Research Station, Mannuthy
Spices	Dr Abi Cheeran, Professor of Horticulture (Pepper) College of Horticulture, Vellanikkara
Cocoa and Beverage Crops	Dr R Vikraman Nair, Professor of Horticulture (Cocoa), College of Horticulture, Vellanikkara
Cashew	Prof KK Vidyadharan, Professor of Horticulture (Cashew), College of Horticulture, Vellanikkara
Fruits & Floriculture	Dr SR Nair, Professor of Horticulture College of Agriculture, Vellayani
Pulses & Oilseeds	Dr V Gopinathan Nair, Professor of Plant Breeding, College of Agriculture, Vellayani
Essential Oils & Medicinal plants	Dr TV Viswanathan, College of Horticulture, Vellanikkara
Post Harvest Technology & Nutrition	Dr G Sreekantan Nair, Professor of Horticulture, College of Horticulture, Vellanikkara
Sugarcane, Cotton & Miscellaneous Crops	Dr KMN Namboodiri, Professor of Agrl. Botany, College of Horticulture, Vellanikkara
Fodder Crops	Sri G Raghavan Pillai, Professor of Agronomy, College of Agriculture, Vellayani
Plant Protection	Dr MC Nair, Professor of Plant Pathology, College of Agriculture, Vellayani
Soils and Agronomy	Dr P Padmaja, Professor (Soils & Agronomy), College of Horticulture, Vellanikkara
Farm Economics & Extension	Dr GT Nair, KVK, RARS Pattambi
Agro-meteorology	Dr P Balakrishna Pillai, Professor of Agrl. Meteorology, College of Horticulture, Vellanikkara
Cropping Patterns & Farming systems	Dr VK Sasidhar, Professor, Department of Agronomy, College of Agriculture, Vellayani

Vegetables and Tuber Crops	Dr KV Peter, Professor, Dept. of Olericulture, College of Horticulture, Vellanikkara
Coconut, Arecanut & Oil Palm	Dr RR Nair, Associate Director, RARS, Kumarakom

Heads of Departments othar than Project Co-ordinators

Professor, Department of Soil Science and Agri. Chemistry, College of Agriculture, Vellayani	Dr RS Aiyer
Professor, Department of Plant Pathology, College of Agriculture, Vellayani	Dr KI Wilson
Professor (Stat), College of Veterinary and Animal Sciences, Mannuthy	Dr KC George
Professor, Department of Agrl. Extension, College of Agriculture, Vellayani	Dr AM Thambi
Professor, Department of Horticulture. College of Agriculture, Vellayani	Dr SR Nair

Secretary

Professor (Research Co-ordination), College of Agriculture, Vellayani	Prof U Mohammed Kunju

VETERINARY & ANIMAL SCIENCES

Director of Research, Kerala Agrl. University	Chairman
Dean, Faculty of Veterinary and Animal Sciences	Member
Director of Extension, KAU	,,
Associate Director of Research (V & AS)	,,
Heads of Departments in the Faculty of Veterinary and Animal Sciences	,,
Professor (Farms)	,,
Director, Veterinary Research and Education	,,
Professor, Coordinated Project on Agrl. by-products	,,
Dr CR Ananthasubramaniam, Professor (Project Coordinator) Cattle and Buffaloe	,,
Dr Radhakrishna Kaimal, Professor (Research Coordination)	Secretary and Convenor

VARIETY EVALUATION COMMITTEE

Director of Research, Kerala Agrl. University	Chairman
Director, CTCRI, Trivandrum or his nominee	Member
Director, CPCRI, Kasaragod or his nominee	,,
Director of Agriculture, Trivandrum or his nominee	,,
Director of Extension, Kerala Agrl. University	,,
Professor of Agronomy, College of Agril, Vellayani	,,
Professor of Plant Pathology, College of Agri. Vellayani	,,
Professor of Agrl. Botany, College of Agrl. Vellayani	,,
Professor of Horticulture, College of Agrl. Vellayani	,,
Professor of Entomology, College of Agrl., Vellayani	,,
Associate Directors (5 Nos)	,,
Associate Directors of Research—Hqrs. (3)	,,

THE POST GRADUATE COMMITTEE

Vice Chancellor, Kerala Agrl. University	Chairman
Director, PG Studies	Member
Dean, Faculty of Agriculture, KAU	,,
Dean, Faculty of Voty. and Animal Sciecces, KAU	,,
Director of Extension, KAU	,,
Director of Research, KAU	,,
Dean, Faculty of Fisheries, KAU	,,
Associate Dean, College of Horticulture, KAU	,,
Professor (Research Coordination), Faculty of Vety. and Animal Sciences, KAU	,,
Professor (Research Co-ordination), Faculty of Agriculture, KAU	,,
Registrar, KAU	Convenor

Appendix III

LIST OF STAFF AT HEADQUARTERS

Vice-Chancellor	:	Sri T Madhava Menon IAS upto 6-6-87
		Dr MJ Sebastian, Dean, College of Fisheries holding charge from 7-6-87 to 18-8-87
		Dr EG Silas from 19-8-87
Registrar	:	Sri KK Pankajakshan, Comptroller holding charge of Registrar upto 30-4-87
	:	Sri M Mohammed Usman from 30-4-87
Comptroller	:	Sri KK Pankajakshan
Special Officer (Agro-Forestry)	:	Sri VR Krishnan Nair
Deputy Registrar (Admn)	:	Sri CN Muraleedharan Nair
	:	,, N Balakrishnan
Deputy Registrar (Acad)	:	Dr TR Sankunny
Deputy Comptroller	:	Sri KI Alex
Assistant Registrar (Admn)	:	Smt VA Saraswathi Bai
		,, KA Appuchettiar
Assistant Comptroller	:	Sri PV Gopalakrishnan Nair
		,, O Vinodakrishnan
Recruitment Officer	:	Sri PM Chandran
Labour Officer	:	Sri C Sasikumaran Nair
Secretary to VC	:	Sri KU Abdul Khader
PA to Registrar	:	Sri AK Abdul Khader
PA to Comptroller	:	Smt VB Leelavathy Amma
Section Officers	:	Smt V Chandrika
		,, EK Bharathy
		,, KM Mary
		,, TA Zainaba Beevi
		,, VV Radhamma
		,, AK Kamala Bai
		,, DA Syamala

Smt VR Vijayamma
,, PV Nalini
Sri A Basil
,, Pius Fernandes
,, VC Bharathan Pillai
,, T Aravindan
,, VR Sankarankutty
,, K Ravikumar
,, K Chandramohan
,, PX Francis
,, MN Sasidharan
,, KK Subramonian
,, KI Chakkunny
,, KA Mohammed
,, KP Sreedharan
,, V Viswambharan
,, NK Unnikrishnan
,, PM Balakrishnan
,, KN Pushpangadan
,, NK Achuthan

Senior Grade Assistants : Sri PV Sreekumaran
Smt Susy Mathew
,, KP Saramma
,, S Valsala
Sri VA Achuthan
Smt KP Mary
Sri A Abdul Karim
,, M Radhakrishnan
,, KK Sadeesan
Smt PE Haleema Beevi
,, S Rajalakshmi Amma
Sri PV Raveendran
Smt AD Omana
,, K Thankam
,, AT Gracy
,, R Thankamani
Sri VS Skandakumar
Smt MA Urmila Devi
Sri MN Vijayakumar
,, B Sukesan
Smt P Lailthakumari Amma
,, A Mary Phillomina
,, G Rema Bai
,, A Santhakumari
Sri KV Sugunan

		Smt Shirly Bai George
		,, M Baby
		Sri K Subramonian
		,, K Haridasan
Grade-I Assistants	:	Smt K Meera
		,, A Daisy Anto
		Sri P Krishna Prakash
		Smt TB Latha
		Sri GV Kumar
		Smt K Hemalatha
		,, G Valsalakumari
		Sri KS Paul
		,, KF Mathew
		,, KR Suresh
		,, K Dineshan
		Smt V Chellamma
		,, KN Lalithamma
		,, C Usha
		,, N Mary Joseph
		Sri K Govindan
		Sri KC Joseph
		,, T Jagadeesan
		,, NP Valsan
		Smt B Bhanumathy
		,, KA Lucy Mary
		,, S Usha Devi
Grade-II Assistants	:	Smt Mary Joseph
		Sri TC Jose
		Smt KK Sunitha
		,, KP Vasanthakumari
		Sri K Girindra Babu
		Smt NV Thankam
		Sri PV Mohanan
		Smt MP Narmada
		Sri VR Pius
		,, PL Tony
		Smt P Sudha
		,, PE Jasmine Beevi
		,, E Hymavathy
		,, KA Valsala
		Sri PA Jacob Joe
Senior Office Superintendents	:	Sri TK Prabhakaran
		,, OU Chandran
		,, K Muraleedharan
		Smt PO Elsy

Office Superintendents	:	Sri VP Asokan
		,, P Haridasan
		Smt JA Emiammal
		,, KN Santhakumari
		Sri R Sadan
Senior Grade Typists	:	Smt MA Bhargavi
		Sri KK Damodaran
		Smt P Subhashini
		,, K Saraswathi Amma
Grade I Typists	:	Sri K Muraleedhara Karanavar
		Smt KA Valsala
		,, VC Mariamma
		,, P Sarada
		,, K Padmavathy
		,, K Girija
		,, S Geetha Bai
		,, A Vasantha
		,, P Sarojini Ammal
		,, TK Sukumari
		,, P Vilasini
Grade II Typist	:	Smt P Prasannakumari
Malayalam Translator	:	Smt KN Chandralekha
Drivers—HDV	:	Sri Rappai
		,, PM Yusuf
		,, PV Sudhakaran
		,, VR Kochu
Drivers—LDV	:	Sri KA Mohammedkutty
		,, MS Reghu
		,, PK Sasidharan
		,, KP Jose
		,, Gopalakrishnan
		,, MV Karappan
		,, KO John Stephan
		,, CL Antony
		,, NA Sukumaran
		,, PK Sasi
Bus Attenders	:	Sri KS Narayanan
		,, Beer Bahadur Singh
		,, TG Radhakrishnan
		,, VA Ouseph
		,, VV Vasu
Binder	:	Sri R Vijayan

Clerical Asst. Lab Asst. Gr. III	:	Sri TN Aravindakshan
		Smt MM Kamani
		,, KV Padmavathy
		,, CR Balakrishnan
Duplicator Operators	:	Sri PA Francis
		,, AV Poulose
		,, IR Govindan
Cook-cum-Caretaker	:	Sri P Sankara Pillai
Daffedar	:	Sri TS Kerala Varman
Class IV Employees	:	Sri CO Varunni
		,, CC Velukutty
		,, PK Bhaskaran
		,, MK Thankappan
		,, VS Mohammedkutty
		,, VA Mathew
		Smt PD Annamma
		Sri S Parameswaran Nair
		,, V Mohandas
		,, V Krishnan
		,, VI Balan
		Smt PD Rosa
		,, PV Devu
		Sri MK Muraleedharan
		,, EK Padmanabhan
		Smt KL Fathima Beevi
		,, KR Sumithra
		,, TR Annamma
		,, MO Kochannam
		,, KK Chandra
		,, S Indirakumari
		Sri John Mendez
		Smt CP Kausalya
		Sri Sankaran Vadakath
		Smt PI Kunjumol
		Sri C Govindan
		Smt KK Madhavi
		Sri KV Chetty
		,, V Gopinathan
		Smt M Soudamini
		Sri RG Babu
		,, T Sasi
		,, Silak Bahadur

KAU School

Headmaster	:	Sri AJ Abraham

Teachers (English medium)	:	Smt Deborah Cyril
		,, KP Thresiamma
		,, Latha Balraman
		,, AJ Lilly
Teachers (Malayalam medium)	:	Sri V Sasidharan
		,, PK Bhaskaran
		,, MA Alli
		,, MV Mary
Hindi Teacher	:	Smt K Narayani

DIRECTORATE OF RESEARCH

Director of Research i/c	:	Dr M Aravindakshan
Assoc. Directors of Research	:	Dr CC Abraham
		Prof PN Pisharody
		Dr M Subramoniam upto 30-9-87
		Prof S Balakrishnan
Assistant Professor	:	Sri P Gangadharan

DIRECTORATE OF STUDENTS WELFARE

Director	:	Dr TG Rajagopalan
Dy. Director of Students Welfare	:	Sri OK Paul
Junior Assistant Professor	:	Smt PJ Manga

DIRECTORATE OF PG STUDIES

Director	:	Dr N Sadanandan
Grade I Typist	:	Sri S Sudhakaran Nair
Peon	:	Sri Govindan

RADIO TRACER LABORATORY

Professor	:	Dr P Abdul Wahid
Assoc. Professor (Safety Officer)	:	Smt MV Kamalam

DIRECTORATE OF PHYSICAL PLANT

Director of Physical Plant	:	Sri C Unnikrishnan till 10-7-87
		,, PO Thomas Ex. Engg. holding charge from 11-7-87
PA to Director of Phy. Plant	:	Sri MN Raghavan, Asst. Ex. Engg. holding addl. charge
Executive Engineer	:	Sri P O Thomas
Asst Exe Engineer (Electrical)	:	Sri PM James
Financial Assistant	:	Sri PM Ramachandrakurup
Head draftsman	:	Smt TL Elsy
Section Officers	:	Sri V Balagopalan
		,, KP Ramchandran Nair

Sr. Gr. Assistants	:	Smt MK Shailaja
		,, AK Lyla
		,, EK Prabhavathy
		,, N Usharani
		Sri PV Sreedharan
Ist. Gr. Assistant	:	Smt KS Vijayalakshmy
Gr. II Assistants	:	Smt Mabel Phillip
		Sri KN Radhakrishnan
		Smt KK Valsa
		Sri MW Wilson Raj
		Smt VK Sobhana
		Sri M Abdul Muthalavi
Sr. Gr. Typists	:	Smt S Akhileswary
		Sri N Haridas
Gr. I Typists	:	Smt M Ponmani Mohana
		,, Rosy K Francis
Draftsman (Hr. Gr.)	:	Sri AP Jose
Draftsman I Gr.	:	Sri G Padmanabhan
		,, MR Mohanan
		,, B Lukose
Driver Gr. II	:	Sri PK Sasi
Office Supdt	:	Sri A William
		,, PI Ittoop
Blue Printer cum Stereo Operator	:	TT Ousephunny
Peons	:	Sri CV Vijayan
		,, K Govindankutty
		,, VA Pareeth
		,, PK Kunhiraman
		Smt V Saraswathy

Divisions and Sub Divisions

Executive Engineer	:	Sri M Reghunathan AEE i/c
Asst. Exe. Engineers	:	Sri AV Balakrishnan
		,, MN Raghavan
		,, P Sreekumaran
		,, TK Sugathan
		,, EK Gokulan
Asst. Engineers	:	Sri PM Paulson
		,, PM Vasudevan
		,, KV Ramanunny
		,, PR Govindan
		,, K Savy Joseph
		,, MV Chakkochan
		,, AJ Anto

		Smt KR Sarojini
		Sri P Raman
		,, Jose George
		,, TA Rappai
		,, TK Abdul Kader
		,, MF Antony
		,, R Reveendran Nair
		,, AD Vincent
		Smt M Vijayakumari
Draftsmen I Gr.	:	Sri KS Vasoo
		,, G Santha Kumaran
		,, G Sasidharan Nadar
		,, M Mohammed Ismail
		,, KT Vasudevan
Draftsman II Gr.	:	Sri AP Satheesan
Technician Gr. II (Ele)	:	Sri CA Varghese
Asst. Line man	:	Sri KV Ravi
Bull Dozer Operator	:	Sri MR Shanmughan
Road Roller Driver	:	Sri MK Bhaskaran
Technicians Gr. I	:	PK Vijayan
		Sri TS Govindan
Pump Operators	:	Sri VB Usaf
		,, MV Parameswaran
		,, R Kumaran Nair
		,, VK Parameswaran
		,, KM Baby
		,, TP Jose Mathew
		,, CR Kochu
		,, MK Balakrishnan
		,, A Narayanan
		,, KK Francis
Section Officers	:	Sri A Vincent Samuel
		Smt K Leelamma
Sr. Gr. Assistants	:	Sri K Narayanan Namboodiri
		Smt VM Ammini
		,, AA Kousallia
		Sri M Vijayakumar
		Smt M Rugmani
		,, CK Prabhavathy
Gr. I Assistants	:	Smt V Savithri
		,, Vinayabai
Gr. II Assistant	:	Sri C Chandran
Sr. Gr. Typists	:	Smt B Sathiavathi Bai
		,, S Vaisala Devi

Gr. I Typists	:	Smt Geetha
		,, K Vimala
		,, K Padmavathy
Peon Hr. Gr.	:	Sri I Nelson
Watchmen	:	Sri VA Paily
		,, MC Murugan
		,, KK Balan
		,, G Dhanapalan
Peons	:	Sri KA Sankaran
		,, VL Antony
		Smt V Ammini Amma
		Sri KP Kumaran
		,, MK Gangadharan
		,, KP Koran
		,, KK Subramanian
		,, PK Aboo
Drivers	:	Sri AS Sukumara Marar
		,, J Joy
		,, AP Chacko

