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FOREWORD

Kerala is very rich in its natural resources. With high rainfall, hilly terrain and long coast line it has high potentials to produce many high value agricultural commodities. If the natural resources were to be more fully utilized and the productivity of the land substantially increased, the relevant scientific technologies will have to be continuously developed and made available to the farmers and to the common man at their door-steps. The very purpose of establishing the Agricultural University in Kerala is to carry out these very important tasks.

Since its inception in 1972, the Kerala Agricultural University has grown in strength, both qualitatively and quantitatively. In order to assess the achievements of the University, to evaluate how far the objectives set forth by the University Act has been fulfilled and to make recommendations of further steps to be taken towards more rapid growth of the University, the Kerala Agricultural University Commission was set-up in 1985. The Commission was given a specific mandate which became the main guideline. More active work of the Commission started only from March 1986. The present report is the outcome of the concentrated efforts put in by the Commission over the past nine months.

The members of the Commission Dr. M. N. Menon, Major General R. K. R. Balasubramaniam, Dr. K. H. Alikunhi, Dr. K. V. Ahamed Bavappa and Dr. A. G. G. Menon have put in their heart and soul towards successful completion of the assignment. In gathering information and processing the data, the Directorate of Extension of the University has carried out an herculean task. In organizing the visits of the Members of the Commission to various campuses and stations of the University and outside, and in arranging for the conduct of the meetings, Dr. A. G. G. Menon, assisted by Dr. K. S. Pillai, have done excellent work all the way through, which deserves special appreciation. The discussions the Commission had with Shri. T. Madhava Menon, I. A. S., Vice-Chancellor of the Kerala Agricultural University on several occasions, were most invaluable.

In presenting the report, the Commission takes the collective responsibility for the various recommendations made, all of which are unanimous. As the Chairman of the Commission, I wish to express my grateful thanks to the Members for their kind co-operation and deep understanding.

The entire work of printing the report was handled by the K. A. U. Press under the Directorate of Extension Education. I wish to place on record my sincere gratitude to the Kerala Agricultural University for the confidence imposed in me to function as the Chairman of the Commission. If steps are taken to implement atleast a few of the recommendations contained in the report, it would be gratifying to me and the Members of the Commission for having contributed towards healthy growth of K. A. U. in the coming years.

Madras 600 018
19th December, 1986.

(G. RANGASWAMY)

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PART—I
BACKGROUND

CHAPTER I

1 INTRODUCTION

- 1.1. The Academic Council of the Kerala Agricultural University at its 29th meeting held on August 21, 1982 unanimously adopted a resolution to constitute an Inspection Commission in the Kerala Agricultural University to review the activities and achievements of the University in the academic field and to suggest a plan of action for the future, keeping long term perspectives in view. Further, a Committee consisting of the Vice-Chancellor, the Deans and Directors and Dr. M. N. Menon, Member, Academic Council was appointed for finalising the terms of reference and the composition of the Commission. The proposal submitted by this committee were considered by the Executive Committee at its 124th meeting held on December 27, 1982 when it was decided to extend the terms of reference of the Commission to other areas such as Research, Extension and Administration. The final decision in this matter was taken by the General Council, at its meeting held on March 30, 1984, approved the recommendations of the Executive Committee and decided to appoint a commission to review the work of the University and to make suitable recommendations. An executive order was issued by the Registrar, Kerala Agricultural University in No. GC/15938/83 dated March 26, 1985, appointing a Review Commission with Mr. A. Venkataraman, I. A. S, Secretary, Agriculture, Government of Tamil Nadu and former Vice-Chancellor, Tamil Nadu Agricultural University as Chairman and the Director of Extension of Kerala Agricultural University as Ex-officio Member-Convenor, along with eight other members (Copy of the Order along with the Terms of Reference is given in Appendix - I). Dr. M. N. Menon, member of the Review Commission in his letter dated April 26, 1985 suggested to rename the Commission as the KAU Commission or University Commission. Accordingly the suggestion was accepted by the University and the Commission was renamed as KAU Commission (vide order No. Extn. (1)91826/85(1), dated June 3, 1985).

A) Historical Review

Covering the origin and development of education, research and extension work on Agriculture in the State, the history of the constituent units which comprised the KAU and the impetus given to those activities after the formation of KAU and an evaluation of the NCA recommendation with regard to their validity and application in Kerala; redefinition of the aims; and objectives of the KAU in the future perspective.

B) Review and Recommendations on Administration & Management

- i) Administrative set up at headquarters, the constituent colleges, institutions and stations, with special reference to the adequacy or otherwise of delegation of powers.
- ii) Personnel management
- iii) Management of properties and physical plant, including infra-structure; and
- iv) Financial management, budgeting and control, audit and analysis of alternative and additional sources of funds.

C) Review and recommendation of Pedagogical methods

- i) Admission policy with special reference to the question whether aptitude has been reflected in the criteria of selection for admission;
- ii) Curricula, syllabi and relevance to existing and emerging problems of Agricultural Development in Kerala;
- iii) Teaching systems and methods, with special reference to the problems and promises of the trimester pattern and whether that pattern required change or replacement.
- iv) Duration of various courses, examination systems, grading, credibility of standards, class-room facilities, morale and discipline;
- v) Guest lectures, instructional tours, co-and extra curricular activities, physical education and health consciousness, students, welfare activities, including "Earn While You Learn" programme;
- vi) Faculty recruitment, training and development; remuneration, incentives and motivation, and work loads.
- vii) Need for and scope of starting new courses of instruction, new faculties, departments and colleges, if any.
- viii) Library facilities, documentation and information systems;
- ix) Identification of areas for development as "Centres of excellence" and
- x) Establishment of specialist schools of subjects covering more than one faculty.

D) Review & Recommendations on Research Work:

- i) Research aims and policy
- ii) Formulation of research programmes and their relevance to reality in Kerala;
- iii) Extent of application of research findings in practice, productivity in terms of quantity and quality of Research findings in terms of their significance to agricultural practices in Kerala;
- iv) Management of research activity including a review of the utility and performance and adequacy of the research stations, laboratory and library facilities;

- v) Sponsored research schemes, funding of research projects and identification of problem oriented research projects;
- vi) Liaison with scientific departments of the State and Centre, other Research institutions and Scientists;
- vii) Retraining, the intellectual rejuvenation of research personnel.

E) Review and Recommendations on extension

- i) Redefinition of the role of KAU in Extension, vis-a-vis the T&V operation Flood II, KADP and other developments, actualised and possible in the next quarter of a century;
- ii) Extent of coverage of various sectors of the farming population of Kerala by extension programmes of the KAU.
- iii) Adequacy and effectiveness of the extension methodologies and scope for improvement;
- iv) KAU's awareness of extension needs and recommendations for more effective dialogue with farmers;
- v) Special programmes for and research into the agricultural development of socially deprived sectors of the population, especially of the scheduled tribes;
- vi) Social factors and rural leadership factors in relation to the effectiveness and coverage of extension activities.
- vii) Interlinking of extension with other activities of the KAU.
- viii) The work of the K. A. U. Press.

F) Other allied matters:

- i) Vocational education on Agricultural subjects in schools and location and encouragement of talents in those vis-a-vis K. A. U.
- ii) Non-teaching staff and the management of their problems.
- iii) Labour relations.
- iv) Management information systems and simplification of procedures.
- v) Any other matter which the commission may include as relevant and meaningful in the context,

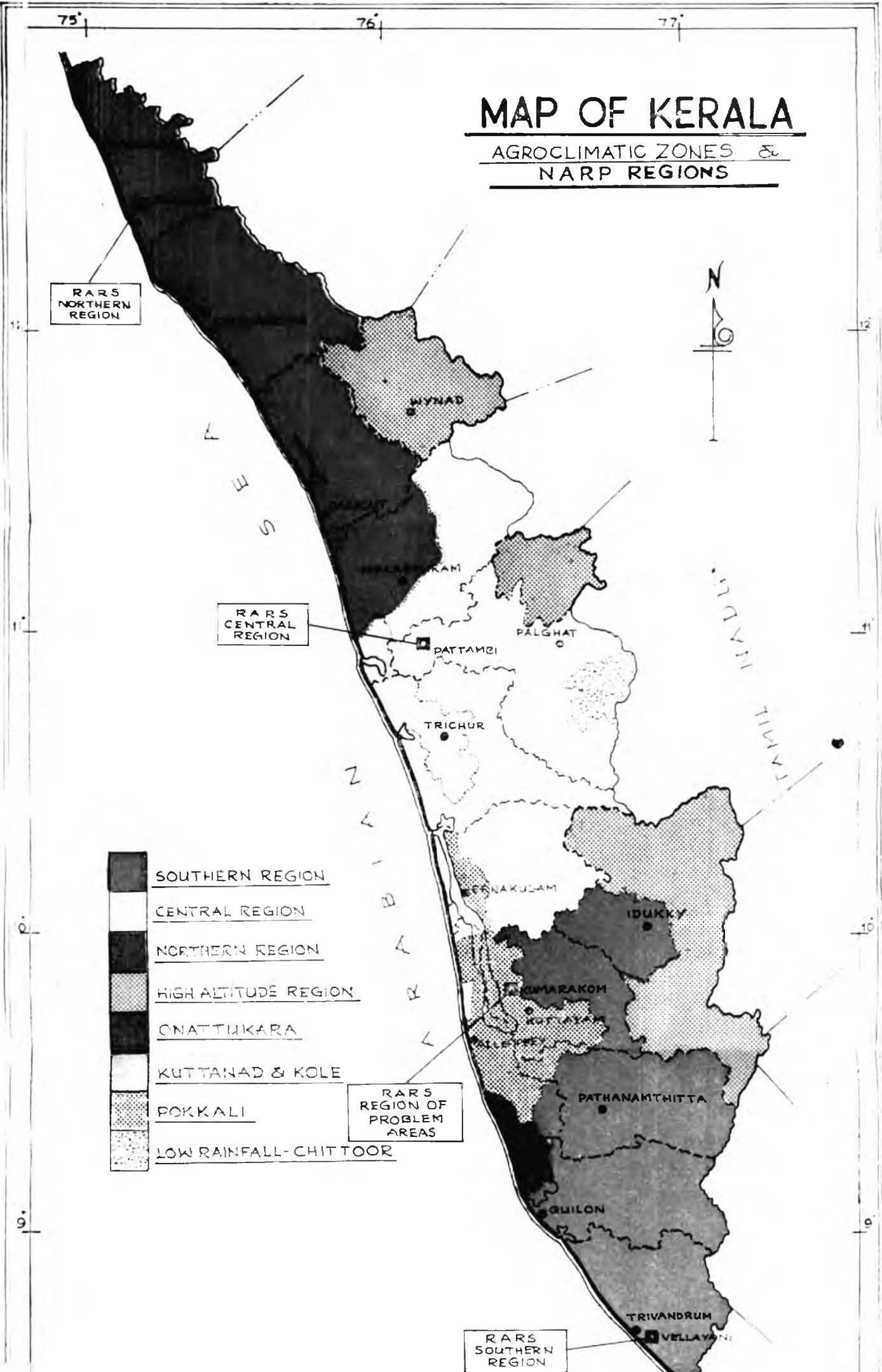
1.2. The first sitting of the Commission was held on June 4, 1985 at the University Headquarters, Vellanikkara. But unfortunately Mr. Venkataraman, declined to be on the Commission. The members present at the first meeting elected Dr. I. C. Mahapatra, as the Chairman. After functioning as Chairman for a short period, he relinquished the post to take up a foreign assignment with the World Bank. At the third meeting held on January 8, 1986 Dr. G. Rangaswami was named as the Chairman of the Commission. During the period June 1985 to January 1986 four of the Members viz., Mr. A. Venkataraman, Dr. I. C. Mahapatra, and Dr. Aram expressed their inability to continue on the Commission. Shri V. A. P. Naik, gave his report pertaining to the Faculty of Agricultural Engineering, before he relinquished his membership of the Commission consequent on accepting a foreign assignment. Thus the Commission continued functioning with the following members:

Dr. G. Rangaswami : Chairman
Dr. M. N. Menon : Member
Dr. K. V. Ahamed Bavappa : Member
Maj. Gen. R. K. R. Balasubramanian : Member
Dr. K. H. Alikunhi : Member
Dr. A. G. G. Menon : Member-Convenor

- 1.3. In all, the Commission made six sittings to review the working of the various wings of the University. It held discussions with all the University Officers and Heads of Institutions/Stations/Units, Heads of Departments in the faculties and representatives of various Employees' organisations and obtained their viewpoints and suggestions. Members were assigned to visit different campuses and Research Stations of University, based on their areas of interest and fields of specialisation. Together they covered all the Academic Campuses and Research Stations, Units and Projects of the University and obtained first hand information about their working. The Commission also received written reports, documents, representations and suggestions from several of the officers and representatives of the University bodies. It had the benefit of personal discussion with the Vice-Chancellor Mr. T. Madhava Menon, I.A.S. on several occasions on matters pertaining to the work of of the Commission.
- 1.4. The Chairman and members of the Commission have made critical review and evaluation of the existing situation in the Kerala Agricultural University and have drawn various recommendations based on their detailed discussions and understanding of the conditions prevailing in the University. The Commission had deliberated among themselves, both formally at the meetings and informally, and also through exchange of written notes, before finalising the report.
- 1.5. The Commission had six sittings during its tenure and also the Members visited different academic campuses and Research Stations individually and collectively. The Chairman (Dr. Mahapatra) visited some institutions outside the University and also met the representatives of different University Staff and Student organisations, the details of which are given in Appendix-II.

MAP OF KERALA

AGROCLIMATIC ZONES &
NARP REGIONS











RARS
NORTHERN
REGION

RARS
CENTRAL
REGION

RARS
REGION OF
PROBLEM
AREAS

RARS
SOUTHERN
REGION

-  SOUTHERN REGION
-  CENTRAL REGION
-  NORTHERN REGION
-  HIGH ALTITUDE REGION
-  ONATTUKARA
-  KUTTANAD & KOLE
-  POKKALI
-  LOW RAINFALL-CHITTOOR

A R B I A N S E A
 TAMIL NADU



75°

76°

77°

12°

12°

11°

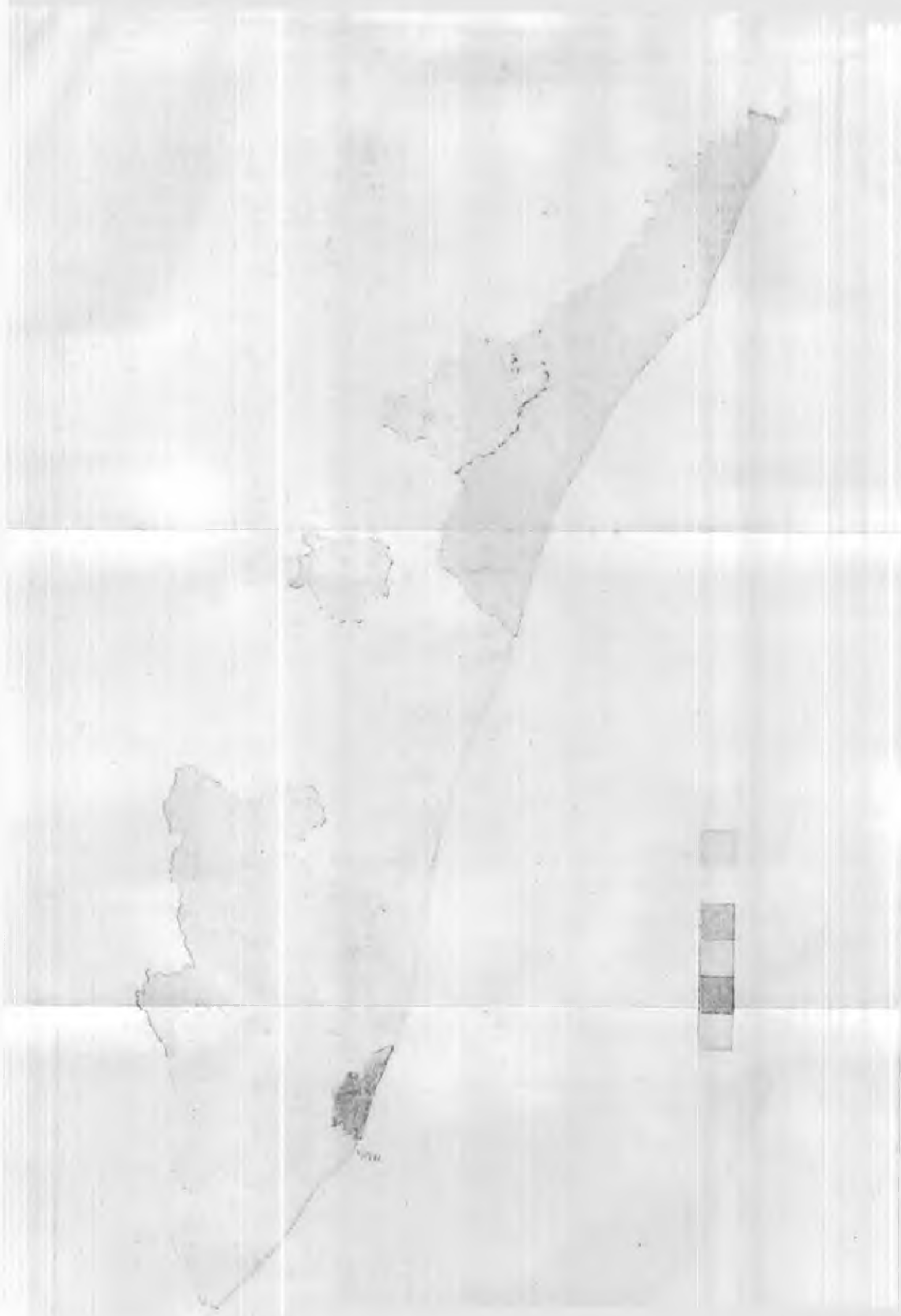
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CHAPTER II

2. HISTORICAL

2.1. Kerala Agriculture in brief

Kerala has a landspread of 38.85 lakh hectares and a population of 25.45 million (1981). Agriculture in its broad definition constitute the most important single sector in its economy, contributing about 42% to the State's income. It provides employment to 41.4% of the working population (Census of India 1981). The distribution of the working population is as follows

Total work force	— 67.43 lakhs
Cultivators	— 8.89 lakhs
Agricultural Labourers	— 19.01 lakhs
Household industrial workers	— 2.76 lakhs
Other workers	— 36.77 lakhs

The man: land ratio in Kerala has been declining over the years. It fell from 0.13 ha of arable land in 1961 to 0.09 ha. in 1981. By the turn of the century, it is expected to fall to 0.07 ha. Kerala has made considerable progress in certain areas of human development during the past three decades, such as in literacy, health, transport etc.

2.1.1. Literacy

Kerala has always been ahead of all other States in the country in respect of literacy. The literacy level which at the beginning of this century was only 11.14% had reached 70.42% in 1981. This is about double the rate for the country as a whole.

2.1.2. Health

In health care too Kerala has performed well, especially during the last two decades. The life expectancy at birth in Kerala is 65.35 years (1979). The decennial growth rate of population in the State decreased from 26.25% during 1961-71 to 19% during 1971-81. The birth rate of 31.6 per thousand population in 1970 came down to 26.8 per thousand in 1980, while the death rate declined from 9.2 per thousand to 7.0 per thousand in 1980. The infant mortality rate and maternal mortality rate have also come down substantially. There were 964 Allopathic, 504 Ayurvedic and 175 Homoeopathic Govt. Medical Institutions as on 1981. Almost every Panchayat has at least one Govt. dispensary.

2.1.3. Transport Infrastructure

Considerable improvement in transport infrastructure has also taken place in the State during the period 1960 to 1980. While the road length under the Public Works Department increased from 12,600 k. m. (1960) to 17,400 k. m. (1980) that under the Panchayat increased from 29,500 k. m. (1960) to 66,100 k. m. (1980) making substantial increase in the net-work of roads. During the same period the number of passenger buses increased by 148% and number of motor vehicles increased seven-folds.

2.1.4. Land Reforms

Land reforms in Kerala may be considered to have undergone a drastic, radical and comprehensive institutional changes. One of the main objectives of the Kerala Land Reforms Act was to put a ceiling on land holdings and to take over and distribute surplus lands, as a result of which the number of large holdings registered a sharp decline. The tenancy reforms, granting of ownership right to kudikidapukars (hutment dwellers) etc, helped to increase the number of families owning or having interest on the land. Out of 35 lakh operational holdings in Kerala, nearly 31 lakh holdings (87%) are marginal, below 1 ha in size. The average size of such holdings is 0.22 ha (See Tables 1 and 2). About 42% of the total area falls under marginal holdings. The small (between 1 and 2 ha) and marginal (below 1 ha) holdings together constitute 66% of the area. Thus, not only a large number of the holdings but also a large chunk of the area fall under small and marginal holdings, which has significant implications on productivity and income. In spite of all its positive gains like distribution of land to the real cultivator and converting a large number of landless people as land owners, the agricultural productivity has not increased to a satisfactory level.

2.1.5. Land Utilisation

There has been some growth in agriculture, but it has not kept pace with the growth of the population over the last two decades. The net area sown increased from 19.24 lakh ha in 1960-61 to 21.80 lakh ha in 1980-81 (13.3%) and the gross cropped area rose from 23.49 lakh ha in 1960-61 to 28.85 lakh ha in 1980-81 (23%). This was mostly due to an increase in the cropping intensity from 1.22 to 1.32, over the period. While there was an increase in the stock of land put to non-agricultural uses during this period, the area under permanent pastures and other grazing lands, land under miscellaneous tree crops, cultivable waste, fallow other than current fallow etc. fell substantially through this period (Table 3).

2.1.6. Area under Crops

During the last two decades the area under most of the crops increased (Table 4). The area under rice which had increased from 7.8 lakh ha (1960-61) to 8.7 lakh ha (1970-71) declined to 8.0 lakh ha by (1980-81). The area under pulses declined from 44,000 ha (1960-61) to 34,000 ha (1980-81). Among the annual crops, the area under tapioca increased from 2.4 lakh ha in (1960-61) to 2.9 lakh ha in 1970-71, but again declined to 2.4 lakh ha in 1980-81. The area under banana and other plantains registered progressive increase. The area under perennial crops

in general registered substantial increase. The area under coconut went up from 5.0 lakh ha in 1960-61 to 7.2 lakh ha in 1970-71 but declined to 6.5 lakh ha in 1980-81. The area under pepper went up from 99,000 ha in 1960-61 to 117,000 ha in 1970-71 but again fell down to 108,000 ha in 1980-81. The area under cashew went up progressively from 54,000 ha in 1960-61 to 1,41,000 ha in 1980-81. The area under cardamom doubled during this period. In the plantation sector, the area under tea has been more or less static, while the area under rubber almost doubled and the area under coffee went up more than three folds during this period.

2.1.7. Production and Productivity

Production of important crops with the exception of coconut has increased in varying degrees during the last two decades. Steady or spectacular increases in production were noticed only in some plantation crops.

Annual production of rice in the State increased from 10.67 lakh tonnes in 1960-61 to 12.72 lakh tonnes in 1980-81, though the all time high level of production of 13.31 lakh tonnes was achieved in 1975-76. The annual production of tapioca went up from 16.83 lakh tonnes in 1960-61 to 40.60 lakh tonnes in 1980-81 an increase of 241%, even though the increase in area was marginal. This spectacular increase in the total production of tapioca was mainly due to an increase in productivity from 6.9 tonnes/ha to 16.58 tonnes/ha. Production in pulses increased from 17,000 tonnes (1960-61) to 22,480 tonnes (1980-81).

The most important cash crop of the common man in Kerala, viz., coconut, provides a dismal picture. The total production of coconut declined from 3,220 million nuts in 1960-61 to 3,008 million nuts in 1980-81. The productivity of coconut declined steeply from 6,430 nuts/ha in 1960-61 to 4,618 nuts/ha in 1980-81. Incidentally, in the year 1955-56 the productivity of coconut was 6,919 nuts/ha.

Production of pepper, another important cash crop, marginally increased during this period, though its productivity declined. The production of cardamom, a major export earner—nearly trebled during this period, while that of cashewnut declined. Substantial increases in production were noticed in plantation crops like tea, coffee, and rubber. The production of rubber in the State increased from 23,040 tonnes (1960-61) to 140,330 tonnes (1980-81) and tea from 40,370 tonnes (1960-61) to 50,720 tonnes (1980-81).

Comparative statement of area, production and productivity of selected crops for the year 1970-71 and 1980-81 is furnished in Table-4.

2.1.8 Irrigation:

The net area under irrigation in the State increased from 3 lakh ha in 1975-76 to nearly 4 lakh ha in 1979-80. Considering the growth in irrigation at the national level during the same period this is not very significant, the only consoling factor being that Kerala comes under heavy rainfall region of the country.

Table—1
Comparative figures on percentage distribution of operational holdings in the State

Size of operational holdings	As per land reforms Survey 1966-67			As per land holdings Survey N. S. S. 26th round 1971-72			As per agricultural Census 1976-77		
	Percentage distribution of holdings in terms of		Average size of holding	Percentage distribution of holdings in terms of		Average size of holding	Percentage distribution of holdings in terms of		Average size of holding
	Number	Area		Number	Area		Number	Area	
1	2	3	4	5	6	7	8	9	10
Less than									
1 00 hect.	81.80	31.10	0.27	86.96	40.16	0.22	87.10	42.40	0.22
1 ha. to 2 ha.	10.10	19.60	1.43	8.37	24.77	1.41	8.40	23.60	1.37
2 ha to 4 ha.	5.60	21.20	2.78	3.57	20.49	2.73	3.40	18.70	2.70
4 ha to 6 ha.	1.50	9.90	4.92	0.74	7.64	4.89			
6 ha to 8 ha.	0.40	3.30	6.74	0.25	3.71	6.96	1.00	11.20	5.50
8 ha. to 10 ha.	0.20	2.50	9.02	0.03	0.60	9.25			
10 ha. and above	0.40	12.00	19.82	0.08	2.63	14.86	0.10	4.10	18.20
All Sizes	100.00	100.00	0.73	100.00	100.00	0.48	100.00	100.00	0.49
Absolute Values	(24.79 lakhs)	(18.28 lakhs ha)		(25.97 lakhs)	(12.37 lakhs ha)		(35.01 lakhs)	(17.19 lakhs ha)	

Source : Agricultural Census, Directorate of Economics and Statistics, Trivandrum.

Table 2

Number, area and average size of operational holdings in 1970-71, 1976-77 and 1980-81

Sl. No.	Size Class (ha.)	Number of holdings			Area of operational holdings			Average size of holdings (ha.)		
		1970-71	1976-77	1980-81	1970-71	1976-77	1980-81	1970-71	1976-77	1980-81
1	0.02— 1.00	1880381	2866518	3728000	538655	678250	750400	0.29	0.24	0.20
2	1.00— 2.00	267833	276917	289800	365199	379930	398200	1.36	1.37	1.37
3	2.00— 4.00	125781	112195	122600	338742	303139	331400	2.69	2.70	2.68
4	4.00— 10.00	26880	33047	35800	149506	181427	195300	5.56	5.49	5.45
5	10.00 & above	4266	3494	3700	200676	66612	130000	47.04	10.07	35.14

Source : Agricultural Census, Directorate of Economics and Statistics, Trivandrum.

Table 3
Land use Pattern in Kerala

Land Use	(Area in '000 ha.)		
	1960-61	1970-71	1980-81
1 Total Geographical Area according to village papers	3858	3858	3858
2 Forests	1056	1055	1081
3 Land put to Non-Agricultural uses	205	275	270
4 Barren and Uncultivable Waste	151	72	86
5 Permanent Pastures and Other Grazing Land	45	28	5
6 Land Under Miscellaneous Tree Crops	204	132	64
7 Cultivable Waste Land	144	80	129
8 Fallow Land other than Current Fallow	62	23	27
9 Current Fallow	67	24	43
10 Net Area Sown	1924	2172	2180
11 Total Cropped Area	2349	2933	2885
12 Area Sown More than Once	425	761	705

Source : Directorate of Economics & Statistics, Kerala.

2.1.9. *The Land and Natural divisions:*

Kerala is a narrow strip of land endowed with a variety of agro-ecological conditions. Bordered by the Western Ghats on the east and the Arabian Sea on the West, it enjoys an undulating topography ranging in altitude from below mean sea level (MSL) to 2,694 metres above MSL, and a coastal line of 580 km. Based on topography, the land resources in the State fall into three well defined natural divisions that run north-south.

- i) The high-land comprising about 48% of the land and 15% of the population forms the hilly tracts on the West of Western Ghats covered with forests and small streams. This area is dominated by plantations of tea, coffee, cardamom and rubber.
- ii) The mid-land comprising about 42% of the land mass and 59% of the population forms the mid-land plains intersected by numerous rivers, small hills and valleys. The mid-land enjoys an intense diversity of seasonal, annual and perennial crops like rice, sugarcane, tapioca, banana, ginger, coconut, arecanut, pepper, cashew, rubber etc.

Table 4
Area sown, production and productivity of important crops for the year
1970-71 and 1980-81 in Kerala.

i) AREA

Items 1	Unit 2	1970-71 3	1980-81 4	% Change 5
a) Net area sown	'000 ha	2171	2180	(+) 0.37
b) Gross cropped area	"	2933	2885	(-) 1.64
c) Area under rice	"	874.93	801.70	(-) 8.37
d) Coconut	"	719.14	651.37	(-) 9.12
e) Tapioca	"	293.55	244.99	(-) 16.54
f) Tea	"	37.59	36.16	(-) 3.80
g) Coffee	"	31.56	57.95	(+) 83.62
h) Rubber	"	179.26	237.77	(+) 32.64
i) Cardamom	"	17.49	54.10	(+) 13.79
j) Pepper	"	117.54	108.07	(-) 8.06
k) Cashewnut	"	102.71	141.28	(+) 37.55
l) Arecanut	"	85.82	61.24	(-) 28.64
ii) PRODUCTION				
a) Rice	'000 tns.	1298.01	1271.96	(-) 2.01
b) Coconut	Mln. Nts.	3981	3008	(-) 24.44
c) Tapioca	000 tns	4617.19	4060.91	(-) 12.04
d) Tea	"	41.45	50.71	(+) 22.31
e) Coffee	"	12.57	23.54	(+) 31.76
f) Rubber	"	78.73	140.33	(+) 78.24
g) Cardamom	"	1.25	3.24	(+) 159.2
h) Pepper	"	25.03	28.52	(+) 13.94
i) Cashewnut	"	115.24	81.90	(-) 28.93
j) Arecanut	Min. Nuts.	12738	10805	(-) 15.17
iii) PRODUCTIVITY				
a) Rice	kg. ha	1484	1587	(+) 7.10
b) Coconut	No. of nuts. ha.	5536	4618	(-) 16.58
c) Tapioca	kg. ha.	15729	16576	(+) 5.38
d) Tea	"	1103	1402	(+) 27.10
e) Coffee	"	430	400	(-) 5.58
f) Rubber	"	439	590	(+) 34.39
g) Cardamom	"	26	60	(+) 30.77
h) Pepper	"	213	264	(+) 23.91
i) Cashewnut	"	1122	580	(-) 48.31
j) Arecanut	No. of nuts ha.	148430	176431	(+) 18.86

Source: Agricultural Statistics in Kerala 1975, Statistics for Planning 1977 of the Bureau of Economics and Statistics and Economic Review 1980-81.

- iii) The low-land comprising about 10% of the total area, supporting about 29% of the population, forms the palm-fringed coastal belt, with its picturesque back-waters. This portion carries extensive paddy fields interspersed with plantations of coconut and arecanut (Table-5).

Table 5
Area, population and density of population of the Three Natural Divisions of Kerala (1971)

Natural Divisions	Area sq. km.	Percent-age	Population (lakhs)	Percent-age	Density of population per sq. km.
1	2	3	4	5	6
Low-land	3979	10.24	55.13	28.83	1386
Mid-land	16231	41.76	126.21	59.12	778
High-land	18654	48.00	32.13	15.05	172
Total	38864	100.00	213.47	100.00	549

Source: Columns 1, 2 and 4 from Agricultural Census 1976-77; Columns 3, 5 and 6 estimated.

These three natural divisions have contributed basically to a heterogeneity of agro-ecological conditions, leading to a wide diversity in cropping pattern in the State.

2.1.10. Seasons:

There are no well-defined seasons in Kerala, but one could broadly identify the following four, which are controlled by the monsoons:-

- i) The dry weather from December to February;
- ii) The hot weather from March to May;
- iii) The South-West Monsoon period from June to September;
- iv) The North-East Monsoon period from October to November.

2.1.11. Rainfall:

The state falls under the heavy rainfall regions of the country, with an average annual rainfall of about 3000 mm. About 90% of the rainfall is received during the two monsoons, from June to November.

2.1.12. Temperature:

Temperature in the plains varies from 69°F to 99°F. In the high ranges the temperature varies from 45°F to 60°F in the months of March-April and from 30°F to 60°F during November-January.

2.1.13. Humidity:

Humidity is very high in the coastal region, varying from 95% in July-August to 60% in January. But the humidity and heat gradually fall as one goes from the coastal belt towards the Western Ghats.

2.1.14. *Insolation:*

Being in tropical region, Kerala receives relatively more annual solar radiation. The daily average for the tropics is reported to be about 400 langleys*/day. Seasonal variations depend primarily on rainfall distribution patterns. In areas with distinct rainy and dry seasons, cloudiness causes considerable seasonality in solar radiation. These differences are reported to have a high impact on crop yields and fertilizer responses. Research data in these areas of crop science for Kerala conditions are yet to come. However, one may expect significant variations in solar radiation in different parts of Kerala in the different seasons under the influence of monsoons.

2.1.15. *Evaporation*

The State falls under the low evaporation regions in the country. The annual evaporation is less than 175 cm² against the average annual precipitation of 3000 mm. Though the State appears to have a net residual moisture, it experiences extreme moisture stress in the summer, from January to March. The heavy downpours during the monsoons on an undulating topography leads to losses due to surface run-off of rain water. This and the poor water holding capacity of the soils upset the moisture balance. Conditions of high humidity and low wind speed keep down the rate of evaporation despite the high atmospheric temperature in the State.

2.1.16. *Agro-Climatic Zones*

The Committee constituted by the State Government for the formulation of a cropping pattern based on rainfall, soil conditions and topography has divided the State into thirteen agro-climatic-zones. The following criteria are used for identifying the agro-climatic zones.

- i) Altitude;
- ii) Rainfall;
- iii) Soil types; and
- iv) Topography

While thirteen agro-climatic zones have been identified, no single development block is assigned to one zone, as the River Bank Alluvium is found scattered over several Blocks.

2.1.17. *Soils*

On the basis of the morphological features and physico-chemical properties the soils of the State have been classified into ten broad groups, viz.,

- i) Red loams
- ii) Laterites
- iii) Coastal alluvium
- iv) Riverine alluvium
- v) Greyish Onattukara
- iv) Brown hydromorphic
- vii) Hydromorphic saline
- viii) Acid saline

* 1 langley = 1 gram — calorie per sq. cm.

- ix) Black soils; and
- x) Forest loams

2.1.18 Soil Hydrology

Ground water comes next as an important resource. Though it is primarily connected with the hydrology of a region, it cannot be viewed apart from the soils. The usefulness of a particular soil depends largely on the prevailing ground water conditions.

Being a heavy rainfall region, surface water is used as a source of water for all purposes in the State. Crops are generally grown under rainfed conditions. All the major industries and municipal water supplies depend upon nearby rivers/streams. However, the domestic water requirements of the rural population is met by dug wells which run into lakhs in number, because of the peculiar village system in the State. Well irrigation is becoming popular, especially for cash crops like coconut, arecanut, banana etc. The present utilisation of ground water in Kerala is limited to certain areas only. It is developed for irrigation purposes through dugwells, tapping the near surface aquifers in parts of Trichur, Palghat and Cannanore districts. In the other districts well irrigation is yet to catch up. The status of ground water extraction in the State as reported by V. C. Jacob *et al*, (1982) is as follows:

1	Total number of irrigation wells	:	120,563
2	Total number of domestic wells	:	1,248,250
3	No. of tube wells for rural water supplies	:	347
4	No. of irrigation tube wells	:	Nil
5	No. of wells used for industrial water supply	:	1,922

The Kerala State Ground Water Department has made an assessment of the ground water potential based on the rainfall infiltration as follows:

Table 6
Rainfall distribution and ground water potentials in the districts of Kerala

District	Average Rainfall (mm)	Area of effective re-charge in sq. km.	Ground water potential based on recharge in MCM
Cannanore	3,334	5,246.78	1,659.26
Kozhikode	2,593	2,510	2,510.15
Malappuram	2,738	2,857.27	362.56
Palghat	2,100	—	537.77
Trichur	2,941	1,504	500.32
Ernakulam	3,577	1,822	373.06
Idukki	2,620	2,084	139.25
Kottayam	2,452	1,872	313.38
Alleppey	3,135	1,599	828.84
Quilon	2,622.9	2,827	572.66
Trivandrum	1,713.2	1,316	181.30
Total			7,979.55

Source : Jacob V. C. *et al* (1982) Ground water Resources of Kerala.