DIRECTORATE OF EXTENSION

Director of Extension	:	Dr AGG Menon
Assoc. Director of Extension	:	Dr GR Nair
Jr. Asst. Professor (Extension)	:	Smt B Seema
Section Officers	:	Smt KU Prabhavathy upto 17-12-87
		Sri P Aliyar from 18-12-87
Office Superintendent	:	Sri Sadasivan Nair
Sr. Gr. Assistants	:	Sri KV Sugunan
		Smt Shirly Bai George
		,, M Baby
Sr. Gr. Typists	:	Smt PP Rosy
		Sri KJ Lonan
Assistant Gr. I	:	Smt S Ushadevi
Driver Grade I	:	Sri CL Antony
Assistant Gr. II	:	Smt E Hymavathy
Peons	:	Smt PD Annamma
		Sri V Mohandas

Supporting staff

Language Editor	:	Smt K Mruduladevi
Section Officer	:	Sri P Gopinathan
Farm Assts. Sr.Grade (Agri.)	:	Smt MK Chandramathy
		,, KP Ambika
Artist	:	Sri P Ganapathy
Photographer	:	Srl A Sulaimankutty
Technician Gr. I	:	Sri K Sukumaran

Senior Grade Assistant	:	Smt JR Fatima malar
Assistants Gr I	:	Smt P Vijayakumari
		,, PV Remani
Assistants Gr. II	:	Smt KN Sarojini
		Sri K Mohanan
Peons	:	Sri Girish Babu
		,, MK Ramakrishnan
		Smt MS Ammini
Sweeper-cum-Sanitation worker	:	Smt PJ Thankom

CENTRAL TRAINING INSTITUTE, MANNUTHY

Professor of Extension	:	Dr G Balakrishna Pillai
		Sri KP Ramachandran Nair
Asst. Professor (Hort.)	:	Sri NK Parameswaran
,, (P.P.)	:	Smt T Sheela Paul
Farm Assistants (Ag.)	:	Sri PC Joshy
		,, NT Santhosh Babu
Typists Grade I	:	Smt AA Ramlath
		,, KK Mary
Assistants Grade II	:	Sri KS Mohandas
		Smt KR Geethe
		Smt PV Bhanumathy
		Sri KP Naina
HDV Driver	:	Sri PK Devassy
Peon	:	Sri KL Devassy

Inservice Training Scheme

Assistant Professor (Extn.)	:	Sri PM Humayun Khaleel
Farm Assistants (Agri.)	:	,, K Gopalakrishnan Nair
		Smt MK Chandramathi
		Sri MJ Kochappan
Typists Gr I	:	Sri KC Mohankumar
		Smt ML Sosannam
Duplicator Operator	:	Sri CA Divakaran
HDV Drivers	:	Sri PM Yusuf
		,, PV Sudhakaran
		,, KV Kochappan

COMMUNICATION CENTRE, MANNUTHY

Farm Advisory Service

Professors (Pl. Protection)	:	Dr MJ Thomas
(Agronomy)	:	Sri AI Thomas
		Dr Muraleedharan Nair
(Animal Husbandry)	:	Dr UT Francis
(Horticulture)	:	Dr P Manikantan Nair
Assistant Professor		
(Plant Protection)	:	Dr Babu M Philip

Publication Unit

Professor (Publications)	:	Sri KC Varghese
Assistant Professor (Aquaculture)	:	Dr Elizabeth Joseph

Information and Graphic service

Assistant Professor (Aquaculture)	:	Dr AD Antony
(Extension)	:	Sri Jose Joseph

KAU PRESS

Press Manager	:	Sri K Rajappan
Section Officer	:	Smt PA Lakshmi
Sr Grade Asstt	:	Smt Vivian Jose
		Sri PK Manikutty
General Foreman	:	Sri G Narayana Pillai
Senior Foreman	:	,, PI Lonappan
Proof Readers	:	Smt Sherly Sam
		Sri KK Sadasivan
Computor	:	Smt K Santhakumari
Printers (H.G)	:	Sri VR Kumaran
		,, TP Joseph
		,, C Viswanathan
Compositors (H. G.)	:	Sri V Subramonian
		Smt KM Thankamma
		,, PA Elsy
		,, K Leela
		Sri V Rajendran
Binders (H.G.)	:	Sri KR Vijayan
		Smt PT Annie
Printers (L.G)	:	Sri PR Aravindakshan
		,, P Prabhakaran
		,, NJ Samuel
Binders (L.G)	:	Smt M Kamalamma
		,, S Sarojini Amma
Helper	:	Sri VN Hassan
Security Guard/ Class IV Employee	:	Sri K Saji Antony
Sweeper-cum-Attendant-Peon	:	Smt P Meenakshy
	:	Sri M Somasekharan

KVK PATTAMBI

Training Organiser

Professor (Agrl Extn)	:	Dr G T Nair

Training Associates

Associate Professor (Hort)	:	Dr MNC Nair

Associate Professor (Agronomy)	:	Sri PJ Ittyaverah
(Home science)	:	Smt Chandralatha
Training Assistants		
Assistant Professors (Agron.)	:	Sri PP Joy
(Hort.)	:	Smt N Mini Raj
(An. Husbandry)	:	Dr OJ George
(Fisheries)	:	Dr VS Narayanan
(Home Science)	:	Smt Omana Pavunni
Para technical Staff		
Farm Assistants Grade II	:	Sri TP Ali
	:	,, MJ Joseph
Audiovisual Operator	:	,, Paulson Varghese
Administrative Staff		
Section Officer	:	Sri K Sivanandan
Senior Gr Assistant	:	,, C Rajagopalan
Senior Gr. Typist	:	,, S Raghavan
Driver Gr. II	:	,, TR Sasidharan
Peon	:	,, C Gopalakrishnan
Hostel Attendant	:	,, PK Govindan
Watchman	:	,, K Kumaran

SCHEDULED CASTE AREA RESEARCH CENTRE, NILAMBUR

Sr Scientist	:	Sri P Rajendran
Asst Professor (Extn.) Specialist (Home Science)	:	Smt Jasmine Zachariah
Small Scale Industries	:	Sri C Mohanan
Technical Assistants	:	Sri M K Vijayakumar
Technical Assistant (Agriculture)	:	Sri A Abdurahiman
Typist (Gr. I)	:	Smt K T Vijayalekshmi
Driver (LDV)	:	Sri M P Unnikrishnan

TRIBAL AREA RESEARCH CENTRE, AMBOORI

Professor & Co-ordinator	:	Dr R S Aiyer
Assoc. Professor (Sr. Scientist)	:	Dr K Harikrishnan Nair
Asst. Professors		
Agronomy	:	Sri V Sreekumaran
Horticulture	:	Sri CS Jayachandran Nair
Health	:	Dr V N Radhakrishnan
Home Science	:	Smt C Nirmala
Jr. Asst. Professors		
Agriculture	:	Sri V Jayakrishna Kumar
Animal Husbandry	:	Dr P J Rajkamal

Junior Asst. Professor		
Home Science	:	Smt K Rari John
Health	:	Dr N Madhuri Devi
Supporting Staff		
Home Science Helpers	:	Smt C Jayakumari
		,, P Chinnamma
		,, B Vasantha
Driver	:	Sri P Reghunathan Nair
Administration		
Typist	:	Smt K Lilly Bai
Peon	:	Smt K Kunji

KVK, MANJESWAR

Professor	:	Sri I P Sreedharan Nambiar
		Sri P Ramachandran Nair
Asst. Professor (Aqua)	:	Sri B Shantharam
Jr. Asst Professor	:	Sri B Jayaprakash Naik
Senior Grade Asst	:	Sri PMF Babu
Farm Assistant (Vety)	:	Sri TP Balakrishnan Nair
Peon	:	Sri KK Velayudhan

National Demonstration Scheme

Professor	:	Dr KV Mammen
Assoc. Professor	:	Sri K Raveendran Nair
Asst. Professors	:	Sri I Johnkutty
		Dr M Abdul Salam
		Sri CS Jayachandran Nair
		Sri BK Jayachandran
Farm Assistants Gr. II	:	Sri Sanuprasad
		,, PG Ajayakumar
Jeep Driver Gr. II	:	Sri PS Babu

Appendix IV

LIST OF STAFF IN THE VARIOUS CAMPUSES

COLLEGE OF AGRICULTURE, VELLAYANI

Dean-in-charge	:	Dr MM Koshy
Professor (RC)	:	Sri U Mohammed Kunju
Department of Agronomy		
Head of Department	:	Dr VK Sasidhar
Professors	:	Sri EP Koshy
		,, V Ramachandran Nair
		,, MRC Pillai
		Dr G Raghavan Pillai
		Sri KP Madhavan Nair
Associate Professors	:	Dr M Achuthan Nair
		Sri M Oommen
Assistant Professors	:	Sri K Viswambaran
		Sri Kuruvila Varghese
		Dr (Mrs) Lekha Sreekantan
		Smt Meera Bai
		Dr M Abdul Salam
		Smt S Chandini
Junior Asst. Professors	:	Smt KR Sheela
		,, S Lekshmi
		,, Sansamma George
Farm Supervisor Gr I	:	Smt K Padmakshy
Farm Assistant Higher Gr.	:	Smt S Icy
Farm Asst. Higher Gr.	:	Smt Radhamma Thankachy
Farm Assistant Gr. I	:	Sri H Gopinathan
Farm Assistants Gr. II	:	Sri MS Krishnakumar
		,, Jones Charles
Lab Assistants	:	Sri PM Sivadasan
		,, J David
		,, M Manian
		Smt K Sakuntala
Typist Grade-I	:	Sri R Noel
Peon Hr.Grade	:	Sri K Sreekantan Nair

Department of Agricultural Botany

Head of Department	:	Dr N Krishnan Nair
Professor	:	Sri K Gopakumar
Associate Professors	:	Dr ST Mercy
		,, (Mrs) D Chandramany
		Smt N Kamalam
Assistant Professor	:	Smt P Maya Devi
Junior Assistant Professors	:	Sri D Wilson
		Smt VA Celine
		,, O Swadija
		,, C Lekha Rani
Farm Supervisor	:	Sri NT George
Lab Assistants Hr. Grade	:	Sri VK Sadasivan Pillai
		,, C Bhanu
Lab Assistant	:	Sri N Appu

Department of Plant Physiology

Head of Department	:	Dr PD Vijayagopal
Professor	:	Dr S Sheshadrinath

Department of Plant Breeding

Head of Department	:	Dr V Gopinathan Nair
Professor	:	Dr R Gopimony
Associate Professors	:	Dr P Manikantan Nair
		Sri N Ramachandran Nair
		Dr (Mrs) J Sreekumari Amma
Assistant Professors	:	Dr SG Sreekumar
		,, Sverup John
		Smt P Manju
		Sri Sunny K Oommen
Junior Asst. Professors	:	Sri N Mohan Babu
		,, KM Abdul Kader
Farm Supervisors Grade-II	:	Sri R Nelson
		Smt J Vimala
Farm Assistant Sr. Gr./Hr. Gr.	:	Smt S Sachoo Devi
Farm Assistants Gr.I	:	Sri KS Ajayakumar
		,, SR Rajeevan
		,, I Gershan
		,, David Dharmakumar
Lab Assistants	:	Smt D Savithri Amma
		,, S Santha
Senior Office Superintendent	:	Smt V Subaida Beevi
		Sri MR Raveendran
Peons	:	Sri K Narayanan Das
		,, M Nagappan

Department of Soil Science & Agrl. Chemistry

Head of Department	:	Dr RS Aiyer
Professors	:	Dr Thomas Varghese
		Dr Alice Abraham
		Sri P Ramasubramoniam
		,, Abdul Hameed
Associate Professors	:	Dr S Pushkala
		Sri K Babukutty
Assistant Professors	:	Sri C Sundaresan Nair
		,, P Rajendran
		Smt P Prabhakumari
		,, Sumam George
		Sri S Subramania Iyer
Junior Asst. Professor	:	Sri Sam T Kurunthottical
Bacteriology Assistant	:	Sri KC John
Assistant Chemists	:	Smt Vasundara Bai
		Smt G Sushama
Technical Assistant	:	Sri K Muraleedharan Nair
Senior Office Superintendents	:	Smt L Lalitha
		,, Sobhanakumari
		,, A Lilly
Lab Assistants	:	Sri V Vamadevan Asari
		,, R Appukuttan
		,, A Prabhakaran
		,, N Sreekumaran
		,, A Johnson
Peon	:	Sri K Madhavan
Permanent Worker	:	Sri P Thomas

Department of Horticulture

Head of Department	:	Dr S Ramachandran Nair
Assoc. Professor	:	Dr K Vasanthakumar
Assistant Professors	:	Sri BK Jayachandran
		Sri Philipose Joshua
		Smt GR Sulekha
		Dr K Rajmohan
Junior Asst. Professor	:	Smt VL Sheela
Farm Supervisors Grade-II	:	Smt K Panky
		Smt L Davy
Farm Assistant Grade-I	:	Sri CS Vijayakumar
Lab Assistant Grade-III	:	Sri P Alexander
		Sri J Thankan
Gardeners		Sri G Parameswaran Nair
		,, G Nagappan
Peon	:	Smt Janamma Pillai
Sr Grade Typist	:	,, S Radhamma

Department of Agricultural Entomology

Head of Department	:	Dr N Mohan Das
Professors	:	Dr John Kurian
		,, A Visalakshi
		,, George Koshy
		,, G Madhavan Nair
		,, KV Mammen
		,, KP Vasudevan Nair
		,, K Sasidharan Pillai
		Sri KK Raveendran Nair
Associate Professors	:	Dr D Dale
		,, Susamma Mathai
		,, KS Remamoni
		Smt K Saradamma
		,, K Santhakumari
Assistant Professors	:	Dr S Nazeema Beevi
		Smt D Ambika Devi
		Sri C Nandakumar
		,, P Reghunath
		Dr PB Gopinathan
		Smt K Sudharma
		,, M S Sheela
		,, T Nalinakumari
		,, Hebsi Bai
		Sri Arthur Jacob
		,, PA Rajan Asari
		Smt Suma Poulose
Junior Assistant Professors	:	Smt KS Premila
		Sri Thomas Biju Mathew
Research Fellows	:	Smt Mary Annie Sebastian
		Sri Sabu Sebastian
		,, B Cletus
Farm Supervisor	:	Smt S Thanka Bai
Farm Assistant Sr. Grade	:	Sri Rajarathnam
Farm Assistants Gr. II	:	Smt KS Sujatha
		Sri S Prabhakaran
Lab Assistants Gr. II	:	Sri K L Samkutty
		,, R Sivanandan
Lab Assistants Gr III	:	Smt B Sakuntala
		Sri P Thankayyan
Senior Office Supdt.	:	Sri K Velappan
Peon	:	Smt K Valsala Kumari

Department of Plant Pathology

Head of Department	:	Dr KI Wilson
		Dr MC Nair
Professors		,, S Balakrishnan
		,, P Karunakaran
		,, Susamma Philip
Associate Professors	:	Dr Sasikumaran Nair
		Smt G Padmakumari
		Dr A Sreedharan
		,, B Rajagopalan
Assistant Professors	:	Dr Bhavani Devi
		Sri PJ Joseph
		Smt M Suharban
		,, KK Sulochana
		Dr P Sivaprasad
Junior Assistant Professors	:	Sri Babu George
		,, C Gokulapalan
		Smt Kamala Nayar
		,, VK Girija
		Dr Lulu Das
		Smt D Geetha
Research Fellows/Res. Associate	:	Sri Boby
		,, M George Paul
Farm Supervisor	:	Smt B Leela Bai
Farm Assistants	:	,, S Kamala Bai
		,, K Rosammal
		Sri C Brigidson
Lab Assistant Gr I	:	Sri Augustin Nadar
Lab Assistant Gr III	:	,, K Balakrishnan
Peons	:	,, Y Simpson
		Smt P Ushakumari
		,, D Vijayakumari

Department of Agricultural Statistics

Head of Department	:	Sri PV Prabhakaran
Associate Professor	:	Dr Saraswathy
Assistant Professor	:	Sri Vijayaraghava kumar
Junior Assistant Professor	:	Miss Brigit Joseph
Junior Programmer	:	Sri CE Ajith kumar
Technical Assistants	:	,, CT Mukundan
		Smt P Saraswathy
Peon	:	Sri S Paul

Department of Agricultural Economics

Head of Department	:	Sri KS Karayalar
Professor	:	Sri ER Narayanan Nair
Junior Assistant Professors	:	Smt Elsamma Job
		,, AM Santha
Peon	:	Sri S Thankappan Nair

Dept. of Agricultural Engineering

Head of Department	:	Dr (Mrs) AN Rema Devi
Assistant Professor	:	Sri V Ganesan
Senior Technicians	:	Sri N Sasidhara Panicker
		,, T Sekharan
		,, D Sreekantan Nair
Lab Assistant Gr. I	:	Sri V Purushothaman
Oil Engine Driver Gr. I	:	Sri M Abdul Muthalif
Peon	:	Smt J Chellamma

Dept. of Agricultural Extension

Head of Department	:	Dr AM Thampi
Professor	:	Dr B Babu
Assoc. Professors	:	Dr G Balakrishna Pillai
		Sri M Mohammed Hussain
Assistant Professors	:	Dr R Muraleedhara Prasad
		Sri S Mothilal Nehru
		Smt NP Kumari Sushama
Junior Assistant Professor	:	Smt PS Geethakutty
Senior Gr. Typist	:	Smt C Padmavathy
Grade-II Typists	:	Smt K Lilly Bai
		,, P Vasantha Kumari
Lab Assistant	:	Sri V Kesavan Kutty
Photographers	:	Sri MS Kuriakose
		,, VV Satheesan
Artists	:	Sri PS Kesavan Namboodiri
		,, V Chandranandan
		,, PK Surendran
Farm Assistant Sr. Grade	:	Smt J Vimala Bai
Duplicator Operator	:	Sri S Dickson
Lab Assistant Gr. III	:	Sri G Ouseph
Peon	:	Sri G Sreedharan Nair
		,, Thomson Nadar

Dept. of Animal Husbandry

Head of Department	:	Dr Skariah Oommen
Assistant Professors	:	Dr MR Rajan
		,, S Subramonian

Junior Asst. Professor	:	Dr R Vijayan
Farm Supervisor Gr. I	:	Sri S Sahadevan
Farm Assistant Sr. Gr. (HG)	:	Sri R Ramachandran Nair
Milk Recorder	:	Sri G Madhavan Nair
Farm Assistants Gr I	:	Sri C Prabhakaran
		,, G Venu
		,, L Devarajan Potty
Herdsman	:	Sri M Parameswaran Nair
Milker	:	Sri C Appu

Dept. of Physical Education

Head of Department	:	Smt AC Marykutty
Junior Assistant Professor	:	Sri S Pazhanis Pillai
Marker	:	Sri N Ramakrishna Nadar

College Library

Assistant Librarian	:	Smt B Leela
Reference Assistants	:	Sri PR Raghavan Pillai
		,, K Rajasekharan
		,, R Manohar
		Smt KR Sarala
Lab Assistant Gr. II	:	Sri M Abdul Rahim
Peons	:	Sri G Gopinathan Nair
		,, N Soman kutty
		,, K Sasidhar

Centre of Excellence for Tropical Soils

Director	:	Dr MM Koshy
Assoc. Professor	:	Sri PA Korah
Jr. Asst. Professors	:	Smt PB Usha
		,, CR Sudharmai Devi

Research Co-ordination

Professor	:	Sri U Mohammed Kunju
Typist Sr. Grade	:	Sri P Nadarajan Pillai
Peon Higher Grade	:	Smt Valiya Thankamma

Instructional Farm

Heads of office	:	Dr K Pushpangadan
		Sri S Janardhanan Pillai
Asst Professors	:	Smt M Suharban
		Sri PJ Joseph
		Smt P Sukumari
Junior Asst. Professors	:	Sri Anil Kumar
		,, Gregory Zachariah
		Smt JJ Rehumath Niza
		,, I Sreelatha Kumari

Administrative Assistants	:	Sri JI Walsalam
		,, Abubacker Khan
Section Officers	:	Sri S Bhaskara Pillai
		Smt VM Lalithakumari
Senior Grade Assistants	:	Smt J Remadevi Amma
		,, CP Padmakumari
Grade-II Assistants	:	Smt Ansamma Philip
		Sri N Valsan
		Smt P Indira Devi
Grade-I Assistants	:	Smt Shirly Mathew
		Srr C Prabhakaran
		Sri S Viswakumaran Nair
Senior Grade Typists	:	Sri S Raghavan
		,, V Bhageval Singh
Peon (HG)	:	Sri A Sivasankaran Nair
Farm Mali	:	Sri K Divakaran Nair
		,, G Chellian Nadar
		,, C Krishnankutty
Gardener	:	Sri G Nagappan
Gardener (HG)	:	Sri G Parameswaran Nair
Watchman Higher Grade	:	Sri J Thampikunjan
Watchman	:	Sri E Lazar Nadar
Sanitation worker	:	Sri V Joshuva
Driver	:	Sri M Xavier
Technicians Gr. II	:	Sri V Gopinatha kurup
	:	Sri B Suresh
Field Supervisor	:	Sri V Krishna Pillai
Farm Supervisors Gr. I	:	Sri V Chakrapani
		,, KC Achuthan
Farm Supervisors Gr. II	:	Sri K Gopinathan Nair
		,, B Indirabai Amma
		Smt I Indira
		,, K Rosammal
		,, I. T. Jasmin
Farm Assistants Sr. Gr. (HG)	:	Sri N Govindan
		Smt A Belsy
		Sri KC Retnakaran Nadar
		Smt H Rachel
Farm Supervisor Sr. Grade	:	Sri KC Retnakaran Nadar
Farm Assistant Gr. I	:	Smt S Sujatha
Tractor Driver	:	Sri P Thankappan

College Central Office

Administrative Officers	:	Sri PN Ramachandra Kurup
		,, KG Balakrishna Pillai

Section Officers (HG)	:	Smt K Pankajakshy
		Sri R Rajendran Unnithan
		,, J Kochukunju
		,, S Bhaskara Pillai
		Smt B Lalithabai
Section Officer	:	Sri MA Alikuty
Senior Office Superintendent	:	Sri L Radhakrishnan Potti
Office Superintendent	:	Smt S Valsala devi
Senior Grade Typists	:	Sri C Rajendran Nair
		Smt P Lalitha
Grade-I Typists	:	Smt B Sukumari Amma
		,, B Leela Bai Amma
		,, L Sobhanakumari
Grade-II Typists	:	Smt S Indira Amma
Senior Grade Assistants	:	Smt P Jameela
		Sri M Abdul Samath
		,, NK Mohankumar
		Smt K Parukutty
		,, CP Padmakumari
		,, SG Kumari Girija
		,, V Leela
		,, C Chandrikakumari
Assistant Grade-II (H. G.)	:	Sri P Gopinathan Nair
Assistants Grade-I	:	Sri N Hrishikesan Nair
		,, S Vallinayakom Pillai
		,, T Sasikumar
		Smt EN Savithry
		,, TA Mridula Kumari
		,, M Padmakshy
		,, Razia Beegum
		,, Sherine V Thomas
		,, K Indira Kumari
		Sri A Shah
		Smt A Sheela
		,, N Indira Devi
Grade-II Assistants	:	Sri N Valsan
		,, P Sreejith
		,, A Pradeep
Sr. Gr. Technicians	:	Sri M Thankappan
		,, M Aboobaker Kunju
		,, S Sivarajan
Grade-I Technician	:	Sri A Raju

Drivers HDV	:	Sri Chandrasekharan Nair
		.. P Moideen
Drivers LDV	:	Sri R Sreekantan Nair
		.. P Sivasankaran Nair
Pump Operators	:	Sri Raveendran Nair
		.. PK Vijayan Nair
		.. M Karunakaran Nair
Lab Assistants Grade-III	:	Sri R Ravindranathan
		.. K Surendran Pillai
Lab Assistant Gr. II	:	Sri R Sankar Ram
Peons	:	Sri A Natesan
		.. M Christudas
		.. K Thayee
		.. N Krishnan Nair
		Smt P Krishnamma
		Sri S Kunjukrishnan Nadar
		.. S Sreedharan Nadar
		.. S Sreedharan Nair
		.. J George
Head Peon	:	Sri V Sreedharan Nair
Scavengers	:	Smt S Sobha
		.. K Gomathy
Watchers	:	Sri K Maniyan Nadar
		.. P Madhavan Nair
Class IV	:	Sri M Solaman
		.. B Rajasekharan
		.. Raveendran Nair
Bus Attendants	:	Sri V Bhaskaran Nair
		.. KC Krishnan
		.. M Gopalan Nadar
Cook-cum-Caretaker (Guest House)	:	Sri NS Balakrishna Pillai

COLLEGE OF RURAL HOME SCIENCE, VELLAYANI

Professor	:	Dr (Mrs) L Proma
Associate Professors	:	Smt N K Vimala Kumari
		.. Mary Mathew
Assistant Professors	:	Smt P Mary Ukkuru
		.. V Usha
		.. S Chellammal
		.. S Syamakumari
		.. PV Nandini
		.. B Prasanna Kumari

Junior Assistant Professors	:	Smt A Mumtaz Beegum
		,, M Rajani
		,, Soffi Cherian
		,, Lizy Behanan
		,, Geetha
		,, Norma Xavier
		,, Achamma Chandy
Senior Research Fellows	:	Smt Mohana Kumari
		,, Girija Devi
Administrative Staff		
Administrative Officer	:	Sri JI Walsalam
Section Officer	:	Smt MN Sreedevi
Senior Grade Assistant	:	Smt V Chandrika
Senior Grade Typist	:	Smt S Sudha Devi
Assistant Grade II	:	Sri K Balachandran Nair
Peon	:	Smt V Sreedevi
Technical & Supporting staff		
Audio-visual Operator	:	Sri N Ayyappan Acharl
Driver (LV)	:	Sri R Gopalakrishnan Nair
Lab. Assistants Gr I	:	Sri J Dasayyan Nadar
		,, R Purushothaman
Lab. Assistants Gr. II	:	Sri Manikantan Nair
		,, G Appu

COLLEGE OF HORTICULTURE, VELLANIKKARA

Department of Agronomy

Professor & Head	:	Dr C Sreedharan
Professors	:	Sri EVG Nair
		,, KPM Nair
Associate Professor	:	Dr M Achuthan Nair
Assistant Professors	:	Dr PK Ashokan
		. PV Balachandran
		Smt P Sreedevi
		Dr R Gopinathan
Junior Assistant Professors	:	Sri V Krishnakumar
		Smt EK Lalitha Bai
		Dr Mercy George
Farm Assistant Gr. I	:	Sri PB Bhashajan
Lab Assistant Gr. III	:	Sri PK Velayudhan
Peon	:	Smt T Mariam

Junior Assistant Professors	:	Smt A Mumtaz Beegum
		,, M Rajani
		,, Soffi Cherian
		,, Lizy Bahanan
		,, Geetha
		,, Norma Xavier
		,, Achamma Chandy
Senior Research Fellows	:	Smt Mohana Kumari
		,, Girija Devi
Administrative Staff		
Administrative Officer	:	Sri JI Walsalam
Section Officer	:	Smt MN Sreedevi
Senior Grade Assistant	:	Smt V Chandrika
Senior Grade Typist	:	Smt S Sudha Devi
Assistant Grade II	:	Sri K Balachandran Nair
Peon	:	Smt V Sreedevi
Technical & Supporting staff		
Audio-visual Operator	:	Sri N Ayyappan Acheri
Driver (LV)	:	Sri R Gopalakrishnan Nair
Lab. Assistants Gr I	:	Sri J Dasayyan Nader
		,, R Purushothaman
Lab. Assistants Gr. II	:	Sri Manikantan Nair
		,, G Appu

COLLEGE OF HORTICULTURE, VELLANIKKARA

Department of Agronomy

Professor & Head	:	Dr C Sreedharan
Professors	:	Sri EVG Nair
		,, KPM Nair
Associate Professor	:	Dr M Achuthan Nair
Assistant Professors	:	Dr PK Ashokan
		,, PV Balachandran
		Smt P Sreedevi
		Dr R Gopinathan
Junior Assistant Professors	:	Sri V Krishnakumar
		Smt EK Lalitha Bai
		Dr Mercy George
Farm Assistant Gr. I	:	Sri PB Bhashajan
Lab Assistant Gr. III	:	Sri PK Velayudhan
Peon	:	Smt T Mariam

Department of Agricultural Botany

Head of the Department	:	Dr KMN Namboodiri
Associate Professor	:	Dr Luckins C Babu
Assistant Professors	:	Smt Achamma Oommen
		Sri VV Radhakrishnan
		Smt KT Prasannakumari
Junior Assistant Professors	:	Smt MT Kanakamany
		,, K Arya
Higher Gr Lab Assistant	:	Sri MC Chandran

Department of Agricultural Economics

Professor & Head	:	Dr V Radhakrishnan
Professor	:	Dr K Mukundan
Junior Assistant Professors	:	Smt S Rajeena
		,, K Jessy Thomas
Research Associate	:	Sri KC Varghese
Typist	:	Smt PK Kalliani

Department of Agricultural Extension

Associate Professor & Head	:	Sri KPR Nair
Assistant Professor & Head	:	Dr R Muraleedhara Prasad
Assistant Professor	:	Smt PS Geethakutty
Junior Assistant Professor	:	Sri N Kishorekumar

Department of Agricultural Entomology

Associate Professor	:	Sri Jim Thomas
Assistant Professors	:	Smt MK Shiela
		Dr Sosamma Jacob
		Smt Maicykutty P Mathew
Junior Assistant Professor	:	Smt R Ushakumari

Root (Wilt) Scheme

Professor of Nematology	:	Dr TS Venkitesan
Asst. Professor (Nemat)	:	Smt Susanamma Kurian

Department of Pomology & Floriculture

Professor	:	Dr KMN Namboodiri
Assistant Professors	:	Dr PK Valsalakumari
		Smt AK Babylatha
		Dr Lila Mathew
Junior Assistant Professors	:	Dr Sarah T George
		Sri VS Devadas
		,, TP Murali
Farm Supervisor	:	Smt PK Vijayalakshmi
Farm Assistant	:	Sri CB Sugathan
Laboratory Attender	:	Sri KR Prabhakaran

Department of Olericulture

Professor & Head	:	Dr KV Peter
Assistant Professors	:	Sri VK Raju
		Smt Salikutty Joseph
Junior Assistant Professors	:	Smt P Indira
		Sri PG Sadhan Kumar
		Smt KB Sheela
		,, Meagle Joseph

AICVIP (ICAR)

Assistant Professors	:	Sri K Rajmohan
		,, Abdul Vahab

ICAR Adhoc Scheme

Associate Professor	:	Dr TR Gopalakrishnan

Vegetable Seed Production

Assistant Professor	:	Sri S Rajan
Junior Assistant Professor	:	Smt Baby Lissy Markose
Farm Supervisors	:	Sri KC Kochumon
		Smt KV Aleyamma
		Sri PC John
Farm Assistant Sr. Grade	:	Smt PK Kalliani
Farm Assistants Gr. I	:	Sri KV Natarajan
		,, Vijayanarayanan
Farm Assistants	:	Smt Valsamma George
		Sri PN Sadasivan
		,, AA Abdulla
Lab Assistant Gr. II	:	Sri AP Augusthy

Department of Processing Technology

Professor	:	Sri KK Vidyadharan
Assistant Professors	:	Smt KA Girija
		Sri P Jacob John
		Smt V Indira
Junior Assistant Professor	:	Sri K Krishnakumar
Processing Technology Asst	:	Sri KK Kumaran
Lab Assistant	:	Sri KG Krishnan

Department of Plantation Crops & Spices

Professor & Head	:	Dr G Sreekantan Nair
Assistant Professors	:	Dr C Ramachandran
		Smt Rema Menon
		, Alice Kurien
		Sri BR Reghunath

Jr. Asst. Professors	:	Smt PK Sudhadevi
		,, T Premalatha
		,, A Suma
		,, MR Shylaja
Farm Assistant	:	Sri N Rajan
Lab Assistant	:	Sri EK Chatha

Department of Plant Pathology

Professor & Head	:	Dr Abi Cheeran
Professors	:	Sri PC Jose
		,, CK Ramakrishnan
		Dr P Varadarajan Nair
Assoc. Professor	:	Sri A Sukumara Varma
Asst. Professors	:	Dr Sally K Mathew
		Smt TN Vilasini
		Sri Rajendran Pillai
Jr. Asst. Professors	:	Dr S Ravi
		Smt S Beena
Farm Assistant Gr. I	:	Smt NJ Eliamma
Lab Assistant Gr. III	:	Sri V Nandakumar
		,, KM George

Root (wilt) Scheme

Farm Assistant Gr. I	:	Sri TC Sidharthan

Central nursery for hybrid pepper

Farm Assistant Gr. II	:	Sri TR Radhakrishnan

Department of Soil Science and Agrl. Chemistry

Head of the Department	:	Dr Al Jose
Professors	:	Dr P Padmaja
		Smt K Leela
		,, S. Droupathy Devi
		Dr NP Chinnamma
Assistant Professors	:	Dr KC Marykutty
		Sri Samuel Mathew
		Dr KA Mariam
		,, Saleena Mathew
Lab Assistants	:	Sri P Unnikrishnan
		Sri KK Prabhakaran
		Smt K Thankamani
		Sri PK Narayanan

Coconut Root (wilt) Disease Project

Professor (SS&AC)	:	Dr AI Jose
Assoc. Professor (SS&AC)	:	Dr VK Venugopal
Junior Asst. Professor	:	Smt K Ushakumari

Department of Agrl Statistics

Assoc. Professor	:	Sri VKG Unnithan
Asst. Professors	:	Smt TK Indira Bai
		,, Graceamma Kurien
		,, P Soudamini
		,, KA Mercy

Department of Agrl Meteorology

Professor & Head	:	Dr P Balakrishna Pillai
Asst. Professor	:	Sri A V R Kesava Rao
Jr. Asst. Professor	:	Smt T Shailaja Devi
Farm Assistant (Agri)	:	Sri VM Mathew
Farm Assistant Gr.I	:	Sri PM Poulose

Department of Agrl. Engineering

Professor	:	Sri TP George
Assistant Professor	:	Sri MR Sankara Narayanan
Technician	:	Sri Ramesh Chandran

Department of Physical Education

Asst. Professors	:	Smt Susy V John
		Sri E Soman
Class IV	:	Sri P Sukumaran

Schemes – AICRP on Weed Control of Plantation Crops

Asst. Professor	:	Dr CT Abraham
Jr. Asst. Professor	:	Sri PA Joseph
Farm Assistant Gr. II	:	Sri CA Mathew
Assistant Gr. II	:	Smt C Rajalekshmy
Driver	:	Sri VR Chandran