The Central Ground Water Board has subsequently revised the resource estimates and the net annual recharge potential is calculated to be of the order of 10,352 MCM. The annual draft is 5,389 MCM and the balance available is 4,963 MCM, indicating that a vast reserve of ground water is available for exploitation.

2.1.19. Milk, Meat, Egg and Fish

Milk production increased from 2.19 lakh tonnes in 1960-61 to 9.08 lakh tonnes in 1980-81. Meat production increased from 166 lakh kg. (1979-81) to 169 lakh kg. 1980-81. Egg production increased from 943 million in 1977-78 to 962 million in 1980-88 and fish production decreased from 4.0 lakh tonnes in 1960-61 to 3.0 lakh tonnes in 1980-81.

2.1.20. Co-operative Banks

From 1956-57 to 1980-11 the share capital of Kerala State Co-operative Bank increased by 30 times, reserves, by 400 times, deposits by 134 times, borrowings by 66 times, working capital by 103 times and loan advances by 187 times. The State Co-operative Bank at the apex level, 12 District Co-operative Banks at District level and 1574 Primary Agricultural Credit Societies at field level form the infrastructure for agricultural credit, supply of inputs, marketing of agricultural produces, and supporting the village and small industries.

2.2. Agricultural Education in India

Agricultural education encompasses all types of formal as well as non-formal and higher education. The ultimate aim of agricultural education is to develop the farming community through interaction of teaching, research and extension. The activities in agriculture in India received formal attention by 1971, when the Department of Revenue, Agriculture and Commerce was set up by the Government of India. Similar departments were formed later on in many provinces. The country has gone through two distinct phases of development in agricultural education; (i) pre-Agricultural University period and (ii) the post-Agricultural University period, after 1961. Organised education in agriculture was started in 1907 when five Agricultural Colleges were established in five different places of the Country. At first they were offering diploma courses which were later upgraded to impart degree courses. In 1928 the Imperial Council of Agricultural Research was formed, based on the recommendations of the Royal Commission on Agriculture. Post-Graduate education in agriculture was started around 1930. The Imperial Agricultural Research Institute and Imperial Veterinary Research Institute started post-graduate training programmes during this time. The number of Agricultural Colleges increased to 17 by 1947 with an intake of about 1,500 students per year.

2.2.1. The Government of India appointed a Joint Indo-American Team in 1954 to make recommendations based on agricultural educational development in U. S. A. and its application to India and in the report submitted by that Team in 1955, it was recommended to adopt in India the pattern of higher education of the Land Grant Colleges of American Universities. As a result of this recommendation the then existing Agricultural and Veterinary Colleges in India were brought into sisterhood relationship with five Land Grant Institutions of U. S. A. for technical assistance.

The first Agricultural University in India modelled after the Land Grant Colleges of U. S. A. was set up at Pantnagar in 1960. At present there are 24 Agricultural Universities excluding deemed University of Agriculture and 48 Agricultural Colleges affiliated to traditional Universities in India.

2.2.2. The second Joint Indo-American Team which was set up to review the work done as a result of the recommendations of the first Team, submitted its recommendations in 1960. Its recommendations include the development of the pattern of agricultural education from vocational schools, multipurpose high schools through the Colleges and Universities. The Agricultural Research Review Team set up in 1963 recommended reconstitution of ICAR into an effective central agency for co-ordinating, directing and promoting agricultural research and education in India.

2.2.3. The ICAR in turn, resolved to bring under the Agricultural University all the research, teaching and extension education activities connected with agriculture, animal husbandry, fisheries, home science, agricultural engineering, forestry and related basic sciences and humanities then vested with the concerned State Departments, based on the Model Act for Agricultural Universities in India. Before the establishment of the Kerala Agricultural University (KAU), all research, teaching and extension education activities connected with agriculture were vested with the Kerala State Departments of Agriculture, Animal Husbandry, Fisheries, Forestry, etc.

2.3. Agricultural Education in Kerala — History

The history of Agricultural Education in Kerala can be traced back to the year 1896 when a scheme was evolved in the erstwhile Travancore State to train a few young men in scientific Agriculture at the Demonstration Farm, Karamana. Later, agriculture was introduced as an optional subject in the Middle School classes in the State. In 1922, an Agricultural Middle School was started at Alwaye. The course of instruction offered in this school was of two years' duration and training was given in elementary agriculture and allied subjects with special emphasis on practical work. The usefulness and popularity of the Agricultural Middle School, Alwaye promoted the starting of similar institutions at Kottarakkara and Konni in 1928 and 1931, respectively.

The need for instruction in agriculture at higher levels was, however, keenly felt, and after the formation of the Travancore University in 1939, a scheme was approved for organising a Diploma Course in Agriculture under the University. But this proposal did not materialise. Agriculture was later introduced as an optional subject in the Intermediate Course in 1953.

In 1955, the erstwhile Government of Travancore-Cochin started an Agricultural College at Vellayani near Trivandrum and a Veterinary College at Mannuthy near Trichur for imparting instruction at the degree level in Agriculture and Veterinary Science, respectively. The first batch of students were admitted in these Colleges in August 1955. Post-graduate courses leading to M. Sc. (Agri.) degree were started in 1961 and Ph. D. courses in 1965 in the Agricultural College.



Headquarters
Kerala Agricultural University, Vellanikkara



College of Agriculture,
Vellayani

Post-graduate courses in Veterinary Science leading to M.V.Sc. and Ph.D. degrees were started in the Veterinary College in 1962 and 1967, respectively. When the Kerala Agricultural University came into being in 1972, these two colleges became its constituent institutions.

Fisheries education for fishermen in Kerala was initiated with the establishment of five Fishermen training centres at Vizhinjam, Neendakara, Ernakulam, Beypore and Cannanore during fifties of the present century. Afterwards a staff training centre under the Department of Fisheries was started at Ernakulam in 1965. Later seven Government Regional Fisheries Technical High Schools were organised commencing from 1968. Courses in Fisheries Sciences at the University level was started as early as in 1938 with the establishment of a Department of Marine Biology in the erstwhile University of Travancore.

2.3.1. College of Agriculture, Vellayani

The Government of Travancore-Cochin sanctioned an Agricultural College and Research Institute in May, 1955. The College and Research Institute started functioning in the same year, by acquiring the Royal Palace at Vellayani, 12 km away from Trivandrum and admitting fifty students for the first batch. The major departments of the College were set up by transferring the staff and equipment belonging to the different sections of the research wings of the University of Travancore and the Department of Agriculture. The College was affiliated to the University of Travancore.

2.3.2. College of Veterinary and Animal Sciences, Mannuthy

The Veterinary College, Mannuthy was started in the year 1955 with a view to train sufficient Veterinary personnel to meet the expanding needs of the various development projects included in the five year plan schemes. Dr. S. R. Chandran was appointed as Special Officer to attend all preliminary details of organising the institution. A two-storeyed building of the District Agricultural Farm at Mannuthy served as College building in 1955. Additional space was provided by putting up two semi-permanent halls, which served both as lecture hall and laboratory in 1958.

2.3.3. For the first few years the institutions were directly administered by the Government, but later they were brought under the Department of Agriculture and Animal Husbandry, respectively. Buildings for providing hostel facilities for the students and residential quarters for the staff were provided as early as in 1957. The post-graduate programmes leading to M.Sc.(Ag), M.V.Sc. and Ph.D. degrees were started in 1961, 1962 and 1965, respectively.

2.3.4. Importance was given in the Agricultural College for teaching, research and extension education from inception. In addition to teaching, a number of research projects were investigated at the College and sufficient laboratory facilities were organised in all the departments for research. The officers of the Agricultural Department were given in-service training in the College. The teachers and research staff, in close collaboration with the NES Blocks and social service organisations used to organise a large number of extension education programmes in the neighbouring areas, even prior to the formation of the Kerala Agricultural University.

2.3.5 The Kerala Agricultural University came into existence with effect from February 24, 1971, as per the Act 33 of 1971. It is the 15th in the series of Agricultural Universities in India. The Main Campus of the University is located at Vellanikkara, in an area of 379.56 ha. The Agricultural Colleges and Research Institute, Vellayani and the Kerala Veterinary College and Research Institute, Mannuthy were transferred by the Government of Kerala to the University on February 1, 1972, to function as its constituent Colleges. Simultaneously, 21 Agricultural and Animal Husbandry Research Stations in the State were transferred to the University. During 1973-74, the Agronomic Research Station, Chalakudy and the Rice Research Station, Vyttila were also transferred to the University.

2.3.6 In view of the importance of horticultural and plantation crops in the State occupying nearly two thirds of the cultivated area in the State, the College of Horticulture was started on October 28, 1971, with an initial intake of twenty students for BSc. (Hort.) degree course and it was temporarily located in the Mannuthy Campus. This was shifted in 1977 to the Main Campus at Vellanikkara.

2.3.7 The Rural Institute, Tavanur which was established in 1963 was taken over by the University with effect from December 12, 1975. This has since been developed as an Institute of Agricultural Technology. The Kelappaji College of Agri. Engineering was started in this campus in 1985, replacing the Institute of Agricultural Technology.

2.3.8 The College of Fisheries started functioning in the Mannuthy Campus on October 10, 1979, with an admission strength of 30 students. The College was shifted to the new campus at Panangad, Cochin, on October 10, 1983.

2.3.9. The College of Co-operation and Banking was started in the Mannuthy Campus during the academic year 1981-82, with an admission of 30 students.

2.3.10 The College of Rural Home Science was started in the Vellayani Campus during the academic year 1986-87 with an admission strength of 30 students for the undergraduate programme.

2.4 Status of the Institutions transferred to KAU.

2.4.1. *The Agricultural College and Research Institute*

The College of Agriculture established in 1955 is located at Vellayani, about 11 km away from Trivandrum city, and surrounded by the Vellayani lake on three sides. The campus covers an area of 243 ha.

The College was started with the objective of imparting scientific knowledge in agriculture at the undergraduate level and also research in different branches of agricultural subjects. In 1962, post-graduate teaching was taken up in a few disciplines, as part of the academic programme. With the establishment of the Kerala Agricultural University in 1972, the college became one of the constituent institutions under the University and was renamed as College of Agriculture. The traditional



College of Horticulture,
Vellanikkara



College of Veterinary and Animal Sciences,
Mannuthy

system of teaching was replaced by the trimester system. The college now offers undergraduate programme in Agriculture B. Sc. (Ag.) and also post-graduate programme in MSc. (Ag.) and Ph. D. levels in the following subjects.

- a) Agronomy
- b) Horticulture
- c) Soil Science & Agrl. Chemistry
- d) Agricultural Botany
- e) Plant Breeding
- f) Agricultural Entomology
- g) Plant Pathology
- h) Agricultural Extension
- i) Food Science & Nutrition

Besides, teaching, research and extension education activities are also undertaken by the staff. The head quarters of the National Agricultural Research Project (Southern Region) is also located in this campus.

2.4.2. *The Kerala Veterinary College & Research Institute*

The Kerala Veterinary College and Research Institute was established in 1955 at Mannuthy, about 6 km from Trichur along NH 47. The College became a constituent unit of the Kerala Agricultural University in February, 1972 and was rechristened as College of Veterinary and Animal Sciences. The College and the residential campus cover an area of 195 ha.

Presently, the College offers undergraduate course leading to the B. V. Sc. & A. H. degree and also post-graduate courses at Master's and Ph. D. levels in the following subjects.

<i>M.V.Sc.</i>	<i>Ph.D</i>
a) Anatomy	a) Animal Management
b) Animal Management	b) Animal Reproduction
c) Animal Reproduction	c) Breeding & Genetics
d) Breeding & Genetics	d) Dairy Science
e) Clinical Medicine & Therapeutics	e) Micro-biology
f) Dairy Science	f) Nutrition
g) Extension	g) Parasitology
h) Micro-biology	h) Pathology
i) Nutrition	i) Pharmacology
j) Parasitology	j) Physiology
k) Pathology	k) Poultry Science
l) Pharmacology	
m) Physiology	
n) Poultry Science	
o) Preventive Medicine	
p) Surgery	
q) Veterinary Public Health	

2.4.2.1 Livestock Farm, Mannuthy

This is one of the oldest livestock farms in the State, established in 1921. It was transferred to the KAU during 1972. The farm functions as a teaching, research and extension unit.

2.4.2.2 Poultry Farm, Mannuthy

The University Farm functioned originally under the Department of Animal Husbandry and was transferred to KAU on February 1, 1972. The main objectives of the farm are to provide hatching eggs, chicks and breeders for farmers and development Departments, to provide instructional facilities for teaching and research and to undertake independent research in various aspects of poultry production.

2.4.2.3. Veterinary Hospital, Kokkalai

The hospital was established about 60 years ago and is situated on the South-Western side of Trichur town. The area of the hospital is about 0.5 ha.

The main objective of this hospital is to give veterinary aid to the animals in and around Trichur and to give them protective vaccination against infectious diseases. Modern trends in the fields of diagnosis and treatment are practised here. Specialists from different clinical and para clinical departments of the Veterinary college are attending this hospital regularly for this purpose.

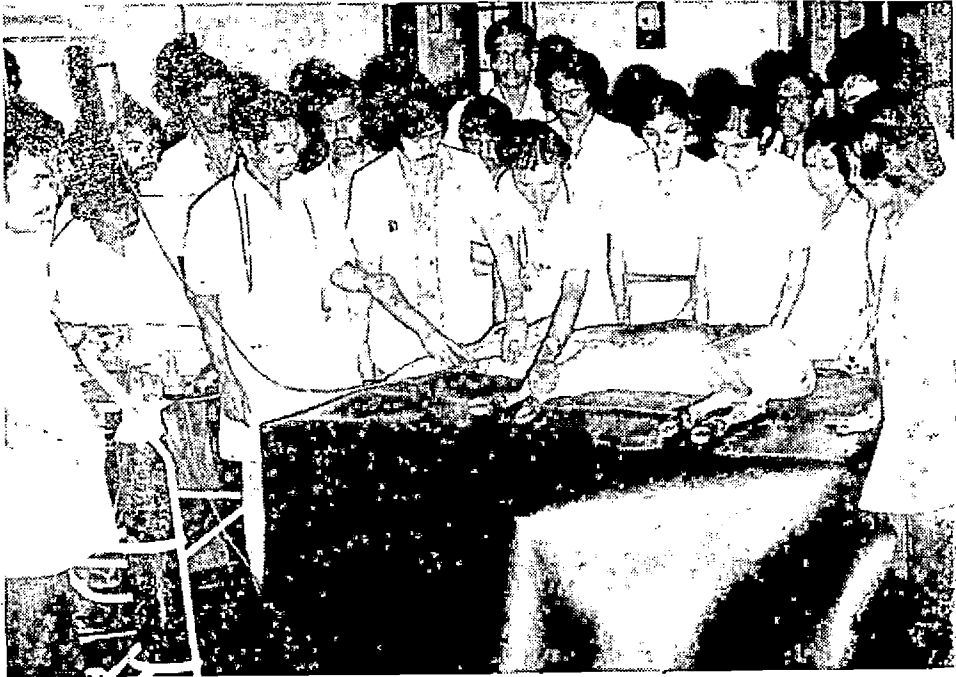
2.4.3. *Institute of Agricultural Technology, Tavanur*

Institute of Agricultural Technology is located in Tavanur village of Malappuram district, about 7 km from Kuttippuram Railway Station and 12 km from Ponnani. Earlier it was established in 1963 by the State Government as Rural Institute and it offered various diploma and certificate courses. The Kerala Agricultural University took over this Institute on December 12, 1975 and renamed it in 1985 as Kelappaji College of Agricultural Engineering and Technology. The campus has an area of 40 ha of which the Instructional farm covers 26 ha. A Dairy Unit and an Artificial Insemination centre are also attached to the Instructional Farm.

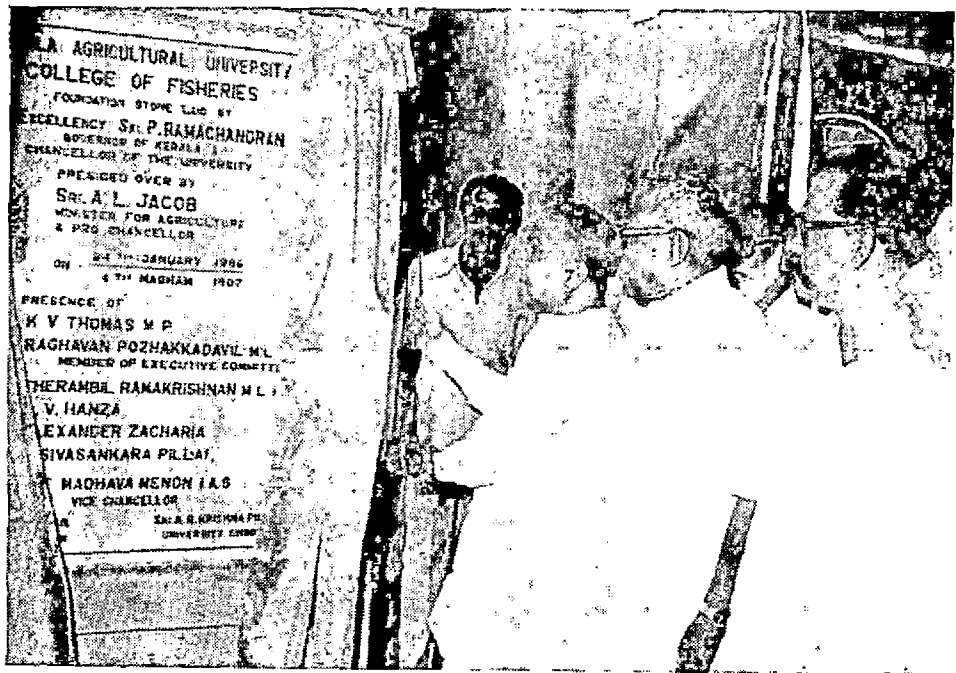
2.4.4. *Coconut Research Station, Pilicode*

Research work on coconut commenced in Kerala with the establishment of four research stations in the Kasargod taluk of the S. Kannara district in 1916. This was based on the decision of the then Government of Madras Province that detailed studies on all aspects of coconut palm would be necessary to improve the income of the farmers in the west coast of the province. Accordingly the four stations were established at Pilicode (Nileswar-1), Nileswar (Nileswar-2), Nileswar-3 and Kasargod, representing different soil types. Regular experimental work started in these stations from 1930. The station at Kasargod was handed over to the Indian Coconut Committee in 1946, and is now the headquarters the Central Plantation Crops Research Institute. The other three stations were transferred to the Govt. of Kerala with the re-organisation of the States in the year 1956.

In the year 1972, when the Kerala Agricultural University was formed, the stations at Pilicode and Nileswar-2 were brought under the University. Pilicode



A practical session at the College of Veterinary and Animal Sciences, Mannuthy



Laying foundation stone for the Academic Block, College of Fisheries, Panangad

station was re-organised in 1981 under the National Agricultural Research Project to solve location-specific farming problems in the northern zone of Kerala comprising of Malappuram, Kozhikode, Cannanore and Kasargod districts. The station is located in Hosdurg Taluk of Kasargod.

Pilicode and Nileshwar together have a land area of 56.90 ha which comprises of 4.0 ha of wetland and 52.90 ha of garden land.

2.4.5 Horticultural Research Station, Ambalavayal

The Agricultural Research Station, Ambalavayal was established in 1946 as a part of Wynad Colonisation Scheme to carry out research on various aspects of improvement of agriculture in Wynad in general, and the colony area in particular, to make available quality seeds and planting materials for distribution and also to tender scientific advice to the farmers on improved technology in Agriculture. In 1966, the station was upgraded as Central Horticultural Research Station, to undertake intensive research on major horticultural crops, especially fruits, spices, essential oils, etc., and in 1972, it was taken over by the KAU. The station was brought under the National Agricultural Research Project in November, 1983 and was upgraded to the status of a Regional Agricultural Research Station for High Ranges with lead functions for research on citrus, mango and other fruits and rice-based farming system and verification function for pepper, essential oils and medicinal plants. The Cardamom Research Station, Pampadumpara, is its sub-station with lead function for research on cardamom and verification function for pepper and hill rice.

The station is situated in Sultan Battery taluk of Wynad district at an elevation of 914 m above MSL and has an area of 87.3 ha. The geographic location is at 11° 37'N latitude and 76° 12'E longitude. The soil is a loam, rich in humus.

2.4.6. Cashew Research Station, Anakkayam

This station was started in 1963 in Anakkayam village in Ernad taluk in Malappuram district. The location of the station is on the western side of the Malappuram-Manjeri Road, at a distance of about 9 km from Malappuram.

The station covers an area of 9.92 ha, of which 8 ha are under cashew and 0.5 ha, under coconut interplanted with cocoa. The station is located at an elevation of 106.8 M above MSL. The land is slopy and of uneven terrain. The soil is red laterite and is deep in some places and rocky in many places.

The main objective of the station is improvement of cashew for higher yield and quality by genetical and agronomical means. Supply of seeds and grafts of improved types is also being undertaken.

2.4.7. Pepper Research Station, Panniyur

The station was started in 1952-53 in Panniyur village of Taliparamba taluk in Cannanore district and with the aquisition of additional area in 1981, the total extent of the farm has become 26.13 ha. Terracing, levelling and planting in the new area is being continued. The station is located at about 10 km north-east of

Taliparamba, enroute to Alakode. It is at 12°5'N latitude and 74°55' longitude and at an altitude of 95 m above MSL. The soil is well drained undulating-lateritic, with depth varying from a few mm to several cm, with a major area having a depth of 30 to 90 cm.

2.4.8. Rice Research Station, Pattambi

Rice Research Station, Pattambi was established as Paddy Breeding Station in 1927, to evolve high yielding rice varieties suited to the different agro-climatic conditions of the State. In 1930 the name was changed to Agricultural Research Station and in 1962 it became the Central Rice Research Station with regional centres at Mannuthy, Kayamkulam and Vyttila, under the Government of Kerala. With the establishment of the Kerala Agricultural University, this station was brought under its control as one of the major stations for research on rice and for post-graduate work. With the implementation of NARP, the station was reorganised as Regional Agricultural Research Station for the Central Zone. It undertakes intensive research on the production and protection technology on rice. The station has been allotted the lead function for research on rice, pulses and oilseeds and rice-based farming systems. The station also functions as an advanced centre for studies on laterite soil management.

The station is located at 10°N latitude and 76°E longitude at an elevation of 25 m MSL. The total area is 63.64 ha. The soil is lateritic sandy loam and overlies unweathered soil. Ridges and slopes of low hills form the bulk of the modan lands, Palliyals are high level terrace lands with extremely porous soil. The soil in double cropped wetland is moderately fertile and deep.

2.4.9. Banana Research Station, Kannara

Banana Research Station at Kannara was established in 1963, to improve the varieties of banana and pineapple by introduction, selection and hybridisation and to standardise management practices for these crops. The venue of the pineapple research centre was shifted to an area of 7.0 ha in the main campus at Vellanikkara during 1974. The Banana Research Station at Kannara comprises an area of 17.53 ha of which 5.6 ha is occupied by perennial crops and 5 ha under annual crops.

The station is located 3 km west of Kannara at Marakkal. The geographical location is at 10°05'N latitude and 76°17'E longitude, at an elevation of 55.60 m above MSL. The soil is lateritic loam and alluvial in some pockets.

The station was brought under the control of the Kerala Agricultural University in 1972. At present its main research activities are under the All India Co-ordinated Fruit Improvement Project of ICAR.

2.4.10. Agricultural Research Station, Mannuthy

This station was originally established as Rice Research Station in 1957 to study the various problems in rice culture in the central tract of the middle lateritic region of Trichur and Ernakulam districts. In 1963, this became one of the Regional Rice Research Stations under the Central Rice Research Station, Pattambi under the

Govt. of Kerala. With the establishment of the KAU in 1972 this station was brought under the University. In 1976, the station was converted into "Research Station and Instructional Farm" attached to the College of Horticulture with another Instructional farm at Vellanikkara under the administrative control of the Head of the Station. In 1976, these two units were amalgamated as Research Station and Instructional Farm, Mannuthy. The Agricultural Research Station at Mannuthy forms a sub-centre of the Central Region of the NARP and special zone for problem area covering the kole lands of Trichur.

2.4.11. Agronomic Research Station, Chalakudy

The research station was originally established in 2 ha of leased land at Pariyaram in 1962, near Chalakudy, to carry out studies on water requirement and cropping patterns to be adopted for the irrigated area. In 1972 the station was re-established at the present site in an area of 8.95 ha for conducting agronomic research under irrigated conditions. The station was taken over by the Kerala Agricultural University in 1973 for implementing the ICAR sponsored Co-ordinated Project for Research on Water Management and started functioning from July 1974 onwards.

The research station is situated in the northern side of the Chalakudy-Sholayar road about 400 metre away from the Chalakudy town and located at 10°20'N latitude and 76°20'E longitude, with an altitude of 3.25 m above MSL.

Of the total area of 8.95 ha, 7.05 ha is wetland and 1.90 ha is upland. The area runs to a fine gradient to south west and wetlands are terraced into blocks and plots. The major soil group is sandy loam.

2.4.12. Rice Research Station, Vyttila

Rice Research Station, Vyttila, was started in the year 1958 in a leased land in Kunnara Area near Vyttila. The station started functioning in the present site in 1963 by acquiring 4.55 ha of land. Subsequently in 1973 an additional area of 4.06 ha and during 1981-82, another 0.30 ha were acquired, thus making the total area to 8.91 ha. The station is located at 1.7 m above MSL. The soil is acid saline, stiff, impervious, and rich in organic matter.

All-India Co-ordinated Research Project on Brackishwater Fish Farming is also functioning at the station since 1976.

2.4.13. Cardamom Research Station, Pampadumpara

The Cardamom Research Station, Pampadumpara, was started in the year 1956 with a view to undertake research programmes on various agronomic, botanical entomological and phyto-pathological problems of cardamom cultivation. It was taken over by the KAU in 1972. The Station is situated in the high ranges of Kerala in Pampadumpara village, Udumbanchola Taluk of Idukki district, 35 km from Kumily in the Kumily-Munnar road at 9°45'N latitude and 77°10'E longitude at an elevation of 100 m above MSL. The All India Co-ordinated Spices and Cashewnut Improvement Project of ICAR was initiated at the Station during 1977.

The total area of the farm is 46.44 ha. The crop coverage is cardamom 37 ha, pepper 2 ha and coffee 5 ha. The soil is typical forest loam.

2.4.14. *Aromatic and Medicinal Plants Research Station, Odakkali*

The station started functioning in 1951 under the Industries Department and later in 1954 it was handed over to the Department of Agriculture. With the formation of the Kerala Agricultural University, the station was brought under the university in 1972. This is the only centre in India where intensive studies of *Cymbopogon flexuosus* are being carried out. The station is located 27 km east of Alwaye by the side of the Alwaye-Idukki road, at an elevation of 66 m above MSL. The total area of the station is 12.4 ha.

2.4.15. *Coconut Research Station, Kumarakom*

The Coconut Research Station, established in 1947 by the India Central Coconut Committee was taken over by the State Government in 1958. From 1972 onwards, the station is functioning under the Kerala Agricultural University.

During 1980-81, a scheme for investigation on the root (wilt) disease of coconut was implemented at this Station. The Station was reorganised under the NARP and upgraded as the Regional Agricultural Research Station for the region of problem areas in 1982 with Rice Research Station, Moncompu; Rice Research Station, Kayamkulam; Rice Research Station, Vyttila and Kole Region Research Unit at Mannuthy as sub-stations. The station is situated 17 km east of Kottayam on the Kottayam-Kumarakom-Vechoor road, at 76°30'E longitude and 9°33'N latitude and 0.6 m above MSL.

2.4.16. *Rice Research Station, Moncompu*

With a view to breed rice varieties suitable to Kuttanad tract, a Paddy Breeding Station was started at Moncompu in 1940. Later in 1963 this station was upgraded to the status of a Regional Rice Research Station to handle problems of Agronomy and Plant Protection in addition to varietal improvement. During 1972, the station was taken over by the Kerala Agricultural University.

Rice Research Station, Moncompu, is located in Chambakulam village of Kuttanad taluk, Alleppey district. The station is equidistant from Alleppey and Changanacherry being 12 km both ways and is located on the northern side of the road from Changanacherry to Alleppey. Total area of the farm is 8.7 ha of which 2 ha comprises garden land and the remaining area constitutes double crop paddy lands. The soil is alluvial clay.

2.4.17. *Rice Research Station, Kayamkulam*

Rice Research Station, Kayamkulam is located in Alleppey district, 1 km east of Kayamkulam town on the northern side of Kayamkulam-Punalur road, at 9°10'N latitude and 76°3'E longitude at 3.05 m above MSL. The station was established in 1937 under the Kerala University and later transferred to the State Department of Agriculture in May, 1958. It was transferred to the Kerala Agricultural University with effect from February 1, 1972. An area of 9.45 ha of wetland and 2.20 ha of garden land was acquired during 1973. Short duration varieties of rice are generally grown during 'Virippu' season and 'medium' to 'long' duration varieties of rice during Mundakan season. During January-April, summer crops of sesamum, pulses and groundnut are raised as catch crops. The soil is sandy loam.

2.4.18 Model Agronomic Research Station, Karamana

This station was established at Karamana in 1955 as Model Agronomic Research Station under the Department of Agriculture, Kerala, with the main objectives of conducting simple fertiliser trials under Fertiliser Use and Soil Fertility project. New schemes and experiments were started in 1968 under All India Co-ordinated Agronomic Research Project aimed at conducting manurial, cultural rotational and multiple cropping experiments in paddy.

In 1972, the station was taken over by the Kerala Agricultural University and in 1983 it was recognised as Cropping Systems Research Centre, mainly to conduct the research programmes envisaged under the All-India Co-ordinated Agronomic Research Project. The headquarters of AICARP was shifted to the station on October 1, 1983 and the two units for Experiment in cultivators' Fields at Vyttila and Nileshwar, were brought under the control of the station. The station is situated at Nedumcaudu, Karamana, about 3 km south east of Trivandrum Central Railway Station at an altitude of 29m above MSL.

The area of the station is 7.65 ha of which double cropped wetland occupies 7.25 ha and garden land 0.40 ha. The soil is a sandy loam.

2.4.19 Coconut Research Station, Balaramapuram

The station was started in 1963 under the Department of Agriculture, Government of Kerala, with a view to conduct research on coconut in the typical red loam soil at Kattachalkuzhi, about 3.2 km south of Balaramapuram, on the Balaramapuram-Vizhinjam road. The area of the station is 14.13 ha in two blocks, viz., 'A' block in Kottukal village in Neyyattinkara taluk and 'B' block in Thiruvallom village of Trivandrum taluk. The farm is located at an altitude of 90m above MSL. The soil is deep red loam type, belonging to the Vellayani series.

2.4.20 Livestock Research Station, Thiruvazhamkunnu

The farm was originally established in 1949 by the Govt. of Madras, and later on it was transferred to Kerala State during the reorganisation of the States.

The farm is located in the Mannarghat taluk of Palghat district in an area of 163.3 ha of which the area under fodder occupies 78.37 ha, grazing land 42.93 ha, agro-forestry experiments 5.00 ha, and coconut and other field experiments on crops 5.4 ha. About 32 ha is forest area. The main activities of the station are conducting research on the scientific breeding of livestock and its management.

2.4.21 Cattle Breeding Farm, Thumburmuzhi

This farm, situated at about 15 km from Chalakudy in the Sholayar route, was started in 1957 as an ancillary station for rearing calves to a stage of seven months pregnancy and for distributing the animals to other farms. The station was taken over by KAU in 1972.

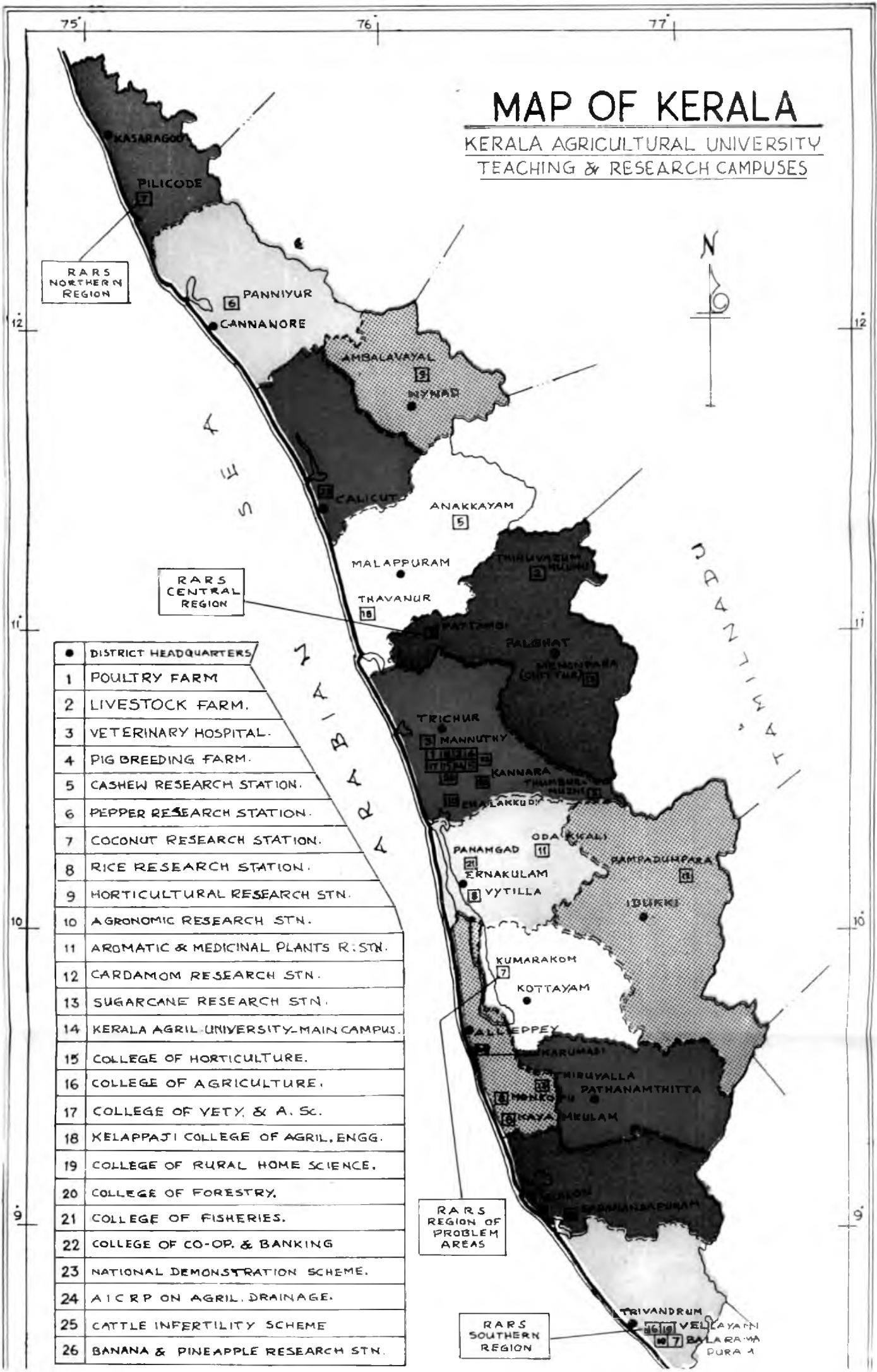
2.4.22 Pig Breeding Farm, Mannuthy

This farm was started in 1965 in an area of 4.2 ha. The major objectives were to conduct research on various aspects of swine production, to serve as a centre to produce high quality piglets to be distributed among the farmers and also to serve as demonstration/instructional unit for farmers and students.