AICRP on Biological control of crop pests

Professor	:	Sri D Joseph
Asst. Professor	:	Smt KR Lyla
Jr. Asst. Professor	:	Sri NV Satheesan
Technical Asst. Hr. Gr.	:	Smt CM Omana
Farm Assistants	:	Sri KS Thankappan
		,, TR Sudevan

AICSIP Research on Ginger & Turmeric

Asst. Professors	:	Smt PA Valsala
		Dr Koshy Abraham
Farm Asst. (Agri) Gr. II	:	Sri CB Venugopal

Centre for Advanced studies for Humid Tropical Tree Crops & Environmental Horticulture

Director	:	Dr M Aravindakshan
Assoc. Professor	:	Dr K Kumaran
Jr. Asst Professor	:	Smt CK Geetha
Farm Assistants	:	Sri NT Satheesh Babu
		,, KK Viswanathan
Typists Gr. II	:	Smt T. Valsala
		,, S. Seemanthini

AICRP on Medicinal & Aromatic Plants

Associate Professor	:	Dr TV Viswanathan
Asst. Professors	:	Sri BR Reghunath
		Dr Jacob John
Farm Asst. Senior Grade	:	Smt S Sarojini
Farm Assistant Gr I	:	Sri PM Poulose
Farm Asst Gr II	:	Smt Valsamma George
		Sri Bashajan
Lab Assistants Gr III	:	Sri KK Chandran
		,, AP Augusthy

Manpower Development Scheme

Professor	:	Dr G Sreekandan Nair
Asst Professor	:	Smt S Prasannakumari

All India Co-ordinated Floriculture Improvement Project

Assistant Professor	:	Dr PK Rajeevan
Jr. Asst. Professors	:	Smt KB Sheela
		,, A Sobhana

Cadbury's Cocoa Research Project

Professor	:	Dr R Vikraman Nair
Assoc. Professor	:	,, (Mrs) VK Mallika
Jr. Assts. Professor	:	,, S Ravi
Farm Assistant Gr I	:	Sri PK Haridas
Farm Assistant Gr II	:	,, AG Rajendra Babu
Assistant	:	,, K Balakrishnan

SIDA Project on Water Management studies using ground water		
Asst Professor	:	Smt Visalakshy
Technician	:	Sri Balakrishnan
Assistant	:	Smt CK Parvathy
LDV Driver	:	Sri Mathai Kurien

COLLEGE OF OF FORESTRY, VELLANIKKARA

Special officers (Forestry)	:	Prof. SMA Aslam till 1-6-87
		Sri VR Krishnan Nair from 1-6-87
Associate Professors	:	Dr Luckins C Babu
		,, NK Vijayakumar
Assistant Professors	:	Dr K Sudhakara
		,, B Mohankumar
Junior Asst. Professors	:	Shri Noyal Thomas
		,, T Premkumar
		,, K Vidyasagaran
		,, Sonney George

COLLEGE OF CO-OPERATION & BANKING, MANNUTHY

Associate Dean i/c	:	Dr CA Jos
Associate Professors (Commerce)	:	Dr N Rajan Nair
Management	:	Sri PC Mathew
Economics	:	,, M Mohandas
Statistics	:	,, N Ravindranathan
Asst. Professors (Economics)	:	Dr U Ramachandran
		,, KA Suresh
		Smt P Shabeena
,, Commerce	:	Sri M Mohanan
		,, Philip Sabu
,, Co-operation	:	Sri T Paranjothi
		,, AT Philipose
		,, AM Jose
		,, K Remesh
,, Management	:	Sri KP Mani
		,, A Sukumaran
,, Banking	:	Smt Molly Joseph
		,, Jaya S Anad
		Sri K Sathees Babu
,, Ag. Statistics	:	Smt KS Sujatha
Junior Asst. Professors		
(Commerce)	:	,, EVK Padmini
(Co-operation)	:	Sri E Vinaikumar
(Banking)	:	,, KM George
Section Officer	:	Smt VJ Rosely

Assistant Sr. Grade	:	Smt Santhakumari
Assistants	:	Smt K Indiradevi
		,, CV Flora
		,, KO Alphonsa
		,, AR Asalatha
		Sri DV Sajeevan
Duplicator Operator	:	Sri Jayagovindan
Office Superintendent	:	Smt L Lalitha
Sr. Grade Typist	:	,, S Vasundhara
Grade-I Typist	:	Sri G Hareendran
Peons	:	,, CA Muthu
		,, V Narayanan
Driver	:	,, KM Subramonian

COLLEGE OF VETERINARY & ANIMAL SCIENCES, MANNUTHY

Department of Anatomy

Professor	:	Dr PA Ommer
Asst. Professors	:	Dr KR Harshan
		,, Jose John Chungath
		,, CK Sreedharan Unni
Jr. Asst. Professor	:	Dr Devada
Farm Assistant Gr. II	:	Sri MK Kumaran

Department of Animal Management

Professors	:	Dr TG Rajagopalan
		,, CK Thomas
		,, Kurian Thomas
Assistant Professors	:	Dr Francis Xavier
		,, KS Sebastian
Junior Asst. Professor	:	Dr Sreekumar

Department of Animal Production Economics

Professor	:	Dr T Prabhakaran

Department of Animal Reproduction

Professors	:	Dr CP Neelakanta Iyer
		,, K Prabhakaran Nair
		,, V Sudarsanan
		,, MS Nair
		,, E Madhavan
		,, E Mathai
Associate Professor	:	Dr PP Balakrishnan

Assistant Professors	:	Dr T Sreekumar
		,, SP Sureshan Nair
		,, KV Athman
Junior Asst. Professors	:	Dr K Ramachandran
		,, Matilda Joseph
		,, Sangeeta Nair
Farm Assistants	:	Sri MV Chandran
		,, V Gopalakrishnan
		,, PS Kumaran
Driver	:	Sri TG Mohanan
Peon	:	Smt Sathi Devi

Department of Clinical Medicine

Professors	:	Dr KM Alikutty
		,, N M Aleyas
Assistant Professors	:	Dr VS Balakrishnan
		,, PC Alex
Junior Asst. Professors	:	Dr KM Jayakumar
		,, PG Baby
Farm Assistant	:	Sri KL Jose

Department of Dairy Science

Professors	:	Dr K Pavithran
		,, MV Sukumaran
		,, UT Francis
Assoc. Professors	:	Sri Narayanan Nair
		,, R Rajendrakumar
Assistant Professors	:	Dr M Mukundan
		,, V Prasad
		,, PI Geevarghese
Farm Supervisor	:	Sri TK Abdul Rahiman
Lab Technician	:	Sri T Georgekutty

Department of Extension

Professor	:	Dr PS Pushkaran
Assistant Professors	:	Dr V Raju
		,, MR Subhadra
Junior Asst. Professor	:	Dr S Ramkumar
Farm Supervisor Gr. I	:	Sri K Rama Menon

Department of Microbiology

Professors	:	Dr S Sulochana
		,, KT Punnoose
Associate Professor	:	Dr PC James
Assistant Professors	:	Dr V Jayaprakasan
		,, R Madhusoodanan Pillai
		,, G Krishnan Nair
		,, MC George

Department of Pharmacology and Toxicology

Professors	:	Dr MK Rajagopalan
		,, Zacharias Cherian
		,, Jacob V Cheeran
Associate Professor	:	Dr P Marykutty
Assistant Professors	:	Dr N Gopakumar
		,, AM Chandrasekharan Nair
		Sri VR Reghunandanan
		Dr CM Aravindakshan
Farm Supervisor	:	Sri Balakrishna Pillai

Department of Physiology

Professors	:	Dr G Nirmalan
		,, G Venugopal
		,, MG Ramakrishna Pillai
		,, KP Sadanandan
		,, KP Surendranathan
Assoc. Professor	:	Dr PK Ismail
Asst. Professor	:	Dr PT Philomina
Jr. Asst Professors	:	Dr KP Sreekumar
	:	,, Sisiliamma George
Research Assistant	:	Sri PN Vishnu Namboodiri
Farm Supervisor	:	Smt MC Annie

Department of Preventive Medicine

Professors	:	Dr EP Paily
		,, PV Georgekutty
Associate Professor	:	Dr K Baby
Assistant Professors	:	Dr K Venugopal
		,, MR Saseendranath
Farm Assistants Gr. I	:	Sri KJ Varghese
		,, AN Sreedharan
Driver	:	Sri M Sooryanarayanan

Department of Surgery

Professors	:	Dr PO George
		,, KN Muraleedharan Nair
Associate Professors	:	Dr AM Jalaludeen
		,, S Raveendran Nair
		,, C Abraham Varkey
Assistant Professors	:	Dr T Sarada Amma
		,, K Rajankutty
Jr. Asst. Professor	:	Dr TP Balagopalan
Radiographer	:	Smt K Indira Devi

Department of Veterinary Public Health

Professors	:	Dr R Padmanabha Iyer
		,, M Soman
		,, P Prabhakaran
Associate Professor	:	Dr J Abraham
		,, E Nanu
Assistant Professors	:	Dr MT Jose
		,, P Kuttynarayanan
Jr. Asst. Professor	:	Dr George T Oommen

Department of Statistics

Professor	:	Dr KC George
Assistant Professors	:	Sri KL Sunny
		,, Jacob Thomas
		,, S Krishnan
Jr. Asst. Professor	:	Sri Mathen Sebastian
Research Associate	:	Smt U Geetha
Technical Assistant	:	Smt VM Serada
Jr. Programmer	:	Smt KP Santha Bai

Veterinary Hospital, Mannuthy

Associate Professor	:	Dr Santha E George

CENTRE OF EXCELLENCE IN PATHOLOGY

Professor & Director	:	Dr A Rajan
Associate Professor	:	Dr KV Valsala
Junior Asst. Professors	:	,, M Gopalakrishnan Nair
		,, Koshy Varghese

ICAR scheme – Mycotoxicosis

Project Officer	:	Dr KI Maryamma
Laboratory Technician	:	Sri Viswambharan
		Sri P Peter

DST Scheme on Hypothyroidism

Sr Pathologist (Professor)	:	Dr T Sreekumaran
Asst. Professor (Pathology)	:	Dr J Mammen
Research Officer	:	Dr Vijayakumar
Farm Supervisor Gr. II	:	Smt PC Mary
Farm Asst Sr Gr.	:	Smt PC Lilly

KAU scheme on Ethmoid carcinoma

Project Officer	:	Dr KM Ramachandran

CENTRE FOR ADVANCED STUDIES IN POULTRY SCIENCE

Director	:	Dr A Ramakrishnan
Assoc. Professor	:	Dr G Raghunathan Nair
Assistant Professor	:	Dr V K Elizabeth

AICRP on Poultry Breeding

Senior Scientist and Head	:	Dr AKK Unni
Junier Poultry Pathologist	:	Dr CR Lalithakunjamma
Senior Technical Asst.	:	Sri KK Abdulla Kutty
Junior Asst. Professor	:	Smt Lally John
Farm Assistant Gr. I	:	Smt V Indira
,, Gr. II	:	Sri KV Louis
Electrician	:	Sri ET Paul
Drivers	:	Sri PI Rappai
		,, MS Kunju
		,, PS Kabir
Assistant Gr. I	:	Smt D Sreekumari
Typist	:	Smt VG Girija

AICRP on Poultry Nutrition

Associate Professors	:	Dr G Raghunathan Nair
		,, A Jalaludeen
Farm Assts (Sr. Gr)	:	Sri AN Sreedharan
		,, MG Vasu

ICAR adhoc scheme on "Efficiency of White Pekin Ducks, Desi Ducks and their crosses for meat production"

Asst Professors	:	Dr Sabu Kuruvilla
		,, PA Peethambaran
Farm Asst. Gr. II	:	Smt PK Ammini

CENTRE FOR ADVANCED STUDIES IN ANIMAL GENETICS & BREEDING

Director & Head	:	Dr G Mukundan
Assistant Professor	:	,, KV Raghunandanan

Dept. of Animal Breeding & Genetics

Professor	:	Dr CA Rajagopala Raja
		,, Sosamma Iype
Asst. Professors	:	Dr KV Raghunandanan
		,, B Nandakumaran
		,, P Nandakumar
Jr. Asst. Professor	:	Dr A Sakthikumar
Farm Assistant	:	Sri PK Vijayamani
Typists	:	Smt Radha
		,, Soudamini

ICAR ad hoc scheme

Assistant Professor (Ani. Breeding)	:	Dr KC Raghavan
,, (Ani. management)	:	Dr CR Girija

Farm Assistants	:	Sri Gangadharan
		,, Chacko
		Smt Sarojam

ICAR ad hoc scheme on Blood group & Biochemical polymorphism in cattle

Lab Technicians	:	Dr KK Kuttan
		,, VK Gracy

ICAR adhoc schome on Karyological studies on cattle of Kerala State

Research Associate	:	Sri P Muraleedharan

ICAR adhoc schemo on breeding rabbit for meat production

Assistant Professor	:	Dr AD Joy
Fur Technician	:	Sri C Ramadasan

COLLEGE OF FISHERIES, PANANGAD

Dean	:	Dr MJ Sebastian

Dept. of Aquaculture

Professor & Head (Aqua)	:	Dr D M Thampy
Assoc. Professors	:	Dr Suseela Jose
		Dr K Jayashree Vadhyer
Asst. Professors (Algology)	:	Dr Thresiamma James
(Aqua.)	:	Sri C Mohanakumaran Nair
(Fish Breeding)	:	Sri Syed Ismail Koya
(Fish Pathology)	:	Dr C Thankappan Pillai
Asst. Professor (Aquaculture)	:	Sri CG Rajendran
Jr. Asst. Professors	:	Smt Susheela Mathew
		,, D Jessy
Research Fellows	:	Sri PK Unnikrishnan
		Smt Sudha B Nair
		Sri KK Chandrasenan
		Sri B Remeshan
Fieldman (Fisheries)	:	Sri VK Balakrishnan
		Sri KK Reghu
		Sri N Chakrapani

Dept. of Fishery Biology

Professor (Fish Bio.) & Head	:	Dr P Rabindranath
Assoc. Professors (Fish Biol)	:	Dr J Rajasekharan Nair
		,, KV Jayachandran
Asst. Proressors (F. Biol.)	:	Dr B Madhusoodana Kurup
(Zool.)	:	Dr R Shylajakumari
		,, T M Jose
		,, TV Annamercy
		,, KG Sunny

Research Fellows	:	Sri US Sajeev
		,, PJ Basty

Dept. of Fishery Hydrography

Assoc. Professor & Head	:	Sri K Kerala Varma
Assoc. Professors (Aquatic Biol.)	:	Dr CJ Cherian
(Chem. Hydrograph)	:	Sri PS Mrithunjayan
Jr. Asst. Prof. (Marine Metero)	:	Sri NN Raman
Research Fellows	:	Sri Shaji Thomas
	:	,, Sabu Joseph

Fishing Technology

Assoc. Professor & Head	:	Sri P Radhakrishnan Nair
Jr. Asst. Prof. (Phys. Edn.)	:	Sri EU Rajan
Research Fellows	:	Sri US Sajeev
		,, Binu M Oommen
		,, PG Unnikrishnan
		,, Aboobacker

Fisheries Research Station

Professor (Fish Res.)	:	Dr PM Mathew
Research Fellow	:	Smt Sheena Stephen
		,, K Zaina

Instructional Farm

Professor (Botany)	:	Sri KM George
Farm Assist. Gr. I	:	Sri P Jayamony

Administrative Officer	:	Sri PC Raveendran Pillai
Section Officer	:	Sri A Kuriakose
		Smt Sreedhari Amma
Asst. Librarian	:	Sri MRC Dutt
Reference Assistant	:	Sri TA Joseph
Officer Supdts.	:	Smt KT Thanka
		,, R Sarada Devi
Typist	:	Smt Salomi Silas
Sr. Gr. Assistants	:	Smt CC Rosily
		Sri PU Kesavan
		Smt C Suchetha
		Sri S Ramachandran Nair
		Smt NN Radhamma
		Sri PG Sreekanta Pai
		Smt M Girija
		,, Prema B Nair
		,, TK Ambika

Driver HDV	:	Sri TK Remanan
Drivers LDV		,, MJ Joseph
		,, AP Chacko
		,, Sreekumara Marar
		,, Abdul Khader
Lab. Assistant Gr. III	:	Sri AM Kareem
Bus Attendant	:	Sri PM Varghese

Fishery Engineering

Assoc. Professor & Head	:	Sri K Niran
Technician Gr. II	:	Sri N Sambasivan Nair
Research Fellow	:	Sri Biju Oommen

Processing Technology

Professor & Head	:	Dr MK Mukundan
Assoc. Prof. (Proc. Tech.)	:	Sri DD Namboodiri
Asst. Profs (Biochem.)	:	Sri PM Sherif
(Proc. Tech.)	:	Sri Sajan George
		Sri S Krishnakumar
(Nutrition)	:	Mrs Lizy Behanan
(Biochem.)	:	Dr Saleena Mathew
Jr. Asst. Profs. (Microbio.)	:	Dr IS Bright Singh
(Biochem.)	:	Dr GM Kurup
(Microbio)	:	Dr D Sudharma
Post Doctoral Fellow	:	Dr Rosamma Philip
Research Fellow	:	Smt Mary Ann Sebastian
Jr. Research Fellows (ICAR)	:	Sri C Maniappan
		Smt PK Sarala
		Sri TM Ayoob
		,, Sabu Joseph

Management Studies

Assoc. Prof. (Stat.) & Head	:	Sri TM Sankaran
Asst. Professors	:	
(Business Mgt)	:	Sri RV Sadanandan
(Economics)	:	Sri MS Raju
Jr. Asst. Profs. (Comm.)	:	Sri KM Mathew
(Stat.)	:	Smt V Malika
		,, Alphikorath
Research Fellow	:	Sri CS Sarojakshan

KELAPPAJI COLLEGE OF AGRL. ENGG. & TECHNOLOGY TAVANUR

Dean i/c	:	Dr TP George

Dept. of Land and Water Resources and Conservation Engg

Asst. Professor	:	Smt Renukakumari

Dept of Irrigation and Drainage Engg.

Professor	:	Sri K. John Thomas
Asst. Professors	:	Sri MS Hajilal
		Smt D Sasikala

Department of Farm Power Machinery and Energy

Assistant Professor	:	Sri Sivaswami

Department of Post Harvest Technology

Assistant Professor	:	Sri Jobi V. Paul

Dept of Supportive and Allied courses of study

Associate Professor	:	Dr. PC Antony
Asst. Professor	:	Dr E Komala Amma

DARE Course

Professor	:	Sri CP Muhammed
Jr Asst. Professors (Maths)	:	Smt VP Lakshmikutty
(Ele. Engg)	:	Smt Geetha V Menon

Agrl Engg. Research Co-ordinated project on R&D (ICAR)

Associate Professor	:	Sri Jippu Jacob
Jr. Asst. Professors	:	Sri M Mathew John
,, (Vety. & An. Sc.)	:	Dr MO Kurian

Instructional Farm

Jr. Asst. Professors (P. P)	:	Sri MA Peter
(Hort.)	:	Sri P Rajendran

DASc Course

Jr. Asst. Professors (Agro)	:	Sri P V Haboobur Rahman
(Phy. Edn)	:	Sri M Velayudhankutty

NARP Tavanur Centre

Asst. Professors (Agro)	:	Sri U. Jaikumaran
(Pl. Br.)	:	Sri K Nandini
Sr. Grade Asst.	:	Sri P Janardanan
Sr. Grade Typist	:	Sri KP Abdurahiman
Trade Assistants (Carp)	:	Sri AK Padmanabhan
(Smithy)	:	Sri VP Kannan
(Fittings)	:	Sri CS Krishnan
(Auto & Tractor Mech)	:	Sri C Velayudhan
(Turning)	:	Sri TP Aboobacker
(Electrical)	:	Sri Satheesh Kumar
Lab. Assts. Gr. II	:	Sri P Theyyunni Menon
		,, K Abdurahiman

	:	Sri K Radhakrishnan
Driver (HDV)	:	Sri MV Ramachandran
Drivers (LDV)		,, CN Soman
	:	Sri M Jebbar
Bus Attendant	:	Sri TP Vijayan
Pump Operators		,, KV John
	:	Smt C Ponna
Peons		,, P Amina
		,, M Abdurazack
		,, C Narayanan
K C A E T (Non-Plan)		
Research Assistant	:	Sri AP Gopalakrishnan
Administrative Officer	:	Sri K Balakrishnan Nair
Section Officers	:	Sri P Unnikrishnan
		,, C Assainar
		,, C Arumughan
Sr. Office Supdt.	:	Sri C Krishnankutty Nair
Sr. Gr. Assistants	:	Sri MP Balan
		,, KV Purushothaman Namboothiri
		,, Raveendra Mohan
Asst. Gr. II	:	Sri P Devadas
Technician	:	Sri K Chellappa Moopan
Technicians Grade II	:	Sri KT Ramachandran
		,, VK Asokan
		,, K Aravindan
		,, E. Abdul Hakkim
Lab. Asst. Gr. II	:	Sri P Krishnankutty Nair
,, Gr. III	:	Sri KV Mohammed
Driver Gr. I	:	Sri V Krishnan
Peons (Hr. Gr.)	:	Smt K Rohini
		Sri P Kunhukutta Menon
		Smt KV Madhavi
Peon	:	Sri Jayaprakash
Agrl. Engg. Res. Co-ordinated Project on R&D (ICAR)		
Technicians Gr. III	:	Sri KO Porinchu
		,, KV Vasudevan
Workshopmate	:	Sri TN Balan
Instructional Farm, Tavanur		
Sr. Gr. Farm Assts. (Agri)	:	Smt RV Balamani
		Sri P Bhaskaran
		,, MV Raveendran
Farm Asst. (Agri). Gr. II	:	Sri MV Yusuf
,, (Vety.) Gr. I	:	Sri P Balakrishnan
Gardener	:	Sri K Mammikutty

Diploma course in Agrl. Engg.

Lab. Asst. Gr, III	:	Sri PV Kumaran

Design & Development of Wind Turbine (ICAR)—IX AER (i) ICAR

Research Associates (Engg)	:	Sri P Mathai
,, ,, (Mat.)	:	Sri MN Sreeranjini
Technician	:	Sri M Sivadasan

REGIONAL AGRICULTURAL RESEARCH STATION, PILICODE

Associate Director	:	Dr KP Rajaram
Assistant Professors (Agro)	:	Sri K Sudhakara
(Pl. Pathology)	:	Smt A Naseema
Junior Asst. Professor	:	Sri M Govindan
Farm Assistants (Agri) Sr. Gr.	:	Sri Basil Rodrigues
		,, A Vijayan
		Smt K Rugmini Amma
		Sri MM Sankaran
Section Officers (Hr. G)	:	Smt CM Radhakutty
		Sri K Prabhakaran Nadar
Sr. Gr. Assistants	:	Sri K Balachandran
		Smt S Droupady
		,, T Lakshmikutty
		,, M Leela
		Sri V Narayanan
Assistants Grade-I	:	Sri EV Sasidharan
		,, VV Kunhambu
Peons (Hr. Gr.)	:	Sri K Raman
		,, P Raghavan
		,, P Narayanan
		,, TK Chandran
Senior Grade Typist	:	Smt P Radha
Jeep Driver	:	Sri TM Sukumaran
Oil Engine Driver Hr. Gr.	:	Sri PK Sadanandan
Watchman	:	Sri KK Ramakrishnan
Pump Operators	:	Sri TK Chandran
		,, KK Zainudeen

NARP – PLAN

Professors (Agronomy)	:	Sri IP Sreedharan Nambiar
(SS & AC)	:	Sri NN Ramankutty
(Pl. Pathology)	:	Sri PK Sathyarajan
(Oil Tech)	:	Dr PK Narayanan Nambiar
(Pl. Breeding)	:	Sri S Sukumaran Nair
(Micro Biology)	:	Sri KP Mammootty

Assoc. Professors (Meteoriology)	:	Dr GSLHV Prasad Rao
(Pl. Pathology)	:	Sri TC Radhakrishnan
(Pl. Breeding)	:	Sri PC Balakrishnan
(Entomology)	:	Smt Sumangala S Nambiar
(Hort)	:	Sri L Rajamony
(Stat)	:	Sri MP Abdul Razak
(Agro)	:	Sri PK Ramachandran Nambiar
(Gene)	:	Sri NK Vijayakumar
Asst. Professors (Hort)	:	Smt Dr Shyam S Kurup
(Eco)	:	Smt Latha Bastine C
(Ento)	:	Sri AM Ranjith
Farm Assistants Grade I	:	Sri KN Rajendran
		,, A Sasidharan
		,, SR Rajeevan
		,, MV Premarajan
		,, Muhammed Hanifa
		,, N Vasudevan
Lab Assistants	:	Sri V Narayanan
		,, T Raghavan
		,, T Venu
		,, K Abdul Rahiman
Adminstrative Officers	:	Sri K Appu Chettiyar
		,, K Kunhoosa
Typists Grade I	:	Sri K Raveendran
		Smt VP Shyamala
Drivers Gr. II	:	Sri AV Kunhikrishnan
		,, EP Narayanan
Peon	:	Sri V Kunhiraman
Tractor Driver	:	Sri P Sasidharan Nair
Training Scheme		
Junior Asst. Professors	:	Sri A Rajagopalan
		Smt S Nirmala Devi
Farm Assistant (Agri)	:	Sri MM Sankaran
		,, N Saidalikutty
Senior Grade Assistant	:	Sri PMF Babu
Assistant Gr. II	:	Smt Suma Varghese
Computer Centre		
Junior Programmer	:	Sri Abdul Jabbar

PEPPER RESEARCH STATION, PANNIYOOR

Professor (Ag. Chem.) and Head of Office	:	Sri V Sukumara Pillay
Farm Supervisor Gr. II	:	Sri C Brigidson
Farm Asst. Sr Grade	:	Sri T Mohammed Haneefa

Farm Asst. Gr. I	:	Sri PJ Joseph
Field Supervisor	:	Sri K Unnikrishnan
Administrative Assistants	:	Sri R Rajendran Unnithan
		Smt CM Radhakutty
		,, S Droupadi
Assistants Gr. I	:	Smt Merly Sarojini
		Sri V Narayanan
		Smt M Leela
Typist Gr. II	:	Smt K Pushpavalli
Jeep Driver Gr. I	:	Sri K Sreedharan
Peon (Hr. Gr.)	:	Sri K Chindan
Watchmen	:	Sri MP Narayanan
		Sri T Kunhiraman

ICAR Co-ordinated Project

Associate Professor (Pl. Pathology)	:	Sri S Sasikumaran
Asst. Prof. (Pl. Pathology)	:	Sri PK Unnikrishnan Nair
Botany)	:	Sri KK Ibrahim
Farm Asst. Gr. II	:	Sri K Lakshmanan
Lab. Asst. (Hr. Grade)	:	Sri V Achuthan
Jeep Driver	:	Sri K Sreedharan
Farm Assistants Gr. II	:	Sri A Sasidharan
		Sri KA Kurian
Peon	:	Sri P Narayanan

REGIONAL AGRICULTURAL RESEARCH STATION, AMBALAVAYAL

Assoc. Directors	:	Prof. P. Chandrasekharan upto 10-8-87
		Dr G Raveendranathan Pillai from 10-8-87
Assoc Professo. (Agronomy)	:	Sri CC Aipe
Asst. Profefssors (Hort)	:	Sri VS Devadas upto 30-11-87
		,, C George Thomas upto 1-5-88
(Plant Breeding)	:	Smt Susamma P George.
(Agrl. Economics)	:	Sri C Viju Aipe from 2-1-88
Administrative Officer	:	Sri O Vinodakrishnan upto 18-12-87
		,, S Ponnayyan from 10-3-88
Section Officer	:	Sri E George
Senior Grade Assts	:	Sri K Kelappan
		Smt P Sulochana
Senior Grade Typist	:	Sri G Shanmughan

Assistants Gr. II	:	Smt D Suprabha
		,, P Pushpavathy upto 7-9-87
		,, CP Pushpavathy
		,, AM Anitha
		,, KM Hajira
		Sri P Sudhakaran
Typist Gr. II	:	Smt PS Padmami
Record Keeper	:	Smt AE Rahel upto 30-11-87
Peons Hr. Grade	:	Sri K Raman
		,, K Gopalan Nair
		,, KR Chandrasekharan
Driver	:	Sri KP Pakkerkutty
Farm Supervisors	:	Sri I Gershan (FA Gr II) upto 4-6-87
		,, K Raghavan
Sr Grade Farm Assts.	:	Sri KM Vijayakumaran
		,, VK Kumaran
		Smt P Padmavathy
		Sri K Sasidharan from 4-6-87
		,, K Aboobacker from 22-6-87
Farm Assistants	:	Sri A Kunhimohammed
Grade-I (Agri)	:	Sri D Prasannakumar from 11-6-87
		,, TP Ali upto 9-6-87
		,, A Imbichi Ali from 10-6-87
Farm Assistants Grade-II	:	Sri KM George
		,, TK Omanakuttan upto 6-6-87
		,, PP Philip upto 28-3-88
		,, S Prabhakaran from 22-6-87
		,, CT Jacob upto 15-6-87
		,, CP Nandakumar upto 11-6-87
Lab Assistant Grade-III	:	Sri CR Balakrishnan upto 27-6-87
Tractor Driver Grade-II	:	Sri M Mohammedkutty
Oil Engine Driver	:	Sri A Varghese
Budder	:	Sri K Ramakrishnan
Lab Assistants	:	Sri A Govindan Nair from 13-4-87
		,, M Vasu upto 4-6-87
		,, M Vasu from 27-6-87
Watchman Hr. Gr	:	Sri P Moosa
Watchman	:	Sri M Chandu from 1-7-87

REGIONAL AGRICULTURAL RESEARCH STATION, PATTAMBI

NARP PHASE I

Associate Director	:	Sri N Rajappan Nair

NON – PLAN

Professors	:	Sri KI James
		,, PKG Menon
Assoc. Professor	:	Smt P Chandrika
Assistant Professor	:	Sri Premanathan
Junior Asst. Professor	:	Sri TK Brigit
Section Officers	:	Sri K Rangaswamy
		,, KP Koyammu
		Smt KU Prabhavathy
Sr. Office Superintendents	:	Sri K Mammoo
		,, MP Ramankutty Nair
Sr. Grade Assistants	:	Smt P Meenakshikutty
		Sri PM Cherukutty
		,, MP Ahammed
		Smt KP Kalyani
		,, NV Thankamani
		Sri MG Rajendra Babu
Ist Grade Assistant	:	Sri O Sothumadhavankutty
Farm Supervisors Gr. I	:	Sri KP Kesava Menon
		Smt PT Sarada
		Sri Abraham K Cheru
Sr. Gr. Farm Assistants	:	Smt NS Gertrude
		,, EL Raichal
		Sri CPMA Azeez
		,, Raveendran Asari
		,, K Sothumadhavan
		,, CO Mathai
Farm Assistant Gr. II	:	Sri George Puravath
Lab Assistants Gr. III	:	Sri P Sankaran
Hr. Grade	:	Sri T Gangadharan
		Smt P Santhakumari
		Sri MP Sankaran
Lab Assistants Gr. III	:	Sri T Ramakrishnan
		,, V Ponnappan
Peons Hr. Grade	:	Sri K Vasu
		,, KP Narayanan
		,, T Raman
Technician Grade-I	:	Sri KM Muraleedharan
Technician Grade-II	:	Sri CJ George

Class IV	:	Sri Madhavan Nair
		,, Beg Bahadur
		,, C Ramakrishnan
		,, P Gangadharan
		,, MP Damodharan
		,, MP Mohanan
		Smt N Rugmini
Watchmen	:	Sri VP Mammy
		,, C Mohammed kutty
		,, P Mohammed
		,, KC Surya Bahadur

ERBMF

Farm Assistants (Voty)	:	Sri K Shanmughan
		,, P Sasidharan Nair

NARP—Phase I

Associate Professor (Agronomy)	:	Sri D Alexander
		Smt Jayasree Sankar
Asst. Professors (Agro)	:	Smt Gracy Mathew
		,, Asha Sankar
(Soil Science)	:	Sri Anilkumar
		,, MA Hassan
(Agrl. Economics)	:	Sri Selvin Jebaraj Norman
(Horticulture)	:	Smt KK Santha
(Bio-Chemistry)	:	Dr Jacob John upto 30-4-87
(Entomology)	:	Smt Baby P Scaria
(Agrl. Engg/Soil Conservation)	:	Sri KP Pradeep
Administrative Officers	:	Sri K Balakrishnan Nair upto 4-1-88
		,, AK Sreenarayanan from 4-1-88
Typists Gr. I	:	Smt S Remani
		,, V Santhakumari
Duplicator Operator	:	Sri C Kunhan
Lab Assistant Gr. III	:	Sri VP Balasubramonian
Lab Assistant Gr. II	:	Sri Achuthakurup
Drivers	:	Sri A Krishnan
		,, K Parameswaran

NARP—Eruthampathy

Associate Professor	:	Sri V Ramachandran Nair
Farm Assistant	:	Sri PA Abdul Majeed
Peon	:	Sri Rajankutty

Pulses

Assistant Professor	:	Smt VP Neema
Assistant Grade-I	:	Sri AV Sreenivasa Raghavan

Farm Assistants	:	Sri T Velayudhan
		,, M Rajendran
Lab Assistant	:	Sri KR Ganesh
Peon Hr. Grade	:	Sri A Mammo

NSP—BSP

Assistant Professor	:	Smt CA Rosamma
Technician Gr. II	:	Sri P Surendran

AICRIP

Associate Professors	:	Dr K Karunakaran
		Sri V P Sukumaradev
		Dr L Nadarajan
Assistant Professors	:	Dr Kamalam Joseph
		Smt K J Alice
		,, E R Elsy
		,, T Girija
Farm Assistants Gr. I	:	Sri V P Ramakrishnan
		,, C Subramanian
		,, P A Mani
		,, P K Rajasekharan

BANANA RESEARCH STATION, KANNARA

Associate Professor	:	Dr K Pushkaran
Assistant Professors	:	Dr E V Nybe
		Smt T Radha
		Sri Job Sathyakumar Charles
		Smt S Estelitta
Junior Asst. Professors	:	Smt A Suma
		,, Darley Jose
		Dr V S Sujatha
Farm Supervisor	:	Sri C K Vijayan
Farm Assistant Gr. I	:	Sri P R Sathyan
Farm Assistants Gr. II	:	Sri V J Paul
		,, M N Pavithran
		Smt R Jayanthi
		Sri C I Surendran
Laboratory Assistant	:	Sri P Madhavankutty
Oil Engine Driver	:	Sri K A Narayanan
Pump Operator	:	Sri C M Prabhakaran
Administrative Asst.	:	Sri S Sheik Abdul Karim
Assistant Gr II	:	Sri U P Davis
Typist Grade I	:	,, K K Parameswaran
Peon Hr Gr	:	,, T Achuthan Nair
Peon	:	Smt K Sarada
Mali	:	Smt P Subhadra
		Sri C M Prabhakaran