Chapter III K.A.U. Today

MAP OF KERALA

KERALA AGRICULTURAL UNIVERSITY
TEACHING & RESEARCH CAMPUSES



●	DISTRICT HEADQUARTERS
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 STN.
10	AGRONOMIC RESEARCH STN.
11	AROMATIC & MEDICINAL PLANTS R:STN.
12	CARDAMOM RESEARCH STN.
13	SUGARCANE RESEARCH STN.
14	KERALA AGRIL. UNIVERSITY-MAIN CAMPUS.
15	COLLEGE OF HORTICULTURE.
16	COLLEGE OF AGRICULTURE.
17	COLLEGE OF VET. & A. SC.
18	KELAPPATI COLLEGE OF AGRIL. ENGG.
19	COLLEGE OF RURAL HOME SCIENCE.
20	COLLEGE OF FORESTRY.
21	COLLEGE OF FISHERIES.
22	COLLEGE OF CO-OP. & BANKING
23	NATIONAL DEMONSTRATION SCHEME.
24	AICRP ON AGRIL. DRAINAGE.
25	CATTLE INFERTILITY SCHEME
26	BANANA & PINEAPPLE RESEARCH STN.

RARS NORTHERN REGION

RARS CENTRAL REGION

RARS REGION OF PROBLEM AREAS

RARS SOUTHERN REGION



75 76 77

12 11 10 9

12 11 10 9



ROYAUME DE KENYA

CHAPTER—III

3. KAU TODAY

3.1 Organisational set up

The University with headquarters at Vellanikkara and with a State-wide jurisdiction is charged with the responsibility of teaching, research and extension education in the field of agriculture and allied disciplines.

The Governor of the State of Kerala and the State Minister of Agriculture are the Chancellor and Pro-Chancellor of the University, respectively. The Vice-Chancellor is the principal executive and academic head exercising general control over all aspects of functioning of the University. He is the ex-officio Chairman of the Executive Committee and the Academic Council and presides over the General Council in the absence of the Chancellor and Pro-Chancellor. He is also the Chairman of Research Council, Research Advisory Committee and Extension Advisory Committee. The Vice-Chancellor is assisted by the Director of Research on research administration, the Director of Extension on Extension Education and the Deans of Faculties on academic matters. He is assisted by the Registrar and the Comptroller in the University's general administration and financial matters, respectively. The Director of Physical Plant is the Head of the Engineering Wing of the University. The other officers of the University are the Librarian, the Director of Student's Welfare and such other persons in the service of the University as may be declared by the Statutes to be the officers of the University, each performing the functions to promote the objectives of the University in accordance with the Act and Statutes. The organisational set up of the KAU is furnished in Fig. 1.

3.1.2. Governance

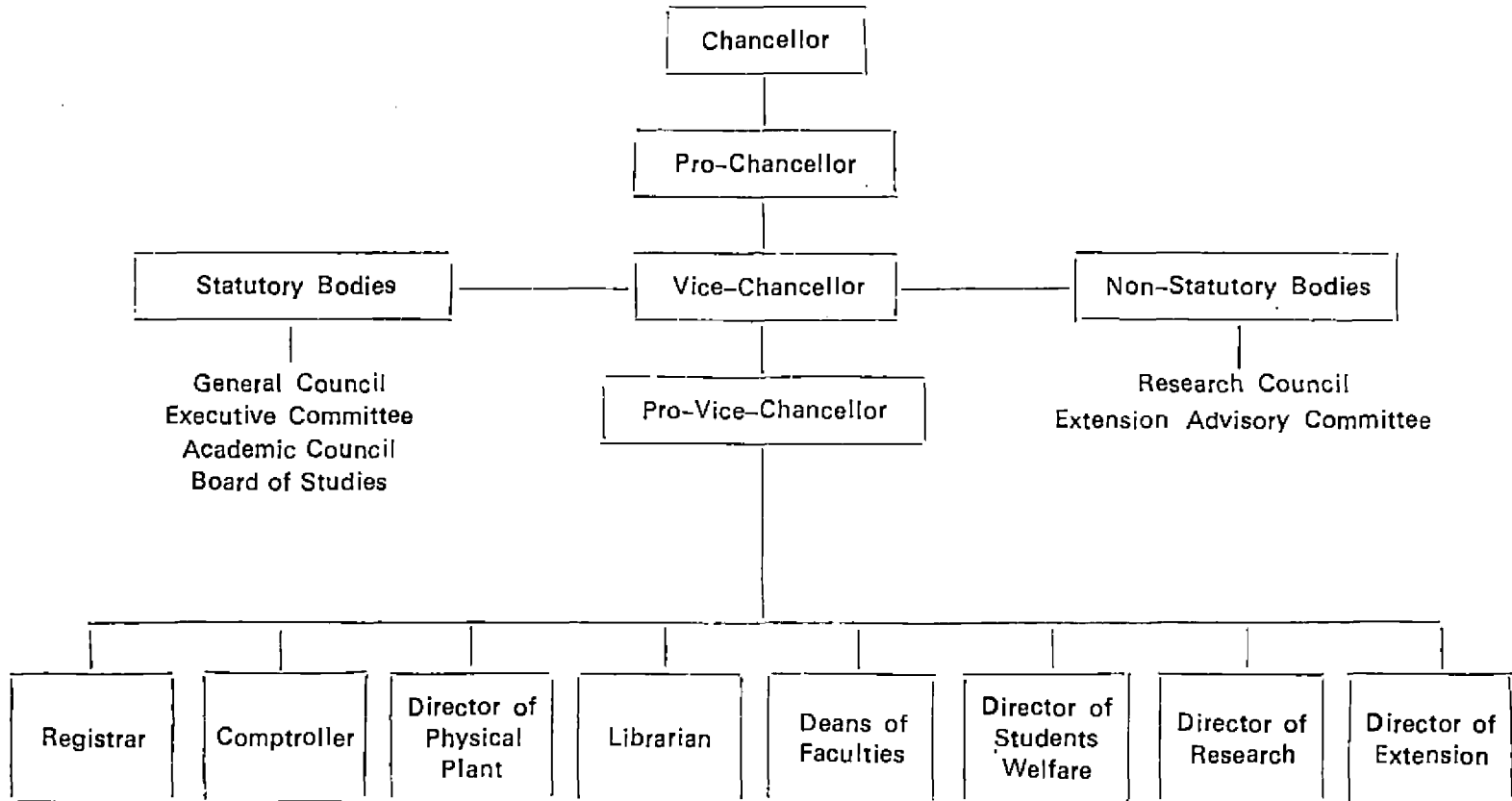
The Governor of Kerala is the Chancellor of the University and the State Minister for Agriculture is the Pro-Chancellor.

3.1.2.1. The General Council

The General Council is the supreme authority of the University. The Council has 18 ex-officio members (Chancellor, Pro-Chancellor, Vice-Chancellor, Pro-Vice-Chancellor, if any, the Secretaries to Government in the Departments of Agriculture, Development and Finance, Director of Agriculture, Director of Animal Husbandry, Director of Dairy Development, Director of Fisheries, Chief Conservator

Fig. 1

ORGANISATIONAL SET UP OF KERALA AGRICULTURAL UNIVERSITY



of Forests, Registrar of Cooperative Societies, Deans of Faculties, Director of Extension, Director of Research and Director of Student's Welfare). Besides there are 20 elected and 17 nominated members in the General Council. The elected members are from State Legislature, from among PG and UG and Diploma students, from among teachers, non-teaching staff, from employees in research stations, the Presidents of Panchayats and Mayors of Municipalities. The General Council has the following sub-committees.

<i>Sl. No.</i>	<i>Sub Committee</i>	<i>Chairman</i>
1.	Accounts Committee	Elected member
2.	Assurance Committee	„
3.	Statute Sub-Committee	„

3.1.2.2. The Executive Committee

The Executive Committee is the chief executive body of the University. It comprises of the Vice-Chancellor, the three Government Secretaries on the General Council, the ICAR representative in the General Council and four elected members of the General Council and one each elected from the Scientific Staff and Deans of Faculties. The Executive Committee should meet atleast once in four months, but it generally meets every month. The Executive Committee has the following sub-committees.

<i>Sl. No.</i>	<i>Name of Sub-Committee</i>	<i>Chairman</i>
1.	Finance Committee	Vice-Chancellor
2.	Planning & Development Committee	Vice-Chancellor
3.	Research Review Committee	Vice-Chancellor
4.	Sports Board	Vice-Chancellor
5.	Establishment Committee	Vice-Chancellor
6.	Student's Welfare Committee	Elected Member

3.1.2.3. Academic Council :

Academic Council is responsible for the maintenance of academic standards of institutions in the different faculties of the University.

3.1.2.4. Board of Studies :

Board of studies of each faculty has an advisory role so as to maintain the academic standards.

3.1.3. Finance

The financial statement of receipts and expenditure of the University for the past four years are as follows : (Table 7)

Table—7
KAU FINANCES — RECEIPTS

	1982-83	1983-84	1984-85	1985-86
A. General Fund.				
1 Statutory Grant from Govt.				
i. Non Plan	3,13,35,000	4,52,52,000	4,45,25,000	5,70,00,000
ii. Plan	1,25,00,000	2,00,00,000	2,75,00,000	4,60,00,000
2 Grants from other sources				
a. ICAR	1,46,88,844	2,39,16,983	1,85,08,805	2,13,53,200
b. Other sources including KADP (Plan)	1,90,800	3,48,449	15,94,621	23,75,800
3 Income from colleges (Non Plan)	13,22,534	12,07,065	8,94,222	13,20,500
4 Income from University properties				
i. Non Plan	52,93,876	64,97,574	81,47,046	75,31,000
ii. Plan	5,99,475	5,48,194	5,89,626	6,61,900
5 Income from investments				
i. Plan	—	4,05,396	25,575	7,50,000
ii. Non Plan	85,561	—	—	—
6 Recoveries from Pension Fund (Non Plan)	—	17,33,149	22,06,784	27,56,000
7 Other miscellaneous income (Non Plan)	6,74,434	5,97,124	10,20,561	7,78,000
Total	6,66,90,524	10,05,05,934	10,50,12,240	14,05,26,400

KAU FINANCES — EXPENDITURE

	1982-83	1983-84	1984-85	1985-86
Non Plan	3,31,55,076	4,14,41,275	5,62,49,257	7,12,54,000
Plan	4,40,78,646	5,22,57,059	3,56,74,617	5,58,61,600
ICAR	(Inclusive of ICAR & Others)	(Inclusive of ICAR & Others)	2,28,91,132	1,96,63,100
Others			5,83,704	14,52,100
Total	7,72,33,722	9,36,98,334	11,53,98,710	14,82,30,800

Source—Budget estimates.

Table—8

University's every rupee of resource is received and spend as below:
(1986-87 estimates)

Received from			Spent on		
Government grant	: Ps.	79	Administration	: Ps.	5
ICAR and other sources	: Ps.	10	Pension	: Ps.	4
University's own income	: Ps.	9	Education	: Ps.	40
Others	: Ps.	2	Research	: Ps.	42
			Extension	: Ps.	9
Total			Total		
	: Re.	1.00		: Re.	1.00

Break-up of the expenditure as between Salaries/Wages/Travel expenses and others.

	Rs. in lakhs	Percentage to total
Salaries	617.71	34.59
Labour wages	239.26	13.39
Travel expenses	16.75	0.93
Land acquisition charges	17.00	0.05
Contingencies/Other charges	374.37	20.44
Works	359.48	20.13
Pension	68.65	3.84
Loans (net)	102.48	5.73
Total	1,785.70	100.00

3.1.4. Teaching function

The University has at present six teaching campuses. viz.,

- i) the College of Agriculture, & College of Rural Home Science, Vellayani,
- ii) the College of Horticulture, Vellanikkara;
- iii) the College of Veterinary & Animal Sciences, Mannuthy;
- iv) the College of Fisheries, Panangad;
- v) the College of Co-operation & Banking, Mannuthy; and
- vi) the Kelappaji College of Agricultural Engineering, Tavanur.

The organisational chart is printed in Fig. 2.

The manpower requirements in selected areas of agricultural Sciences, at the levels of graduates and post-graduates, as projected by the State Planning Board is given in Table 10. A brief write-up on the teaching activities of these institutions are as follows: (Page 40)

Table—9
Annual financial statement for the year 1986-87

RECEIPTS				
Accounts 1984-85	Budget Estimate 1985-86	Revised Estimate 1985-86	Head of account	Budget estimate 1986-87
			A. GENERAL FUND	
			I a) Statutory grant from Govt.	
445,25,000	750,00,000	570,00,000	i. Non-Plan	768,00,000
275,00,000	460,00,000	460,00,000	ii. Plan	500,00,000
			b) Specific purpose Plant grant— Construction of Admn. Block & Campus Development (Plan)	—
—	50,00,000	—		
			II. Grants from other sources	
185,08,805	262,19,000	213,53,200	a) ICAR	141,36,100
15,94,621	26,39,000	23,75,800	b) Other sources (including KADP) Plan	12,30,200
8,94,621	13,12,000	13,20,500	III. Income from Colleges (Non-Plan)	13,74,000
			IV. Income from University Properties	
81,47,046	79,86,600	75,31,000	i) Non-Plan	80,80,900
5,89,626	6,39,100	6,61,900	ii) Plan	7,37,100
25,575	8,00,000	7,50,000	V. Income from investments (Plan)	7,00,000
22,06,784	25,40,000	27,56,000	VI. Recoveries from Pension Fund (Non-Plan)	32,80,000
10,20,561	7,39,000	7,78,000	VII. Other Miscellaneous Income (Non-Plan)	35,50,000

Table-9 Annual financial statement for the year 1986-87

(Receipts Contd.)

Accounts 1984-85	Budget Estimate 1985-86	Revised Estimate 1985-86	Head of Account	Budget Estimate 1986-87
10,50,12,240	16,88,75,600	14,05,26,400		15,98,88,300
—	—	—	B. FOUNDATION FUND	—
—	3,18,000	6,19,000	C. PENSION FUND	2,00,000
1,19,09,311	1,27,68,200	1,76,50,100	D. DEBT AND SUSPENSE	1,50,61,200
11,69,21,551	18,19,61,800	15,87,95,500	Total	17,51,49,500
1,55,20,846	84,52,746	58,76,869	Opening balance	35,68,469
—	—	—	Deficit	—
13,24,42,397	19,04,14,546	16,46,72,369	Grand Total	17,87,17,969

Table 9
Annual financial statement for the year 1986-87 (Expenditure)

EXPENDITURE				
Accounts 1984-85	Budget Estimate 1985-86	Revised Estimate 1985-86	Head of Account	Budget Estimate 1986-87
			A. GENERAL FUND	
77,145	1,20,000	1,33,000	I. General Council	1,45,000
1,44,323	1,60,000	1,88,000	II. Executive and other Committees	1,91,000
			III. Administration	
91,66 008	1,14,58,500	1,22,70,400	i. Non-Plan	1,34,49,800
3,79,952	10,73,200	7 83,000	ii. Plan	8,50,000
			Education, Research and Extension	
			IV Education	
			a) Agricultural Education	
1,52,63,251	1,87,22,200	1,89,88,500	i. Non-Plan	2,07,85,900
46,33,025	69,02,100	54,68,500	ii. Plan	31,64,700
			iii. Externally aided projects	
—	—	—	ICAR	—
18,039	70,000	77,000	Others	80,000
			b) Veterinary Education	
56,45,319	82,77,500	83,47,300	i. Non-Plan	90,92,000
41,70,437	60,35,500	34,11,500	ii. Plan	54,40,000
			c) Fisheries Education	
—	22,79,000	22,84,800	i. Non-Plan	30,54,600
18,63,032	43,84,300	42,48,300	ii. Plan	13,75,000

Table 9 (Expenditure contd)

Accounts 1984-85	Budget Estimate 1985-86	Revised Estimate 1985-86	Head of Account	Budget Estimate 1986-87
88,078	5,86,800	1,95,500	d) Faculty of Basic Science and Humanities (Plan)	3,00,000
41,680	6,00,000	5,54,000	e) Faculty of Forestry (Plan)	15,00,000
—	1,00,000	70,000	f) Faculty of P. G. Students (Plan)	1,00,000
4,24,093	10,46,500	6,82,800	g) Faculty of Co-operation and Banking (Plan)	8,75,000
—	20,00,000	12,90,000	h) Faculty of Agricultural Engineering (Plan)	39,40,000
93,801	4,60,000	2,64,400	i) Faculty of Home Science (Plan)	3,80,000
—	5,41,000	3,08,400	j) Directorate of Students Welfare (Non-Plan)	6,10,500
—	—	—	k) University Library	
—	10,000	10,000	i. Plan	1,00,000
			ii. Non-Plan	75,000
			V. Agricultural Research	
1,00,98,656	1,25,62,900	1,22,16,800	i. Non-Plan	1,44,56,700
35,99,818	87,47,300	92,06,900	ii. Plan	64,12,500
			iii. Externally aided projects.	
1,77,85,519	90,27,300	1,29,48,200	a) ICAR	61,85,000
4,16,399	2,28,500	9,08,300	b) Others	5,61,900
			VI. Veterinary Research	
63,50,014	65,44,700	64,71,600	i. Non-Plan	71,14,400
13,99,786	26,12,100	19,10,500	ii. Plan	23,63,600

Included under Administration.

Table—9 (Expenditure contd.....)

Accounts 1984-85	Budget Estimate 1985-86	Revised Estimate 1985-86	Head of Account	Budget Estimate, 1986-87
			iii. Externally aided projects	
20,80,630	49,54,800	31,95,700	a) ICAR	31,52,400
92,619	—	—	b) Others	—
			VII. Fisheries Research	
1,28,927	4,55,000	4,34,900	i. Plan	3,73,400
			ii. Externally aided projects	
1,43,847	—	—	a) ICAR	—
2,39,672	2,33,400	2,55,500	VIII. Forestry Research (ICAR)	2,32,000
			IX. Agricultural Engineering	
1,15,836	1,73,600	1,29,000	i. ICAR	2,92,900
—	5,63,000	5,55,000	ii. Others	1,91,300
			X. Home Science	
—	18,000	36,000	a) ICAR	18,000
8,302	38,100	35,500	b) Others	32,800
			XI. Extension	
27,35,931	28,66,400	34,57,500	i. Non-Plan	38,25,500
9,56,203	29,30,000	23,41,300	ii. Plan	17,31,000
			iii. Externally aided projects	
27,65,301	36,32,500	25,43,700	a) ICAR	22,73,400
48,345	40,68,200	4,31,300	b) Others	4,21,300
			XII. Civil Works	
53,52,606	57,84,700	49,49,000	i. Non-Plan	59,48,500
1,77,71,949	3,50,00,000	2,50,00,000	ii. Plan	3,00,00,000
13,00,170	18,78,100	16,18,700	XIII. Vellanikkara Estate (Non-Plan)	19,99,500

Table—9 (Expenditure contd.....)

			XIV. i. LS for teachers Pay Revision: 1.4.79/ General Pay Revision 1.7.83 and Interim Relief (Non-Plan)	
—	26,00,000	—		
—	42,00,000	—	ii. LS for DA Revision (Non-Plan)	1,000
			iii. Grade/Norms Promotion of Teachers (Non-Plan)	—
5,62,49,257	7,83,74,700	7,12,54,000		Non-Plan 8,07,49,400
3,56,74,617	7,24,91,500	5,58,61,600	Total	Plan 5,88,69,200
2,28,91,132	1,82,69,200	1,96,63,100	I to XIV	ICAR 1,23,45,000
5,83,704	49,59,800	14,52,100		Others 10,96,000
11,53,98,710	17,40,95,200	14,82,30,800		Total 15,30,59,600
—	8,00,000	—	B. FOUNDATION FUND	1,000
—	3,18,000	6,19,000	C. PENSION FUND	2,00,000
1,11,66,818	1,49,23,100	1,22,54,100	D. DEBT AND SUSPENSE	2,53,09,100
12,65,65,118	19,01,36,300	16,11,03,900		Total 17,85,69,700
58,76,869	2,78,246	35,68,469	Closing Balance	1,48,269
—	—	—	Deficit	—
13,24,42,397	19,04,14,546	16,46,72,369	GRAND TOTAL	17,87,17,969

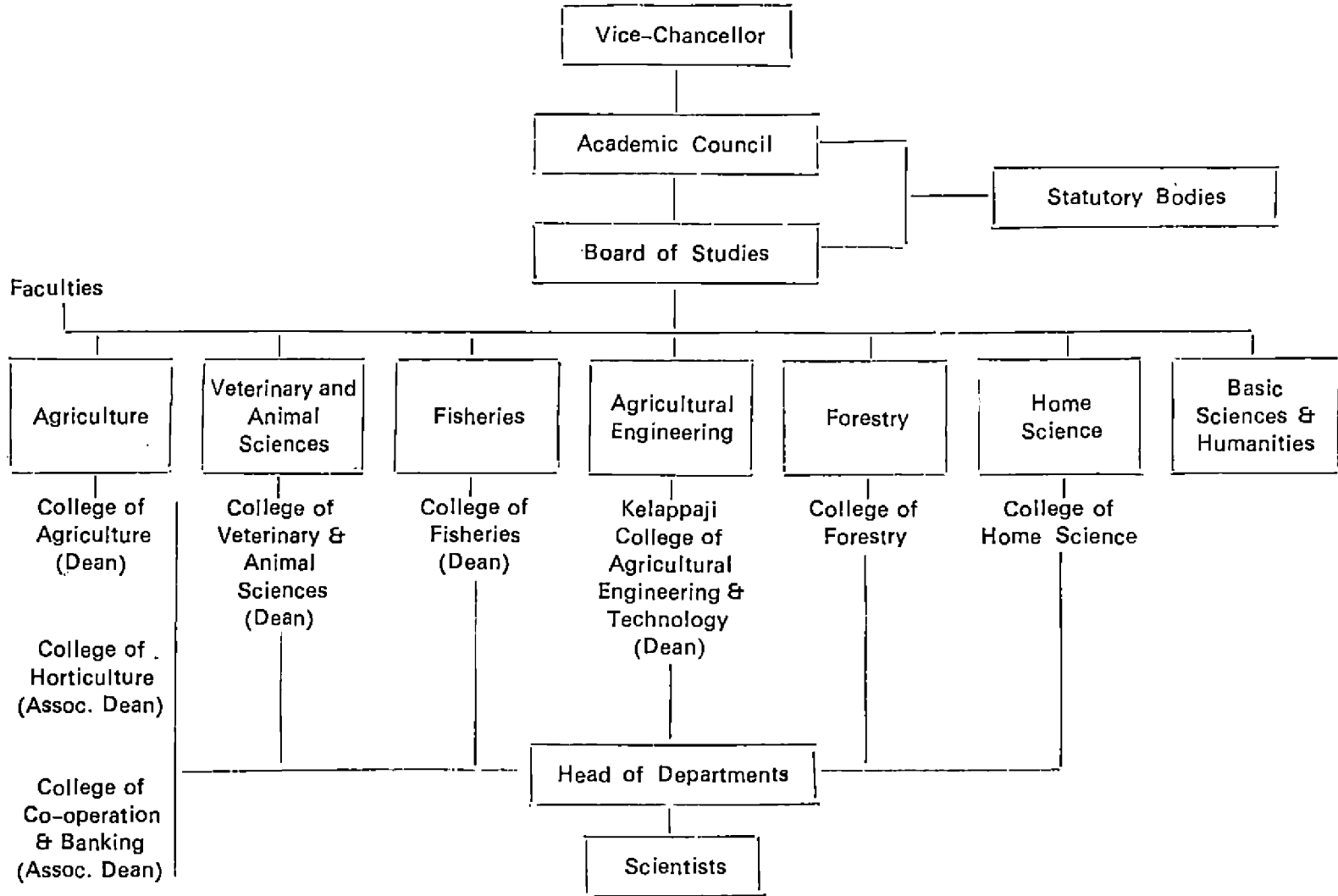
Table 10

Projection of graduates and Post-graduates in Agriculture, Veterinary & Fisheries based on demand

Faculty	1984- 85	1985- 86	1986- 87	1987- 88	1988- 89	1989- 90	Total at the end of VIIth Plan	1990-91 to 1994-95 (5 years)	1995-96 to '99-2000 (5 years)	Grand Total
Agriculture B. Sc. (Ag.)	100	100	100	150	150	150	750	750 150/year	600 120/year	2100
M. Sc. Ag./Hort./Engg./Stat.	76	76	76	76	76	76	456	300 @ 60/year	300 @ 60/year	1056
Ph. D. Ag./Hort./Engg./Stat.	18	18	20	25	25	25	25	125 @ 25/year	200 @ 40/year	446
Total	194	194	196	251	251	251	1327	1175	1100	3602
Veterinary B. V. Sc. & AH.	120	120	120	120	120	120	720	600	600	1920
M. V. Sc.	50	50	50	50	50	50	300	250	250	800
Ph. D. (Vety.)	20	20	20	20	20	20	120	180	180	480
Total	190	190	190	190	190	190	1140	1030	1030	3200
Fisheries B. Sc. (Fish)	30	30	30	30	30	30	180	150	150	480
M. Sc. (Fish.)	4	4	4	4	4	4	24	30	30	84
Total	34	34	34	34	34	34	204	180	180	564

(Source—Report of the High Level Committee on land and water resources, State Planning Board, Trivandrum May 1984)

Fig. 2 ACADEMIC ORGANISATION- IN KERALA AGRICULTURAL UNIVERSITY



3.1.4.1. Faculty of Agriculture

3.1.4.1. (j) College of Agriculture, Vellayani

The College was started at the Vellayani Campus in 1955 by the Government of Travancore-Cochin. The College was taken over by the University in 1972. The College is 12 km away from the Trivandrum city and has 130 ha, of estate out of which 67 ha. comprise Kayal land and the rest of the area is garden land. This college is offering B. Sc. (Ag.), M. Sc. (Ag) and Ph.D. programmes.

The major departments in the College of Agriculture are Agronomy, Agricultural Botany, Soil Science and Agricultural Chemistry, Plant Breeding, Agricultural Entomology, Plant Pathology, Agricultural Engineering, Agricultural Extension Agricultural Statistics and Food Science and Nutrition. The Departments of Agricultural Economics, Animal Husbandry are also functioning in the College. The number of Academic staff sanctioned to the College of Agriculture, Vellayani is given in Table 11.

Table 11

Staff strength in Agricultural College, Vellayani (as on 1984-85)

Dean : 1

Professor (Research Co-ordination) : 1

Sl. No.	Department	Professor	Assoc. Prof.	Asst. Prof.	J.A.P.	Total
1	Agronomy	1	5	3	1	10
2	Agricultural Botany	1	1	3	1	6
3	Plant Physiology	—	2	—	1	3
4	Soil Sciences & Agricultural Chemistry	1	1	3	1	6
5	Plant Breeding	1	2	3	2	8
6	Agricultural Entomology	1	6	10	5	22
7	Plant Pathology	2	4	5	5	16
8	Agricultural Engineering	1	—	1	—	2
9	Agricultural Extension	1	2	5	3	11
10	Agricultural Statistics	1	2	1	—	4
11	Horticulture	1	1	1	1	4
12	Agricultural Economics	1	—	1	—	2
13	Food Science & Nutrition	1	1	1	2	5
14	Animal Husbandry	—	1	3	1	5
15	Physical Education	—	—	—	2	2
16	Instructional Farm	1	1	1	2	4
Total		13	29	41	27	110

For the B. Sc. (Ag.) programme, 65 students are submitted in the Vellayayani campus. The intake capacity for the M. Sc. (Ag.) courses is four each in the major departments of Agronomy, Plant Breeding, Agricultural Chemistry,

Agricultural Entomology, Plant Pathology and Agricultural Extension. The Ph. D. programmes are also offered in these disciplines. The present strength of under graduate students is 267 and of post-graduate students 126. The number of students who have secured various degrees from the inception of the College till the year 1985 are given below:-

B. Sc. (Agri.)	:	1767
M. Sc. (Agri.)	:	528
Ph. D.	:	27

3.1.4.1. (ii) College of Horticulture, Vellanikkara

The College of Horticulture was established in 1972 with the initial intake of 20 students. The College was shifted to the Vellanikkara Campus in November, 1977. The courses offered in the College of Horticulture at Vellanikkara are B. Sc. (Ag)/B. Sc. (Hort), M. Sc. (Ag.), M. Sc. (Ag. Engg.), Ph. D. in Horticulture and Agricultural subjects besides PG Diploma in Water Management and Natural Rubber Production. The B. Sc. (C & B) course is also offered from this College.

The Master's degree programmes are offered in Agronomy, Soil Science & Agricultural Chemistry, Agricultural Botany, Plant Breeding, Agricultural Entomology, Plant Pathology and Agricultural Economics. Doctorate programmes are offered in Horticulture and in the Department of Agricultural Entomology. For the B. Sc.(Ag.)/ B. Sc. (Hort.) courses a pass in the Pre-Degree examination of the Kerala and Calicut Universities is necessary.

For Masters programme a basic degree in Agriculture/Horticulture is essential while, for Ph. D. programme, holders of Master's degree in the discipline are eligible for admission.

The College has at present the Departments of Pomology, Plantation Crops and Spices, Olericulture and Processing Technology, besides Agronomy, Agricultural Botany, Agricultural Entomology, Agricultural Chemistry, Agricultural Engineering, Plant Pathology and Agricultural Economics. The Sections of Agricultural Extension, Agricultural Meteorology and Agricultural Statistics, are also functioning in the College. The staff strength of College of Horticulture, Vellanikkara is furnished in Table 12.

The intake capacity of students for the various programmes in the College of Horticulture are 65 for B. Sc. (Ag)/B. Sc. (Hort.), four each for M. Sc. (Ag) in Pomology, Olericulture, Plantation Crops and Processing Technology and for Agricultural Chemistry, Agricultural Botany, Plant Pathology and Agricultural Entomology departments. For the Ph.D. Programmes in Horticulture the intake capacity is usually two per Department.

Students are selected for admission to the B. Sc. (Hort.)/Ag. courses on the basis of the results of the competitive examinations conducted for the purpose by the Govt. Since 1981-82 academic year, B. Sc. (Hort.) is discontinued. At

Table 12
The sanctioned staff strength of the College of Horticulture, Vellanikkara
(as on 1984-85)

		Associate Dean : 1				
Sl. No.	Department	Prof-essor	Assoc. Prof.	Asst. Prof.	J. A. P.	Total
1	Pomology and Floriculture	1	—	4	4	9
2	Plantation crops	1	—	7	5	13
3	Olericulture	1	—	4	3	8
4	Agrl. Meteorogy	1	—	1	1	3
5	Processing Technology	1	—	2	1	4
6	Agronomy	1	1	6	2	10
7	Soil Science & Agrl. Chemistry	2	4	4	2	12
8	Agricultural Botany	1	—	4	—	5
9	Agrl. Entomology	1	2	3	1	7
10	Plant Pathology	2	3	5	2	12
11	Agrl. Engineering	1	2	4	2	9
12	Agrl. Economics	1	1	2	1	5
13	Agrl. Extension	1	—	—	—	1
14	Agrl. Statistics	—	2	1	1	4
15	Physical Education	—	—	—	1	1
16	K.A.D.P.	5	2	5	—	12
Total		20	17	52	26	115

present there are 277 under-graduate students in this college. The numbers of students who have secured degrees from the college upto 1985 are noted below:

B. Sc. (Agri.)	: 195
B. Sc. (Hort.)	: 204
M. Sc. (Agri.)	: 78
M. Sc. (Hort.)	: 65
Ph. D.	: 4

3.1.4.1 (iii) College of Co-operation & Banking, Mannuthy

The College of Co-operation and Banking was started in 1981 in the Vellanikkara campus and was shifted to the building housing the Directorate of Extension, Mannuthy. The course offered is B. Sc. (C & B). The annual intake capacity is 30 and the minimum qualification for admission is Pre-degree. The sanctioned academic staff position in this college is given in Table 13.

Table 13
Staff strength of the College of Co-operation & Banking (as on 1984-85)
Associate Dean : 1

Sl. No.	Department	Prof-essor	Assoc. Prof.	Asst. Prof.	J. A. P.	Total
1	Co-operation	1	1	4	—	6
2	Economics	—	1	2	—	3
3	Commerce	—	1	4	1	6
4	Management	—	—	3	—	3
5	Banking	—	—	2	1	3
6	Statistics	—	1	1	—	2
7	Extension	—	—	1	—	1
Total		1	4	17	2	24

3.1.4.2 Faculty of Veterinary & Animal Sciences, College of Veterinary & Animal Sciences, Mannuthy

The Kerala Veterinary College was established at Mannuthy in 1955 by the then Government of Travancore-Cochin. The College Campus consists of 25 ha for the College proper, 15 ha. for the Livestock Farm, 2 ha for the Poultry & Pig Farms, making a total of 42 ha.

The present student strength is 129.

37 Students have secured B. Sc. (C & B) from this institution as on 1985.

The Academic programmes offered by the College are the B. V. Sc. & AH (5 year programme), M. V. Sc. (2 years), Ph. D. (not less than 2 years) and the PG Diploma in Veterinary Science (1 year).

At present M. V. Sc. courses are offered in the disciplines of Nutrition, Animal Reproduction, Parasitology, Pathology, Physiology, Pharmacology, Veterinary Microbiology, Dairy Science, Anatomy, Surgery, Poultry Science, Preventive Medicine, Clinical Medicine, Veterinary Public Health, Animal Breeding and Animal Management.

The College has the following major departments, viz., Anatomy, Animal Management, Animal Reproduction, Breeding and Genetics, Clinical Medicine, Dairy Science, Extension, Microbiology, Nutrition, Parasitology, Pathology, Pharmacology, Physiology, Poultry Science, Preventive Medicine, Surgery, Veterinary Public Health, Animal Production, Economics and Statistics. The academic position sanctioned for the College of Veterinary & Animal Sciences are as follows:

The annual intake of the students for the B. V. Sc. & AH programme was 80 until 1983-84. The intake was increased to 120 with effect from 1984-85. For the PG programme the intake of students for M. V. Sc. programme is four each in the major Departments. For the Ph. D. programme normally two students are admitted every year.

The qualifications for admission to the B. V. Sc. & AH programme is a pass in the Pre-degree examination of the Kerala or Calicut Universities with Physics, Chemistry and Biology as optional subjects or an examination recognised by the University as equivalent thereto. For the admission to the M. V. Sc. programme the minimum qualification is a pass in B. V. Sc. & AH securing an OGPA of not less than 2.50 out of 4.00 or any other qualification recognised by the University as

Table 14

Academic staff structure—College of Veterinary and Animal Sciences (1984–85)

Dean	:	1
Professor (Research Co-ordination)	:	1
Asst. Registrar (Tech.)	:	1

Sl. No.	Department	Professor	Assoc. Prof.	Asst. Prof	J.A.P.	Total
1	Anatomy	1	1	—	—	2
2	Animal Breeding & Genetics	1	2	—	1	4
3	Animal Management	1	1	2	—	4
4	Animal reproduction	2	3	2	3	10
5	Clinical Medicine	1	1	1	2	5
6	Dairy Science	1	4	2	—	7
7	Extension	1	—	1	4	6
8	Microbiology	1	1	1	1	4
9	Nutrition	1	3	3	1	8
10	Parasitology	1	4	2	—	7
11	Pathology	3	2	—	3	8
12	Pharmacology & Toxicology	2	2	2	—	6
13	Physiology & Bio-Chemistry	1	3	2	1	7
14	Poultry Science	2	2	2	—	6
15	Preventive Medicine	2	1	2	1	6
16	Surgery	1	4	2	—	7
17	Veterinary Public health	1	3	1	—	5
18	Statistics	1	—	2	2	5
19	Animal Production Economics	1	—	—	—	1
	Total	25	37	27	19	108

equivalent thereto. Holders of the Master's Degree in the discipline or related discipline from the concerned Faculty or a qualification recognised as equivalent thereto are considered eligible for admission for the Ph. D. programme in the Faculty. At present there are 410 students on the roll in this College. The following degrees were awarded from the college from its inception.