REGIONAL AGRICULTURAL RESEARCH STATION, KUMARAKOM

Associate Director	:	Dr R R Nair
Professors (Pl Pathology)	:	Dr K M Rajan
		Sri G Mathai
		Dr James Mathew
(Soil Science)	:	Sri K Chandrasekharan Nair
(Extension)	:	Sri P Ramachandran Nair
(Economics)	:	Sri E R Narayanan Nair
Associate Professor	:	Dr P J Joy
Assistant Professors	:	Sri P A Rajan Asari
(Bio-Chem)	:	Dr Sosamma Cherian
(Agronomy)	:	Sri K C Rajan
(Aqua)	:	Smt Santha Ram
(W S)	:	Sri N K Sasidharan
(Aqua)	:	Dr K G Padmakumar
(Hort)	:	Sri Sabeena George Thekkayam
		Dr Joseph Philip
(Econ)	:	Sri K J Joseph
Junior Assistant Professors	:	Sri Babu Mathew
		Smt Elizabeth K Syriac
		,, Alice Antony
		Sri K A Inasi
		,, K Sreekumar
		,, Jose Abraham
Research Fellow	:	Sri S Anilkumar
Assistant Professors (Aqua)	:	Dr Anuradha Krishnan
(Micro)	:	Sri B Balakrishnan
Junior Assistant Prof.	:	Sri Thomas M Sebastian
Farm Supervisor Gr. I	:	Sri P Damodaran
,, Gr. II	:	Sri K K Viswanathan
Sr. Gr. Farm Assistant	:	Smt N Kamalamma
		Sri V P Rajappan Nair
Farm Assistants Gr I	:	Sri K Sasidharan
		,, John David
Farm Assistants Gr II	:	Sri M V Sasidharan Nair
		,, C V Kuttappan
(Vety)	:	Sri O K Sukumaran
Artist	:	Sri P K Surendran
Lab Assistant Gr. II	:	Sri V K Vasu
,, Gr III	:	Sri P V Gopinathan
		,, P S Retnam
		Smt Mary Sebastian
		Sri N Prakasan

Pump Operator	:	Sri C C Punnen
Fisherman	:	Sri P Viswanathan
Watchmen	:	Sri K K Thankappan
		,, C G Mohanan
		,, P K Sukumaran
Farm Assistant Gr I	:	Sri P V Reghunathan
Farm Assistants Gr II	:	Sri Gopalakrishnan Nair
		,, P S Sanalkumar
		,, T K Omanakuttan
Farm Assistants Gr I	:	Sri S Sukumaran Nair
		,, M K Vijayan
Artist	:	Sri V Chandranandan
Administrative Officer	:	Sri M Nakulan
Section Officer	:	Sri S Krishnan Nair
Sr. Grade Typist	:	Smt C B Merlin
Sr. Grade Assistant	:	Sri K P Rajan
Office Superintendent	:	Sri K K Gopikuttan Nair
Senior Grade Typist	:	Sri M C Jayakumar
Grade I Typist	:	Smt T K Ponnamma
Grade I Assistants	:	Sophiamma Joseph
		Smt Rothi
Grade-II Assistant	:	Sri P M Mani
Grade-II Typist	:	Sri N A Raju
Grade-I Typist	:	Smt Lillikutty Sebastian
Section Officer	:	Sri S Ponnayyan
Senior Gr. Office Suptd.	:	Sri K V Kurien
Grade-I Assistant	:	Smt Annamma Varghese
Bus Attendant	:	Sri K K Raghavan
Tractor Driver	:	Sri M P Joseph
Grade-II Driver	:	Sri G Balachandran Nair
Tractor Driver	:	Sri K G Prakasan
Peon	:	Sri M Easo
		,, N Purandaran
Duplicator Operator	:	Sri K Rajendra Babu Pillai
Bus Attendant	:	Sri V V Vasu
Driver (HDV)	:	Sri P C Kurien
		,, K Uthaman
Sweeper cum Attendant	:	Smt A P Meenakshi
Peon (Hr. Gr.)	:	Sri T K Sreedharan
Driver	:	Sri T M Francis

CARDAMOM RESEARCH STATION, PAMPADUMPARA

Assoc. Professors (Pl. Path)	:	Dr CK Peethambaran
(Agronomy)	:	Sri CK Prabhakaran Thambi
Asst. Professors (Ento)	:	Sri CM George
(Pl. Breeding)	:	Sri KP Kuriakose

Jr. Asst. Professor (Hort)	:	Sri PC Jessykutty
Administrative Assistant	:	Sri L Wilson upto 17-6-87
		Sri PR Sasidharan Pillai from 18-6-87
Assistant Grade-I	:	Sri MR Ramachandran Nair
Assistant Grade-II	:	Sri MP Vijayachandra Babu
Typist Gr. II	:	Sri K Chandra Kumar
Driver	:	Sri K Chacko
Farm Supervisor Gr. II	:	Smt L Indira
Sr. Gr. Farm Assistant	:	Smt K Devaky
Farm Assistants Gr. I (Agri)	:	Sri VP Prasad
		,, TV Kuttiachan
Farm Assistants Gr. II	:	Sri CV Kuttappan
		,, KC Varghese
		,, CG Pradeep
Lab Assistant Gr. II	:	Sri PV Joseph
Peons	:	Sri KN Sankara Pillai
		,, Chacko Chandy
Driver	:	Sri K Chacko
Field Supervisor	:	Sri KN Raghavan
Watchmen	:	Sri K Raghavan Pillai
		,, KV Thankappan
		,, MK Sivaraman
		,, P Narayana Pillai

AROMATIC & MEDICINAL PLANTS RESEARCH STATION ODAKKALI

Assistant Professor	:	Dr J. Thomas
Jr. Asst. Professors	:	Smt K Geetha
		,, KS Shylaraj
Jr. Res. Associate	:	Smt G Suja
Farm Supervisor Gr. II	:	Smt VV Mariamkutty
Farm Assts. (Sr. Gr.)	:	Sri EN Sudhakaran Nair
		,, V James
Farm Assistant Gr. I	:	Sri KK Vijayakumar
Farm Assistant Gr. II	:	Sri NR Rajan
Graduate Lab. Asst.	:	Smt KK Santhakumari Amma
Non-graduate Lab. Asst. (Sr. Gr.)	:	Sri TK George
Lab. Asst. (Gr. III)	:	Smt T N Kousallya
Administrative Asst.	:	Sri CS Asoka kumar
Assistants Grade I	:	Smt KP Premakumari
		,, Annamma Varghese
Senior Grade Assistants	:	Smt PK Elsy
		,, VK Pathumma
Typist Grade I		Smt ER Vilasini

Peon (Hr. Grade)	:	Sri MM Poulose
Sweeper-cum-Attendant	:	Sri KB Sivaramakurup
Watchman	:	Sri PT Kalidason

RICE RESEARCH STATION, VYTTILA

Professors (Botany)	:	Sri. TU George
(Agronomy)	:	Dr V Thomas Alexander
Junior Assistant Profs	:	Dr MV Mohan
		Smt Annamma George
		,, Reena Grittle Pinhero
		,, Suseela Mathew
Farm Supervisor Gr. II	:	Smt MJ Annakutty
Senior Gr. Farm Assistant	:	Sri Haridas
Farm Assistant Gr. I	:	Sri MC Sachidanandan
Farm Assistants Gr. II	:	Sri ER Soman
		Smt Padma Narayana Pillai
		Sri Sadasivan
Fishermen	:	Sri MS Moni
		,, AN Reghu
Pump Operator	:	Sri KA George
Administrative Assistant	:	Smt R Kamalabai
Senior Gr. Assistant	:	Sri Vincent Pereira
Assistant Grade-I	:	Smt K Vinayabai
Assistant Gr. II	:	Sri P Sreekumar
Peons	:	Sri N Vasu
		,, NS Reghunandanan
Watchman	:	Sri MA Sebastian

CASHEW RESEARCH STATION, ANAKKAYAM

Junior Assistant Professor	:	Smt PV Nalini
Senior Grade Assistants	:	Sri C Rajagopalan
	:	,, T Somasundaran
Farm Assistants Gr. I	:	Sri K Aboobacker
		,, K Mohammed Ali
Peon	:	Sri C Muhammed
Mali	:	Smt PP Ummachu upto 16-7-87
		Sri KV Balakrishnan from 30-9-87

CASHEW RESEARCH STATION, MADAKKATHARA

Professor of Agronomy	:	Sri PG Veeraraghavan
Assistant Professor (Entomology)	:	,, D Sitarama Rao
Junior Asst. Professors	:	,, V Kunchu
		,, Gregory Zachariah
		Smt PB Pushpalatha
Farm Assistant Gr. II	:	Sri C Greesan
Assistants Grade I	:	Sri PG Sreekantha Pai
		,, KP Rajan

RICE RESEARCH STATION, KAYAMKULAM

Professors (Entomology)	:	Sri K Balakrishna Pillai
(Bot)	:	Smt S Santha Kumari
Assoc. Professors (Bot)	:	Dr K Sivan Pillai
	:	Sri MG Vasavan
Assistant Professors (Agron)	:	Sri Abraham Varghese
(Bot)	:	Sri Sunny K Oommen
Junior Asst. Professors (Agron)	:	Smt P Sushama Kumari
(Ag. Engg.)	:	Sri KR Anil

Research on Rice (Non-plan)

Farm Supervisor	:	Sri AE Mendez
Lab Assistant Grade-I	:	Sri N Sivadasan
Lab Assistant Grade III	:	Sri S Haneefa
Farm Assistant (Agri) Sr. Grade	:	Sri M Varghese
		Smt B Radha
Farm Assistants (Agri) Grade I	:	Sri N Vasudevan
		Smt S Naseema
		Sri Krishnan Chettiar,
Farm Assistants (Agri) Grade II	:	Sri TK Vijayan
		,, VJ Rajamohan
Farm Assistant (Agri) Grade II	:	Sri KG Muraleedharan Pillai
Administrative Assistant	:	Smt Mary Amma Eapen
Assistants Grade I	:	Smt G Valsala Kumari
		Sri M Abdul Salam
Typist Grade II	:	Smt K Sobhana
Watchmen	:	Sri Bhaskaran
		,, K Sankaran
Peon	:	Sri K Balakrishnan

RICE RESEARCH STATION, MONCOMPU

Professor & Head	:	Dr CA Joseph
Professors (Agronomy)	:	Sri PK Chellappan Nair
(Entomology)	:	Dr KP Vasudeven Nair
		Sri B Thomas
(Pl. Pathology)	:	Dr L Rema Devi
Assoc. Professors (Bot)	:	Smt N Rema Bai
(Entomology)	:	Smt K Santhakumari
Assistant Professors		
(Chemistry)	:	Smt M Indira
(Bot)	:	Smt R Devika
(Agronomy)	:	Sri N Purushothaman Nair
(Extension)	:	,, Alexander George
(Pl. Breeding)	:	Smt S Leenakumari
(Chemistry)	:	Smt Annie Koruth

Junior Asst. Professors		
	(Agronomy)	: Smt Ahmed Regina
	(Pl. Pathology)	: Smt D Girija
	(Entomology)	: Smt G Suja
		,, D Jessy
Junior Statistician		: Smt PR Krishnakumari Amma
Farm Supervisor Grade I		: Sri K Chellappan
Farm Supervisor Grade II		: Sri CN Raghavan
Field Supervisor		: Sri V Thankappan
Senior Grade Farm Assistant		: Sri VCM Das
Grade-I Farm Assts		: Sri CS Joseph
		,, TJ Mathew
Administrative Assistant		: Smt K Rajamma
Sr Gr Assistant		: Smt B Sarasamma
Grade I Typist		: Smt PK Sreedevi Amma
Grade I Assistants		: Sri V Govindarajan
		,, NV Unnikrishnan Nair
		,, VP Raveendran
Peons		: Sri George A Murickan
		,, K Lalu
Watchman		: Sri Joseph Peter
Boat Driver		: Sri MD Janardhanan
Jeep Driver		: Sri CC Chacko
Boat Helper		: Sri PK Thankappan
Lab Assistants Grade III		: Sri G Vasudevan
		,, N Prakasan
		,, V Viswanathan

AGRONOMIC RESEARCH STATION, CHALAKKUDY

Professor (Agronomy)		: Dr G Raveendranathan Pillai till 30.7.87
Assoc. Professors (Soil Phy.)		: Smt G Santhakumari
		: Dr M Abdul Salam
	(Ag. Engg.)	: Smt Lissy David Chirayath
Asst. Professors	(Agron.)	: Sri Kuruvilla Varghese
		: Smt Reena Mathew
	(Soil Physics)	Dr KA Mariam
		Smt Manorama Thampatty
	(Ag. Engg.)	: Smt Sheela
	(Ag. Che.)	: Sri CS Gopi
Farm Asst. Gr. I		: Smt TA Vasanthy
Farm Assts. Gr. II		: Sri PK Raghu
		,, Sri MT Varghese
Lab. Asst. Gr. III		: Sri TR Balakrishnan
Assistant Gr. I		: Smt MA Sujatha

Driver (LV) Gr. II	:	Sri MP Paul
Peon	:	Sri K Radhakrishnan

NARP

Asst. Professors (Agron.)	:	Sri R Illangovan
,, (Ag. Engg.)	:	Sri EK Kurien
Farm Assts. Gr. I	:	Sri M Varghese
		Sri V Unnikrishnan
		Sri NM Mohanan
Lab. Asst. Gr. II	:	Sri PK Anandan
Typist Gr. II	:	Smt PK Sara
Farm Supervisor Gr. I	:	Sri R Chandran Pillai
Administrative Asst.	:	Sri D Gilbert
Oil Engine Driver-cum-Pump Operator	:	Sri KA Subran

AGRICULTURAL RESEARCH STATION, MANNUTHY

Project Co-ordinator (Rice)	:	Prof TF Kuriakose
Asst Professor (Agro.)	:	Dr PV Balachandran
	:	Smt KE Savithri
Jr. Asst. Professors	:	Smt KE Usha
		,, KP Prasanna
		,, L Meera
		,, KS Meenakumari

AICRIP—Double Cropping Centre

Assistant Professors (Bot.)	:	Smt MT Kanakamony
		Sri Gregory Zachariah

NARP Central Zone

Associate Professors (Agri)	:	Sri S Janardhanan Pillai upto 17.6.87
		Dr K Pushpangadan
Associate Professor	:	Sri PA Varkey
Assistant Professors(Agrl. Engg.)	:	Smt Latha A Koshy
	:	Sri George Mathew
Design Engineers	:	Smt Susan K Cherian
		Sri Boby Mathew

NARP– Special Zone

Assistant Professors (Agro.)	:	Sri TM Kurian
		Dr R Gopinathan
Junior Asst. Professor	:	Smt Tessy Joseph
Farm Supervisors	:	Sri TK Mithran
		Smt PG Yamuna
		,, VV Mariyakutty
		Sri P Gopinathan Nair
		,, CN Raghavan

Field Officer	:	Sri T Raman Nair
Farm Supervisor Gr. II	:	Smt M Kamalamma
Sr. Gr. Farm Assistant	:	Sri EN Sudhakaran Nair
Grade-I Farm Assistants	:	Smt L Radhammal
		Sri R Reghu
		,, John David
Lab Assistant Gr. III	:	Sri CK Dharmadasan
Technicians Gr. II	:	Sri TR Viswamharan
		Sri V Gopinatha Kurup
		,, KV Johny
Lab Assistant	:	Sri TV Parameswaran
Administrative Assistant	:	Smt S Vanaja
Office Superintendent	:	Sri KK Ramachandran Nair
Senior Grade Assistant	:	Smt KP Narayanikutty
Senior Grade Typist	:	Smt Kumari Sathyabhama
Gr. II Assistant	:	Smt M Komalam
Senior Grade Asst.	:	Smt PA Lakshmy
Peon Higher Grade	:	Smt I Parukutty
Peon	:	Sri CR Velayudhan
Driver Gr. III	:	Sri PS Kabeer
Driver Gr. II	:	Sri MS Kunju
Watchmen	:	Sri PV Kumaran
	:	Sri KM Devy

INSTRUCTIONAL FARM, VELLANIKKARA

Professor (Agronomy)		Dr K Pushpangadan
Asst. Professor (Agronomy)	:	Dr PS John
Jr. Asst. Professors (Pl. Path)	:	Smt KS Meenakumari
(Soil Science)	:	Sri K Meera
Farm Supervisors Grade I	:	Sri VV Mariamkutty
,, ,, Grade II	:	Sri P Gopinathan Nair
		,, CN Raghavan
Farm Asst. Sr. Grade	:	Sri EN Sudhakaran Nair
,, Asst Grade II	:	Sri R Reghu
Technician Grade II	:	Sri TR Viswambharan
Section Office Hr. Grade	:	Sri Pius Fernandez
Asst Senior Grade	:	Sri Y Rajas
Senior Office Superintendent	:	Sri Paul Sextus
Peons	:	Sri M Sundaram
		,, AP Manikyan

AICRP ON AGRL. DRAINAGE, KARUMADY

Asst. Professors (Agrl. Engg)	:	Sri EK Mathew
,, (Agronomy)	:	,, Madhusudanan Nair
Jr. Asst. Professors (Agrl Engg)	:	Sri TD Raju
Sr. Grade Farm Assistant (Agri)	:	Sri R Madhavan Pillai

Farm Asst. (Agri) Grade II	:	Sri KO Shahul Hameed
		Smt I Krishnakumari
Technicians Grade-II	:	Sri KP Sreedharan Nair
		,, Thomas Scaria
Lab Assistant Grade-II	:	Sri K Kunju Pillai
Assistants Grade I	:	Sri K Govindan up to 3-6-87
		,, Mohammed Bashir from 4-6-87
Typist Grade-I	:	Smt KK Mary upto 3-6-87
Senior Grade Typist	:	Smt HK Khadeeja Beevi from 4-6-87
Peon	:	Sri M Mohammed Haneef
Watchmon	:	Sri MG Thomas
		,, CA Checko
Driver Gr II	:	,, TK Francis from 15-6-87

ECF UNIT—MANNUTHY

Associate Professor (Agron)	:	Sri John kutty
Grade I Farm Assistants	:	Sri VN Gopi
		,, D Vigrahanathan
		,, G Shaji
		,, EN Raveendran Nair
		,, R Satheesan
		,, V John George
		,, M Kamarudheen
		,, G Udayakumar
Assistant Grade II	:	Sri CP Jayakumar
Jeep Driver	:	Sri K Sukumara Pillai
Watchman	:	Sri EV George

ORP, OZHALAPPATHY

Asst. Professor (Agron)	:	Sri PH Latif
Jr. Asst. Professors (Ag.Eco)	:	Sri KU Viswanathan
(Ag. Engg.)	:	Smt A Latha Koshy
(Ag Chem)		Sri KM Durgadevi
(Ag. Chem)	:	Sri C Naraynankutty
Farm Asst. S Gr. II		Sri D Sivaprasad
		,, C Easwarachandran
LDV Driver Grade II	:	Sri MV Arumughan
Class IV	:	Sri K Divakara Panicker
(Field Guide)	:	Sri M Natarajan

COCONUT RESEARCH STATION, BALARAMAPURAM

Professor	:	Sri GK Balachandran Nair
Assistant Professor	:	Sri M Vijayan
Farm Supervisor Gr I	:	Sri K Chellappan
,, Gr II	:	Sri N Madhavan Nair
Head Mazdoor	:	Sri J Vijayan

Watchmen	:	Sri G Raghavan PIllai
		Sri K Mohanan
Administrative Assistant	:	Smt B Rugmini Amma
Sr Grade Assistants	:	Smt R Vasumathy
		Sri N Rajasekharan
Sr Grade Typist	:	Sri KC Mohankumar
Peon	:	Sri N Prabhakaran Nair

NARP SOUTHERN REGION, VELLAYANI

Associate Director	:	Dr N Monanakumaran
Assoc. Professors (Soil Sci)	:	Sri PR Ramasubramonian
(Pl. Br.)	:	Sri N Ramachandran Nair
(Ag. Stat.)	:	Dr P Saraswathy
Asst. Professor (Pl. Br)	:	Sri Sunny K Oommen
(Nematology)	:	Smt MS Sheela
(Agrl. Ex.)	:	Sri R Prakash
(Statistics)	:	Sri R Balakrishnan Asan
(Soil Sci.)	:	Smt Betty Bastin
(Hort)	:	Smt GR Sulekha
Administrative Officer	:	Sri N Soman
Typists Grade I	:	Smt S Majida Beevi
		,, A Vasantha
		Sri G Hareendran
		,, S Raghavan
		Smt S Remani
		Sri R Noel from 1-2-1988
Assistant Gr. I	:	Sri MS Sanalkumar
Assistant Gr II	:	Smt S Sathee Devi from 13-7-1987
Farm Assistants Gr. I	:	Sri KS Ajayakumar
		,, Justin
		,, SR Rajeevan
		,, I Gershan
Lab. Asst. Gr I	:	Sri M Krishnan Nair
Drivers (LDV) Gr. II	:	Sri R Soman Nair
		,, PS Vijayakumaran Nair
Photographer	:	Sri MS Kuriakose
Duplicator Operator	:	Sri C Madhusoodanan Nair

AICRP on Forage Crops

Associate Professor (Agron/Pl. Breeding	:	Dr G Raghavan Pillai
Asst. Professor (Agron)	:	Smt M Meera Bai
(Pl. Breed)	:	Dr J Sreekumari Amma
Junior Asst. Prof. (Agron)	:	Smt S Lakshmi
(Pl. Breed)	:	Sri KM Abdul Khader

Farm Asst Gr. I	:	Sri Gopinathan
" Gr. II	:	Sri Jones Charles
Asst Grade II	:	Smt S Vasanthakumari
Lab Asst Gr. III	:	Smt R Sakuntala
Peon	:	Sri M Nagappan

AICRP on Nematode Pests

Assoc. Professor (Nem.)	:	Dr K John Kurian
Asst Professor (Nem.)	:	Smt Hebsy Bai
	"	T Nalinakumari
Farm Asst. Gr. II	:	Smt KS Sujatha
Lab. Asst. Gr. III	:	Sri P Thankayyan

AICRP on Oil Seeds

Assistant Profs. (Pl. Br.)	:	Dr Sverup John
(Agron)	:	Smt S Chandini
Farm Asst. Gr. I	:	Sri Devi Dharmakumar
Assoc. Prof. (Ent.)	:	Dr A Visalakshy
Asst. Prof. (Ent/Agril Chem.)	:	Dr S Naseema Beevi
		Sri PA Rajan Asari

USDA Scheme on Tissue Culture

Asst. Prof. (Hort.)	:	Dr K Rajmohan
Senior Gr. Typist	:	Smt S Raghamma

Science and Technology Scheme on Mushroom Flora

Research Fellow	:	Sri S Robby Ezhiyath

Science and Technology Scheme on Mycorrhizae & Forest Ecosystem (Terminated on 31-12-1987)

ICAR Adhoc Scheme on Rice Cyst Nematode

Assistant Professor	:	Sri Arthur Jacob
Jr. Res Fellow	:	Sri Sabu Sebastian

SUGARCANE RESEARCH STATION, THIRUVALLA

Professor	:	Dr N Neelakantan Potty
Assoc. Professor	:	Sri KC Chandy
Junior Assistant Professors	:	Sri Sajan Kurian
		" Suresh Kumar
		Smt Jessy M Kuriakose
Research Fellow	:	Sri Babu George
Farm Supervisor	:	Sri A Mohammed Kunju
Farm Assistant Senior Grade	:	Sri VP Rajappan Nair
Farm Assistant Grade I	:	Sri EK Sukumaran
Farm Assistant Grade II	:	Sri KG Muraleedharan
Administrative Assistant	:	Sri TV Rajasekharan Nair
Senior Grade Assistant	:	Smt B Thankamani

Grade I Assistant	:	Smt D Vijayamma
Senior Grade Office Supdt.	:	Sri MR Raveendran
Office Superintendent	:	Sri Gopinathan Nair
Driver	:	Sri OR Sasidharan
Peon	:	Smt S Kala Devi
Watchman	:	Sri S Rajeev

LIVESTOCK RESEARCH STATION, THIRUVAZHAMKUNNU

Associate Professor (Animal Nutrition)	:	Dr P Kuttinarayanan
Assistant Professor (Animal Breeding & Genetics)	:	Dr PC Sasoendran

AICRP ON AGROFORESTRY

Special Officer (Agro-forestry)	:	Sri VR Krishnan Nair
Assistant Professor (Agronomy)	:	Sri Thomas Mathew.
Junior Asst. Professors (Horticulture)	:	Sri KV Suresh Babu
(Plant Pathology)	:	Sri K Umamaheswaran
Farm Supervisors (Agri)	:	Smt B Indira Bai Amma
(Vety)	:	Sri PP Narayana Panicker
Farm Assistants (Agri)	:	Sri M Ummer
		Sri D Sulochanan
		,, VM George
		,, Sreenivasan Palasseri
		,, KG Mohandas
(Vety)	:	Sri T Venu
Technician Gr. II	:	Sri A Sankaran
Maistry	:	Sri P Balakrishnan
		,, K Ramakrishnan
		,, K Krishnan
Farm Assistants (Agri)	:	Sri Thomas Chirakandathil
		,, CP Nandakumar
Peon	:	Sri K Narayanan
Lab Assistant	:	Sri P Bharathan
Administrative Assistant	:	Sri TN Sankutty
Sr Grade Assistant	:	Smt A Subbalakshmi Ammal
Assistant Gr. II	:	Sri P Muraleedharan
Typist Gr. II	:	Sri M Mohandas
Lab Assistant Gr. II	:	Sri C Mohammed Usman
Driver Gr I	:	Sri PM Mohammed
Driver Gr II	:	Sri T Moidu
Peon Spl Grade	:	Sri K Mohammed
Peon Hr Grade	:	Sri P Narayanan Nair

Pump Operators	:	Sri M Ramachandran
		,, N Appunni

PIG BREEDING FARM, MANNUTHY

Professor	:	Dr Kurien Thomas
Assistant Professor	:	Dr KS Sebastian
Farm Supervisor (Vety)	:	Sri KM Neelakandan Kartha
Farm Assistants (Vety)	:	Sri KP George
		,, KK Sasidharan Nair
Administrative Asst.	:	Smt PN Sudhadevi
Assistants	:	Smt M Jessintha
		,, TD Annie
Watchmon	:	Sri TM Kesavan
		,, S Manikandan
Peon	:	Smt KK Karthiayani
Pump Operator	:	Sri MS Mohanan
Pig Attendants	:	Sri PB Velayudhan
		,, V Pushpangadhan

AICRP ON AGRICULTURAL BYEPRODUCTS

Professor	:	Sri P Ramachandran
Assistant Professor	:	Sri George Mathen
Lab Technician	:	Smt MV Kumari
Farm Assistants (Vety)	:	Sri Sivaraman
		,, KR Sasidharan
		,, K Radhakrishnan
Mechanic	:	Sri Sudarsanakumar
Lab Attendant	:	Sri PV Sreedharan
Assistant Gr II	:	Sri Sreekumar

POULTRY AND DUCK FARM, MANNUTHY

Professor	:	Dr R Sabarinathan Nair
Assoc. Professor	:	Dr G Reghunathan Nair
Asst. Professor	:	Dr C V Andrews
Farm Supervisors	:	,, U T Dominic
		,, K Raman Menon
		,, M Narayanankutty
		Smt K V Rocily
Poultry Attendants	:	Sri P B Abdulrahiman
		,, K K Velayudhan
Administrative Asst.	:	Sri P K Nataraja Pillai
Assistants	:	Smt C Shobhanakumari
		Smt B Shobhana
Peon	:	Sri M Ayyappan
Watchman	:	Sri K K Gopalan
Farm Assistant (Vety)	:	Smt P G Thankam

VETERINARY HOSPITAL, KOKKALAI

Professor	:	Dr K Ramadas
Assistant Professor	:	Dr MR Surendranath
Farm Supervisor (Vety)	:	Sri PP Sankaran
Farm Assistants	:	Smt Sarojini
		Sri JK Narayanan
Sr. Gr. Assistants	:	Smt A Subbalakshmy Ammal
		,, L Syamala Devi
Attendant Special Grade	:	Sri MK Sheik Abdul Rahiman
Attendant Grade-I	:	Sri KO Varghese
Permanent Servant	:	Sri KS Radhakrishnan
Sweeper cum Scavenger	:	Smt KN Saraswthy

CATTLE BREEDING FARM, THUMBURMUZHI

Assistant Professor	:	Dr Joseph Mathew
Farm Supervisor (Agri)	:	Sri SM Jainulabdeen
Sr. Grade Farm Assistant (Vety)	:	Sri V Sukumaran Nair
Pharmacist	:	Sri CK Alias
Farm Asst. (Vety)	:	Sri K Sivasankaran
Pump Operator	:	Sri MP Joseph
Herdsmen	:	Sri AO Thomas
		,, VA Kannan
		,, NK Ramakrishnan
		,, PK Velayudhan
		,, TK Thomas
Farm Asst (Vety)	:	Sri Mohanan Nair
Administrative Asst.	:	Smt PK Elsy
Asst. Gr. I	:	Sri KK Kuttappan
Peon	:	Sri KV Bhaskaran

FISHERIES STATION, PUDUVEYPU

Associate Professor	:	Sri KS Purushan
Assistant Professor	:	Sri MM Jose
Research Fellow	:	Sri KM Hamza
Fieldman (Fisheries)	:	Sri KK Raghu
Farm Assistant (Agri)	:	Sri PK Abdul Salam
Pump Operator	:	Sri EI Andrew
Assistants	:	Smt T Vijayalakshmi
		Sri MN Chandrasekharan
Typist	:	Smt P V Brizitha

Appendix V

LIST OF PUBLICATIONS

FACULTY OF AGRICULTURE

PUBLICATIONS/SCIENTIFIC ARTICLES

COLLEGE OF AGRICULTURE, VELLAYANI

K Viswambharan, and VK Sasidhar, (1986) Water balance studies of soil with rainfed cassava in the slopy fields of central Kerala Madras Agric. J 73 (10): 545-552.

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PR Krishnakumari Amma, B Thomas and N Mohandas (1987). Pesticides consumption in Kuttanad in relation to the operational research programme on integrated control of rice pests in Kuttanad in Kerala. *IBID* pp. 9.

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KK Ravindran Nair and PL Kamalakshi Amma (1987). Control of root-knot nematodes on brinjal by the use of organic amendments. IBID. p 18-19.

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PB Gopinathan and KS Kushawaha (1987). Efficacy of larval and larval pupal parasitoids on the regulation of army worm. *Mythimna separata* (Walker). IBID. 34.

S Naseema Beevi and Abraham Jacob (1987). Effect of pesticides on the growth and sporulation of *Fusarium moniliformes* var. subglutinana infecting epilachna beetle *Monosepilaehna vieintioctopunctata* (Fabr). *coccinellidae: coleoptera*. *IBID* 40

John V Cheriyan and K P V Nair (1937). Joint action of nuclear polyhedrosis virus of *Spodoptera litura* (Fabricius) with insecticides and its applicability in pest control. *IBID*. pp. 41.

KPV Nair and Suma Pouloso (1987). Control of Snakegourd semilooper *Anadevidia peponis* (Fabricius) with its nuclear polyhedrosis virus p. 41

Susamma Mathai, MRGK Nair and N Mohandas (1987). Studies on the field application of nuclear polyhedrosis virus and insecticides mixtures in the control of the rice swarming caterpillar *spodoptera mouritia IBID*. p. 41

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K Sudharma, A Visalakshi, S Naseema Beevi and NM Das (1987). Need based application of insecticides for the control of cowpea aphid, *Aphis craccivora* Kosh *IBID*. p. 47.

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K Ravindranath and K Sasidharan Pillai (1987). Use of Synthetic pyrethroids in management of snakegourd pests *IBID* pp. 48-49.

KS Romamony, Jim Thomas and Thomas. (1987). Economic dose of carbaryl and quinalphos for the control of paddy pests. *IBID* p. 49.

C Nandakumar, P Reghunath, A Visalakshi and N Mohandas (1987). Management of pollu beetle *Longitarsus nigripennis* Mots) on pepper by adjusting the spray schedule. *IBID*. p. 50

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D Ambika Devi, K Saradamma, D Dale and KV Mammen (1987). Impregnation of gunny bags with natural products for the management of insect pests of dried tapioca chips. *IBID*. p. 59–60.

K Saradamma, D Dale and N Mohandas (1987). Plant extract for the management of insect pests of vegetables. *IBID*. 60.

K Saradamma, D Ambika Devi and Dale (1987). Management of some insect pests of vegetables through the use of chitin synthesis inhibitors, *IBID*. p. 61.

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D Revi, K Saradamma and N Mohandas (1987). On the control of *Honosepilachna vigintioctopunctata* using mixtures of insecticides and chitin synthesis inhibitors *IBID*.

C Nandakumar, P Reghunath, T Nalinakumari, S Naseema Beevi and A Visalakshi (1987). Surveillance of pollu beetle (*Longitarsus nigripennis* Mots) infestation on black pepper. *IBID*. p. 80.

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College of Horticulture, Vellanikkara

M Aravindakshan, PK Valsalakumari and K Gopikumar (1987). A promising variety of sapota for homesteads in Kerala. *Agric. Res. J. Kerala*-25.

M Aravindakshan, PK Valsalakumari and JKL Marmacharya (1987) Interclonal hybridization in banana. *Agric. Res. J. Kerala*-25.

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S Jacob and S Verma (1987). Efficacy of insecticides against the sopulation aphid *Bravicoryne brassica* on cauliflower. *Indian J. Agric. Sci.* 57(1)857-861.

BL Markose and M Aravindakshan (1987). Compatibility studies in shoe flower (*Hibiscus rosasinensis*) *Agric Res. J. Kerala* 25 (1):17-26.