B. V. Sc.	:	1366
M. V. Sc.	:	200
Ph. D.	:	21

3.1.4.3. Faculty of Fisheries

College of Fisheries, Panangad

The College was established in the academic year 1979-80 at the Mannuthy Campus and it commenced functioning on October 10, 1979. The College was shifted to the permanent location at Panangad on October 12, 1983. The academic positions sanctioned for the College of Fisheries are as follows:

Table 15
Staff strength in the College of Fisheries, Panangad (1984-85)

Sl. No.	Department	Prof- essor	Assoc. Prof.	Asst. Prof.	JAP	Total
	Dean					1
	Professor (Fisheries Research)					1
1.	Aquaculture	1	3	5	4	13
2.	Fishery Biology	1	3	5	3	12
3.	Fishery Hydrography	1	3	5	3	12
4.	Fish Processing Technology	1	2	4	3	10
5.	Fishing Technology	—	1	2	3	6
6.	Fishery Engineering	—	2	2	3	7
7.	Management Studies	—	2	3	2	7
	Total	4	16	26	21	67

The intake capacity of students for the B. F. Sc. programme is 30 per year. The minimum qualification for admission to the B. F. Sc. course is a pass with the Pre-degree examination of the Kerala/Calicut University with Physics, Chemistry and Biology as optional subjects. Knowledge of swimming as proved by practical tests is an essential qualification for admission to the B. F. Sc. course. The first batch of students from the College of Fisheries completed their course during the academic year 1983-84. 32 Students have secured B. F. Sc. Degree from this institution till 1984-85.

3.1.4.4. Faculty of Agricultural Engineering

Kelappaji College of Agricultural Engineering & Technology

The Kelappaji College of Agricultural Engineering was inaugurated in the Tavanur Campus in Malappuram district on October 2, 1985 with an intake capacity of 30 students for the four year B. Tech. degree course. The nucleus for the College was the earlier Institute of Agricultural Technology which was established by the State Government in 1963 as Rural Institute and got transferred to the University in 1975. The minimum qualification for admission is a pass with 50% marks in Pre-Degree examination. Besides the new degree programme, the College continues to offer two diploma courses, viz., Diploma in Agricultural Science and Diploma in Agricultural and Rural Engineering. The intake capacity of students is 50 for Diploma in Agri. Sciences and 30 for the Diploma in Agrl. & Rural Engineering. There are 180 students at present. The following number of students have secured diploma from the former Institute of Agrl. Technology upto 1984-85.

D.A.Sc. : 300

D.A.R.E. : 150

The staff strength is given in Table 16.

3.1.5. Library

The total number of accessions in the libraries of the constituent Colleges of the University as on December 31, 1983 is 75012. A total of 508 periodicals are being subscribed in the teaching institutions of the University. The institution-wise split up of the books/periodicals is as under:

Table 16
Sanctioned posts of Scientific staff of Kelappaji College of Agricultural Engineering & Technology, Tavanur (1986-87)

Sl. No.	Department	Adviser	Prof-essor	Assoc. Prof.	Asst. Prof.	J.A.P.	Total
		1	—	—	—	—	1
1.	Resource & Conservation Engineering		1	2	3	—	6
2.	Farm Power Machinery & Engineering		1	2	3	—	6
3.	Irrigation & Drainage Engineering		1	2	3	—	6
4.	Post harvest Technology		1	1	3	—	5
5.	Maths		1	—	—	1	2
6.	Agro.		1	—	—	1	2
7.	Physics		—	1	—	—	1
8.	Agri. Chemistry		—	1	1	—	2
9.	Chemistry		—	—	1	—	1
10.	Plant Physiology		—	—	1	—	1
11.	Plant Pathology		—	—	—	2	2
12.	Horticulture		—	—	—	1	1
13.	Agril. Engineering		1	1	—	—	2
14.	Civil Engineering		—	—	—	—	—
15.	Electrical Engineering		—	—	—	1	1
16.	Mechanical Engineering		—	—	—	1	1
17.	Physical Education		—	—	—	1	1
	Total	1	7	10	15	9	42

Table 17
Total holding of books and periodicals in the College Libraries

	Books	Periodicals
College of Agriculture, Vellayani	19,915	91
College of Horticulture, Vellanikkara	18,349	135
College of Fisheries, Panangad	5,451	52
College of Veterinary & Animal Sciences, Mannuthy	16,909	201
Institute of Agricultural Technology, Tavanur	14,488	29
Total	75,012	508

3.1.6. Research Function

The objectives of research in the Kerala Agricultural University are to develop an appropriate land and water use pattern keeping in view the socio-economic needs of the state and to develop viable technologies to increase agricultural production and the net income of farmers and fishermen.



Inaugural function of Kelappaji College of Agricultural Engineering and Technology, Tavanur



Exhibition organised by KAU in connection with the Trichur Pooram Festival 1985

To achieve the above goal, the University is undertaking fundamental, applied and adaptive research to develop efficient technologies for the establishment of economic agro-livestock, and fisheries farming systems suitable for the homestead and other farming situations of Kerala.

3. 1. 6. 1. Organisational set up of Research Wing

The organisational set up of the research wing is furnished in Fig. 3.

Research Council is the supreme policy making body of the University in matters relating to research in the constituent Faculties. The Vice-Chancellor is the Chairman of the Research Council. The Director of Research is the Member-Secretary of the Research Council.

The Research Advisory Committee with a broad representation of the Institutions and farming community of the State provides feed-back information on Research Project implementation.

The Faculty Research Committees are functioning in each of the constituent Faculties. The main function of the Faculty Research Committee is to advise the University on the implementation of research projects. The FRC consists of all Heads of Departments, Associate Directors, full time and part-time Project Co-ordinators and selected scientists nominated by the Director of Research. It provides advice on the research policy for the Faculty, fixation of priorities for research programmes and directions to project co-ordinators and scientists on research project formulation, besides reviewing the output from the research projects. All the Research schemes are to be approved by the Faculty Research Committee before implementation.

The Project Co-ordination groups are functioning in the Faculties to serve as sub-committees of the FRC. These groups consist of scientists from different related disciplines. In the Faculty of Agriculture there are altogether 17 such Project Co-ordination groups. In the Faculty of Veterinary & Animal Sciences, there are seven project co-ordination groups. The primary task of the Project Co-ordination group is to process, scrutinise and suggest modifications, where necessary, in the technical programmes of research projects.

In the Faculties of Veterinary & Animal Sciences, Agriculture and Fisheries Professors co-ordinate the research activities in the concerned Faculty.

3. 1. 6. 2. Faculty of Agriculture

NARP Regional Stations and other Research Stations

There are five NARP Regional Stations catering to the requirements of different agro-climatic regions. The University has 18 Research Stations in the Agricultural Faculty and 5 in the Faculty of Veterinary and Animal Sciences. The details of these stations are noted in Table 18.

Fig. 3

ORGANISATIONAL PATTERN OF RESEARCH IN KERALA AGRICULTURAL UNIVERSITY

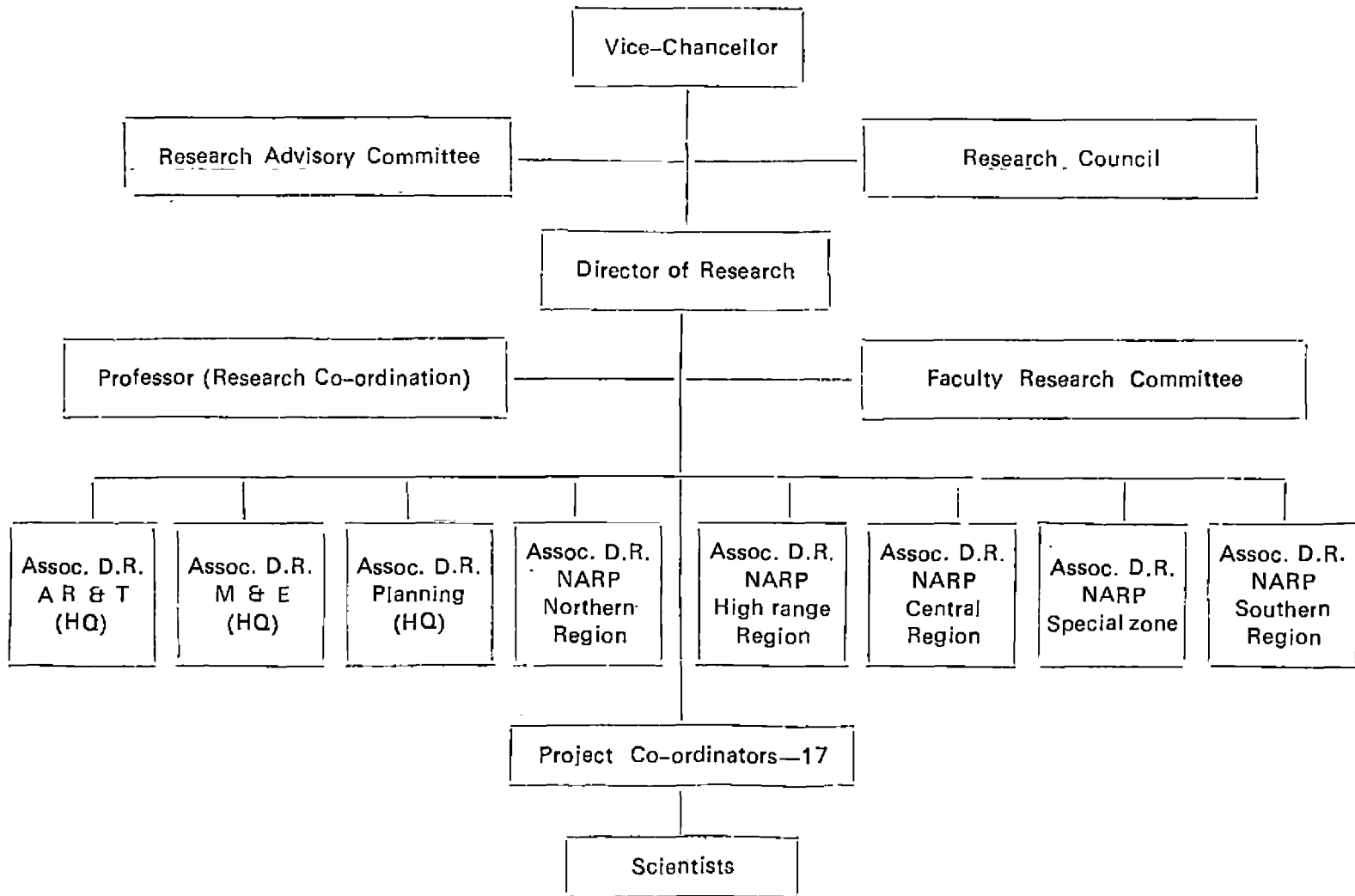


Table 18

Faculty of Agriculture--NARP Stations

Sl. No.	Region	Station	Area (in ha)
1	NARP (Northern Region)	— RARS, Pilicode	56.90
2	NARP (Central Region)	— RARS, Pattambi	63.69
3	NARP (Southern Region)	— NARP Centre, Vellayani	30.19
4	NARP (Region of Problem area)	— RARS, Kumarakom	44.49
5	NARP (High Range Region)	— RARS, Ambalavayal	87.30

Faculty of Agriculture—Other stations

Sl. No.	Name of Station	Area (in ha)
1	Agricultural Research Station, Mannuthy	38.34
2	Banana Research Station, Kannara	17.53
3	Agronomic Research Station, Chalakudy	8.95
4	Rice Research Station, Vyttila, Cochin	8.91
5	Aromatic & Medicinal Plants Research Station, Asamanoor, Odakkali	12.40
6	Rice Research Station, Moncompu	8.70
7	Sugarcane Research Station, Thiruvalla	9.75
8	Rice Research Station, Kayamkulam	11.65
9	Cardamom Research Station, Pampadumpara	46.44
10	Cropping System Research Station, Karamana, Trivandrum	7.65
11	Coconut Research Station, Kattachalkuzhy, P. O. Balaramapuram	14.13
12	Cashew Research Station, Anakkayam, Malappuram Dist.	9.92
13	Pepper Research Station, Panniyur, Taliparamba	26.13
14	Cashew Research Station, Madakkathara, Trichur	15.00
*15	Research Centre on Agricultural Drainage, SCS Building, Karumady	
*16	Sugarcane Research Centre, Menonpara, Chittoor	
**17	Pepper Research Centre, Vellanikkara	
**18	Pineapple Research Centre, Vellanikkara	

* These Stations are functioning on lands leased out from private owners

** Attached to the College of Horticulture, Vellanikkara.

The details of lead and verification functions of the NARP Regional Stations are as in Table 19.

Table 19
Functions of NARP Stations

Regional Station	Sub-Station/ special station (s)	Details of	
		Lead function (s)	Verification function (s)
NORTHERN REGION RARS, Pilicode	—	Coconut	Rice, Tubers, Pulses
	Panniyoor	Pepper	—
	Anakkayam	Cashew	—
CENTRAL REGION RARS, Pattambi	—	—	Rice, Coconut
	—	Rice	Rice, Pulses
	Eruthiampathy	Groundnut	Coconut
	Mannuthy	—	Rice, Groundnut Pulses
	Chalakydy	Water Management	
	Kannara	Banana & Pineapple	—
REGION OF PROBLEM AREAS RARS, Kumarakom	Odakkali	Medicinal and Aromatic Plants	
		Coconut diseases integrated farming systems	Rice in Kayal lands
	Moncompu	Rice in Kayal lands	
	Kayamkulam	Oil seeds, Pulses	Rice in Onattukara
	Vyttila	Crop-Fish farming	Rice in Pokkali
	Kole (Mannuthy)	—	Rice in Kole areas
	Thiruvalla	Sugarcane	—
SOUTHERN REGION	Vellayani		
	Balaramapuram		
RARS (High Range Region) RARS, Ambalavayal	Karamana		
	Kottarakkara	Homestead farming	—
	—	Hort. crops tribal area development	Rice, Pepper & Coffee
	Pampadumpara	Cardamom Tribal area	Rice & Pepper

Table 20

Staff strength in the Research Stations/Schemes/Projects as on 31-3-1985

Stations	Assoc. Director	Prof-essor	Assoc. Prof.	Asst. Prof.	J.A.P.	Total
1	2	3	4	5	6	7
FACULTY OF AGRICULTURE						
Regional Agri. Research Station, Pilicode						
NARP	1	2	16	5	—	24
Non-Plan	—	—	—	1	2	3
AICC & AIP	—	—	2	4	2	8
Pepper Res. Station, Panniyoor						
Non-Plan	—	—	1	1	1	3
ICAR Co-ordinated projects						
RARS, Ambalavayal						
NARP	1	—	1	4	—	6
Non-Plan	—	—	—	3	—	3
Citrus Scheme	—	—	1	1	2	4
CRS Anakayam	—	—	1	—	1	2
RARS Pattambi	1	1	10	25	10	47
BRS Kannara	—	—	1	5	5	11
KADP „	—	5	2	6	—	13
Ginger Scheme	—	—	1	2	—	3
Pepper Scheme	—	1	—	—	1	2
AICRP on Biological control of crop pests and weeds, Vellanikkara						
	—	—	1	—	2	3
AIC Vegetable Improvement Programme, Vellanikkara						
	—	—	—	2	—	2
AICRP on Tuber crops, Vellanikkara						
	—	—	—	1	1	2
AICFIP, Vellanikkara						
	—	—	1	—	2	3
Veg. Seed Project, Vellanikkara						
	—	—	—	1	1	2
Cashew Res. Station, Madakkathara						
	—	—	1	1	1	3
MSCRP Madakkathara						
	—	1	1	1	—	3
ARS, Mannuthy						
	—	1	—	1	5	7
AICRP Double Cropping Sub-Centre						
	—	—	—	1	—	1
ICAR						
	—	—	—	1	—	1
NARP						
	—	—	2	2	1	5
ARS, Chalakudy						
	—	1	3	4	—	8
NARP Water Management, Eruthiamphy						
	—	—	—	4	—	4
RRS, Vyttila						
	—	—	2	1	2	5
CRS, Pampadumpara						
	—	—	3	6	—	9
AMPRS, Odakkali						
	—	—	1	2	4	7

1	2	3	4	5	6	7
RARS Kumarakom						
Root Wilt Scheme	—	1	2	4	2	9
NARP	—	—	3	7	5	15
RRS Moncompu	—	1	5	13	13	32
SRS Thiruvalla	—	—	2	1	4	7
AICRP on Agrl. Drainage, Karumady	—	—	1	2	—	3
RRS Kayamkulam	—	—	4	4	5	13
CSRC Karamana	—	1	—	4	3	8
ECF Quilon	—	—	1	—	—	1
ECF Palghat	—	—	1	—	—	1
NARP Vellayani	1	—	3	6	—	10
Special Station, Kottarakkara	—	—	2	5	—	7
AICRP on Forage Crop	—	—	1	2	2	5
CRS Balaramapuram	—	—	1	1	—	2
AICRP on Agro Forestry						
LRS, Thiruvazhamkunnu	—	—	1	3	4	8
National Demonstration Scheme, Kottarakkara (Sadanandapuram)	—	—	1	3	—	4

3.1.6.3. Faculty of Veterinary & Animal Sciences

Besides the different departments in the College, research work is carried out in the following Research Stations.

- 1 University Livestock Farm, Mannuthy
- 2 University Poultry and Duck Farm, Mannuthy
- 3 University Pig Breeding Farm, Mannuthy
- 4 Cattle Breeding Farm, Thumburmuzhi, Kanjirappalli
- 5 Livestock Research Station, Thiruvazhamkunnu, Mannarghat

The staff position in the research stations under the Faculty is given in Table 21.

Table 21

Scientists/staff position in the Research Stations of the Faculty of Veterinary and Animal Sciences (1984-85)

FACULTY OF VETY. & ANIMAL SCIENCES						
AICRP on Poultry for Eggs	—	1	—	6	4	11
AICRP on utilisation of Agro-Industrial by-products for evolving economic ration for livestock	—	1	—	2	2	5
AICRP on goats, Mannuthy	—	2	—	4	3	9
Pig Breeding Farm, Mannuthy	—	—	—	2	—	2
Poultry and duck farm, Mannuthy	—	—	—	—	1	1
University Livestock Farm, Mannuthy	—	—	1	—	2	3
Fodder Res. Scheme, Mannuthy	—	—	—	1	1	2
University Vet. Hospital, Kokkalai & Mannuthy	—	1	—	1	—	2

3.1.6.4. Faculty of Fisheries Science

In the Faculty of Fisheries, there is one Centre at Vyttila for studies on brackish water fish farming. Research work on some aspects of aquaculture are carried out at the Instructional Farm at Puduveypu. The staff position in the Research Station attached to the Faculty of Fisheries is given in Table 22.

Table 22

Scientists/staff in the Research Stations of the Fisheries Faculty (1984-85)

Stations	Assoc. Director	Prof.	Assoc. Prof.	Asst. Prof.	J.A.P.	Total
FACULTY OF FISHERIES						
Fisheries Station Puduveypu	--	--	1	2	1	4
Fisheries Station, Moncompu	--	--	--	--	1	1
Prawn Centre, Pokkali	--	--	--	1	--	1
AICRP on Brackish Water fish farming, Vyttila	--	--	1	--	--	1

3.1.6.5. Centres of Excellence/Advanced Studies

The following centres of Excellence/Advanced Studies are functioning in the University.

- i) Centre for Advanced Studies in Tropical Soils, College of Agriculture, Vellayani.
- ii) Centre for Advanced Studies in Humid Tropical Tree Crops and Spices, College of Horticulture, Vellanikkara.
- iii) Centre of Excellence for Research in Animal Diseases, College of Veterinary and Animal Sciences, Mannuthy.
- iv) Centre for Advanced Studies in Poultry Sciences, College of Veterinary and Animal Sciences, Mannuthy.
- v) Centre for Advanced Studies in Animal Breeding and Genetics, College of Veterinary and Animal Sciences, Mannuthy.

3.1.6.6. Research Projects

There are 1891 ongoing research projects in the University. Of these 51 are ICAR and other externally funded projects and others are KAU projects.

3.1.6.7. Faculty position in the Research Wing (1984-85)

Summary of staff position in the Research Wing of the University.

Director of Research	:	1
Directors of Centres of Excellence/ Advanced Studies	:	5
Associate Directors	:	8
Professors	:	10
Associate Professors	:	102
Assistant Professors	:	133
Jr. Asst. Professors	:	153
Total	:	<u>415</u>

3.1.6.8. Research findings

The salient research findings in different disciplines are listed in Appendix III.

3.1.7 Extension Education Function

As per the Kerala Agricultural University Act the Extension Education role of Kerala Agricultural University is to "make useful information based upon the findings of research available to the farmers and others through the concerned Government Department".

"Provided that in special circumstances the University may with the previous approval of the Government make such information available to the farmers and otherwise than through the concerned Government Department".

Although the above provision implies undertaking extension education activities by Kerala Agricultural University, there is no definite understanding with the State Development Departments as to the role to be played by the Kerala Agricultural University in respect of extension activities. Similarly, participation of the University Scientists in extension education efforts is rather very limited for want of definite understanding of the principle of integration of teaching, research and extension education.

In view of the explosion of knowledge in agricultural and allied sciences and the multiplicity of institutions/agencies in addition to the State Development Departments, the Kerala Agricultural University should be able to play leadership role in influencing the farmers as well as the extension functionaries without duplicating the duties of the field level extension agencies. This demands the transfer of innovations with appropriate education to the extension agencies and to equip them to do effective field extension work. This will involve developing new extension approaches, organisational management etc. Therefore, the basic role of the Kerala Agricultural University in extension education will be to undertake first line extension programmes which may involve the following:

- a) Teaching the subject of Extension Education
- b) Communication of Agricultural Technology

- c) Training both extension personnel and selected farmers.
- d) Farm Advisory, Consultancy and Development services.
- e) Research in Extension Education.

Based on the above roles the specific objectives will be:

- 1) To prepare personnel to perform various extension roles and provide dynamic and analytical leadership to extension programmes through a sound systematic and integrated undergraduate and post-graduate teaching in extension education.
- 2) To collect, process and disseminate latest research findings to extension and personnel and extension clientele through appropriate media.
- 3) To identify field problems for which scientific solutions are not yet available and to communicate these to the concerned subject matter methods and departments.
- 4) To produce information material and teaching aids for extension work.
- 5) To plan, organise, and conduct production and problem-oriented training of various types and durations for extension personnel, selected farmers, and others connected with development programmes.
- 6) To provide authentic and systematic technical guidance through an up-to-date, specialised farm and home advisory service to selected farmers, farm women and farm youth, extension personnel, bankers, input dealers and manufacturers, voluntary farm organisations and others connected with agricultural development.
- 7) To undertake researches on various facets of extension education with a view to enriching programme formulation and operation, and gaining insight into the process of dynamics of planned changes.
- 8) To undertake adaptive and operational research projects with a view to testing applicability of findings under different soil, agro-climatic and socio-economic conditions in different parts of the State.

The Directorate of extension of Kerala Agricultural University with its Training Service Scheme, Farm Advisory Service and Communication Centre (including a Printing Press) is organising the first line extension programmes in the State. The Directorate also implements a number of ICAR sponsored Transfer of Technology programmes such as National Demonstration Project at Sadanandapuram (Kottarakkara), Krishi Vigyan Kendra (KVK) at Pattambi and Ambalavayal, Project for Socio-Economic Upliftment of Scheduled Castes (Nilambur) and Scheduled Tribes at Trivandrum, and Trichur Lab-to-Land Programme. Operational Research Project on Agricultural Drainage in Alleppey, Integrated Control on Rice Pests in Kuttanad, Alleppey District and Watershed Management in Palghat District are also operated by Kerala Agricultural University under the supervision of Director of Research. The Kerala Agricultural University operates the Village Adoption Programme covering 34 villages located around the educational and research campuses

of the University also runs a Krishi Vigyan Kendra at Manjeswar with its own funds. A non-statutory Extension Advisory Committee with the Vice-Chancellor as Chairman and representatives of Scientists, representatives of State Development Departments Social Workers, Farmers etc., as members is also functioning. This Committee advises the University on the Extension Programmes to be undertaken by the University.

The University provides upto 9% of its budget allocations for extension education activities, but it is found inadequate to meet the minimum requirements.

The Director of Extension is in overall charge of the Extension Education function of the University. The organisation pattern of the Directorate of Extension is furnished in Fig. 4. The staff pattern of the Directorate of Extension is given in Table 23.

Table 23
Staff position in the Extension Wing of the University (1984-85)

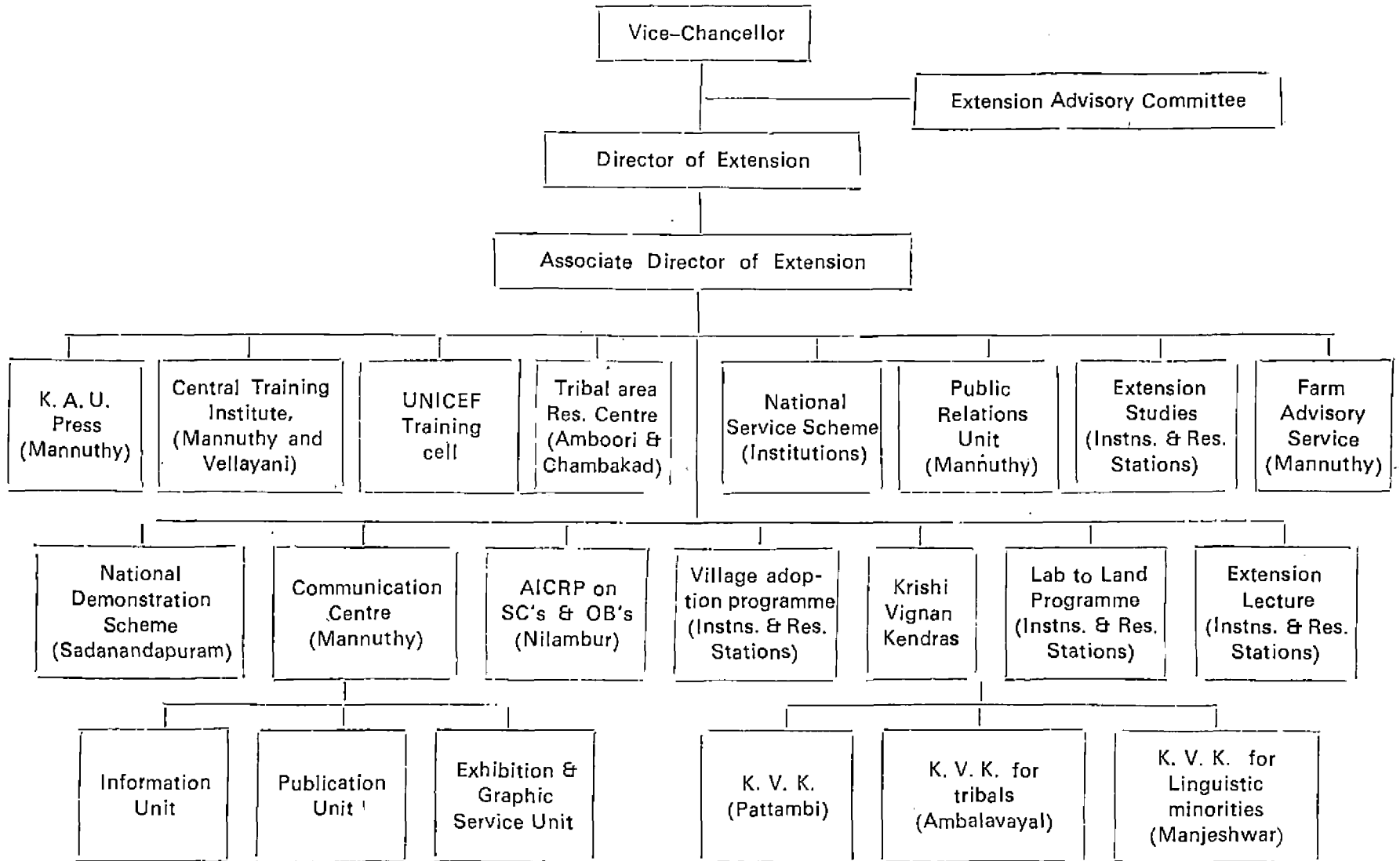
Name of the Station	Assoc. Dir.	Prof. essor	Assoc. Prof.	Asst. Prof.	J.A.P.	Total
Directorate of Extension	1	—	—	—	—	1
Central Institute of Training Service	—	—	—	3	2	5
Communication Centre	—	—	—	2	—	2
Publication Unit	—	—	1	2	—	3
Information Unit	—	—	2	2	2	6
Exhibition & graphic unit	—	—	—	1	1	2
Farm Advisory Service	—	2	5	1	—	8
Tribal Development Scheme, Peechi	—	—	—	—	1	1
KVK, Manjeswar	—	—	1	8	—	9
AICP on ND on major food crops, Quilon	—	—	1	3	—	4
AICRP on SC/OBC, Nilambur	—	—	1	3	—	4
KVK Pattambi	—	1	4	5	—	10
AICRP on ST at Amboori	—	—	1	5	5	11
KVK, Ambalavayal	—	1	4	6	—	11
Kanikkar Tribals, Agasthyamudi	—	—	—	—	1	1
UNICEF Training Centre	—	—	—	1	1	2
Total	1	4	20	42	13	80

3.1.7.1. Communication Centre—Vital link of Lab-to-Land

The Communication Centre attached to the Extension Directorate disseminates scientific technology to the farming community through all available media like newspapers, exhibitions, radio, TV etc. The three sub-units, viz., Publication Unit, Information Unit and Exhibition and Graphic Service Unit perform the duties of information communication. Publication of articles in the 'Karshikarangom' columns of the leading local dailies of the State, Publication of serialised lessons on Agriculture, Animal Husbandry and Fisheries, conduct of correspondence courses for farmers, publication of books and participation in the Farm and Home programme of the All India Radio are projects undertaken by the Communication Centre.

Fig. 4

ORGANISATIONAL PATTERN OF EXTENSION EDUCATION IN KERALA AGRICULTURAL UNIVERSITY



3.1.7.2. Farm Advisory Service

A Farm Advisory Service is functioning in the Extension Directorate. District level seminars for farmers are conducted throughout the State in close collaboration with the Department of Agriculture. Besides the FAS also conducts Farm clinics and Front-line Demonstrations. Technical advice to solve farmers problems is also rendered by the scientists of Farm Advisory Service. There are 8 faculty members attached to the programme.

3.1.7.3. Training

The University organises pre-service and in-service training programmes for the staff of the State Department of Agriculture, Animal Husbandry, Dairy Development and also for School teachers, farmers, bank officers etc. A Central Training Institute has been sanctioned recently by Government of India with 5 Faculty members.

3.1.7.4. Publication Unit

The periodical publications include the extension education quarterly 'Kalpadhenu' and the Research Journals viz., the *Kerala J. Vety. Sciences* and the *Agri. Res. J. Kerala*. A monthly Newsletter (KAU Newsletter) and Agres News supplement are also being published regularly as a part of the Public relation activity. Package of Practices Recommendations for crops as well as for Livestock, Poultry and Elephants are formulated and published periodically to serve as guides for extension personnel of the State Departments concerned. Monographs, text books, technical bulletins, leaflets, pamphlets etc., are published both in English and Malayalam. The unit is headed by an Associate Professor and supported by 2 faculty members.

3.1.7.5. Village Adoption Programme

A village adoption programme, to enable students and scientists of the University to get direct knowledge of the farming situations and to serve as field laboratories for research and teaching programme, is being implemented in 27 selected villages.

3.1.7.6. Krishi Vigyan Kendras

A Krishi Vigyan Kendra (KVK) is functioning at the RARS, Pattambi and another at the RARS, Ambalavayal to provide skill training to farmers, with ICAR funds. The Krishi Vigyan Kendra at Ambalavayal is for the benefit of tribal people. The Krishi Vigyan Kendra at Manjeswar installed for the benefit of Kannada speaking linguistic minorities, was inaugurated in 1985. This Krishi Vigyan Kendra is operated with University funds.

3.1.7.7. Extension Education Projects

In all 179 extension education projects are in progress. These includes projects on information communication, training, advisory services etc.

3.1.7.8. Lab-to-Land Programme

The Lab-to-Land Programme financed by the ICAR is being implemented by Kerala Agricultural University at 32 Transfer of Technology Centres, benefitting 1100 farm families.

3.1.7.9. National Demonstration Project.

The National Demonstration Project with ICAR funds is functioning at Sadanandapuram in Quilon District.

3.1.7.10. Tribal Area Research Centre

The Tribal Area Research Centre is functioning at Amboori since July 1983. This is an ICAR funded programme. The objective of the Centre is to conduct research oriented development programmes for the welfare of the Kanikkar Tribal people in Amboori area.

3.1.7.11. Scheduled Caste Area Research Centre

The KAU Project Centre is implementing the ICAR sponsored All India Co-ordinated Project on Scheduled Caste Area Research among the selected 277 Harijan families and 23 Girijan families of the five panchayats in the Nilambur Community Development Block. This project was started in 1982.

3.1.7.12. Peechi Project—Scheme for the development of tribal colonies on the eastern side of Peechi Dam

The scheme for the development of tribal colonies on the eastern side of Peechi Dam was commenced from 1st August 1985. The main objectives of the scheme is to hasten the socio-economic development of the tribal people of the selected colonies by boosting up the several development of agriculture and horticulture.

3.1.7.13. Kerala Agricultural University Press

The Kerala Agricultural University Press established in 1976 at Mannuthy Campus attends to all the printing requirements of the University. About 240 materials are printed in the press annually including books, monographs, technical bulletins, folders, pamphlets, registers, annual reports, research reports, research journals, magazines etc. 132 non-periodical technical publications have been printed till 1985. Ten periodicals including Kalpadhenu, Agricultural Research Journal, Veterinary Research Journal, Horti. Abstract, Anivet Abstract, KAU Newsletter, Agres News, Research Report, Annual Report and Budget Estimate are being regularly printed in the Press. Technical bulletin in Agriculture, Veterinary and Fisheries are printed in English and Malayalam. 40 per cent of the total work alone is utilised for technical publications. The remaining 60% of the work is utilised for printing Degree Certificates, prospectus, application forms, bus passes, cover pages for various reports, letter heads, various forms and registers required for the entire University institutions, agenda notes of different committees, student magazines, leaflets, folders etc. Recently the Press was awarded with the "All India Prize for Excellence in Printing" (under the category of Magazines, Bulletins, Souvenirs—Indian Languages) in 1985. There are 37 staff and 10 casual labourers working in the Press headed by the Press Manager.

3.1.8. Directorate of Physical Plant

The Engineering Wing of the University consists of the Directorate of Physical Plant with two divisions, one at Pilicode and the other at Panangad, and five sub-divisions, three at Vellanikkara, and one each at Mannuthy and Vellayani. The Director of Physical Plant is responsible for the construction and maintenance of buildings, roads, procurement of vehicles, machinery etc. The budget and the statement on various civil works on hand under the Director of Physical Plant are given in Appendix IV. The staff of the Directorate of Physical Plant is given in Table 24.

Table 24
Staff Position in the Directorate of Physical Plant (1984-85)

Name of Department	Dir	Exe. Eng.	Asst. Exe. Eng.	Asst. Eng.	Drafts-man	Total
Directorate of Physical Plant	1	—	1	2	7	11
Eng. Division, Tavanur	—	—	—	—	2	2
Engg. Division, Panangad	—	1	—	2	2	5
Engg. Division, Mannuthy	—	—	1	3	3	7
Engg. Division, Vellayani	—	—	1	3	5	9
Mech. Sub. Dn. Mannuthy	—	—	1	4	3	8
Eng. Sub Dn. No. I	—	—	1	3	4	8
" No. II	—	—	1	3	4	8
Eng. Sub Dn. Tavanur	—	—	1	1	5	7
Engg. Sub Dn. Pattambi	—	—	1	1	1	3
Total	1	1	8	22	36	68

3.1.9. Directorate of Students Welfare

The Directorate of Students Welfare headed by the Director of Students Welfare is functioning at the Head-quarters. The present facilities available are quite insufficient as this directorate has to look after the student Welfare activities in the 8 constituent colleges. A proposal has been included in the 7th plan proposals for providing enough infrastructural and organisational support for co-ordinating the activities in different campuses.

3.1.10 Administrative, Technical and Supporting staff

3.1.10.1. Administrative Staff

Following is the administrative staff strength in the University (Tables 25 & 26).

Table 25
Summary statement of the administrative staff strength in the University Administration (1984-85)

Dy. Registrar/Dy. Comptroller	...	4
Assistant Registrar/Comptroller	...	4
Labour Officer	...	1
Secretary to Vice-Chancellor	...	1
P. A. to Registrar	...	1
Section Officers	...	76
Sr. Grade Assistant	...	76
Assistant Grade I	...	126
Assistant Grade II	...	102
Senior Office Superintendent	...	14
Office Superintendent	...	22
Sr. Grade Typist	...	27
Typist Grade I	...	46
Typist Grade II	...	38
Total		538

3.1.10.2. Supporting Staff

Drivers	...	118
Peons & Others	...	450
Total		568

Table 26
Administrative, technical and supporting staff position (1984-85)

Name of Stations	AR/ AO	Section Officer	Asst.	Tech- nical	Support- ing	Total
Research Wing						
RARS, Pilicode	1	2	10	13	10	36
PRS, Panniyur	—	1	2	9	4	16
RARS, Ambalavayal	1	2	7	17	15	42
CRS, Anakkayam	—	—	1	1	3	5
RARS, Pattambi	1	2	12	34	13	62
BRS, Kannara	—	1	2	6	6	15
MSCRIP, Madakkathara	—	—	2	3	2	7
ARS, Mannuthy	—	1	4	13	6	24
ARS, Chalakudy	—	1	4	9	4	18
RRS, Vyttila	—	1	5	6	4	16
AMPRS, Odakkali	—	1	3	6	6	16
CRS, Pampadumpara	—	1	2	7	6	16
RARS, Kumarakom	1	4	9	13	14	41
RRS, Moncompu	—	1	6	9	7	23
SRS, Thiruvalla	—	—	4	3	3	10
RRS, Kayamkulam	—	1	4	9	7	21
CSRS, Karamana	—	1	2	3	5	11
CRS, Balaramapuram	—	1	3	2	4	10
LRS, Thiruvazhamkunnu	—	2	4	14	12	32
AICRP on Poultry	—	—	3	6	3	12
AICRP on Agri By-Products	—	—	2	6	—	8
AICRP on Goat	—	—	5	5	5	15
Pig Breeding Farm	—	1	2	2	1	6
Fodder Res. Scheme	—	—	2	5	3	10
University Poultry Farm	—	—	1	4	3	8
Vety. Hospitals	—	—	1	2	4	7
CBF, Thumburmuzhy	—	—	1	5	7	13
Livestock Farm Mannuthy	—	1	4	5	4	14
ICAR Caged Layers	—	—	—	1	—	1
AICRP on Drainage	—	—	2	4	4	10
NARP, Vellayani	1	—	5	8	4	18
Total	5	26	114	230	169	544

Table 26 (Contd.....)

	DR/ DC AO	AR/ AC/ SOS	Section Officer/	Assist- ant	Tech- nical	Suppo- rting	Total
Colleges:							
College of Horticulture		1	4	25	34	12	76
College of Agriculture		2	13	40	29	56	140
College of Vety & Animal Sciences		1	7	23	29	44	104
College of Fisheries		1	3	12	17	21	54
Kelappaji College of Agri. Engg.		1	4	13	6	24	48
College of Co-operation & Banking		—	—	5	—	1	7
Total		6	32	118	115	158	429
Extension Units:							
Public Relations	1	—	—	1	—	—	2
Central Institute of Trg. Communication Centre	—	—	—	4	3	5	12
Publication Unit	—	—	1	3	1	3	8
Information Unit	—	2	—	3	—	1	6
Exhibition & Graphic Unit	—	—	1	2	—	2	5
Farm Advisory Service	—	—	—	—	3	—	3
University Press	—	1	1	4	26	5	37
Tribal Development Scheme							
Peechi	—	—	—	—	1	1	2
KVK, Manjeswar	—	—	1	2	2	2	7
National Demonstration Project							
SCAR Nilambur	—	—	—	—	2	1	3
KVK, Pattambi	—	—	—	—	3	1	4
TARC Amboori	—	—	1	2	2	5	10
KVK Ambalavayal	—	—	—	1	5	2	8
Kanikkar Tribals	—	—	1	2	—	7	10
Eco System in Kerala	—	—	—	—	—	1	1
Total	1	3	7	33	54	40	138
Headquarters	3	9	25	68	10	48	163
Directorate of Research	—	—	1	12	—	6	19
“ Extension	—	—	2	7	—	1	10
“ Physical Plant	—	—	2	18	49	25	94

3. 1. 11. Infrastructural & Other facilities

3. 1. 11. 1. Instrumentation Unit

With a view to strengthening the research facilities available to the scientists of the Kerala Agricultural University, a Central Instrumentation Laboratory

(CIL) has been established at the Main Campus of the University in the College of Horticulture under the World Bank aided Kerala Agricultural Development Project. The Laboratory possesses some of the most modern analytical instruments. These instruments have been centrally pooled, following the concept of a Central Analytical Agency. The following are the systems available at the CIL. Costing above Rs. 1.00 lakh.

- 1) Amino Acid Analyser—Hitachi 835-10—Japan Rs. 4.3 lakhs for high speed automated amino acid analysis, of quantities down to 30 picograms.
- 2) Atomic Absorption Spectrophotometer—IL 257—USA—Rs. 2.2 lakhs for micronutrient analysis.
- 3) Auto Analyser—Technician AA II—Australia—Rs. 2.8 lakhs for Automated analysis of nitrogen and phosphorus in plant and soil samples. The system can also be used to estimate parameters like SGOT, SGPT, Glucose, BUN etc. in biological samples for research in Veterinary and Animal Sciences.
- 4) Gas Chromatograph—Hewlett Packard 573 A—USA Rs. 2.75 lakhs for estimation of micro quantities of various compounds.
- 5) UV-Visible Spectrophotometer—Perkin Elmer 554—West Germany Rs. 2.2 lakhs—for automatic double beam programmed recording spectrophotometry in visible and UV regions.

The laboratory has been centrally air-conditioned and provided with necessary amenities to house the CIL and sufficient provision has been made for future expansion. The laboratory is under the charge of the Associate Professor (Instrumentation) KADP.

3.1.11.2. Instrumentation Centre

To attend to the maintenance and repair of the various scientific instruments in the Kerala Agricultural University, an Instrumentation Centre was started in 1977. In 1980, it was brought to the Main Campus and attached to the College of Horticulture. The Centre attends to the repair of the various scientific equipment in all the research institutions and constituent Colleges of the Kerala Agricultural University. The Centre has the necessary test and repair equipment to provide effective service support to the user-scientists. There are three staff members in the Centre, one Instrumentation Engineer (Mechanical), One Assistant Engineer (Electronics) and one Mechanic (Electronics), in addition to the Associate Professor (Instrumentation) KADP under whose charge the Centre is functioning at present.

3.1.11.3. Computer Centre

A Computer Centre has been set up in the University headquarters at Vellanikkara. Terminal Units of the Computer Centre will function in the major campuses of the University.

3.1.11.4. Radio isotopes research facilities

The following facilities are available in the Radio Tracer Lab at Vellanikkara.

- a) Work with any beta emitters can be carried out in the Radio Tracer Lab. The instruments include conventional G. M. Counter and proportional counter and a micro processor controlled liquid scintillation system for radio assay or soft beta emitters.

- b) Work with any gamma emitter can be taken up. The instruments include single channel gamma spectrometer and microprocessor controlled multichannel gamma spectrometer.
- c) Autoradiographic facilities: A dark room is provided in the radio-tracer laboratory for auto radiographic work. There is also an autoradiogram scanner and an automatic spotting device for thin layer chromatographic work.
- d) Gamma irradiation facility is available for mutation breeding work with seeds etc. The Gamma Chamber (Co. 60) and hole 900—1 volume of sample at a time.

3.1.11.5. Agricultural Meteorology Observatory

There is a full fledged class I Meteorological observatory at the Main Campus at Vellanikkara. This station is a Co-operating observatory of the India Meteorology Department. Synoptic observations are taken and supplied to the Meteorological Centre at Trivandrum at 0830 and 1730 hr every day.

Out of the 23 University Farms, 13 are having meteorological stations.

3.1.11.6. Instructional farm facilities for undergraduate and post-graduate students in different faculties

The Instructional Farm at Vellayani was established in 1955 to provide instructional facilities for the students in the College of Agriculture. The total area of the farm is 243 ha., of which 57 ha is under kaval lands which are used for raising one crop of rice in the summer season after putting up bunds and dewatering.

In the College of Veterinary & Animal Sciences, Livestock Farm, Poultry Farm, Pig Breeding Farm and Goat Farm are functioning to provide instructional and research facilities.

In the College of Fisheries, the Instructional Farm is located at Puduveyppu right in the mouth of the Cochin harbour. The total area of the farm is 101 ha.

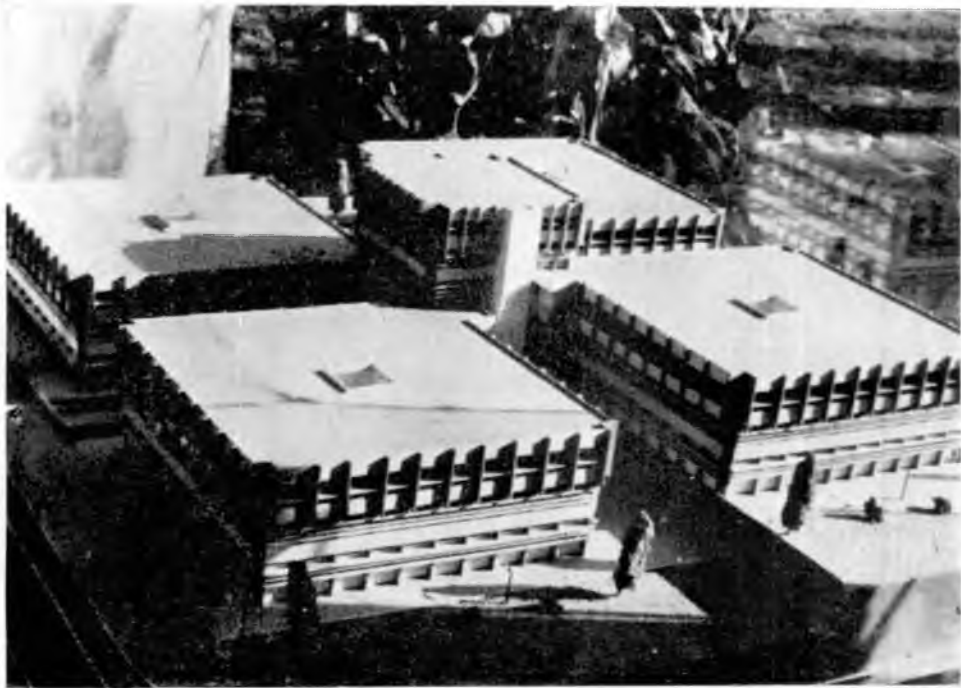
In the College of Horticulture, the Agri. Research Station, Mannuthy, and the Instructional Farm and Research Station, Mannuthy (Total area 133.69 ha) provide instructional and research facilities.

3.1.11.7. In the College of Agriculture, Vellayani three buses, three petrol jeeps, three tempo vans and one ambassador car are provided. In the College of Fisheries Panangad, one bus, two tempo vans and one ambassador car are available.

The College of Horticulture, Vellanikkara and the College of Veterinary & Animal Sciences, Mannuthy are provided vehicles from a Central pool of three buses and one Mini-Bus.

In the College of Horticulture, one tempo and one ambassador car are viable.

In the College of Veterinary & Animal Sciences, there is one ambulatory van, besides four tempo vans and one staff car. Chasis for one milk tanker has recently been purchased.



Proposed Administrative Block at Vellanikkara



A group discussion under Lab to land programme

3.1.11.8. Employment Information & Guidance Bureau

The Employment Information & Guidance Bureau attached to the Kerala Agricultural University was set up on November 23, 1979. The Bureau started functioning on December 23, 1979 at Mannuthy. This Bureau was established with a view to give all possible employment assistance and guidance to the students/alumni of the Kerala Agricultural University. The Bureau is charged with the following responsibilities:

- 1) Collection and dissemination of information on employment opportunities and competitive examinations in India and abroad.
- 2) Collection and dissemination of information on higher educational facilities relevant to the University and render necessary guidance to the students on employment, scholarships, fellowships and training facilities in India and abroad.
- 3) Registration of students after completion of their courses to sponsor them against suitable vacancies notified by the Central Employment Exchange.
- 4) Publication of a monthly containing relevant and up-to-date details collected on employment, educational facilities, fellowships etc., plus other useful articles.
- 5) Establishment and maintenance of Career Information Room with details of various courses available in all the Agricultural Universities in India for the benefit of students/alumni.
- 6) Arranging coaching classes for facing interviews and carrier talks by experts in agricultural sciences.
- 7) Arranging courses on public speaking, communication and personality development to the needy students/alumni.
- 8) Supply of blank U. P. S. C. application forms to the prospective candidates for the posts advertised by Union Public Service Commission.

In addition to the above functions, the Bureau is also disseminating information on the posts advertised by the Indian Council of Agricultural Research and other Institutions/Agencies to the Officers and Heads of Faculties under the University.

In addition to the Monthly Employment Information Bulletin published by the Bureau, it also organises Career Guidance seminars etc., for the benefit of the student community as part of its extension activity.

3.1.11.9 Hospital facilities and Health Service Unit

The University is at present depending on the Government of Kerala for the health care of the academic staff and students of the University. The Medical College Hospital at Trichur and Public Health Centre at Vellanikkara and some of

the private hospitals near Trichur provide medical check-up and treatment facilities. At the Vellayani Campus, a Public Health Centre of the Government of Kerala, is functioning. The Fisheries College Campus at Panangad is making use of the hospital facilities available at Cochin.

3.1.11.10 Hostels for Students & Teachers

In the Main Campus, a Teachers' Hostel is provided for the benefit of teachers in the College of Veterinary and Animal Sciences and the College of Horticulture. Teachers' Hostels are not available in the College of Fisheries, Panangad at the College of Agriculture, Vellayani. Hostel facilities for boys and girls are provided in all the teaching campuses; however, residential accommodation for the students has to be stepped up.

3.1.11.11. Housing for Faculty members

Accommodation facilities for faculty members in the Vellayani, Vellanikkara, Mannuthy and Panangad Campuses are far too inadequate. More residential quarters for the teaching staff are to be provided at these campuses.

3.1.11.12. Visiting Scientists' Hostels/Guest Houses

Visiting Scientists' hostels are not available in any of the Campuses. Full fledged Guest houses are also not available in the University.

3.1.11.13. Facilities for recreation, games & sports

Auditoria are not available in the Vellanikkara, Panangad and Vellayani Campuses. Steps have been taken for the construction of an auditorium at the Vellayani Campus.

Facilities for sports and games are very meagre in the campuses of the University. Lack of a multipurpose open stadium with pavilion, weight training-cum-gymnastic hall, play fields for major and minor games and aquatic centre for aquatic activities are lacking and this deficiency is very keenly felt.

3.1.11.14. Educational Technology Service for Teachers

Seminars on teaching methods are periodically held in the University to discuss the recent developments in educational technology.

3.1.11.15 Improving learning skills

Students from weaker sections and SC/ST candidates are provided special coaching under the tutorial system to ensure that they acquire adequate levels of skills.

3.1.11.16 Faculty Improvement Programme

Based on manpower requirements for the various disciplines, teachers are selected and deputed to undergo Doctoral programmes in relevant fields of specialisation.

3.1.11.17. Supply of quality inputs

The University is actively involved in the supply of seeds, planting materials of crops, chicks, fish fingerlines etc. Paddy seeds to the tune of over 90 tonnes, seedlings of fruit and spice crops numbering about 25,000, ornamentals (about 12,000), coconut seedlings (25,000 nos), pulses seeds (1 tonne), oil seeds (2 tonnes), banana suckers (15,000 nos), sugarcane setts (2 lakhs nos), coffee seedlings (1 lakh), pepper rooted cuttings (2 lakhs), cashew air-layers (2500 nos), cashew seeds (2 tonnes) and vegetable seeds (one tonne) are some of the important items of materials issued from the University Stations annually.

Poultry eggs for hatching are issued from the University Poultry Farm and from the AICRP Centre for Poultry.

Fish fingerlings are issued to cultivators from the Brackish Water Fish Farming Centre at Vyttila.

3.1.11.18 Labour

The labour strength in the Kerala Agricultural University as on 1984-85 is as follows:

1. Permanent labourers	:	1177
2. Casual labourers	:	2800

PART—II
REVIEW AND RECOMMENDATIONS

Chapter IV Administration

CHAPTER IV

4. ADMINISTRATION

- 4.1. Kerala Agricultural University has state-wide jurisdiction with several academic campuses and research stations distributed all over the State. Unlike general Universities, it has the responsibility for teaching, research and extension education in various branches of agricultural sciences in its broad coverage. The Vice-Chancellor is the chief co-ordinator of all these activities, besides being the Chief Administrative and academic head. Unfortunately, the powers of the Vice-Chancellor are very restricted through the various provisions of the Acts and Statutes with the result that he has to go to the Executive Committee and General Council for taking several important and urgent decisions. This hampers the tone of the administration in the University. Further, while the Vice-Chancellor is busy with too many day-to-day administrative matters he does not find enough time to visit the academic campus and the research stations, as often as desirable. This again adversely affects the quality of administration.
- 4.2. The powers for taking decisions for financial and administrative matters are largely concentrated at the University's Central Office. Often small matters for which decision could be taken at a sub-station have to be referred to the University's Central Office where the papers seem to get lost in the multitude of files. Because of the overload of work in the Central Office more important matters get relegated to secondary or tertiary positions and often go unnoticed. The Comptroller's Office is also overloaded with too much routine work with the result that often statutory responsibilities are not attended to. It was brought to the notice of the Commission that the auditing work of the accounts of the University is pending for about 5 years now. It is understood that a Computer has been set up in the University recently and that it is hardly utilised even for an hour a day. This is not only wastage of University funds but also under-utilisation of modern facilities. The University Registrar being from the administrative cadre does not seem to realise the importance of certain decisions to be made in academic matters. To cite an example, the up-to-date syllabus for post-graduate programmes has not been printed and supplied to the concerned and as a result, teachers are unaware of the revised syllabus and they are offering courses with the out-dated syllabus.

- 4.3.** The Agricultural Universities have been set up in the Country on the recommendation of the ICAR. The ICAR had prepared a Model Act for the Agricultural Universities and circulated the same for adoption with necessary modifications to suit the local conditions by the State Agricultural Universities. The Kerala Agricultural University Act, while taking into account the provision under the Model Act, has deviated from it considerably. One of the major deviations is the setting up of a General Council and an Executive Committee, the former being described 'Supreme Authority' of the University in the place of Board of Management, provided for in the Model Act. While the General Council is the 'Supreme Authority', the Executive Committee meets more often to take administrative decisions in the University. The membership of the General Council is too unwieldy with 56 persons (including Chancellor, Pro-Chancellor and Pro-Vice-Chancellor, if any) whereas the Executive Committee consists of 12 members (including the Pro-Vice-Chancellor, if any) which is small enough and effective. Therefore, the name 'Supreme Authority' seems to be a misnomer, since the Executive Committee really manages the affairs of the University. However, the official members of the Executive Committee represented by the three senior State Government Secretaries and one representative of the ICAR rarely attend the meetings. As a result, the proceedings of most of the meetings of the Committee are outnumbered by four non-official representatives. Thus in effect the management of the University runs into certain administrative difficulties, especially in respect of academic matters, which should be avoided. In the opinion of the Commission, it is necessary to amend the KAU Act in conformity with the model Act so as to make the top administrative body more effective in its functions. As an immediate measure, it is recommended that all the Deans of the Faculties and the Directors of Research and Extension Education be made Ex-officio members of the Executive Committee.
- 4.4.** The article 28 (7) of the Act dealing with the Appellate Authority, should be modified so as to overcome the existing difficulties of handling the differences of opinion in decision making in the Executive Committee meetings. It is recommended that any dispute arising between the Vice-Chancellor and the other members of the Executive Committee at the Executive Committee meetings should be referred to the Chancellor for a ruling.
- 4.5.** Presently not all the academic institutions of the University are headed by Deans. This leads to certain administrative difficulties. For example: the the Head of the College Horticulture is an Associate Dean whereas the College of Agriculture at Vellayani is headed by a Dean. In day-to-day administration of the institution, the Associate Dean does not carry less responsibility when compared to the Deans of other Colleges. In order to avoid such administrative discrepancies it is recommended that each academic institution should be headed by a Dean. It is further recommended that one of the heads of Departments in the Faculty concerted be selected and appointed as Dean, for a period of 5 years, extendable for one more term. Other things being

equal, seniority should be the basic criterion for such appointments. In respect of such faculties where there are more than one College, the senior Dean should be designed as Dean of the Faculty for a period of five years, extendable for one more term.

As an alternative, all senior posts such as Heads of Departments, Deans and Directors including Director of Centres for Advanced Studies may be filled up by contractual appointment for five years. Contract may be renewed for a further periods of five years or till the age of superannuation in deserving cases based on assessment by a committee appointed for the purpose by the Vice-Chancellor. However, contract should not be renewed if there is recorded evidence of incompetency.

- 4.6. The Director of Research and Director of Extension Education should also be selected on a five year term, extendable for one more term, from among the qualified Heads of Departments, cutting across the Faculties. In respect of such inter-disciplinary posts, the senior-most from different faculties should be screened by a Committee appointed by the Vice-Chancellor.
- 4.7. The University, which is a technological centre of higher learning set up to provide more pointed and purposeful education in agriculture and allied sciences should have as its principal executive and academic head, a technically competent and experienced science administrator and manager capable of guiding University affairs in teaching, research and extension, in order that this office may command the highest respect from staff and students alike besides the people at large.
- 4.8. The Registrar of the University is required to take decisions on scientific matters as well as on non-scientific matters of routine nature. Besides, the Registrar is also a member secretary of the Academic Council of the University. There will be several advantages rather than disadvantages if the Registrar is a technical person. It is recommended that one of the senior Deans/Directors of Research and Extension may be appointed as Registrar for a period of 3 to 5 years, with a provision to renew for a second term.
- 4.9. Personnel management of administrative staff in the University needs to be looked into 'in-depth'. While the Registrar is the Chief Executive of administration in the University the various categories of administrative and supporting staff are distributed in the Academic institutions, and Research Stations, where they are directly responsible to the respective Heads of institutions. It is therefore, recommended that an effective code of conduct for the management of the staff is worked out and implemented. All disciplinary and administrative matters relating to students and staff should be dealt with by the respective Deans/Directors. Such matters pertaining to administrative and supporting staff of the Central Office would be dealt with by the Registrar. The Appellate Authority in all these matters and pertaining to all categories of University employees should be the Vice-Chancellor.

- 4.10.** The Dean of the College will be in overall charge of the Academic, Research, and Extension Education activities of the College concerned. In each College every discipline will be under the technical and administrative control of the Head of the Department. In order to further improve the effectiveness of the administration of the College, each Head of the department should be delegated with adequate administrative and financial powers, as also provided with the required supporting staff. In this regard the Heads of Departments of the Colleges should have the same powers as those of the Heads of the Regional Research Stations, prescribed in the Statutes and Guidelines. Heads of Departments of the College will be appointed from among the Professors or in their absence Associate Professors for a five year tenure, with a provision for a second term. In this context, in such of the Faculties where there are more than one College, one among the Heads of Departments of a given discipline will be declared by the Vice-Chancellor as Head of the University Department to represent on the Board of studies, Faculty Research Committee, Academic Council etc. This will be for a term of five years with a provision for a second term.
- 4.11.** Considering that there is heavy concentration of administrative staff at the University Central Office and in the Dean's office there appears to be no need for appointing additional staff to implement the above recommendation on decentralisation of administration. Proper re-deployment of the staff from the Central Office to the Colleges and from one College to another and from the Dean's office to the offices of Head of Departments would help in meeting with the requirement and in streamlining of the administrative set up.
- 4.12.** Presently, the annual budget allocations of the College is concentrated with the Dean who is the only authority to incur expenditure. The Heads of Departments are not even aware of the finances available for the respective Departments for their normal activities and for developmental works. This system should be changed and detailed annual budget for each of the Departments of the Colleges in respect of staff salary and allowances, all recurring expenses including cultivation expenses, laboratory expenses, contingencies, etc. and also for approved items of developmental activities should be prepared and got approved by the University Authorities concerned, well in time, before the financial year begins. The Heads of Departments should have full administrative and financial powers to incur expenditure upto the prescribed limits for each item and within the limits of the approved budget, adopting the prescribed procedures of the University.
- 4.13.** On decentralisation of the administrative set up, the matters relating to drawing and disbursement of salary, sanctioning of leave and other routine matters will be attended to by the Heads of Department/Research Stations. The redeployed administrative and supporting staff would help the Heads of Departments/Research Stations in carrying out their responsibilities in a more effective manner.

- 4.14 The Computer Centre of the University located at Vellanikkara should be fully utilised by the academic and financial administration, including monitoring of expenditure, disbursing of salaries, statistical analyses of research and financial data, maintenance of academic records of students, storage of details on research projects and extension programmes, etc. Towards this end the staff at the headquarters as well as at the Academic Campuses and Regional Research Stations should be trained to programme their activities to the computerised system of management.
- 4.15. The performance of the scientific personnel working in teaching, research and extension education wings should be assessed once a year. A personal file should be opened for each scientist. The Head of the Department will send annual evaluation report to the Dean Director of Research and Director of Extension, simultaneously so that the work done during the year by each scientist can be assessed. A proforma for the purpose is given in the Appendix V.
- 4.16. The Engineering unit of the Directorate of Physical Plant in different campus should be under the control of the respective Dean/Heads of the Stations. The Director of Physical Plant will, however, exercise technical control over them. Budget provision for the engineering units should be under the direct control of the Dean of the College/Head of the Station. However, where major construction works are undertaken by the University, they would be the direct responsibility of the Director of Physical Plant. Repairs and maintenance and management of the properties of the Campuses should be the direct responsibility of the Deans of Colleges/Heads of Stations, who will be assisted by the respective Engineering units. This will rectify the present deficiencies in maintenance and repair works in all the campuses of the University.
- 4.17. It is brought to the notice of the Commission that there is enormous delay in fillings up the staff positions, including those of the posts funded by external agencies. This appears to be mainly due to the present procedure adopted for recruitment of scientific staff. In the opinion of the Commission, the procedure should be such that all vacancies are filled up within a three month period of reporting of the vacancy. The practice of keeping the Vacancies unfilled even after a year and more after advertisement is not justifiable. Once advertisement is made and applications are received they should be scrutinised as a matter of priority and the interviews held within the prescribed time limit of three months. While selecting the candidates, a panel of names may be waitlisted in the order of merit which should be valid for a period of one year. Subsequent vacancies in the same disciplines and categories of posts, whether it be in teaching, research or extension education, whether it is a regular or temporary post, and whether it is a University post or externally financed project post, should be filled from out of the names in the panel. A separate Recruitment Cell headed by a Senior Academic Head may be set up for this purpose.

- 4.18. For the categories of Assistant Professors and Junior Assistant Professors, the concerned Deans and Director of Research and Director of Extension should be the members of the Selection Committee and one of them by rotation shall act as Chairman. In all Selection Committees for academic posts in the categories of Professors and Associate Professors, the Vice-Chancellor should be the Chairman and the respective Dean of the Faculty, should be a member. Invariably besides the expert members, the Director of Research and the Director of Extension Education should be members of all Selection Committees for the scientific staff.
- 4.19. It is reported that a large number of vacancies exist in Research Stations in remote areas. In order to attract staff to such places special incentives of 20% of the basic salary as additional pay, rent-free quarters, free medical aid, and free transport for children's education (limited to two childrens per family) should be provided for the employees working in such specified remote areas. Also, weightage may be given to such staff who put in a minimum of three years of service in such stations in the matter of selection for admission to post-graduate degree programmes and in appointments for higher category posts. Such postings to remote areas may be for a period of three years after which they may be posted to places of their choice to the extent feasible.
- 4.20. It is understood that the service rules for the University staff are yet to be framed and in the absence of which the relevant government rules are being followed. This creates ambiguity and confusion in administration. It is recommended that specific service rules for the various posts in the University should be framed and got approved by the competent authority within a period of the next six months.
- 4.21. For training of staff in administration and financial matters a Central Management Training Institute should be established. Training programmes to meet the requirements of different categories of staff should be organised. Special orientation and management training programmes should be organised for new entrants in teaching, research and extension education. Likewise, the Administrative staff should also be trained in better managerial skills. The courses for various categories of personnel should be tailor-made and organised with the help of Guest Lectures from other management institutions within the State and from outside. The staff of the University should be deputed to undergo the above training and the University should pay an attractive stipend, besides the normal pay and allowances for which they are eligible.
- 4.22. The General financial position of the University is not very satisfactory for the reason that the grant-in-aid from the State Government is only about 6% of the budget under the State Department of Agriculture. Presently the contribution to the University is met only from the Budget Head of Department of Agriculture whereas the Departments of Animal Husbandry, Fisheries, Forestry, Co-operation, Social welfare, Rural Development, Irrigation Dairy Development etc., do not contribute to the University funds though they are

also the beneficiary Departments of the State Government. It is recommended that the State Government should contribute to the University not less than 10% of the overall budget of the concerned Development Departments. Such amounts should be pooled and placed under a separate Budget Head "Kerala Agricultural University" of the State Budget.

- 4.23. The University should try to increase its internal revenue by the better management of farms, widening the scope for Consultancy Service, treatments in Veterinary hospitals etc. Quality planting materials, may be produced in large numbers in University farms on commercial basis for sale to the farmers.
- 4.24. The funds received from the ICAR and other agencies should be fully utilised by taking necessary steps in simplifying the procedures for expenditure. The Comptroller of the University should issue necessary instructions to the project leaders of such programmes. It is stated that audited accounts of the projects are not sent in time, leading to long delays of release of funds by the agencies. This should be looked into by the Comptroller and necessary steps taken to audit such accounts on top priority.
- 4.25. The Comptroller of the University is presently appointed by the Government and this infringes on the autonomy of the University. The Comptroller should be appointed by the University. The procedure for appointment should be changed so that a panel of three names is obtained from the Government, and one from among the panel found suitable, is selected and appointed with the approval of Executive Committee.
- 4.26. In the light of the suggested decentralisation of administrative and financial powers in the University, the Comptroller should revise the standing orders and issue necessary instructions with the approval of the Vice-Chancellor.
- 4.27. The present system of auditing the accounts of the University is by the Government Auditors which is done as post-payment audit. For various reasons the audit work is in arrears for 4 or 5 years. It is recommended that the University may adopt pre-payment audit system, so that the technical staff who are given administrative powers get the advice of the auditors before making payments. This will minimise irregularities and unauthorised expenditure. The change would require also a change in the statutory provisions. Necessary additional audit personnel will have to be appointed and stationed at the College Campuses and Regional Research Stations. Audit personnel stationed at Regional Research Stations should be responsible for pre-audit of the accounts under the sub-stations and other research centres of the respective regions.

Chapter V Teaching

CHAPTER V

5 TEACHING

- 5.1. The Dean of the College is the academic and administrative head of the institution. Since he is overloaded with administrative matters he does not find time to look into the academic matters. Often this results in delays in obtaining materials meant for teaching purposes. The financial and administrative powers are so much centralised in the Dean's office, the Heads of Departments find it almost impossible to carry out their normal duties and responsibilities. Therefore the quality of the academic programmes in the College suffers.
- 5.2. The routine maintenance, annual repairs and other civil works in the Colleges are not carried out in time and properly, because they are not under the direct control of the Dean. This should be changed so that the engineering works of essential and routine nature are carried out quickly (vide para 4.16).
- 5.3. While the University started functioning with only two Faculties and two Colleges, viz., (i) Agriculture and (ii) Veterinary in the year 1972, presently there are seven Faculties and eight colleges, viz., Faculties of (i) Agriculture (ii) Veterinary & Animal Sciences, (iii) Fisheries, (iv) Agricultural Engineering (v) Forestry, (vi) Basic Science & Humanities, and (vii) Rural Home Science and the Colleges of (i) Agriculture (Vellayani), (ii) Horticulture (Vellanikkara), (iii) Veterinary and Animal Sciences (Mannuthy), (iv) Fisheries (Panangad) (v) Agricultural Engineering & Technology (Tavanur) (vi) Forestry (Vellanikkara), (vii) Co-operation & Banking (Mannuthy) and (viii) College of Rural Home Science (Vellayani). The College of Horticulture and the College of Co-operation & Banking are presently headed by Associate Deans. Considering that these are also post-graduate institutions they should be given proper academic status by appointing Deans as heads in the place of Associate Deans (vide para 4.5).
- 5.4. Presently admission to all the undergraduate classes of the University are made on the basis of a common entrance examination conducted by the State Government, except for B.Sc. (Co-operation & Banking). It is recommended that all the admissions to the undergraduate and post-graduate courses in the University should be made on the basis of entrance examinations conducted in the respective disciplines by the KAU. The minimum

requirement for writing the entrance examination should be 50% aggregate marks in the concerned subjects in the qualifying examination for the general quota candidates and 45% for the reserved seats. Admissions to the various courses of studies in the University will be based on combined performance at the qualifying and entrance examinations. The weightage given to the marks obtained in the qualifying examination in the concerned subjects be 50% and the marks obtained in the entrance test be 50%.

- 5.5. In order to attract better students to the post-graduate programmes in the University, incentives such as scholarships and fellowships should be provided by the University. Also, such of those who obtain doctoral degree be given five additional increments in the pay-scale when appointed to such posts where the minimum prescribed qualification is lower than doctorate the subject in the University. In the case of Veterinary graduates also the same recommendations will hold good, though as at present they are attracted towards Government service where private practice is permissible. In order to attract the Veterinary graduates to the University they should be paid 20% of their basic pay as non-practicing allowance.
- 5.6. The University is presently following the same pay scales for the teaching staff as also for the scientists employed in research and extension education wings. While the University Grants Commission and the ICAR have recommended parity of pay scales in different disciplines in respect of Professors, Associate Professors (Readers) and Assistant Professors, they do not recognise the category of Junior Assistant Professors. Recently the University has issued orders fixing a higher pay scale for the Junior Asst. Professors with B. V. Sc. qualification in the Veterinary Faculty than the Jr. Asst. Professors in other Faculties which is not in line with the existing Statutes of the University. Instead of fixing a higher pay scale additional increment in the common scale of pay be given to the Veterinary graduates to compensate for the extra time spent for obtaining the basic degree.
- 5.7. The University has been adopting the Trimester pattern of education and evaluation of students' performance since inception in 1972. On the basis of certain experiences gained over the past 14 years, the University has taken a decision in principle to switch over to the Semester pattern and necessary steps in this regard have been initiated. In the opinion of the Commission, the success of either of the systems would depend upon the sincerity with which the system is implemented by the teachers and University administration. Wherever there are weaknesses in imparting the educational programme and in the evaluation of the students' performance, these should be identified and effective steps taken to rectify them.
- 5.8. In these days of super specialisation, it is necessary that Faculties and students are exposed to most modern technologies in different branches of agricultural sciences. In order to make this possible the University should provide for Guest Lectures by Specialists drawn from all over the country. Also, there

should be a provision for Visiting Professorships and exchange of teachers between the institutions within the country and abroad. In order to attract them to the programme, suitable honoraria and special pay should be offered to them.

- 5.9. It is important that practical aspects of different disciplines whether it be crop production, horticulture, animal production, fish production or forest biomass production, are given adequate coverage. The relevant technology of production will have to be taught to the students with proper field-oriented programmes. The required area of land and water for the purpose will have to be provided in close vicinity of the Colleges concerned. The students should be assigned the land and water for commercial production of the commodities concerned so that they gain not only practical experience but also learn the biology, ecology, economics and marketing aspects of the produce. This has to be specifically born in mind in organising new Colleges in improving the facilities and in expanding the programmes of the existing Colleges/Institutions.
- 5.10. The facilities in the class rooms and teaching laboratories of the constituent Colleges of the University are most inadequate and out-moded. Not only the basic audio-visual aids are not available in most places, but also the available ones are not put to use adequately in the class rooms. The audio-visual aids should be modernised to cover closed circuit TV, etc. Besides the class rooms, laboratories and the College premises in general are not kept clean. The general morale of the students and discipline among students appear to be not up to the mark. It is felt, that frequent visits by the Vice-Chancellor and the Deans to the various Departments in the academic institutions to supervise and tone up the academic administration would yield the desired results.
- 5.11. The agricultural education should be in tune with the ever-changing needs of agricultural development in the country. The graduates passing out of the University should be readily employable in challenging jobs arising in various spheres of agricultural and agro-based private and public sector enterprises, besides the Government Development Departments and Nationalised Banks. The major aim should be to maximise the utilization of the natural resources of the State with economic benefits to the community. It is therefore necessary, that the University fore-sees the changing conditions in different branches of Agricultural Sciences in the State and revise the courses and curricula to meet with the challenging demands of the future. A Committee of Deans and Directors headed by the Vice-Chancellor should examine the needs for such changes at frequent intervals and take necessary steps to effect the changes.
- 5.12. There are certain areas of general interest such as Biology, Biochemistry, etc. covering more than one Faculty and these need to be centralised and permitted to function under the existing Faculty of Basic Sciences and Humanities. By vitalising the Faculty of Basic Sciences and Humanities not only the

above objective could be fulfilled, but also new areas of activity such as Sociology, Psychology, etc. could be developed as curricular subjects. The more important areas which are inter-disciplinary in nature and which are of great importance for the progress of Agricultural Sciences are:-

- 1) Biochemistry
- 2) Genetics
- 3) Bio-Technology
- 4) Economics
- 5) Environmental Biology
- 6) Molecular Biology
- 7) Statistics

Steps should be taken to strengthen the Faculty of Basic Sciences and Humanities at the University headquarters and the branches of the Departments concerned in the other academic campuses as a long-term goal.