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Appendix VI

PROJECT CO-ORDINATION GROUPS

AGRICULTURE

Rice

Project Co-ordinator : Prof TF Kuriakose

Members : Prof. PN Pisharody, Dr CA Joseph, Mr N Rajappan Nair, Dr K Karunakaran Dr N Vijayakumar, Mr PKG Menon, Mr NN Ramankutty, Dr CC Abraham, Dr MC Nair

Coconut, Arecanut and Oil Palm

Project Co-ordmator: Dr RR Nair

Members : Dr PK Sathyarajan, Dr C Sreedharan, Dr Al Jose, Dr KM Rajan, Dr MJ Thomas, Officer i/c CRS Balaramapuram

Spices

Project Co-ordinator : Dr Abi Cheeran

Members : Officer i/c, RARS Ambalavayal, Officer i/c, PRS Panniyur, Dr TS Venkitesan, Mr D Joseph, Dr A Visalakshi, Dr M Aravindakshan

Cocoa and Other Beverage Crops

Project Co-ordinator : Dr R Vikraman Nair

Members : Dr K Kumaran, Mr D Joseph, Dr J Ravi, Professor & Head, Dept. of Plantation Crops

Cashew

Project Co-ordinator : Prof KK Vidyadharan

Members : Officer in charge CRS Madakkathara, Mr PG Veeraraghavan, Officer in charge CRS Madakkathara, Mr PG Veeraraghavan Dr Abi Cheeran, Dr M Aravindakshan, Officer in charge CRS Anakkayam, Dr Seetha Rama Rao

Fruit Crops and Floriculture

Project Co-ordinator : Dr SR Nair

Members : Mr PC Jose Professor of Horticulture, (College of Agrl, Vellayani), Officer i/c. BRS Kannara, Officer i/c. RARS Ambalavayal, Professor of Pomology, College of Hort., Dr A Visalakshy and VS Devadas Smt PK Valsalakumari, Dr G Gopikumar

Vegetables and Tuber Crops

Project Co-ordinator : Dr KV Peter

Members : Professor of Horticulture, College of Agriculture, Vellayani, Dr N Mohanakumaran, Officer i/c, AICVIP, College of Horticulture, Dr John Kurian, Sri PK Asokan, Dr K Sasidharan Pillai, Sri CR Manikantan Nair, Prof. V Sukumaravarma, Dr TR Gopalakrishnan

Pulses and oil seeds

Project Co ordinator : Dr V Gopinathan Nair

Members : Smt S Santhakumari, Officer i/c, AICRP on Pulses Research, RARS Pattambi, Mr MRC Pillai Dr VK Sasidhar, Dr K Sivan Pillai, Mr KI James, Mr KP Vasudevan Nair, Dr K Pushkaran, Dr SK Nair' Dr S Balakrishnan, Dr Alice Abraham

Essential Oils and Medicinal Plants

Project Co-ordinator : Dr TV Viswanathan

Members : Dr MK Rajagopalan, Officer i/c, Odakkali, Dr G Sreekantan Nair, Dr VG Nair, Smt K Saradamma, Dr NP Chinnamma, Dr Jacob John

Post Harvest Technology and Nutrition

Project Co-ordinator : Dr G Sreekantan Nair

Members : Mr Jacob John, Mr VP Sukumara Dev, Dr L Prema, Officer i/c, AICRP on Agrl. By-Products, Dr PV Nair, Professor of Hort., Processing Technology, Mr A Augustin, Smt T Nalinakumari

Sugarcane and Miscellaneous Crops

Project Co-ordinator : Dr KMN Namboodiri

Members : Dr R Vikraman Nair, Mr S Sukumaran Nair, C Chandrasekharan Nair, Dr MC Nair, Dr NN Potti, Mr D Joseph

Fodder Crops

Project Co-ordinator : Mr G Raghavan Pillai,

Members : Mr KP Madhavan Nair, Dr R Gopimony, Dr KI wilson, Officer i/c, Fodder Research Scheme, Mannuthy, Dr C Sreedharan

Plant Protection

Project Co ordinator : Dr MC Nair

Members : Mr KP Vasudevan Nair, Dr CC Abraham, Dr TS Venkitesan, Dr Abi Cheeran, Dr KM Rajan, Mr KK Ravindran Nair, Dr James Mathew, Dr CT Abraham, Mr M Govindan, Dr A Visalakshi, Dr P Karunakaran, Dr N Mohandas

Soils and Agronomy

Project Co-ordinator : Dr P Padmaja

Members : Dr C Sreedharan, Dr R Vikraman Nair, Dr RS Aiyer, Dr KP Rajaram, Dr Ai Jose, Mr PK Gangadhara Menon, Mr NN Ramankutty, Dr P Balakrishna Pillai, Dr Thomas Varghese, Dr J Thomas

Farm Economics, Extension & Statistics

Project Co-ordinator : Dr G I Nair

Members : Dr DM Thampi, Dr AM Thampi, Mr ER Narayanan Nair, Dr K Mukundan, Dr T Prabhakaran, Dr CA Jose, Dr N Rajan Nair, Mr M Mohandas, Mr Abdu Razak, Mr FMH Khaleel, Dr V Radhakrishnan, Dr KC George, Prof PV Prabhakaran

Cropping Pattern and Farming System

Project Co-ordinator : Dr VK Sasidhar

Members : Prof PN Pisharody, Dr KP Rajaram, Dr N Manianakumaran, Dr VG Nair, Mr KP Madhavan Nair, Mr KC Iype, Dr CR Ananthasubramaniam, Mr ER Narayanan Nair, Dr K Wilson, Dr N Mohandas, Dr R Vikraman Nair

Agro Meteorology

Project Co-ordinator : Dr P Balakrishna Pillai

Members : Mr PC Jose, Dr GSLHV Prasad Rao, Mr KV Mammen, Mr Abdu Razak, Dr GP Pillai

VETERINARY AND ANIMAL SCIENCES

Cattle and Buffaloes

Project Co-ordinator : Dr CR Ananthasubramaniam

Members : Dr TG Rajagopalan, Dr E Sivaraman, Dr CP Neelakantan, Dr K Pavithran, Dr PA Ommer, Dr G Mukundan, Dr P Prabhakaran, Dr Abraham C Varkey, Dr PP Balakrishnan, Dr V Japaprakasan

Goat and Rabbit

Project Co-ordinator : Dr G Mukundan

Members : Dr KM Ramachandran, Dr E Mathai, Dr V Sathianesan, Dr N Kunjukutty, Dr NM Aleyas, Dr CS James, Dr PC James, Dr AD Joy, Dr N Gopakumar

Poultry

Project Co-ordinator : Dr A Ramakrishnan

Members : Dr A Rajan, Dr AK Kochu Govindan Unny, Dr R Sabarinathan Nair, Dr Maggie D Menachery, Dr MG Ramakrishna Pillai, Dr C George Varghese, Dr Sosamma Iype, Dr AM Jalaludin, Dr KP Surendranathan, Sri KL Sunny

Swine Elephant and Other Species

Project Co-ordinator : Dr G Nirmalan

Members : Dr CR Ananthasubramaniam, Dr K Chandrasekharan, Dr Jacob V Cheeran, Dr CK Thomas, Dr Kurien Thomas, Dr P Ramachandran, Dr KN Muraleedharan Nair, Dr K Baby, Dr CA Rajagopala Raja, Dr C Pythal.

Animal Reproduction

Project Co-ordinator : Dr CP Neelakantan

Members : Dr G Nirmalan, Dr MK Rajagopalan, Dr K Prabhakaran Nair, Dr K Ramadas, Dr M Sthanumalayan Nair, Dr PA Devassia, Dr KT Punoose, Dr KP Sadanandan, Dr T Sreekumaran, Dr T Saradamma

Animal Diseases

Project Co-ordinator : Dr A Rajan

Members : Dr PO George, Dr EP Paily, Dr KM Alikutty, Dr K Rajamohan, Dr S Sulochana, Dr M Soman, Dr V Sudarsanan Dr P Marykutty, Dr CT Thomas, Dr M Mukundan

Animal Products Technology

Project Co-ordinator : Dr R Padmanabha Iyer

Members : Dr KI Maryamma, Dr Zacharias Cherian, Dr MV Sukumaran, Dr P Prabhakaran, Dr CK Venugopalan, Dr E Madhavan Dr S Ravindran Nair, Dr K Madhavan Pillai, Dr MT Jose, Dr Francis Xavier.

Economics, Statistics and Extension

Project Co-ordinator : Dr T Prabhakaran

Members : Dr KC George, Dr PS Pushkaran, Dr A Ramakrishnan Dr R Padmanabha Iyer, Dr PT Georgekutty, Dr G Venugopal, Dr Lucy Paily, Dr KV Valsala, Dr V Raju, Mr N Ravindranathan

Appendix VII

LIST OF PROJECTS FINANCED BY OUTSIDE AGENCIES DURING VII FIVE YEAR PLAN

A. RESEARCH PROJECTS

i) All India Co-ordinated Projects

	Project Details	Project Centre
a)	*Faculty of Agriculture*	
1	AICRP on Agroforestry	Livestock Research Station, Thiruvazhamkunnu
2	AICRP on Nematode Pests of crops	College of Agriculture, Vellayani
3	AICRP on Agricultural Drainage	Karumady
4	AICRP on Cashew	Madakkathara
5	AICRP on Spices	
	i) Research on Spices	Pepper Research Station, Panniyur
	ii) Research on Cardamom	Cardamom Research Station, Pampadumpara
	iii) Research on Ginger	College of Horticulture, Vellanikkara
6	AICRP on Floriculture	-do-
7	AICRP on BCCP	-do-
8	AICRP on Tropical Fruits (Banana)	Banana Research Station, Pattambi
9	AICRIP Main Centre	Regional Agricultural Research Station, Pattambi
	AICRP Sub-Centre	Agricultural Research Station, Mannuthy
10	AICARP-Cropping Systems and One ECF Unit	Cropping Systems Research Centre Karamana and Quilon
11	AICRP on Sugarcane	Sugarcane Research Station, Thiruvalla
12	AICRP on Pulses	Regional Agricultural Research Station, Pattambi
13	AICRP on Vegetables	College of Horticulture, Vellanikkara
14	AICRP on Forage crops	College of Agriculture, Vellayani

15	AICRP on Water Management	Agronomic Research Station, Chalakudy
16	AICRP on Weed Control in Plantation Crops (PL 480)	College of Horticulture, Vellanikkara
17	Operational Research Project on Integrated Control of Rice Pests, Kuttanad	Rice Research Station, Moncompu
18	ORP on Watershed basis	Ozhalappathy, Palghat
19	NSP—Breeder Seed Production Unit	Regional Agricultural Research Station, Pattambi
20	PL 480 scheme—Fate and Efficiency of Urea based fertiliser	Cropping Systems Research Centre, Karamana
21	AICRP on Pesticide Residue	College of Agriculture, Vellayani
22	Promotion of Agrl. Electronics—Pilot Centre (Financed by Dept. of Electronics, Government of India through ICAR)	Vellanikkara

b) *Faculty of Veterinary & Animal Sciences*

1	AICRP on Goat	Mannuthy
2	AICRP on Poultry	-do-
3	AICRP on Agricultural Byproducts	-do-
4	AICRP on Poultry Nutrition	-do-
5	Centre on Poultry housing and management	-do-

c) *Faculty of Agricultural Engineering & Technology*

1	AICRP on Farm Implements and Machinery	Kelappaji College of Agricultural Engineering & Technology, Tavanur

ii) AP cess fund projects

	Title of scheme	Location
	1	2
a)	*Agriculture*	
1	Studies on the strains of Rhizobia of Pulses, the effect on them and standardisation of a mass culturing technique	College of Agriculture, Vellayani

1		2
2	Cyst nematode *Heterodera oryzicola* infesting rice in Kerala	College of Agriculture, Vellayani
3	Tapioca consumption and goitre incidence in Kerala	-do-
4	Research on *Cymbopogon flexuosus* and other *Cymbopogon* spp.	Aromatic & Medicinal Plants Research Station, Odakkali
5	Survey, appraisal and control of major diseases of sugarcane	Sugarcane Research Station, Thiruvalla
6	Marketing of coconut and cocoa in Kerala	College of Horticulture, Vellanikkara
7	Breeding for resistance to bacterial wilt in chilli and brinjal	-do-
8	Development of improved varieties of sesamum and ground nut suited to the rice fallows in the Onattukara region, Kerala	Rice Research Station, Kayamkulam
b)	*Veterinary & Animal Sciences*	
1	Karyological studies of cattle of Kerala with special reference to infertility and sterility	College of Vety. & Animal Sciences Mannuthy
2	Mycotoxicosis in domestic animals and poultry	-do-
3	Studies on blood groups and biochemical polymorphism in cattle	-do-
4	Efficiency of white Pekin ducks, Desi ducks and their crosses for meat production	-do-
5	Progeny testing of cross-bred bulls in rural areas	-do-
c)	*Agricultural Engineering & Technology*	
1	Design and development of wind turbines and its feasibility studies in Kerala	Kelappaji College of Agricultural Engineering & Technology, Tavanur

iii) Schemes sanctioned by other external agencies

	Project Title	Project Centre
a)	*Department of Science & Technology, GOI*	
1	Mushroom flora of Kerala	College of Agriculture, Vellayani
2	Mycorrhizal association and forest ecosystem of Kerala	-do-
3	Incidence and nature of Hypothyroidism in domastic animals	College of Vety. & Animal Sciences, Mannuthy
4	Micro-organisms associated with eggs and larvae of *Macrobrachium rosenbergii* in hatchery	College of Fisheries, Ernakulam
b)	*State Department of Science & Technology, GOK, Trivandrum*	
1	Hazards of food adulteration in Trivandrum District	College of Agriculture, Vellayani
2	Trials on large scale cultivation of edible species of mushroom *Pleurotus*	-do-
3	Investigations on the diseases of bamboo and reeds in Kerala	Regional Agricultural Research Station, Kumarakom
4	Investigations into the role of free flying birds in transmission of parasitic nematodes	College of Vety. & Animal Sciences, Mannuthy
5	Nutritional deficiency symptoms and foliar diagnosis in Tree crops	College of Horticulture, Vellanikkara
6	Eco development of Vellanikkara campus	-do-
c)	*SIDA*	
	SIDA assisted project on ground water studies	College of Horticulture, Vellanikkara
d)	*ICSSR Project*	
	"Spatial Micro-level planning for integrated rural development"	College of Co-operation & Banking, Mannuthy
e)	*Hindustan Cocoa Products*	
	Cadbury's Cocoa Research Project	College of Horticulture, Vellanikkara
f)	*USDA project on tissue culture*	College of Agriculture, Vellayani

B EXTENSION PROJECTS

Project Details	Projects
i) ALL INDIA CO-ORDINATED PROJECTS (ICAR FINANCED)	
1. All India Co-ordinated project for the rapid improvement of Agrl. Technology directed at the Socio economic upliftment of SC & OBC	Scheduled Caste Area Research Centre, Nilambur, Malappuram District
2. All India Co-ordinated Project for strengthening Agricultural and Research programmes for the Socio-economic upliftment of Tribals	Tribal area Research Centre, Amboori Trivandrum District
3. All India Co-ordinated Project on National Demonstration on Major Food crops	Sadanandapuram, Quilon Dt.
ii) OTHER ICAR FINANCED PROJECTS	
1. ICAR Golden Jubilee Celebration Lab-to-Land programme	Directorate of Extension, KAU, Mannuthy
2. Krishi Vigyan Kendras	a) Regional Agrl. Research Station, Pattambi, Palghat Dt. b) Regional Agrl. Research Station, Ambalavayal, Wynad Dt.
3. All India Adhoc Research Project for studying the impact of modernization in Agriculture on women with special reference to rice farming systems in the country	Directorate of Extension, KAU, Mannuthy
iii) GOVT. OF INDIA ASSISTED PROJECTS/STATE GOVT. ASSISTED PROJECTS	
a) Govt. of India assisted projects	
1. Ministry of Home Affairs	
Integrated development of Kanikkar tribals dispersed in hamlets situated in the slopes of Agasthyamudi Peak	College of Agriculture, Vellayani, Trivandrum Dt.

2. *Ministry of Welfare*

Follow up studies of certain innovative development programmes among a few selected communities in the Western Ghat area with special reference to ecology and forestry development for Tribal development	College of Agriculture, Vellayani, Trivandrum Dt.
3 *Department of environment* Socio-cultural exploratory pilot survey on customs traditions with positive as well as negative influence on sustainable use of natural living resources of Ecosystem in Kerala	Directorate of Extension, Kerala Agricultural University, Mannuthy, Trichur Dt

b) State Government assisted projects

Department of Planning & Economic affairs

1. Simple methods of water harvesting for drinking and irrigation purposes along the western ghats	College of Agriculture, Vellayani, Trivandrum Dt.
2. Establishment of Agro-met observatory at Amboori	Amboori in Trivandrum Dt.

iv) GOVT. OF INDIA AND STATE GOVT. ASSISTED PROJECT

National Agrl Extension Project (NAEP)

a. Central Training Institute	Mannuthy, Trichur Dt.
b. Training Service Scheme	College of Agriculture, Vellayani, Trivandrum

v) OTHER EXTERNALLY AIDED PROJECTS

1. UNICEF Training Cell	College of Rural Home Science, Vellayani, Trivandrum Dt.
2. Council for Advancement of Peoples Action and Rural Technology, (CAPART)	
i) Design, Development and Evaluation of Sand dredging equipment	College of Horticulture, Vellanikkara, Trichur Dt.

Appendix VIII

STATUTE AND AMENDMENTS ISSUED DURING 1987-88

1. Amendments made to Statute SRO No. 81/76

   (The qualification & method of appointment for the post of Deputy Director of Students Welfare (Sports & Games) have been amended vide Notification No. GH/E3/45253/82 dated 16-3-1987)

2. Issued ordinance regarding the departmental tests to be passed by the Assistant Engineers of the Kerala Agricultural University.

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