5.13. One of the important links between the public and University is through its alumni. The records of the alumni of the University since its inception giving details of academic performance and placements in life should be maintained by the respective Colleges. There should be a strong Alumni Association which should function actively involving the alumni distributed within the State and elsewhere. The Alumni Association should be organised Faculty-wise, with a parent University Alumni Association.

5.14. **College of Agriculture, Vellayani**

5.14.1. There should be more frequent revision of syllabus and curricula to incorporate the latest developments in the subject. There should be more flexibility in the courses offered and in the choice of courses taken by the students to complete their academic degree requirements.

5.14.2. The staff of the college should be given ample opportunities for exposure to most modern technologies in their respective branches of specialisation. Towards this end they should be permitted to attend national and international meetings, workshops and seminars.

5.14.3. There should be proper balance between applied and basic research undertaken by the post-graduate students in the various disciplines of the College as against the present level of almost cent per cent applied research. The research programmes selected by the post-graduate students should fall into the mainstream of the research objectives of the University.

5.14.4. There are a number of vacancies in staff positions in the College and this needs to be filled without any further delay so as to maintain high academic standards. There are also vacancies of the Research Fellowships and Junior Assistant Professors in several of the externally financed projects, seriously affecting the progress and quality of work. Wherever possible the Departmental Heads should be given *ad hoc* powers to appoint Research Fellows, Research Associates and supporting staff, without any long term commitments to the University.

- 5.14.5. The College Library should be centrally located and readily accessible to the staff and students. A separate building for the Library is considered essential. Also, an Auditorium for the benefit of the students and staff of the College is necessary.
- 5.14.6. There should be common-room facilities for the students. A Student Centre for the purpose, including the facilities for the day-scholars may be constructed. Additional facilities such as drinking water, telephones, and general pool of transports are also urgently required in the campus.
- 5.14.7 Presently there is one Advanced Centre for Tropical Soils functioning in the College. Advanced Centres in Crop Production, Plant Protection, Agricultural Economics and Rural Development, Crop Improvement and Agricultural Communication may also be organised by pooling the related Departments already existing in the College. The required leadership for each Advanced Centre should be identified before setting them up.
- 5.14.8. It is recommended that steps may be taken to start new Departments of: (1) Seed Technology, (2) Forage Crops, (3) Agrl. Microbiology, (4) Nematology, (5) Bio-technology, (6) Biochemistry and (7) Water Management in the College.
- 5.14.9. The teaching and research programmes in Horticulture in the College should be strengthened by creating the Departments of: (1) Olericulture, (2) Pomology, (3) Floriculture, (4) Plantation Crops and Spices, and (5) Processing Technology.
- 5.14.10 An Assistant Director of Student Welfare should be appointed to take care of all student welfare activities, including sports and games, entertainment and all other extra-curricular activities. He should be administratively responsible to the Dean of the College, and be under the technical control of the Director of Student Welfare.

5.15. College of Horticulture, Vellanikkara

- 5.15.1. Since more than 60% of the cultivated area in the State is grown to horticultural crops, it is important that the teaching, research and extension education programmes in horticulture are strengthened so as to bring better benefits to farmers and the State. The College of Horticulture was started in the year 1972 with the main objective of offering a basic degree in Horticulture and the 204 B. Sc. (Hort.) graduates who passed out have been equated to those of B. Sc. (Ag.) graduates for the purpose of employment and most of them are employed in the State Department of Agriculture and a few in the KAU. However, the B. Sc. (Hort.) degree programme was discontinued from 1981-82. Subsequently, the course content of B. Sc. (Ag.) was reoriented to give more weightage for horticultural subjects. The revised syllabus is being now followed at Vellayani and Vellanikkara. It is recommended that the College of Horticulture, Vellanikkara be named

as College of Agriculture. The post-graduate programmes in Horticultural subjects be strengthened at Vellanikkara and Vellayani, so as to produce increasing number of specialists to meet the growing needs of the State.

- 5.15.2. There should be more facilities for PG programmes in horticultural tree crops in the college. Facilities available for processing technology are most inadequate.
 - 5.15.3. It is necessary that to strengthen the academic programmes in the College, a Department of Biochemistry and a Tissue Culture Laboratory are set up.
 - 5.15.4. The PG programmes leading to M. Sc. and Ph.D. in different branches of Horticulture, should be strengthened and steps should also be taken to create a new Post-graduate Faculty of Horticulture.
 - 5.15.5. The Horticultural crops to be covered are many, but the land made available to the College at present is inadequate to cultivate all the crops, including the plantation crops. A part of the rubber plantation in Vellanikkara may be earmarked for expanding the field facilities of the College. The Horticultural College should also take over the responsibility of maintaining the ornamental gardening of the Main Campus, which will provide the practical field facilities for teaching the Horticultural students.
- 5.16. College of Veterinary & Animal Sciences, Mannuthy**
- 5.16.1. The different Livestock Units within the Mannuthy campus should be attached to the Department of Animal Production and Management. The research facilities at Thiruvazhamkundu should become available for Post-graduate students to carry out research work.
 - 5.16.2. The clinical Departments of Medicine and Surgery should be strengthened and expanded with Pachyderm and Mobile Clinics. The Veterinary Hospital at Kokkalai in Trichur should be developed further with ambulatory clinical facilities. There should also be facilities at Kokkalai for student internship and for in-plant hospital training, where maximum clinical materials are forthcoming.
 - 5.16.3. The staff of the Department of Preventive Medicine should confine themselves to prevention, control and eradication of contagious diseases of animals.
 - 5.16.4. The Dairy Science Department should be upgraded and strengthened so as to facilitate offering of a separate degree programme in the subject. Specialized Dairy Science graduates are required to man the rapidly developing Dairy programmes in the State. Proper planning and execution for rapid development of the Department are therefore necessary. The ultimate aim should be to create a separate Faculty of Dairy Science. Until adequate facilities are created only diploma and certificate courses in Dairy Science should be offered.



Men's Hostel
College of Horticulture, Vellanikkara



A Ladies Hostel of the
College of Horticulture, Vellanikkara

- 5.16.5. The Department of Anatomy is under-staffed, number of positions being vacant and the facilities for dissection and demonstration are inadequate and these should be rectified.
- 5.16.6. Separate Departments of Biochemistry and Endocrinology be created by detaching them from the Department of Physiology.
- 5.16.7. The Department of Animal Reproduction should be strengthened with proper technology for artificial breeding.
- 5.16.8. The Department of Animal Nutrition should re-orient itself to carry out more work on nutrition than at present. The facilities created earlier for carrying out animal nutrition work should be restored to the Department.
- 5.16.9. The Poultry, Livestock, and Piggery units are not functioning on scientific lines. Every possible step should be taken to convert the farm into a model scientific unit for teaching and research purposes.
- 5.16.10. The extension training imparted to the students should be more field-oriented so that they become better extension workers when they graduate.
- 5.16.11. There should be good library service at the College, through open-shelf system and subject matter abstract services. Qualified staff should be appointed to manage the Library.
- 5.16.12. The Department of Parasitology should be further strengthened covering Entomology, Protozoology and Helminthology.
- 5.16.13. The Department of Pharmacology should start comparative status studies on drugs and pharmaceuticals in different systems of medicines like Ayurveda, Homeopathy etc., for both external and internal medications.
- 5.16.14. The syllabus of under-graduate and post-graduate courses should be revised and updated more frequently. The undergraduate course appears to be overloaded and it is therefore necessary that opportunities are given for elective courses at the undergraduate level, as recommended by the ICAR.
- 5.16.15. In order to attract more students to the PG programme in Veterinary & Animal Sciences, the value of fellowships should be substantially increased so as to fall in line with that of the ICAR and CSIR.
- 5.16.16. The campus of the College of Veterinary & Animal Sciences should be fully developed with a master plan. The land which has been given to the Trichur Rifle Club should be taken back and utilised for providing additional facilities for the College.
- 5.16.17. The building in which the Nutrition Laboratory was originally housed is now occupied by the College of Co-operation & Banking, Communication Centre and Directorate of Extension. These should be shifted to the Vellanikkara Campus. The building when released should be made available to the Animal Nutrition Department.

- 5.16.18. In order to impart practical skills, the University should offer Certificate courses for Lab. Technicians and Analysts for various durations depending upon the nature of skilled persons required. Also, Post-Graduate Diploma Courses in some specialities should be conducted by the University so as to improve the specialised services rendered by the Government Animal Husbandry Department to the farming community.
- 5.16.19. The College staff should be deputed for higher training in selected areas of specialisation within and outside the country and the deputationists should be well paid in the form of fellowships and travel grants, on par with the ICAR and CSIR.
- 5.16.20. The Assistant Director of Students Welfare should work directly under the Dean to take care of all students welfare activities, in line with the one recommended for the Agricultural College, Vellayani.
- 5.16.21. A separate Directorate of Animal Production and Management be created and located at the Livestock Research Station, Thiruvazhamkunnu.
- 5.16.22. A separate Directorate of Animal Diseases and field Investigation Units in close liaison with the existing Centre of Excellence in Animal Diseases be created to improve the research facilities in these areas and for student internship.
- 5.16.23. A Centre of Advanced study in wild life Management to cover the wild animals in nature and in captivity be set up in the College.

5.17. College of Fisheries, Panangad

- 5.17.1. In the opinion of the Commission the Fisheries College has started the post-graduate programme too early, before the required basic facilities for the under-graduate programme were fully met. It has therefore become necessary that more concerted efforts are made to provide the required facilities for both the under-graduate and post-graduate programmes, without any further delay.
- 5.17.2. The building programme for housing the laboratories, class rooms, library, museum etc., should be speeded up. Keeping in mind the facilities required for practicals and field orientation of the training programme, facilities should be created for hatcheries, breeding tanks, seed production units, growout ponds, etc. Such facilities should cover marine prawns, other shell-fish, carps, fresh water prawns and brackish, and marine food fish. The land available at Pudukkottai may also be utilised for creating the necessary facilities for intensive culture of fish and prawn.
- 5.17.3. Facilities for fish processing including a canning plant, cold storage units, and ice-plant, and quality control, microbiology and biochemistry laboratories should be provided.
- 5.17.4. A workshop and an instrumentation laboratory with modern equipments should be put up. This will help in training the students to handling and maintenance of Fisheries equipment.



Bachelor's Hostel
Main Campus, Vellanikkara

- 5.17.5. A modern Fisheries Museum should be set up so that it becomes a facility for teaching as well as to improve public relations
- 5.17.6. The existing 43.5 ft vessel is inadequate for training-cum-research and it is also not suitable for all weathers. It is necessary that an all weather minimum 25 meter research-cum-training vessel, to carry at least 10 students and two staff members at a time is acquired.
- 5.17.7. There are a large number of vacancies in the staff positions. Specialist staff in different branches are not available for immediate employment. As a short-term measure a limited number of highly qualified persons in the related basic sciences may be recruited and appointed and they should be given opportunities to orient themselves to teach the applied courses in fisheries science. The Fisheries Graduates should be recruited to fill up vacancies and they should be deputed for training in the Post-Graduate Fisheries Colleges in the country and abroad, so that the Faculty is strengthened in the course of time.

5.18. College of Co-operation and Banking, Mannuthy

- 5.18.1. The college is presently headed by an Associate Dean. It is recommended that the post be upgraded to that of a Dean.
- 5.18.2. There are a large number of vacancies of staff positions and these should be fill up immediately so that the quality of teaching programme does not suffer. To begin with the B. Sc. (C & B) graduates may be appointed, giving necessary relaxations to the rules, and they be given preference for undergoing post-graduate training programme. Thus they will become available in due course for strengthening the Faculty Positions.
- 5.18.3. The College should have independent building located in the Main Campus at Vellanikkara. A separate hostel building for the students of the College should also be constructed.

5.19. Kelappaji College of Agricultural Engineering and Technology

- 5.19.1. This being a developing institution, the facilities for the College are yet to be fully provided. Post-graduate courses are offered at present at the Vellanikkara Main Campus. The present laboratory and workshop facilities are insufficient even for a Diploma Course, whereas the Post-Graduate courses are already being offered. This has led to sub-standard academic programmes. It is necessary that urgent steps are taken to rectify this serious academic deficiency. Sufficient space for workshop should be made available and latest equipments and machinery acquired without delay and the entire teaching programme shifted to Tavanur.
- 5.19.2. Facilities for covering all branches of Agricultural Engineering such as Soil and Water Conservation Engineering, Farm Power and Machinery, Farm Produce Processing, Dairy and Animal Science Engineering, Home Appliances, Forestry, Engineering, Fishery Engineering, etc. should be provided on the lines recommended in the project report for the establishment of the College.

- 5.19.3. The present facilities suffer seriously for offering the essential farm training to the students. The under graduate and post-Graduate programmes should have the support of applied agricultural science programmes including Crop Husbandry, Soil Science, Plant Protection, Agricultural Economics and Marketing, Agricultural Extension, Statistics etc. The important crops of the State should be cultivated on most modern scientific lines in the farm attached to the College so as to provide proper exposure and training to the students.
- 5.19.4 Since it is difficult to get qualified staff in different branches of Agricultural Engineering, it is essential that qualified and experienced persons from outside the State are appointed on deputation basis, while selected staff of the University are deputed for higher training in institutions within and outside the country.
- 5.19.5 The Diploma Course in Agricultural Sciences now being offered at Tavanur, which does not belong to the Faculty of Agricultural Engineering may be shifted and the physical facilities thus released be made available for the College of Agricultural Engineering and Technology. A master plan for the development of 40 ha of land in the campus for providing the physical facilities such as College building, workshop, educational farm, students hostel, staff quarters, etc., be prepared and implemented with speed.

5.20. College of Forestry

- 5.20.1. The Commission was informed that the University has taken a decision to start a College of Forestry at Thiruvazhamkunnu, which for the present is located at Vellanikara. The project report for the establishment of the college has been accepted by the University and steps are now being taken to implement the same.
- 5.20.2. The University has an area of 163.4 ha of land in Thiruvazhamkunnu close to the Silent Valley Tropical Evergreen Forest. The University proposes to develop the basic and applied research facilities relating to genetic conservation, breeding of local high-value tree species, growing leguminous shrubs and trees capable of providing leguminous shrubs and trees capable of providing fuel, fodder, etc. The areas of specialization should include Plant Breeding and Genetics, Agronomy, Plant Protection, Post-harvest Technology, Wood Processing Technology and Bio-mass utilisation, Social Forestry, Forest Management and Economics, Forest Ecosystem and Conservation, Wildlife Management, Forest Engineering etc.
- 5.20.3. Since specialists in these disciplines are not readily available, extra efforts are required to recruit and train the persons of different disciplines, within and outside the country. These are pre-requisites for establishment of a strong academic programme. A Master plan for the development of Faculty and also the physical facilities should be prepared by a Committee of Experts.



Directorate of Extension Education and College of Co-operation and Banking, Mannuthy



Inaugural function of the College of Forestry, Vellanikkara

5.21. College of Rural Home Science, Vellayani

- 5.21.1. Home Science is an essential part of the Agricultural University system to cover various branches of Rural Home Economics, Human Nutrition, Food Processing and Preservation etc. The staff for the college is available at the Agricultural College, Vellayani. Also, a few scientists who are working in some research and extension projects under the University would be available for teaching the students. Detailed project proposal has been prepared and accepted by the University.
- 5.21.2. Presently the Department of Home Science of the Agricultural College, Vellayani is engaged in offering Certificate and Diploma Courses in Rural Home Science and Post-Graduate degree programmes in Food Science and Nutrition. In the opinion of the Commission, a full fledged Home Science College under the Faculty of Home Science be organised at Vellayani with effect from the Academic year 1986-87. Necessary steps to organise the College and to provide the required physical and academic facilities be taken well in advance as recommended in the project report so that quality of the programme does not suffer even in the initial stages.

5.22. Library

- 5.22.1. As per the University Act the University Library is one of the most active centres of the University. The University Librarian is a Statutory Officer of the University, playing a key role in the University management and administration. The above provision of the Act has not so far been taken up for implementation. A report on the steps to be taken to implement the provisions of the Act was given by Dr. A. B. George in 1984. The Academic Council appointed a Committee headed by Prof. K. A. Issac of the University of Kerala in 1984 and the Committee recommendations became available in 1985. After going through the recommendations contained in the two Reports, and after acquainting itself with the existing College Libraries in the University, the Commission makes the following recommendations.
- 5.22.2. A Central University Library should be set up at the Main Campus of the University at Vellanikkara and a University Librarian appointed as prescribed in the Statutes. While organising the Central Library, the 80,000 volumes of books and periodicals available in different Colleges should be catalogued uniformly and the records maintained at the Central Library. Each of the Colleges should have a College Library. Likewise the Regional Research Stations, and other Research Centres of the University should also have libraries, proportionate to their scientific activity. All these holdings should be catalogued and the records maintained at the Centre. There should be centralised acquisition of books and periodicals, though delivery system should be decentralised to save time. All acquisitions, whether they are books or periodicals, should be centrally catalogued with copies sent to the respective Colleges/Stations. As a result, there will be

permanent record of the holdings of the Library at the central and sub-central locations and the information on the holdings at different Colleges/ Stations will be known to everyone concerned in the University. It should be permissible to hold limited number of books in the Departmental libraries of the Colleges, provided they are centrally catalogued. In respect of certain subjects such as Genetics, Biochemistry, etc. multiple copies of books and journals may be ordered and disbursed among the Colleges and Stations, as per their requirements.

- 5.22.3. The University Library and College Libraries and Research Station Libraries should be headed by qualified staff. A separate cadre of library scientists should be created in the University, as recommended by the Issac Committee. The University Librarian will draw a salary equivalent that of the Dean of the College and the Deputy and Assistant Librarians of Grade I and II will draw the salaries equivalent to Professor and Assoc. Professor and Asst. Professor, respectively. The University Library will have an Advisory Committee headed by the Vice-Chancellor as the Chairman, Deans and Directors of Research and Extension Education as members and the University Librarian as the Member-Secretary. Likewise, the College Library will be headed by the respective Dean as the Chairman, College Librarian as Convenor and four Heads of Departments nominated by the Deans as members. Similar Committees may be formed at the Research Stations. Where necessary, representation to the student community may be given in the Library Committees.
- 5.22.4. It should be the aim of the University to develop the Library into one of the very best the State and on par with the leading Agricultural University libraries in the country.
- 5.22.5. The rate of growth of acquisitions in the Library should be such that the total volumes should double itself every five years, which would be an indication of the coverage of the literature published on various branches of agricultural sciences in the world.

5.26. Student Welfare

- 5.26.1. The literary, cultural and other co-curricular activities, including games and sports, are to be given importance on par with academic programmes of the University. Such activities have so far been mostly limited to the individual Colleges, though more recently the Director of Student Welfare has taken steps to organise some inter-collegiate games and sports at the University level. These are far inadequate to the requirement. The required physical facilities for conducting the University level games and sports, athletic meets etc., are wanting. Various play grounds for field games at the Vellanikkara campus are yet to be developed to meet with the requirements of the entire University. At the individual College premises there are limited facilities but there is ample scope for improving these facilities. Even the games fields and tracks developed in the past have



Hon'ble Minister for Agriculture and Animal Husbandry Mr. N. Sundaran Nadar
inaugurating the College of Rural Home Science

not been maintained properly. It is necessary to appoint full-fledged staff for games and sports. Central facilities such as a gymnasium, swimming pool and a recreation centre, with an attached kitchen and canteen for serving refreshments should be put up. Facilities for playing games during late after-noon and nights with sodium vapour flood-lighting would also help in promoting the games and sports activities of the students.

- 5.26.2. Besides developing the central facilities at the University Main Campus, such facilities should also be provided at each of the outstations of Academic campuses and Regional Research Stations. At least limited basic field game facilities should be provided in the smaller Research Stations/Centres depending upon the availability of space and staff strength.
- 5.26.3 The Director of Students Welfare should be in overall charge of all these activities and he should be assisted by Deputy and Asst. Student Welfare Officers, depending upon the size of the campus and total students/staff strength.
- 5.26.4 A separate cadre of service in Physical Education, similar to the ones in the general Universities be created and the necessary rules and regulations and service conditions framed and got approved by the proper authorities. When fully developed, these student welfare activities would help in bringing in better discipline and bring out the rich athletic, games and histrionic potentials of student community.

Chapter VI Research

CHAPTER VI

6. RESEARCH

6.1. The Director of Research is expected to co-ordinate all the research activities being carried out by the Colleges and Research Stations in every branch of agricultural science. This would mean that he should be up-to-date in his knowledge on the work that is being carried out in every discipline and has to ascertain the situations obtaining currently before he could guide future lines of research work. But in practice he is loaded with periodical reports from the Research Centres from all over the State which he finds impossible to go through and digest. As a result, he is unable to carry out his legitimate duties and responsibilities in an effective manner. This results in duplicatory, repetitive research works with wastage of human talents and financial resources. In spite of all emphasis on research work given by the University over the past 14 years of its existence the accomplishments so far have been too meagre to justify the large resources spent. Out of the research results obtained not all of them have been published. Furthermore, most of them have not been carried to the appropriate ends for bringing benefit to the farming community. Besides, the review of research work has not been made at regular intervals by such of the Heads of Departments of various disciplines, who are the designated Co-ordinators. The Research Stations are not also properly maintained and experimental fields are loaded with weeds. The premises of buildings and approach roads are not maintained properly. This is inspite of the fact that in many Research Stations, the administrative staff are generally in excess and the permanent labourers are far too many and are employed without much work in the off season. Some of the Research Stations are over staffed with scientists having neither the field and laboratory facilities nor the conducive environment to do research work, perhaps with a few exceptions.

6.2. Collaborative Research in the University

The Kerala Agricultural University, which is charged with the triple functions of Teaching, Research and Extension Education in the fields of Agriculture, Animal Husbandry, Fisheries, Forestry and related Sciences is to comprehensively cover the researches on production, protection and processing aspects, relevant to all the areas. This will mean that the University should keep abreast of the efforts going on in the State in the above areas by different agencies so that the University is able to play a leadership role.

In Kerala, besides KAU, there are several National and State level research institutions carrying out works which are of relevance to the Kerala farmers and the general public and of direct interest to Kerala Agricultural University. The examples are given below:

- | | |
|---------------------------------------|--|
| 1) Faculty of Agriculture | <ul style="list-style-type: none"> 1 Central Plantation Crops Research Institute, Kasargod with its sub-centres at Kayamkulam, Calicut, Palode and Peechi. 2 Central Tuber Crops Research Institute, Sreekaryam, Trivandrum. 3 Cardamom Research Institute, Myladumpara. 4 Rubber Research Institute, Kottayam. 5 Tea Research Centres under UPASI. 6 Coffee Research Centre under Coffee Board at Wynad. 7 Centre for Development Studies, Trivandrum. 8 Tropical Botanical Garden, Palode. Trivandrum. 9 Centre for Earthe Science, Trivandrum 10 Centre for Water Resources Development & Management, Calicut. 11 Kerala Institute for Research Training and Development Studies for Scheduled Castes and Scheduled Tribes, Calicut. |
| 2) Faculty of Vety. & Animal Sciences | <ul style="list-style-type: none"> 1 Veterinary Biological Research Institute, Palode, Trivandrum. 2 Indo-Swiss Project, Mattupatty, Idukki Dist. |
| 3) Faculty of Forestry | <ul style="list-style-type: none"> 1 Kerala Forest Research Institute, Peechi, Trichur 2 Centre for Water Resources Development and Management, Calicut. 3 Centre for Earth Sciences, Trivandrum 4 Regional Forest Guards Training School, Valayar. 5 CSIR Regional Research Laboratory, Trivandrum. |



Pavizham—a high yielding variety of rice released by K. A. U.



T x D Hybrid coconut

4) Faculty of Fisheries

- 1 Central Marine Fisheries Research Institute, Cochin.
- 2 Central Institute of Fisheries Technology, Cochin.
- 3 Department of Marine Biology, University of Cochin.
- 4 Department of Aquatic Biology and Fisheries, University of Kerala, Trivandrum.
- 5 Central Institute of Fisheries and Nautical Engineering Technology, Cochin.
- 6 Fisheries Division of Cochin University, Cochin.
- 7 National Institute of Oceanography, Cochin Branch, Cochin.
- 8 Marine Survey of India, Cochin Branch, Cochin.
- 9 Marine Products Export Development Authority, Cochin.

5) Faculty of Co-operation

- 1 Co-operative Training Colleges at Trivandrum, Trichur and Kottayam.
- 2 Co-operative Training College, Govt. of India, Trivandrum.

6) Faculty of Agrl. Engineering

- 1 Centre for Water Resource Development and Management, Calicut.
- 2 Centre for Earth Sciences, Trivandrum
- 3 Kerala Forest Research Institute, Peechi.
- 4 Regional Testing and Training Centre, Department of Agriculture, Vellayani, Trivandrum Dist.
- 5 Regional Research Laboratory, Trivandrum.

The Kerala Agricultural University should have close collaboration with all the above mentioned institutions and others who are directly or indirectly involved in teaching and research in various branches of agriculture. There should be frequent meetings to exchange information on the works being carried out. The senior scientists working in these institutions should be involved in formulating research programmes and in periodical reviews of the research works being carried out in the University. In this regard, the initiative and leadership should come from KAU and its scientists. This should be considered one of the prime responsibilities of the University.

It is essential that an inventory of the research efforts being made by the different institutions of the State and Central Organisations connected with agriculture and related activities is obtained and properly documented so that the future efforts of the University will be in those areas where there are clear-cut gaps. This should enable the University to frame a research network for Kerala State for the immediate and distant future. The possibility of computerising the above information is worthy of consideration so that retrieval becomes easy for taking spot decisions for the approval of different research programmes.

6.3. Project formulation and implementation

It has been observed that the present system of approving research programme is based on the proposals submitted by scientists/teachers, which are considered in the Co-ordination Committee and later in the Faculty Research Committee. It appears that such programmes/experiments have at times little relevance to the problems to be tackled in a given area. A better course appears to be to make use of the very well documented information for the 5 different zones under the NARP (First phase) which has listed for each zone, the different problems awaiting solutions. The second phase of the NARP which when fully implemented will adequately cover the gaps of the first phase. Using these documents it is essential to formulate projects, indicating priorities and for each project, sub-projects and experiments in the order of priority. These documents should be available in all the Research Stations and with Heads of Departments and Directors and Deans. While selecting new areas for research, it will be highly advantageous if projects are chosen on the basis of priority already fixed and experiments initiated keeping in view the manpower and facilities available at the Centres where they are to be implemented. Problems for Post Graduate dissertations should also invariably be chosen from this list so that after a period of time a given area of work gets exhaustively covered, keeping priority and continuity as primary considerations.

6.4. Core Projects

The University receives funds from different sources for research activities extending over varying periods. Some of the projects undertaken with such outside funding are of long term nature and very important from the point of view of the State needs.

When the outside fund flow ceases such programmes come to an abrupt end, with no alternate arrangements to continue the work. When a clear picture of the research projects and priorities emerge as a result of the exercise suggested under item 2 above, it will be useful to identify the core project works relating to which may be continued as the normal activity of the University because of their importance.

6.5. Projects for outside funding

A similar effort may also be made to identify and classify out of the projects under item 2, those for funding by outside agencies. This will enable the different Heads of Departments to propose schemes, when such offer comes, in a more realistic manner.

6.6 Classification of Research Stations

Kerala Agricultural University has a total of 27 Research Stations and Farms spread over the entire State. All of them do not have the same infrastructural facilities. Also their mandates vary widely. It may be advantageous to classify these different Centres into the following categories.

- 1) Instructional Farms (Teaching and Research)
- 2) Research Stations—Regional
- 3) Seed/Commercial Farms

It will be not only an income generating venture for the KAU but also a great service to the farming community if those of the existing farms which cannot effectively participate in research are converted as Commercial Farms to produce adequate quantities of the planting materials of released varieties of different crops and breeding stocks of milch animals and birds, purely on commercial lines.

6.7 Manpower allocation

It may be advisable to clearly list the project leaders' names and those of the associates, indicating manmonths (mms) of each. Normally one scientist can be a leader of one project and be an associate in one or two more projects. Such a system can help accountability in project work and authorship seniority in research publications.

6.8. Control of Research Stations

For administrative convenience and better co-ordination as well as for effective coverage of the research needs of different areas it may be advantageous to follow a regional approach in the management of the research stations. The following Instructional and Regional Centres may be assigned the responsibility of the research centres of the concerned region.

I. Instructional

- 1 Vellanikkara (KAU HQ)
- 2 Tavanoor
- 3 Thiruvazhamkunnu
- 4 Panangad and Pudukpepu
- 5 Vellayani (also Southern Regional Station)

II. Regional Stations

- 6 Pilicode (Northern Region)
- 7 Ambalavayal (Hill Agriculture)
- 8 Kumarakom (Problem Areas)
- 9 Pattambi (Central Region)
- 10 Vellayani (Southern Region)

All the Research centres may be grouped and attached to one of the five Regional Stations as indicated below:

Main Station

- 1) Pilicode

Sub-Station

- : Pepper Research Station, Panniyur
Cashew Research Station, Anakkayam

- | | | | |
|----|-------------|---|--|
| 2) | Ambalavayal | : | Cardamom Research Station, Pampadumpara |
| 3) | Pattambi | : | Agricultural Research Station, Mannuthy
Banana Research Station, Kannara
Aromatic and Medicinal Plants Research Station, Odakkali. |
| 4) | Kumarakom | : | Rice Research Station, Moncompu
Rice Research Station, Kayamkulam
Rice Research Station, Vyttila
Sugarcane Research Station, Thiruvalla |
| 5) | Vellayani | : | Coconut Research Station, Balaramapuram
Special Station, NARP, Kottarakkara |

The following research centres may be converted in to Seed Stations.

- 1) Agronomic Research Station, Chalakudy
- 2) Cropping System Research Centre, Karamana

6.9. Role of each Centre

It may be worthwhile to examine the mandate of each centre in the light of the achievements made so far and the role that it can possibly play in the future. The infrastructural needs for achieving the revised objectives may then be listed which should include the disciplines of research, the number of scientists to be allotted to each of the disciplines, farm area and laboratory space, residential and other non-residential buildings required, transportation etc., so that all the centres have a minimum component of these important inputs.

6.10. Farm Management Cadre

Since farm management and farm development require special skills it may be advantageous if a separate technical service is established for this area of activity. In addition to the existing and the technical posts such as Farm Assts, and Farm Supervisor posts like Farm Manager, Senior Farm Manager, Assistant Farm Superintendent, Farm Superintendent, Senior Farm Superintendent, etc., if created can man the different sized farms and the promotion of the incumbent can be made through assessment. This will be a service wing of the University which will develop all the farms on economical lines and ensure that they are made presentable to the visitors. The scientists and teaching staff will thus be relieved of the routine farm management duties.

The chief of the personnel belonging to this service wing will be under the immediate administrative control of the Head of the Station/Farm. This means that the cadre of the farm management personnel to be provided will depend upon the size of the farm, budget allotment, etc. This recommendations will also apply to similar categories in all University Farms, including Livestock, Fisheries, Forestry etc.



Krishi Vigyan Kendra, Pattambi



Regional Agricultural Research Station, Pattambi

6.11. Revolving fund

A revolving fund for running of the commercial activities of the farms may be set up, so that this activity will not burden the financial resources of the University. Farms suitable for the operation may be identified and specific programmes drawn up.

6.12. Research monitoring

The present system of monitoring progress of research in various centres is through a register maintained for the purpose in which the supervisory scientist on the spot as well as the Director of Research record their observations. The individual scientists are not sending any reports on regular basis for review at the appropriate level and also for review by the Director of Research. It is essential that every scientist reports his work systematically and forward the same at monthly or quarterly intervals to the Director of Research through the respective Head of the Department and the same filed in the project file separately maintained with the Director of Research.

6.13. Rearrangement of projects

A perusal of the list of Research Projects approved by the FRC for the period 1980-85 revealed that under rice there is a total of 175 projects listed, of which 37 are under crop improvement. In a few projects there appeared to have duplication of efforts. The 37 crop improvement projects may be regrouped after merging those with similar projects as detailed below:

- 1) Germplasm collection, conservation and evaluation.
- 2) Varietal improvement through selection and breeding for high yield in upland conditions, for fine grain and scented rice etc.
- 3) Breeding for pest resistance,
- 4) Breeding for disease resistance,
- 5) Breeding for stress tolerance for drought, for deep water, etc.
- 6) Breeding for special requirements, for iron toxicity, resistance, etc.
- 7) Basic work, Genetic analysis, BPH of resistance etc.

The date of starting of the project, duration for which sanction is given and the names of the project leader and associates may also be useful. The above regrouping will foster inter-disciplinary team work and avoid duplication. Adopting similar broad headings, all the research projects may be regrouped.

6.14. Computerisation of Data

If the large volume of research data already available and being generated are to be effectively analysed and retrieval made easy the possibility of computerising the same is worth consideration. The Director of Research should have access to the Computer Centre in the University headquarters for storing and retrieval of the information on research.

6.15. Post-Graduate Research

The advantages of assigning related problems to students in a succession so as to generate continued data in solving problems are well known. This requires good comprehension of the problems and also the areas of investigation required for solving the same. In the light of the recommendations made under para 6.2 it is essential that problems for post-graduate research are chosen only from the lists already sequenced so that these research programmes help to solve a given problem along with the ongoing research programmes of the University.

6.16. Research by Teaching Staff

Involvement of teaching staff in research activities can considerably help to improve their competence. Every teacher should take up at least one research project from the areas of his specialization.

It has been told that though the research programmes are approved in FRC jointly by the Director of Research and Professors, there is no subsequent involvement of Professors of different discipline in monitoring and supervision of the work. It will be highly useful if Senior Professors of the different disciplines are associated in this work, so that their guidance is available in the respective fields. The reports of the scientists from the centres could be routed through the Professors to the Director of Research.

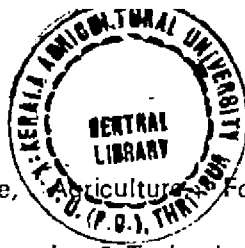
6.17. Teaching by Research Staff

At present the research staff working in Research Stations are very rarely called upon for offering teaching courses. It will be highly advantageous to have the research staff to teach in fields of their specialisation so that the academic standards go up. To foster better link with teaching and research it will be useful if post-graduate students are also guided by research staff so that the research work is pursued in important problem areas in different research centres. Such an approach will also incidentally improve the research facilities of various Research Stations.

6.13. Research publications

It appears that there is some lack of trust among the scientific group working in multi-disciplinary projects in writing research papers and publishing the same. Irrespective of the leadership of the project, the seniority in the authorship of the articles should go to that individual who has contributed most, followed by others according to the quantum of their contribution. Properly spelling out the names of workers of a given project along with number of man months each and regular reporting of the work done by the scientists can enable cross-checking of the contributions if a need arises. Setting good examples of ethics by senior colleagues will also go a long way in improving the situation. It is essential that to improve the output of research, the workers are encouraged to write their results as research papers by giving a proper working climate.

6.19. The following Instructional Farms attached to the respective Colleges should be developed further with facilities for teaching the under-graduate and post-graduate programmes and also to carry out research in wide ranging areas, including Post-graduate student research for thesis.



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- 1) Vellanikkara (Horticulture, Agriculture, Forestry, Co-operation & Banking)
- 2) Tavanur (Agricultural Engineering & Technology)
- 3) Thiruvazhamkunu (Forestry)
- 4) Panangad and Puduveypu (Fisheries)
- 5) Vellayani (Agriculture & Home Science)
- 6) Mannuthy (Veterinary & Animal Sciences)

As at present the facilities at these centres are not adequate and this is true even in the 31 year-old Agricultural College at Vellayani and the Veterinary and Animal Science College of the same age at Mannuthy. Every possible step should be taken to allot adequate areas for students practical work and also for their work experience.

- 6.20. In respect of five Regional Research Stations, the NARP programme has developed master plans which are now being adopted. These master plans include development of some Sub-Stations identified for attachment to the respective Regional Stations. It is expected that during the next five year period when the second phase of the NARP programme is fully implemented the facilities for research would substantially increase. However it should be mentioned that some of these Stations are too small to provide the required field facilities for carrying out the programme of research work. The Rice Research Stations, Moncompu (8.67 hectares), Rice Research Station, Kayamkulam (11.67 hectares), Rice Research Station, Vyttila (8.7 hectares) and Sugarcane Research Station, Thiruvalla (10.26 hectares) are too small to justify the large staffing pattern and the extensive experimental programme. It would be essential that additional land should be acquired in each of these farms, or as an alternative, a part of the staff should be deployed elsewhere to do more effective research work. Presently there is wastage of manpower in these Stations.
- 6.21. In respect of the two stations viz., the Agronomic Research Station, Chalakudy (8.95 hectares) and the Cropping System Research Station, Karamana (7.65 hectares), recommended for conversion into seed Stations the existing senior staff may be shifted and the farms handed over to the farm managerial staff. As recommended under para 6.10 above, these two farms should be run as model seed farms with provision for carrying out adaptive field trials by the research scientists whenever required.
- 6.22. The deployment of research staff in the various research stations of the University appears to be imbalanced. For example, there are 32 scientists posts at the Rice Research Station, Moncompu where only about 6 of the 8.67 hectares of the total land-spread is available for experimentation. It has already been recommended that some of the Research Stations should be converted into Seed Stations and as also some of the programmes may be strengthened. It is implied, therefore, that there should be redistribution of the research staff taking into account the needs of the respective Stations.

The opinion of the Commission is that there are enough posts of research scientists in the University and when properly redistributed more productive work can be turned out.

The imbalance in distribution of scientists in the Research Stations seems to be further aggravated by the recent on-the-job promotions resulting in concentration of Professors and Associate Professors in Research Stations where there are no adequate facilities for work commensurate with their positions.

- 6.23.** The break up of the research and administrative staff in each of the Research Stations is given in Tables 20 and 27, respectively. There is need for redistribution of the staff depending upon, (a) status of the Station, (b) extent of land (c) the subject area coverage, (d) the external financial assistance received, and (e) overall annual expenditure incurred.
- 6.24.** It should become possible that all these Research Stations are brought under computerised administrative, financial and technical management. It would then be possible for the Director of Research to have better control and management over the entire research system.
- 6.25.** The following Research Stations come under Veterinary and Animal Sciences:
- 1) The Instructional Farm at Mannuthy (Poultry, Livestock, Piggery and Goat)
 - 2) Livestock Research Station, Thiruvazhamkunnu
 - 3) Cattle Breeding Farm, Thumburmuzhi

These three stations should be interlinked and developed in an integrated manner to provide the required facilities for teaching and research of basic and applied nature. All the important species of domestic animals should be covered among the three stations. These include Elephant Husbandry, Poultry, Sheep Husbandry, Dairy Science, Cattle Breeding etc. It should also be possible to include Agronomy, Forage Crops, Agro-Forestry and Home Economic Research with the animal sciences research activities at these centres. These research activities should be under the technical control of the respective Heads of Departments of the concerned Faculties. The Director who is in charge of animal sciences research should develop a master plan and provide the leadership for implementing the programme at all the three Stations.

Chapter VII Extension Education

CHAPTER VII

7. EXTENSION EDUCATION

- 7.1 The Director of Extension Education is responsible for carrying the research results from all the institutions whether it be Crop Science, Veterinary Science, Fishery Science, Forestry or Home Science to the benefits of farming community. However, required technical staff as well as physical facilities to carry out the work so far provided are inadequate. Directorate of Extension Education should be centrally located in the Main Campus of the University to facilitate proper co-ordination of the activities with the Director of Research and Central Office. The co-ordination between the Director of Research, Director of Extension and the Deans of Colleges is inadequate in identifying areas of problems solving research to benefit the farming community and in carrying the research results to the farmers' fields. Extension Education in Agricultural University has to be offered as common programmes for all disciplines of the University instead of developing separate programmes in every faculty. It is to be regretted that presently the extension wing of the University is least sought after area of employment in the University, which if continued will result in very poor performance of the entire gambit of extension activities for which the University is responsible.
- 7.2 There is considerable dilution of the principle of 'limited' extension work by KAU due to lack of clearcut demarcation of limits of extension areas between the University and the State Development Departments. It is necessary that the KAU and the State Development Departments discuss the matter in detail in the light of the provisions of the University Act and Statutes and enter into a memorandum of understanding. This should be done with everyone of the State Development Departments concerned with extension activities in the subject matter areas with which the University is involved.
- 7.3 With the explosion of information in agricultural technology and ever increasing demands for newer knowledge and skills from the farming community and the general public, there is a dire need for strengthening the communication unit of the Directorate of Extension Education. It is recommended that a Centre of Excellence in Developmental Communication Technology be set up under the Directorate of Extension. This Centre should cover all aspects of Audio-Visual Technology with a view to making them most modern.

7.4 Training of the trainers is an important activity of the Extension Education Wing. The proposed Central Training Institute of the University which is expected to function under the Directorate of Extension Education should cover all types of training, including the induction, refresher and in-service training programmes for the benefit of all categories of staff covering the scientific, administrative and supporting staff of the University and extension personnel of Extension Agencies. The courses should be tailor-made to suit the requirements of the trainees.

7.5 It should be the responsibility of the Directorate of Extension Education to plan, organise and co-ordinate all the extension education programmes of the University.

Therefore all the Extension Education programmes, irrespective of the project to which they are attached should be run under the Directorate of Extension Education. In order to facilitate proper transfer of technology from the College, Research Laboratories and Research Stations, one Extension Unit headed by an Extension Education specialist should be established at each of the five Regional Research Stations.

7.6 The Extension Education staff of the Regional Research Stations should form the link between the research staff of the University and the extension staff of the various Development Departments of the State Government in the respective regions.

A single University Department of Extension cutting across all the faculties should be established. To this Department one Extension Division in each of the Colleges/Disciplines/Faculties should be established. Also, the Extension Education staff of the Colleges should be brought under the technical control of the Director of Extension Education.

7.7 There are several externally aided extension programmes and also University extension programmes. The programmes such as Lab-to-Land, T & V, Village Adoption, Krishi Vigyan Kendras and Scheduled Tribes and Scheduled Castes Upliftment etc. should be well co-ordinated under the Directorate of Extension. To accomplish this a separate Co-ordination, Evaluation and Monitoring Cell should be established under the Directorate of Extension.

7.8 There is scope to start a fullfledged Consultancy Service in the University. Such a service should cover all branches of the agricultural sciences in broad coverage. Along with Farm Advisory Service this should be strengthened to form a separate unit of the Extension Education Directorate.

7.9 The University Press should be strengthened with modern equipments such as Offset Press, Photo Composing Unit etc. There should also be a separate functional building with provision for training of the technical personnel for the Press. The working of the Press should be streamlined so as to provide support to administrative, teaching, research and extension education wings of the University.

Acknowledgements



Training tribal youths in Agriculture at the Training Centre, Mannuthy



A District seminar organised by the Farm Advisory Service Mannuthy

- 7.10. The Extension Education Committee/Council should be made a Statutory body with the Vice-Chancellor as the Chairman and the Deans of Faculties, Director of Research and Director of Extension as the Member Secretary. The Committee should meet at least once in six months to review the working of the Extension Education Wing and to provide guidance.
- 7.11. While one of the main objectives of the Agricultural University is to integrate teaching, research and extension education activities, in effect, the extension education doesn't get due recognition because of the fact that the scientists do not prefer to work as agents of technology transfer. This could be changed if weightage is given to the extension works carried out by the scientists on par with the research and teaching works. In assessment of scientists in the University and in recruitment of staff to higher positions not only provision should be made for such weightages but also preference should be given to those who have done meritorious extension works.
- 7.12. It is responsibility of the Directorate of Extension Education to have good public relation activities for which a separate Public Relations Wing should be set up at the Directorate of Extension with sub-centres in the major campuses.
- 7.13. The report on the Review Committee in Agricultural University (1978) has observed: "In several Universities, the Extension set up is extremely weak, without adequate staff and facilities. It is generally under financed, in an average the budget allocation for extension work forms only six per cent of the total budget of an Agricultural University". This is true in K. A. U. also. The University should allot at least double the present level of its budget on Extension Education in view of the importance to be given to the subject in the interest of the farming community of the State. It should be recognized that all the efforts of the University would be of very little value unless and until the latest scientific technology is transferred to the farmer's fields and homes, the Extension Education Wing playing the pivotal role.



Trainees Hostel
Main Campus, Vellanikkara



Scientists at R. A. R. S. Pattambi explaining a point to the
young farmers undergoing a training

CHAPTER VIII

8. GENERAL

- 8.1. Kerala Agricultural University is a dynamic institution created to serve the farming community of the State in a continuing manner, bringing material and economic benefit through transfer of modern technology. It has to develop long term perspective in education, research and extension methodology. Unfortunately there is no adequate planning on manpower requirements of the State in respect of various categories of graduates and post-graduates to be trained by the University. While the University does not realistically estimate the manpower requirements it does not also take into consideration the manpower requirements as estimated by the State Government in organising its teaching programmes. On the other hand, the University initiates new graduate and post-graduate teaching programmes and when the graduates come out they are not properly employed in the State resulting in wasteful exercise of human talent and resources. The new graduates feel disgusted and frustrated and as a result the faith in the entire higher educational programme erodes miserably. The University has now planned to start new degree programmes without taking effective steps either to solve the existing problems or taking proper steps to pave the way for proper utilisation of the manpower when the graduates with newer degrees pass out. There appears to be no proper career guidance service in the University. The University should take necessary steps to set right these difficulties.
- 8.2. The Farm Management work which is of routine nature, though requiring special skills is often entrusted to Post-graduate degree holders specialised in different disciplines, which is wastage of time and expertise. Often such administrative deficiencies result in scientific staff avoiding postings in Agricultural Research Stations even in places nearby towns, not to speak of such stations located in remote areas. Therefore, it is recommended that a separate cadre of posts for Farm Management Works be created, as suggested elsewhere in this report (vide para 6.10).
- 8.3. One of the main objectives of the Agricultural Universities in India is to integrate teaching, research and extension education at all levels. The teacher should do research work and whenever possible extension work. Researcher should do teaching whenever called for and also carry out extension work when called for to extend the benefit of his specialised

expertise to the farming community. An extension worker should carry out teaching when called for besides helping the research worker in identifying field problems and in conducting adaptive field trials. There should also be close linkage between the University and the various Development Departments of the State Government. Some of the Agricultural Universities in India have achieved this by establishing University Development Centres at the District headquarters. This set up exists in the Agricultural University of Haryana. It is recommended that the KAU may also organise Agricultural Development Centres in selected Districts, which will create the linkage between the University and the Development Departments of the State Government. To begin with such Centres be set up in the Districts where the strong research base of Regional Research Stations exist. It should be possible to cover several disciplines in such Centres, so that the transfer of modern technology is better accomplished. This will result in improvement in the quality of teaching in the colleges making it increasingly relevant to the field situations and the research work will become increasingly location-specific.

- 8.4. It is being increasingly realised at National and State levels that agricultural subjects should be taught in schools under the Vocational Education Programme. Though Agricultural Universities are generally meant for higher educational programmes, the required technical help for strengthening the vocational educational programmes in the field of agriculture should come from the Agricultural University. KAU will have to work in liaison with the State Education Department in popularising the programme of teaching agricultural subjects in schools. For this purpose the required courses and curricula will have to be developed on location-specific basis. Talents and skills required for development of agriculture in its broad coverage should be made available for such programmes. The University has to play the leadership role for this purpose.
- 8.5. The Commission received several representations from the Staff and Students' Unions. Wherever possible the representations have been taken into account in making recommendations. It is generally felt that there is need for stimulating the morale of the entire staff and student community in the University. This is possible by deeper involvement of the students and the staff of all categories not only in the official works and class room programmes but also in social and extra curricular activities. This would need provision of Staff Clubs, Student Clubs and facilities for in-door and out-door games for all categories of employees at each campus of the University.
- 8.6. KAU should play a leading role in bringing about Agricultural prosperity in the State in the coming years. It is gratifying to note that the University had organised a seminar entitled "KAU 2000 AD" in 1984 at which the future of Agriculture has been brought out and the problems and solutions in different disciplines enlisted. This seminar was followed by a Workshop conducted

in 1985 to suggest follow up actions on the recommendations of the Seminar. These are very commendable steps and KAU should come forward in a continuing manner to lead the State for better scientific farming and increased agricultural productivity.

- 8.7. Kerala State being prominently a horticultural region in the country, should give due importance to scientific cultivation of the various horticultural crops. The Agricultural Colleges of India have been training graduates for extension work in all branches of agriculture, including horticulture in the past. There is increasing demand for specialised knowledge in horticulture. The B.Sc. (Ag.) programme should therefore be increasingly oriented to teach more of horticultural subjects and also more specialists in different branches of horticulture with Masters and Doctoral degrees produced in the coming years.

PART—III

SUMMARY

ACKNOWLEDGEMENTS

APPENDICES

Chapter IX Summary

CHAPTER IX

9. SUMMARY OF RECOMMENDATIONS

Administration :

- 9.1. In order to improve the effectiveness of the administration in the University certain changes in the Act and Statutes are considered essential. The Vice-Chancellor should be given more authority to deal with the day-to-day administrative and academic issues, as against the present system of taking most of these to the Executive Committee. In all matters of administration of the constituent Colleges, Research Stations and Directorates, the respective Deans/Directors should be the decision making authorities and the Vice-Chancellor the appellate authority. Where the Vice-Chancellor is the decision making authority the Executive Committee and/or the General Council should be the appellate authority. In cases of difference of opinion between the Vice-Chancellor on one side and majority of the Executive Committee members on the other, the matter should be taken to the Chancellor for a decision. The Executive Committee should also be expanded to include the Deans of Faculties, Director of Research and Director of Extension Education as members. Necessary amendments to the Act and Statutes to accommodate the above suggestions be made.
- 9.2. The decision making powers on financial and administrative matters presently concentrated at the University Central Office should be largely decentralised. Likewise, the powers concentrated in the Deans' Office should be decentralised to the levels of Heads of Departments. Departmentwise budget allocations should be made well in advance of the financial year and the Head of the Department empowered to incur expenditure as per the allocations. These will facilitate effective functioning of the institutions and their subunits.
- 9.3. The present system of post-auditing of accounts should be replaced with the pre-auditing system. The Comptroller's Office should take every possible step to clear the present massive arrears of auditing work in the University.
- 9.4. In order to have uniformity in the levels of authorities, each of the Colleges should be headed by a Dean and if there are more than one College in any Faculty, the senior most of the Deans should be designated as Dean of the Faculty. Appointments to the positions of Dean should be made on the basis

of a five year term, renewable for second term. However, this would not apply to the present incumbents who have been selected and appointed on a regular basis.

- 9.5 In the opinion of the Commission, the Vice-Chancellor should be a competent technical person with proven administrative abilities so as to command respect from scientists, students, administrative staff and the public, alike.
- 9.6 The Registrar of the University is required to take several decisions on scientific matters and has also to function as a member of scientific Committees and Academic Bodies of the University and therefore, there would be several advantages if a competent senior Dean/Director is appointed as a Registrar for a tenure of 3 to 5 years, with a provision to renew for a second term.
- 9.7 The Director of Physical Plant should be in-charge of only major works in different University Campuses and Stations, whereas the minor works including annual maintenance and repairs should be carried out under the direction of the administrative head of the campus/Station. Towards this necessary sub-units of the Directorate of Physical Plant be created and stationed in the College campuses and Regional Research Stations.
- 9.8. The administrative machinery of the University should be geared to the computerised system so as to fully utilize the available computer and also improve the efficiency of administration. All matters connected with teaching, research, extension, financial and administrative areas could be handled through the centralised computer system which will reduce the burden of heavy administrative staff in the University. Through redeployment and rational distribution of the existing staff and training them in modern management system not only the administration could be tuned-up but also considerable economic benefits would accrue.
- 9.9. The Academic, technical and administrative staff of various categories should be given pre-service and in-service training to improve their managerial skills. A Central Managerial Training Institute may be established under the Directorate of Extension Education for the purpose.
- 9.10 The abnormal delay in filling-up of vacancies in staff positions in the Colleges and Research Stations should be avoided at all cost. It is suggested that a separate Recruitment Cell headed by a senior scientist be set-up for this purpose. While selecting candidates for various categories of posts, panels of names be wait-listed, on priority basis, with one year validity, from which subsequent vacancies could be more readily filled-up. The selection Committee for the posts of Asst. Professors and Junior Asst. Professors the concerned Deans, Director of Research and Director of Extension should be members and one of them by rotation will be the Chairman, for the posts of Professors and Associate Professors the Vice-Chancellor should be the Chairman and the Director of Research and Director of Extension and the Dean concerned should be members, besides the expert members.

- 9.11. The performance of the scientific personnel working in teaching, research and extension education wings should be assessed once a year and the assessment should be recurrent and continuous. The suggested procedure for such assessment is detailed in the Report.
- 9.12. It is recommended that in order to attract staff to the Research Stations in remote areas and less convenient places, special incentives of 20% of the basic salary as additional pay, rent-free quarters, free medical aid and free transport for children's education (limited to 2 children per family) be provided to the employees, besides giving additional weightage to such staff in appointment to higher category positions and in selections for Post-Graduate programmes.
- 9.13. The State Government should be persuaded to contribute to the University atleast 10% of the overall budget of all the Development Departments, which are drawing benefits from the University, as against the present 6% of the budget from only the State Department of Agriculture. The budgetary contributions of the Development Department should be pooled and placed under a separate budget Head 'Kerala Agricultural University' of the State budget.
- 9.14. The Comptroller should be appointed by the University, with the approval of the Executive Committee and General Council, as against the present system of the Government appointing the comptroller, so as not to infringe on the autonomy of the University.
- 9.15. As against the present system of post-auditing of accounts, pre-payment audit system should be introduced. Necessary administrative changes should be brought about to effect the change.

Teaching

- 9.16. The University should organise and conduct entrance examinations for admissions to the various under-graduate and post-graduate courses, as against the present system of the State Government conducting common entrance examinations for all professional courses in the State.
- 9.17. The University has so far been adopting the Trimester pattern of education and evaluation of students' performance but has now decided to switch over to the Semester pattern. In the opinion of the Commission, the success of either of the systems depends upon the sincerity with which it is implemented by the teachers and the University's administration.
- 9.18. It is important that the students are given more orientation in practical aspects of different specialities than obtaining at present, for which necessary physical facilities and the conducive environment should be created. The existing facilities in this regard are not only inadequate but are poorly maintained.
- 9.19. The objective of the University should be not only train the required manpower for the State in different disciplines as obtaining at present, but also to plan for the future in a dynamic manner to cover the conventional and newer areas of activity.

- 9.20.** It is necessary that the University establishes certain Departments as central facility for the benefit of all the Faculties, e. g., Biochemistry, Genetics, Biotechnology, Economics, Environmental Biology, Molecular Biology and Statistics. By vitalising the Faculty of Basic Sciences and Humanities not only the above objective could be fulfilled but also new areas of activity such as Sociology, Psychology, etc. could be developed as curricular subjects.
- 9.21.** While the University has been offering newer educational programmes, such as B. Sc. (C & B), M. Sc. (Agrl. Engg.), and B. F. Sc., not all the graduates who pass out of the programme are fully employed and there have been disappointments and frustrations among them. In order to avoid such unhealthy situations the University should work in close collaboration with the State Government Development Departments in organising and offering new courses and educational programmes.
- 9.22.** In order to attract better and more students to the Post-Graduate programmes in the University, better scholarships and fellowships should be provided. In the case of Veterinary Post-Graduates, the University should pay suitable non-practicing allowance so as to attract them to the vacant positions in the University.
- 9.23.** In the opinion of the Commission there is scope for setting-up of a few more Advanced Centres in the Faculties of Agriculture and Veterinary and Animal Sciences so as to encourage more of inter-disciplinary teaching and research and to upgrade their standard. Some areas for such Advanced Centres have been suggested in the Report. Such Advanced Centres should be established after identifying the leadership in the respective field, which is essential for the success of the centre.
- 9.24.** The under-graduate B. Sc (Agri) course should be increasingly oriented to cover horticultural subjects. Also, the Horticultural College at Vellanikkara should be named as Agricultural College. Post-graduate programmes in Horticulture should be strengthened both at Vellanikkara and Vellayani, to produce increasing number of specialists in the subjects to serve the needs of the State.
- 9.25.** There is an urgent need for improving the physical facilities, academic standards and educational atmosphere in the various Departments of the Veterinary College. Specific recommendations for the Departments are given in the Report. The Commission further recommends that in due course a separate Faculty of Dairy Science be created to produce graduates and post graduates in the subject to meet with the requirements of the State Development Department.
- 9.26.** The facilities provided for the under-graduate programmes in Fishery sciences at Panangad are most inadequate and the post-graduate programme started recently is academically weak and of sub-standard. These deficiencies should be rectified on top-priority basis and the required physical facilities provided

and qualified teaching staff appointed. It is also necessary to recruit additional staff in different branches of Fishery science and depute them for higher training in different specialities within the country and abroad.

- 9.27. The College of Co-operation and Banking needs a building of its own and also hostel for the students. These should be provided in the Main Campus at Vellanikkara.
- 9.28. The Kelappaji College of Agricultural Engineering and Technology is a developing one with inadequate facilities. It is necessary to take early steps to remove the academic deficiencies so as to strengthen the B. Tech. and M. Tech. programmes in Agrl. Engineering. Also, adequate facilities to give an orientation towards practical farming and all related branches of agricultural science along with agricultural engineering, should be provided. The Diploma Course in Agricultural Sciences now being offered at this institution should be discontinued and the facilities thus released be made available to the Agricultural Engineering faculty.
- 9.29. The College of Forestry started at Vellanikkara and proposed to be shifted to Thiruvazhamkunnu should be developed on most modern lines with dynamic leadership. The necessary infrastructure facilities will have to be created for the purpose. Care should be taken to see that offering of Post-graduate degree programme in Forestry at this stage does not lead to lowering of academic quality. Staff for the College, in different branches should be recruited (and where necessary they should be specially trained at various institutions within and outside the country.
- 9.30. The College of Rural Home Science started at Vellayani to offer a four year under-graduate B. Sc. (Home Science) degree and P. G. programme should be provided with the necessary class-room, laboratory and other physical facilities along with specialists staff in different branches and should be brought under the faculty of Home Science.
- 9.31. A University Library, as per the University Act be set-up as a central facility, The College Libraries and the Libraries at the Regional Research Stations and Sub-centres should be closely linked and co-ordinated with the Central University Library. A separate cadre of staff for the University Library Service should be created and qualified persons appointed to the Central and the other branch Libraries. The Commission further recommends that adequate finances should be made available to enable the library to double its total holdings atleast once in five years.
- 9.32. The student Welfare Activities of all the Colleges should be placed under the charge of the Director of Students Welfare who should be the Chief Co-ordinator of all the literary, cultural and other co-curricular activities, including games and sports. There should be Deputies/Assistant Directors working in different College Campuses who will be technically under the Director of Student Welfare and administratively under the respective Deans of Colleges. Basic facilities for sports and games are also be provided in the Regional Research Stations and Sub-centres.

Research

- 9.33.** In the opinion of the Commission, the Research Stations of the University should be classified as (i) Instructional Farms (Teaching and Research), (ii) Regional Research Stations and Sub-Stations and (iii) Seed/Commercial Farms. In doing so, the recommendations of the NARP programme now under implementation in the University should be given due weightage.
- 9.34.** Besides KAU, several Central Government and State Government institutions and Universities are also carrying out research work in certain important areas of agriculture and related fields. The University should prepare an inventory of all the research efforts being made by these different institutions and utilize it for streamlining its own research programmes. The University should play a leadership role in co-ordinating the programmes and collecting them to the needs of the State and its farming community. Towards this end, the existing research projects of the University should be reorganised in the suggested pattern and properly documented. The information should be stored in the computer, to avoid overlaps in future programmes and to facilitate better programming and implementation.
- 9.35.** A separate cadre for Farm Management be created and the maintenance of all the Farms in the Academic Campuses and Research Stations, as well as Commercial and Seed Farms be entrusted to this specialist staff. This will help in minimising the wastage of specialist scientific talents on Farm Management and also in better and economic management of the Farms.
- 9.36.** There should be provision for teachers to do research works besides carrying out extension work when called for; the research workers should do teaching and extension works as and when required; and the extension workers should do teaching and research works in selected extension education areas. Necessary provisions should be made in the rules for assessing their performance in all the three areas and proper weightage given while selecting them for higher positions.
- 9.37.** The existing Agronomic Research Station, Chalakudy and the Cropping System Research Station, Karamana are recommended to be converted into seed Farms with no research responsibility.
- 9.38.** Proper redeployment of the research staff, taking into consideration, the physical facilities, the research responsibilities and financial inputs of the respective Stations would lead to better balancing of the research activities of the University and in elimination of superfluous concentration of staff in certain Stations. Such of the Stations which do not have adequate landspread should be strengthened by acquisition of additional lands, or else their status reduced to Sub-Stations and the extra staff redeployed.

Extension Education:

- 9.39. The Directorate of Extension should be strengthened substantially to enable the institution to carry out its duties and responsibilities as provided for in the Act and Statutes.
- 9.40. A separate cell to co-ordinate the extension activities under Lab-to-Land, Village Adoption and T & V programme be created in the Directorate of Extension.
- 9.41. The University Press under the Directorate of Extension should be provided with modern machineries to carry out more fully its responsibilities.
- 9.42. A Separate Public Relations Wing should be set-up under the Directorate with sub-centres in the major Campuses to bring the public into more contact with the University and its activities.
- 9.43. A centre of Excellence in Communication Technology should be set up under the Directorate of Extension to cover all aspects of audio-visual technology with most modern facilities.
- 9.44. A separate building for the Directorate of Extension should be provided at the University's Headquarters at Vellanikkara.
- 9.45. There should be Agricultural Development Centres to carry the research results from the University to the farmers' fields and homes. This should be established on a regional basis, at the Regional Research Stations and in the Colleges of the region. The Director of Extension Education should provide the technical guidance and co-ordination of all the activities at these Centres and the expertise available in the respective regions including the Colleges and Research Stations should be fully utilized for the extension activities.
- 9.46. The Directorate of Extension should be responsible for teaching of extension subjects in all the Colleges of the University, as against the present system of each College developing its own extension education activity, independent of the Directorate. While the Department of Extension Education of the College should be under the administrative control of the Dean concerned, the technical control of all such Departments should rest with the Director of Extension Education. The common facilities available with the Directorate would help in offering better academic programmes in the subject to the students of all College.

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ACKNOWLEDGEMENTS

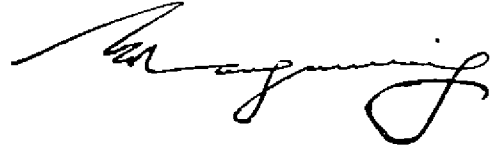
The Commission wishes to acknowledge its grateful thanks to the University and its authorities for extending all possible help in carrying out its work, from the very inception. It is particularly thankful to the Vice-Chancellor Mr. T. Madhava Menon, I. A. S., for his kindness in finding time to discuss with the Commission on several occasions and extending all possible help by way of additional staff and financial support to carry out the work. All the Officers of the University including the Registrar, Comptroller, Director of Research, Director of Extension, Deans of Faculties and Associate Deans, Heads of Research Stations, Director of Students Welfare, Comptroller etc., extended wholehearted support and co-operation by providing all the information and data which went into the preparation of the report. The Chancellor and the Governor of Kerala, the Chief Secretary to Government of Kerala, Agricultural Production Commissioner, Secretary (Agriculture), Director of Agriculture, Director of Animal Husbandry, Director of Fisheries, Registrar of Co-operative Societies, Members of the KAU Executive Committee, and various others had discussions on matters related to the Kerala Agricultural University and its functioning. The Commission is also thankful to the various Associations and Organisations of the KAU staff and students who gave in writing their view points and recommendations and also discussed the various issues which would improve the functioning of the University. The Heads of Departments in the Colleges and also the Scientists in the Research Stations provided all the information and showed them round when the members of the Commission visited the institutions. All these helps whole-heartedly extended by every one concerned facilitated crystallisation of the recommendations which have gone into the report.

The Chairmain (Dr. Mahapatra) had an opportunity to visit the ICAR headquarters at New Delhi, Punjab Agricultural University, Ludhiana, G. B. Pant University of Agriculture and Technology, Pantnagar, the Orissa University of Agriculture and Technology, Bhubaneswar and had discussions with the officials on matters pertaining to the functioning of Agricultural Universities for which the Commission wishes to record its grateful thanks.

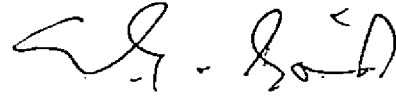
The Commission wishes to record its happiness in having had an opportunity to visit the University in detail and obtain first hand knowledge of its activities and problems. It wishes to thank the University's General Council for this rare opportunity given and is hopeful that the recommendations would be found helpful in improving the functioning of the University.

□

Dr. G. RANGASWAMY



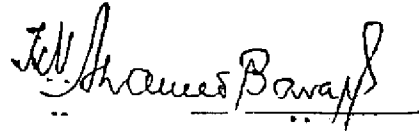
Dr. A. G. G. MENON



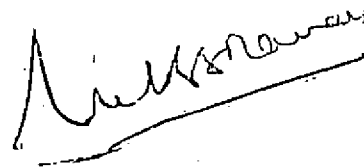
Dr. M. N. MENON



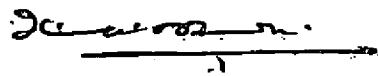
Dr. K. V. AHAMED BAVAPPA



Maj. Gen. R. K. R. BALASUBRAMANIAM



Dr. K. H. ALIKUNHI



Appendices

11. APPENDICES

Appendix I

ORDER APPOINTING THE KAU COMMISSION

KERALA AGRICULTURAL UNIVERSITY

Proceedings

KAU—Review of activities and perspective plan—constitution of a
'Review Commission'—Orders issued—

(GENERAL COUNCIL SECTION)

No. GC/15938/83.

Vellanikkara, Dated, 26.3.1985

- Read:—1. Decision of the 29th meeting of the Academic Council held on 21.8.82
2. Decision of the 124th and 133rd meeting of the Executive Committee held on 27.12.1982 and 2nd and 3rd Nov. 1983.
3. Decision of the XXXI meeting of the G. C. held on 29th and 30th March, 1984.

ORDER

In accordance with the decision of the XXXI meeting of the General Council of the KAU held on 29th and 30th March 1984, a 'Review Commission' with the following composition is constituted in the KAU to review the activities and achievements of the KAU in the fields of Education Research, Extension and Administration and to determine a plan of action for the future, keeping in view a long term perspective.'

- 1 Mr. A. Venkataraman, I.A.S.,
Commissioner & Secretary to Government,
Agrl. Department, Govt. of Tamil Nadu, Madras.
- 2 Dr. G. Rangaswami,
International Agrl. Consultant & Chief Executive.
Vorion. Chemicals and Distilleries Ltd.
10, Srīman. Srīnīvasa Road,
Alwarpet, Madras-600 018.
- 3 Dr. M. N. Menon,
Rtd. Animal Husbandry Commissioner, GOI,
Anuradha, Peroorkada,
Trivandrum—695 005.

- 4 Dr. M. Aram,
Vice-Chancellor,
The Gandhigram Rural Institute,
Gandhigram, Madurai Dist., Tamil Nadu-624 302.
- 5 Sri. V. A. P. Naik, Chief Engineer,
The Kerala Agro-Industries Corporation Ltd.,
Fort, Trivandrum-695 023.
- 6 Maj. Gen. R. K. R. Balasubramanian, AVSM.
Director of Remount Veterinary Services,
Remount Veterinary Directorate,
Quartermaster General's Branch,
Army Headquarters, West Block 3,
R. K. Puram, New Delhi-110 006.
- 7 Dr. I. C. Mahapatra,
Consultant,
Agri. Research, Education & Extension & Rural Development
A-3/82, Janakpuri,
New Delhi-110 058.
- 8 Dr. K. H. Alikunhi,
Advisor (Aquaculture),
Crescent Hatchery & Prawn Farm,
'Almanar', Eriyad,
Kodungallur, Kerala.
- 9 Dr. K. V. Ahmad Bavappa,
Director, C. P. C. R. I.,
Kasaragod-670 124.
- 10 Dr. A. G. G. Menon,
Director of Extension,
Kerala Agri. University,
Mannuthy-680 651,
Trichur.

The terms of reference of the Commission will be as detailed in the Annexure enclosed hitherto.

Dr. A. Venkataraman will be Chairman of the Commission and the Director of Extension will act as the Ex-officio Member-Convenor.

The Director of Extension will pursue further action to convene the first meeting of the 'Review Commission'.

Sd/-
REGISTRAR

Annexure

TERMS OF REFERENCE OF REVIEW COMMISSION

A) Historical Review

Covering the origin and development of education, research and extension work on Agriculture in the State, the history of the constituent units which comprised the KAU and the impetus given to those activities after the formation of KAU and an evaluation of the NCA recommendation with regard to their validity and application in Kerala; redefinition of the aims; and objectives of the KAU in the future perspective.

B) Review and Recommendations on Administration & Management

- i) Administrative set up at headquarters, the constituent colleges, institutions and stations, with special reference to the adequacy or otherwise of delegation of powers.
- ii) Personnel management
- iii) Management of properties and physical plant, including infra-structure, and
- iv) Financial management, budgeting and control, audit and analysis of alternative and additional sources of funds.

C) Review and recommendations of Pedagogical methods

- i) Admission policy with special reference to the question whether aptitude has been reflected in the criteria of selection for admission;
- ii) Curricula, syllabi and relevance to existing and emerging problems of *Agricultural Development in Kerala*;
- iii) Teaching systems and methods, with special reference to the problems and promises of the trimester pattern and whether that pattern required change or replacement.
- iv) Duration of various courses, examination systems, grading, credibility of standards, class-room facilities, morale and discipline;
- v) Guest lectures, instructional tours, co-and extra curricular activities, physical education and health consciousness, students' welfare activities, including "Earn While you Learn" programme.
- vi) Faculty recruitment, training and development; remuneration, incentives and motivation, and work loads.
- vii) Need for and scope of starting new courses of instruction, new faculties, departments and colleges, if any.
- viii) Library facilities, documentation and information systems;
- ix) Identification of areas for development as 'Centres of excellence' and
- x) Establishment of specialist schools of subjects covering more than one faculty.

D) Review & Recommendation on Research work

- i) Research aims and policy
- ii) Formulation of research programmes and their relevance to reality in Kerala;
- iii) Extent of application of research findings in practice, productivity in terms of quantity and quality of Research findings and in terms of their significance to agricultural practices in Kerala;
- iv) Management of research activity including a review of the utility and performance and adequacy of the research stations, laboratory and library facilities;
- v) Sponsored research schemes, funding of research projects and identification of problem oriented research projects;
- vi) Liaison with scientific departments of the State and Centre, other Research institutions and Scientists;
- vii) Retraining, the intellectual rejuvenation of research personnel.

E) Review and Recommendations on extension

- i) Redefinition of the role of KAU in Extension, vis-a-vis the T & V, Operation Flood II, KADP and other developments, actualised and possible in the next quarter of a century;
- ii) Extent of coverage of various sectors of the farming population of Kerala by extension programmes of the KAU.
- iii) Adequacy and effectiveness of the extension methodologies and scope for improvement;
- iv) KAU's awareness of extension needs and recommendations for more effective dialogue with farmers;
- v) Special programmes for and research into the agricultural development of socially deprived sectors of the population, especially of the scheduled tribes;
- vi) Social factors and rural leadership factors in relation to the effectiveness and coverage of extension activities
- vii) Interlinking of extension with other activities of the KAU.
- viii) The work of the KAU Press.

F) Other allied matters

- i) Vocational education on Agricultural subjects in schools and location and encouragement of talents in those vis-a-vis KAU.
- ii) Non-teaching staff and the management of their problems.
- iii) Labour relations.
- iv) Management Information systems and simplification of procedures.
- v) Any other matter which the commission may include as relevant and meaningful in the context.

Sd/-
REGISTRAR

Appendix II

DETAILS OF SITTINGS MADE AND PERSONS MET BY THE KERALA AGRICULTURAL UNIVERSITY COMMISSION

1. Details of sittings

- 1st sitting — 4th June, 1985 at the Kerala Agricultural University Headquarters, Vellanikkara.
- 2nd sitting — 29th and 30th September, 1985 at Directorate of Extension, Kerala Agricultural University, Mannuthy.
- 3rd sitting — 8th and 9th January 1986 at Kerala Agricultural University Headquarters, Vellanikkara.
- 4th sitting — 21st and 22nd February, 1986 at College of Agriculture, Vellayani
- 5th sitting — 9th and 10th May, 1986 at Trichur.
- 6th sitting — 11th and 12th October 1986 at Trichur.

2. Persons met by the KAU Commission outside the Kerala Agricultural University

- 1 His Excellency the Governor of Kerala and the Chancellor of Kerala Agricultural University
- 2 Dr. A. Appa Rao, Vice-Chancellor, Andhra Pradesh Agricultural University, Rajendra Nagar, Hyderabad.
- 3 Sri. K. Ramamurthy, Vice-Chancellor, Orissa University of Agriculture and Technology.
- 4 Dr. L. D. Kataria, Vice-Chancellor, Haryana Agricultural University, Hissar.
- 5 Dr. G. B. Singh, Deputy Director General (SAE): ICAR New Delhi
- 6 Dr. U. C. Upadhyay, Assistant Director General (Edn) "
- 7 Dr. M. N. Sadaphal, Assistant Director General (Co-ordn.) "
- 8 Dr. Shankarlal, Assistant Director General (Food) "
- 9 Dr. M. V. Velayudhan, Assistant Director General (Soil Science) "
- 10 Dr. Punjab Singh, Assistant Director General (NARP) "
- 11 Mr. T. P. Panganathan, Director (Finance) "
- 12 Dr. R. N. Singh, Sr. Scientist (Edn) "
- 13 Dr. A. P. Sexena, Sr. Scientist (NARP) "
- 14 Sri. B. B. Nayar, Sr. Scientist (Nat. Dem) "
- 15 Dr. B. K. Rastogi, Sr. Scientist (NARP) "
- 16 Dr. A. M. Michael, Director IARI, New Delhi
- 17 Mr. Sukumaran, Registrar "
- 18 Dr. N. N. Goswami, Head, Division of Soil Science. "

- | | | |
|----|---|--|
| 19 | Dr. Y. P. Singh, Head, Division of Agrl. Extension. | IARI, New Delhi |
| 20 | Dr. (Mrs) Srivasthav, Professor of Agrl. Economics | " |
| 21 | Mr. M. A. Muralidharan, Sr. Scientist, Agrl. Economics | " |
| 22 | Dr. K. N. Singh, Sr. Scientist, Agronomy, | " |
| 23 | Dr. R. A. Agarwal, Professor of Entomology | " |
| 24 | Dr. R. M. Pandey, Head of Division of Horticulture | " |
| 25 | Dr. P. K. Majumdar, Sr. Scientist, Horticulture | " |
| 26 | Mr. S. R. Bapat, Head of Division of Crop Forecasting
Methodology | IASER New Delhi |
| 27 | Dr. P. N. Bhargave, Head of Division of Crop Science Statistics | " |
| 28 | Dr. G. S. Sekhor, Director, | Indian Potash Research Institute
(Delhi-Gurgoan Road) |
| 29 | Sri. V. Ranmachandran IAS, Chief Secretary, Government of Kerala | |
| 30 | Sri. S. Gopalan, Agricultural Production Commissioner, Government of Kerala | |
| 31 | Sri. M. S. Joseph, Secretary for Agriculture, Government of Kerala | |
| 32 | Dr. S. Vasudev, Chairman, State Science and Technology Committee | |
| 33 | Sri. P. Shanmugha Sundaram, Development Commissioner, Government of Kerala | |
| 34 | Sri. P. Suseelan, Director, Department of Agriculture, Kerala State | |
| 35 | Dr. P. C. Ramakrishnan Nambiar, Director, Department of Animal Husbandry,
Kerala State | |
| 36 | Sri. C. T. Sukumaran, Director, Department of Fisheries, Kerala State | |
| 37 | Sri. P. N. Surendran, Chief Conservator of Forest, Kerala State | |
| 38 | Sri. K. V. Harikrishnan Nair, Registrar of Co-operative Society, Kerala State | |
| 39 | Sri. N. George, Director, Bureau of Economics and Statistics, Kerala State | |
| 40 | Sri. G. Sreekumaran Nair, Agricultural Specialist, Government of Kerala | |
| 41 | Sri. P. A. Eapen, Joint Secretary, Port and Fisheries, Government of Kerala | |
| 42 | Dr. G. Arthur Vijay, Scientist, Sree Chitra Tirunal Medical Institute, Trivandrum | |

Institutions visited

The Kerala Agricultural University Commission visited all the institutions under the Kerala Agricultural University for detailed discussions. In addition, the following institutions outside Kerala Agricultural University also were visited by the Commission.

- 1 Indian Council for Agricultural Research, New Delhi.
- 2 Indian Agricultural Research Institute, New Delhi.
- 3 Indian Potash Research Institute, New Delhi
- 4 Andhra Pradesh Agricultural University, Rajendra Nagar, Hyderabad
- 5 Orissa University of Agriculture and Technology, Bhubaneswar.
- 6 Haryana Agricultural University, Hissar.
- 7 Central Tuber Crop Research Institute, Sreekarlam, Trivandrum.
- 8 Centre for Water Resources Development and Management, Calicut.
- 9 Punjab Agricultural University, Ludhiana.
- 10 G. B. Pant University of Agriculture and Technology, Pantnagar.

Appendix III

SALIENT RESEARCH FINDINGS

I. FACULTY OF AGRICULTURE

A. Crop varieties released

Name of variety	Station No.	Duration	Qualitative characteristics if any	Yield
(i) RICE				
1. Jyothi	PTB-39	110-115 days	Field tolerance to BPH	5-6 t/ha
2. Bharati	PTB-41	120-125 ..	Moderately resistant to Blast & field tolerance to BPH	5-6 t/ha
3. Sabari	PTB-40	100-135 ..	Suitable for Kuttanad & Kole areas	5-6 t/ha
4. Aswathi	PTB-41	120-125 ..	Dee-gee-Woogen-Semi-dwarf	5 t/ha
5. Suvarnamodan	PTB-42	115-120 ..	Semi-tall-Non-lodging. Moderate resistance to Blast-suitable for upland conditions	1650-2000 kg/ha.
6. Bhadra	MO-4	115-130days during Punja & 150 days during additional crop season	Suitable for cultivation in Kuttanad during the punja and additional crop seasons	5 t/ha
7. Asha	MO-5	115-118 days	Fairly resistant to the BPH Thrips and sheath blight-suitable for the punja and additional crop season of Kuttanad	5-6 t/ha
8. Pavizham	MO-6	115-118 ..	Good field tolerance to BPH, BLB and sheath blight	5-6 t/ha
9. Karthika	MO-7	115-118 ..	Fairly resistant to BPH, Sheath blight, and BLB	5-6 t/ha
10. Vytila-2		128 days	Tolerant to blight and blast	1700-2000kg/ha

11.	Lakshmi	Kayamkulam-1	175-180	,,	Fairly resistant to stem borer-Resistant to lodging-suitable for early and late sown conditions	2-3 t/ha
12.	Karthika	Mo-7	115-120	,,	Recommended for growing in all the three crop seasons single and double crop wet lands in Kuttanad and in Onattukara. Tolerant to BPH and moderately resistant to sheath blight, sheath rot and BLB.	5-6 t/ha
13.	Reshmi	PTB-44	150-180	,,	Suitable for growing in the second crop season	3.5 t/ha
14.	Vyttila-3		115 days		Suited to the Pokkali system of cultivation	1.8 t/ha
15.	Swarna Prabha	PTB-43	100-105	,,	Photosensitive suited for all the three seasons and also for the modan cultivation	4.0 t/ha
16.	Bhagya	Kayamkulam-2	100 days		Photosensitive and highly resistant to the drought conditions in the first 30-33 days after direct sowing in the first crop season in the Onattukara region.	4 t/ha
17.	Onam	Kayamkulam-3	95 days		A photosensitive variety for first crop season in the Onattukara region, highly resistant to drought conditions in the first 30-35 days after sowing. Moderately resistant to blight, sheath blight and blast diseases. Moderately resistant to stem borer, leaf roller and case worm.	

Name of variety	Station No.	Duration	Qualitative characteristics if any	Yield
(ii) COCONUT				
18. Pilico-1			Mean nut production per tree/palm for a period of 15 years 127.42 as compared to corresponding yields in LO and GB being 97.43 and 51.18.	
(iii) COWPEA				
19. Kanakamani	PTB-1	75-80 days	Photosensitive—Dual purpose variety. Fit for sowing during rabi and summer season.	1100 kg/ha of dry grain or 2500-3000 kg of green pods/ha
20. Krishnamany	PTB-2	50-60 days	Suitable for cultivation in rice fallows during the third crop season. Field tolerance to yellow mosaic	600 kg/ha
(iv) GROUNDNUT				
21. JL-24		90-105 ..	Bunch variety found suitable for Command areas	2820 kg/ha
22. TG-3		100-110 ..	For growing in summer rice fallows, also can be grown in kharif uplands.	2745 kg/ha
23. TG-14		105-150 ..	Also recommended for growing in summer rice fallows	2472 kg/ha
24. Spanish Improved		100-110 ..	Fit for growing in the uplands during the Kharif season	2326 kg/ha
(v) SESAMUM				
25. Kayamkulam-1		75-80 ..	Suitable for rice fallows and for uplands—Oil content 56.6%.	380 kg/ha
26. Thilothama	Kayamkulam-2	80-85 ..	Suited for the 3rd crop season for rice fallows in Onattukara—Multipoded, moderately resistant to phyllody—Oil content 55%	650 kg/ha

x	27. Soma	ACV-1	83 days in rice fallows and 85 days in rabi uplands	For summer rice fallows and in uplands in the rabi season. White seeded oil content is 51.2%	700 kg/ha in rice fallows and 350 kg/ha in rabi uplands
	28. Surya	ACV-2	87 days in rabi uplands	Seeds grey coloured	350 kg/ha
	(vi) SUGARCANE				
	29.	Co-62175		Co-62175 has been identified for cultivation in the river banks of the PRF Tiruvalla and MSM. Pandalam areas—	60 t/ha
		Co-7704		CO-7704 is found to be moderately resistant to the red rot disease. This is recommended as a replacement of the popular but susceptible Co-997. Co-7405 is another promising variety under advanced stages for release in Kerala	The yield of Co-7704 and Co-7405 are 60-90t/ha and 90 t/ha respectively.
	(vii) GINGER				
	30. Rio-de-Janeiro			Rio-de-Janeiro for high yield of fresh rhizomes; Marn—for maximum Oleoresin output and Rajpad—for maximum recovery of dry ginger. were identified suitable for cultivation in Kerala.	
	31. Rajpad				
	(viii) CASHEW				
	32. Anakkayam-1			Possesses some additional desirable attributes such as early flowering (October-November), short flowering phase (30 days) and early harvesting potential. Nuts medium sized shelling percentage 28%.	30 kg nuts/tree/year
	(ix) VEGETABLES				
	33. Bittergourd.	Priya		Fruit greenish with blunt spines	35 t/ha.

Name of variety	Station No.	Duration	Qualitative characteristics if any	Yield
(x) GUINEA GRASS				
34. Haritha	ACV-F-1		Suitable for growing in the sandy loam soils of coastal Kerala. Tolerant to drought and shade leaves glabrous with 5.31% protein.	Mean yield of forage/cutting is 1.78 t/ha.
(xi) LEMONGRASS				
35. OD-19				Grain yield 10t/ha, oil yield 28 kg/ha in the first year and 25 t/ha and 75-80/kg/ha in the second year; Citral content 85-90%.

B Crop Management—Rice

- 35 Sulphur coated urea, urea super granules and granulated compost increased Nitrogen use efficiency.
- 36 Placement of two urea super granules each of 26 for every four hills significantly improved grain yields. The increase was 700 kg/ha.
- 37 Cowpea was found to be the best catch crop after the punja crop in Kuttanad.
- 38 In the Cannanore and Ernakulam districts the fertilizer dose of NPK at 80, 40, 40 kg/ha, seemed to be the optimum for medium duration varieties for the Virippu and Mundakan seasons.
- 39 For medium duration varieties grown in the virippu season, June is found to be the best time of planting.
- 40 'Marotti' cake (*Hydrocarpus pentadra*) at the rate of 60 kg/ha recorded the lowest incidence of sheath blight disease.
- 41 Joint application of carbofuran at 0.75 kg/ai/ha and urea 10 kg N/ha at 20 days after transplanting gave higher grain yield and led to better overall pest control.
- 42 In trials to explore the possibility of taking an additional crop of rice under 'Koottumundakan' system in the Pokkali region, it was found that for combination sowing, 70% of Vyttila-1/Vyttila-2 and 30% of either the culture 25100 or 'Mundakan' seeds constituted the optimum proportion for direct seedling in the Virippu season.
- 43 Application of nitrogenous fertilisers during the early growth phase upto 35 DAT was found to be more productive than later applications.
- 44 For direct seeded Mashoori crop, application of nitrogen in three equal splits at sowing, 45 DAS and 85 DAS gave the highest grain yield.
- 45 For transplanted Mashoori crop, NPK at 50-25-25gkg/ha was found to be the optimum, the best times of application being 50% N as basal, 25% N each at 40 and 60 DAT during the Virippu season and 50% N as basal, 25% each at 20 and 40 DAT during the mundakan season.
- 46 It was found that the Karthika variety of rice required NPK at 90-45-45 kg/ha during the additional crop season and 110-55-35 kg NPK/ha during the punja crop season.
- 47 In studies on the suitability of rock phosphate for direct application in acidic rice soils of Kerala, superphosphate was found to be better than rock phosphate increasing the available P content of soil. Considerable quantity of P applied in the form of rock phosphate remained in soil even after growing rice for two seasons.



Cashew—BLA 4, 139-1
A variety released by K. A. U.



Bittergourd—Priya variety released by K. A. U.

C Crop Protection—Rice

- 48 Seedling root dip for 12 hours in 0.02% Chlorpyrifos followed by application of Carbofuran 3%G at 0.75kg ai/ha or Methosolan at 0.50 kg ai/ha or spraying Quinalphos at 0.5 kg ai/ha were effective against gall midge infestation.
- 49 Fenitrothion, Fenthion, Monocrotophos and Phosphamidon were safer at recommended rates for use in pokkali fields for the control of rice stem borer without considerable adverse effects to fishes/prawn.
- 50 MBC (Carbendazim) was found to be promising at 500 g ai/ha against the sheath blight disease of rice.
- 51 Application of potash in two equal split doses as basal and at panicle initiation was more effective in reducing blast incidence.
- 52 Among the high yielding varieties Jyothi and Sabari tolerated copper fungicides without any phytotoxicity.
- 53 Granular formulations of Oxadiazon at 0.25 or Oxfluorfen at 0.10kg ai/ha applied at 6 DAS effective against most of the weeds occurring in direct sown crop.
- 54 Oxadiazon granules at 0.75 kg ai/ha and 2, 4-D (EC) granules at 1kg ai/ha were equally effective against weeds in direct sown crop under puddled soil situations.
- 55 Application of carbofuran in the nursery at 1 kg ai/ha is found to be effective against the rice cyst nematodes. *Heterodera oryzoicola*. Seedling root dip in 0.2% Diméthoali for 6 hours before transplanting is also recommended.
- 56 Sheath rot (*Acrocyldrium oryza*) is controlled spraying benlate 1-2g/L ha (0.1%) or difolatan (0.1%).
- 57 Combined application of 2, 4-D sodium salt and urea gave effective weed control both under direct sown and transplanted conditions.
- 58 The varieties RPW-6-17 showed remarkable resistance to rice gall midge while IET 5912 and IET 7568 were resistant to the rice stem borer.
- 59 The most vulnerable stage of rice crop for insect attack in the field is 30 to 60 days after transplanting. This brings to focus the need for intensification of surveillance during this phase of crop growth.
- 60 Aswathy, Co-25 and IR-5 showed moderate level of resistance to bacterial leaf blight.
- 61 Delchlor @ 1.0kg ai/ha, applied at 6 days after sowing followed by one hand weeding given on the 40th day is found to control the weeds effectively.
- 62 Soaking germinated seeds in Chlorpyrifos (Dursban 20 EC) at 12 ml/1.2 litre water for three hours gave very good control of the gall midge and stem borer.

- 63 Reduction in the dose of Carbaryl from 1.00 kg ai/ha to 0.75 kg ai/ha and quinalphos (Ekalux 25% EC) from 0.25 to 0.15 kg ai/ha was found to be feasible without affecting the level of pest control. The reduced doses are hence recommended for pest control in rice.
- 64 Spray applications of Chlorpyrifos (Dursban), Quinalphos (Ekalux) and Monocrotophos (Nuvacron) were found to be more effective than granular application of Carbofuran (Furadan), Quinalphos(Ekalux) and Phorate (Thimet), in controlling the leaf folder.
- 65 The lines IRBN-R, 165, 494, IET-7109 and 6826 showed absolute resistance to sheath blight and sheath rot diseases.
- 66 In kole lands, benthocarb @1.0 ai/ha applied six days after sowing followed by hand weeding on 35 DAS was very effective in controlling weeds.
- 67 2, 4-D EC@0.8 kg ai/ha and Benthocarb @ 1.5 kg ai/ha were found to be relatively more effective for controlling weeds in the additional crop and punja crop seasons in the Kuttanad area.
- 68 2, 4-D EC @1 kg ai/ha or Butachlor or Benthocarb each at 1.5 kg ai/ha, controlled the weeds more effectively under transplanted conditions.
- 69 Combined application of 2,4-D sodium salt and urea gave effective weed control both under direct sown and transplanted condition.
- 70 Application of Carbofuran at 1 kg ai/ha on 25 DAT and application of 50% more of recommended dose of potash were found to be very effective in reducing the severity of sheath blight and sheath rot in endemic areas, through effective control of the rice root nematodes which predisposes the crop for sheath blight infection.
- 71 Among the varieties/cultures screened for their reaction to major diseases, Jaya, IR-20 and Sabari showed resistance to sheath blight during both kharif and rabi seasons. Varieties Aswathi, Bharathi, Rohini, Suvarnamodan and H-4 showed moderate resistance to blast.
- In the high ranges of Wynad district, herbicidal treatments were found to be effective and more economical than hand weeding, for controlling weeds occurring in the rice crop. The treatment with Basalia, 2, 4-D at 1.5 kg ai/ha given on 12 DAP was relatively more economic and efficient.

D. Coconut, Arecanut and Oil Palm

- 72 In germplasm evaluation studies, copra yield in the Laccadive ordinary variety was found to be consistently good.
- 73 Application of P beyond 225 g/palm/year is not essential for red sandy loam soils.
- 74 Simple fertilizer trials in cultivator's fields clearly showed that in Root (wilt) free areas, yield increase ranging from 20-130% could be obtained by proper NPK fertilization.

- 75 Guava was recorded as the alternate host of the coreid bug *Paradasynus rostratus* infesting nuts. The bugs are effectively controlled on alternate hosts by spraying Quinalphos 0.025% suspension.
- 76 Protection from the seedling stage onwards with fungicides, nematicides and antibiotics jointly as well as independently and NPK fertilization in conjunction with Ca, Mg, Zn was of no value in affording protection to the palms from the Root (wilt) disease.
- 77 Chowghat Dwarf Green (CDG) was found to be a promising pollen parent for the production of superior hybrids involving WCT, in respect of seedling vigour and flowering behaviour of the hybrid progenies.
- 78 In respect of precocity, the off-types (NDC) from Chowghat Dwarf Yellow (CDY) were found to be promising and these came to flowering in a period of 50 months.
- 79 Sibmated progenies from WCT lines showed increased nut production than selfed progenies.
- 80 In the red soils of Trivandrum district, the fertilizer level of 680:450:900 g/tree/year of NPK and the spacing of 5x5m gave the highest nut yield in WCT palms.
- 81 Tapping did not improve the productivity of uneconomic palms.
- 82 Stem injection of grown-up coconut palms with monocrotophos at 7ml ai/palm gave good control of the red palm weevil grubs upto 90%.
- 83 Among the hybrids evaluated for their performance, WCT x Niyurgading, WCT x CDG and WCT x Gangabondam were found to be more promising.
- 84 In pre-potency studies in WCT palms, the progenies from the elite tree no. 36 located at the Kuttiady region showed consistently higher nut yield than the progenies from other palms.
- 85 Fermenting cocoa beans kept sandwiched between transversely cut discs of coconut stem were found to attract and trap the adults of the red palm weevil.
- 86 Nutritional requirements of sweet potato grown as a floor crop in coconut plantations showed that 50 kg each of N and K/ha was found to be optimum for the crop.
- 87 The turmeric variety T Sunder was identified to be suitable for growing in coconut gardens.
- 88 There was conspicuous improvement of root (wilt) affected palms consequent on growing and in situ incorporation of green manure crops. For lateritic, alluvial and sandy soil among Sesbania, Cowpea, Sunhemp, Daincha and Kolinji, Cowpea the most suitable for growing in coconut basins for subsequent incorporation.

- 89 *Tylenchorhynchus* sp. and *Helicotylenchus* sp. were dominant in soil around roots of wilt affected palms.
- 90 The extent of button shedding was maximum in the variety Laccadive Ordinary (75.51%), the minimum being in Strait Settlement (52.20%). There was significant positive correlation between the number of female flowers produced and the number of buttons shed.
- 91 Stem injection with Oxytetracyclin and Penicillin at graded doses of 4, 6, 8 g/palm at intervals of 4 months did not reduce the intensity of the Root (wilt) disease infesting coconut.
- 92 In studies on the performance of NCD materials, the off-type seedlings from the Strait Settlement variety continued to maintain its lead over others in respect of nut production, followed by Chowghat Dwaf Green in that order.
- 93 Simple fertiliser trials carried out in the cultivators' fields in the laterite areas of the Kasaragod and Cannanore districts have proved beyond doubt that fertiliser application to coconut at 500-320-1200 g/NPK/tree/year was highly beneficial in augmenting the productivity of palms by 50-70%.
- 94 Studies on the response of D x T hybrids to common salt application in progress at the Pilicode centre from 1976, clearly indicate that the treatment comprising application of Na_2O @ 250 g + K_2O @ 750 g/palm excelled other treatments in respect of the performance of the palms. There was absolutely no deleterious effects due to the application of common salt.
- 95 The percentage of button shedding in coconut was found to be the maximum in July, there being a significant positive correlation between the extent of button shedding on the one hand and the monthly rainfall on the other.
- 96 Application of Bordeaux mixture at 1%, thrice an year and as sprays in the pre monsoon break period and in the post monsoon period was found to be best prophylactic treatment for the management of the leaf rot disease.

E. Spices

a) Pepper

- 97 Under the partially shaded conditions of coconut gardens, Karimunda performed the best.
- 98 Pepper in plots intercropped with turmeric yield better.
- 99 Banana was found to be unsuitable as an intercrop for pepper.
- 100 Plants receiving 150 g potash per year recorded a low percentage of spike shedding.
- 101 NAA at 100ppm and 2, 4-D at 200 ppm gave maximum weight of spikes and berries.
- 102 Dipping the cuttings in IBA 1000 ppm solution for 45 seconds improved rooting.



Pepper – Panniyur-1
a KAU variety

- 103 A promising culture (Culture 354) with a dry pepper yield of 1.629 kg/plant/year was identified in preliminary variety trials.
- 104 Planting pepper cuttings in potting mixture drenched with 0.04% solution of Emisan-6 controlled the rotting in the nursery.
- 105 It was demonstrated that pepper can be grown as a bush plant in pots or as a floor crop in the multi-tier system.
- 106 The fertiliser trials led to the conclusion that 50 g N, 75g P₂O₅ and 200g K₂O per plant per year as the optimum for Karimunda and Arakulam Munda. For Panniyur-1, the indications were that the optimum combinations may be 50g N, 100g P₂O₅ and 150g K₂O/plant/year.
- 107 Fungal pollu infection was found to be minimum when Bordeaux Mixture 1% was sprayed during the last week of June and in the third week of September.
- 108 A taxonomic key was formulated for grouping of pepper varieties based on some stable morphological features of *Piper nigrum*.
- 109 The fungus *Phytophthora*, which causes the quick wilt disease of pepper is also found to be the causal agent for the abnormal leaf fall in rubber, mahali of arecanut, azhukal disease of cardamom, black pod rot of cocoa and bud rot of coconut.
- 110 Hybridization programme to evolve superior types of pepper was continued during the year and the cultures 774, 120 and 54 were found to be relatively more promising in the progeny row trial.
- 111 Application of NAA/2-4, D at 10 ppm at spike initiation, berry setting and berry development stages resulted in the production of bold heavy berries, in pepper.
- 112 In CYT of 5 pepper varieties, the variety Kuthiravali excelled others. It was found that this variety was the most stable in respect of important economic attributes.
- 113 The studies on the influence on planting materials on the growth habit and yield of vines showed that the vines selected from the basal 1/3 portion of the runner shoots gave highest yield.
- 114 Studies on the root activity pattern in black pepper plants employing radio tracer techniques clearly indicated that root system is located at a radial distance of 30 cm away from the vine at a depth of 10 cm.

(b) *Cardamom*

- 115 Among the seed treatments, gibberellic acid, scarification + hot water treatment and cowdung slurry gave higher germination.
- 116 Fruit set in sugarcane was found to be maximum in plots colonised by honey bees at 4 hives/ha.
- 117 Ekalux 0.1% (Quinalphos 0.025%) gave effective control against shoot fly.

- 118 Continuous eradication of the 'Katte' affected plants reduced the overall percentage of infection.
- 119 Spraying and/or drenching the soil with 1% Bordeaux mixture reduced the capsule and panicle infection in 'Azhukal' disease.
- 120 Nursery practices for Cardamom were standardised. Storing the Cardamom capsule as such, ensured better viability of seeds.
- 121 Application of Phorate 30 g/6m² nursery area or spraying 0.025% Quinalphos suspension controlled the shoot fly incidence in the nursery.
- 122 A minimum of five applications of Fenthion 0.05% on a scheduled basis were found to be essential against the Cardamom thrips. Among the dusts, Phenthoate at 10g/plant applied with Duster was found to be more promising. Methyl parathion dust 1.5% was relatively less effective.
- 123 Highest germination of cardamom pollen grains was obtained in 20 per cent sucrose solution.
- 124 It was found that in cardamom cross pollination is the rule, the honey bees being the main pollinating agents.
- 125 Spraying Bordeaux mixture (1%) along with rosin-Soda adhesive at the commencement of the monsoon and 2-3 times more upto November-December was quite effective in controlling the 'Azhukal' disease of cardamom.
- 126 Monthly spraying with fenthion (0.05%) from June to November gave very effective control of cardamom thrips (*Sciothrips cardamomi*)
- 127 The causal organism for the 'Azhukal' disease was identified as *Phytophthora meadii*.

(c) Clove

- 128 Clove seeds collected and sown during the month of May gave better vigour and rate of growth of seedlings.
- 129 The seeds collected during June recorded the highest percentage of germination.
- 130 Transferring the seedlings from the primary nursery to coconut husk pots at the second month and transplanting them to the main field with the container intact at the ninth month gave higher rate of survival.
- 131 Bordeaux mixture 1% and Fytolan 0.3% were found to be effective in controlling the common diseases of Clove.
- 132 The clove seedlings transplanted to coconut husk pots containing a potting mixture consisting of 1:1:1 mixture of soil, sand and cowdung and two teaspoons each of bone meal and powdered groundnut showed maximum growth.
- 133 The disease in tree spices caused by *Colletotrichum* could be effectively controlled by Bordeaux mixture (1%) or fytolan (0.3%)

(d) *Ginger*

- 134 Nadia, Bajpai and Maran were found suitable for obtaining high yield of dry ginger, oleoresin, and oil. Rio-de-janeiro was suitable for the second crop of ginger (irrigated).
- 135 A pre-planting soil drench followed by a minimum of two post-emergence applications (one and three months after planting) of either cheshunt compound or Agallol 0.1% controlled the Soft rot disease.
- 136 The Ginger type 'Maran' was found to be least susceptible to the leaf spot. Cumán 0.2% and Bordeaux mixture 1% were effective in controlling the *Phyllosticta* leaf spot.
- 137 None of the thirty varieties tested were resistant to *Pseudomonas solanacearum* Smith.
- 138 Aldicarb @ 4.5 g/m² effectively controlled the nematodes infesting Ginger.

(e) *Turmeric*

- 139 Whole rhizomes were found to be the best planting material for realising maximum yield of green turmeric. In the germplasm evaluation conducted at Ambalavayal, T. Sunder, Kuchipudi, Sugandam and Ettamukkala proved superior.
- 140 Under the partially shaded conditions of coconut gardens, Kasthuri Tanaka, Mannuthy local and Kuchipudi performed well. In another varietal trial, Mannuthy local, with a per hectare yield of 560.6 kg of curcumin and 1470.3 kg of oleoresin, was found to be superior to the others. A multilocational trial with four promising types conducted in seven locations indicated the superiority of Mannuthy local and Kuchipudi.
- 141 Middle of May planting using rhizome material weighing 60 g and adopting a spacing of 10 x 20 cm were found to be the best practice for obtaining high yields of rhizomes. Among the planting materials evaluated, whole mother rhizomes were found to be superior to half-cut rhizomes and finger rhizomes.

(f) *Nutmeg*

- 142 Spray applications of NAA at 30 ppm at the time of flowering controlled abnormal fruit drop.
- 143 In seedling trees of nutmeg, fruit setting was higher when NAA at 10 ppm (Celmon) was applied. In grafts 10, 20, 30 and 40 ppm sprays led to improved fruit setting.

F *Cashew*

- 144 The weight of nuts had positive correlations with height and number of leaves in cashew seedlings.

- 145 The best season for side grafting, veneer grafting and budding was found to be May–October and the highest percentage of survival of these materials was from July to September.
- 146 The only natural enemy recorded in association with the tea mosquito-bug *Helopeltis antonii* was a predatory ant *Crematogaster wroughtoni*.
- 147 Ordinary potting mixture in polybag container was found to be more promising for rooting and establishment of air-layers of Cashew. Significant variability among the trees with respect to percentage of rooting in air-layers was detected and the tree No. 1610 gave maximum rooting of 50%.
- 148 With stone grafting, successes were more when grafting was conducted during June–September.
- 149 Epicotyl grafting is the simplest and the best method of vegetative propagation in cashew. The best period for epicotyl grafting was found to be March–April.
- 150 Pineapple was found to be most suitable and economic intercrop for cashew plants of less than five years' growth.
- 151 Nutrient contents in the leaf were not found to be related to the extent of rooting in cashew air-layers.
- 152 Fertiliser trials in cashew showed that the main effects of N and K as well as PK interaction were significant. Nitrogen given at 1000 g/tree/year gave significantly higher yields than the control.
- 153 IAA, IBA, Seradix at 250 ppm promoted root growth in cashew air layers.
- 154 Pre-curing of scion twigs for 10 days in advance was found to be the optimum for successful epicotyl grafting as well as for the patch-budding and soft-wood grafting.
- 155 The long term fertiliser trial on cashew in progress at Madakkathara centre from 1973 was concluded during the year. The overall results showed that there was no response to P & K. There was significant response to nitrogen up to 500 g/tree/year. Based on the economic analysis and also on the basis of pooled analysis of the yield data, a nitrogen dose of 500 g/tree/year could be recommended.
- 156 Among the various methods of vegetative propagation evaluated for their relative efficiency, epicotyl grafting continued to give encouraging results. The summer months (March–May) were found to be the best for ensuring the maximum take in this technique of grafting.
- 157 The studies on prophylactic and curative measures against the cashew stem borer were continued at the Madakkathara and the Pilicode centres. In both centres prophylactic painting of the trunk up to a height of 1 m and the exposed roots with HCHO .2% afforded adequate protection against the pest. The curative treatments were found to be ineffective at both centres.

152 The aerial spraying for evaluating various insecticides against pests occurring on cashew inflorescence clearly indicated the distinct superiority of endosulfan 35 EC at 750 ml/ha for control of the tea mosquito bugs. For controlling the inflorescence thrips and leaf miners, quinalphos was found to be as effective as endosulfan.

G. Pulses:

i) Cowpea:

- 159 The variety C 152 performed well as an intercrop in Tapioca.
- 160 Among the pulse crops evaluated for their soil enrichment potential, Cowpea excelled others.
- 161 Treatment of seeds with Phoxim at 10 ppm was effective in controlling the pulse beetles for up to four months in storage.
- 162 Application of half the dose of N and the full dose of P as basal followed by two foliar applications of urea at 2% on 20 and 30 DAS was relatively more effective, in increasing production.
- 163 C 152 and P 118 were identified as promising for growing as intercrop in tapioca crop (variety M4).
- 164 Application of full P as basal and two foliar sprays of urea 2% solution at 20 and 30 days after sowing gave the best yield.
- 165 Maximum uptake of N and maximum profit resulted from the application of 20 kg N/ha as basal+10 kg N/ha, as foliar spray at mid-pod filling stage.
- 166 The variety V-16 recorded the maximum yield among 12 varieties evaluated for three years during the kharif season at Pattambi.
- 167 C-152 gave the maximum yield among six varieties during kharif and 10 tested during Rabi at Pattambi.
- 168 V-26 and HG-22 were better yielders among 12 varieties under partially shaded conditions in coconut gardens during the kharif season.
- 169 Single ploughing followed by interculture on 15th and 30th days gave the highest seed yield and net profit per hectare.
- 170 The economic dose of P_2O_5 under irrigated conditions was 56.7 kg/ha.
- 171 Maximum yield was obtained at 20 kg N/ha as basal+10 kg N/ha as foliar spray at mid-pod filling stage.
- 172 The pathogen causing collar-rot and web blight diseases in cowpea infects about 28 different host plants belonging to 16 different families. PCNB was effective as soil drench and vitavax as foliar application against the collar-rot disease.
- 173 The variety, HG-22 was found to be the most suited for cultivation in the command areas of Peechi, Malampuzha and Chalakudy.

- 174 The variety Ci-152 recorded maximum seed yield when grown as a companion crop for tapioca.
- 175 The varieties V-59, V-87, V-37, KBC-1, S-488 and CG-104 were moderately resistant to the cowpea isolate of *Rhizoctonia solani*.

ii) *Greengram:*

- 176 Path coefficient analysis showed that the number of pods/plants, number of seeds/pod and 100 seed weight are the traits exhibiting positive direct effect on yield.
- 177 The Rhizobial culture no. 27 was better suited for Greengram.
- 178 Maximum grain yield was obtained at 30 kg K₂O per hectare.
- 179 Application of 500 kg lime and 60 kg P₂O₅ or 100 kg lime and 30kg P₂O₅ per hectare was found to increase seed yield. Phosphorus has marked influence on seed and protein yield.
- 180 The variety, Philippines recorded the highest yield among 11 varieties evaluated. It was found to be a good general combiner for 10 out of the 12 characters studied.

iii) *Blackgram:*

- 181 Co 2 was found to be the best yielder in summer rice fallows at Pattambi and Kayamkulam.
- 182 For irrigated conditions, the variety T 9 was better suited.
- 183 The Rhizobial strain no. 5 was found to be better suited to Blackgram.
- 184 Border strip and bed methods were equally effective in summer rice fallows.
- 185 KMU-3, M-3 and T-9 were found to be high yielders in rice fallows during summer.
- 186 The NPK level of 20.50:40 gave maximum seed yield in rice fallows during summer at Kayamkulam.
- 187 T-9 was the best suited variety for irrigated conditions in rice fallows during summer.
- 188 The variety Co-4 gave the maximum yield at Pattambi during Rabi.
- 189 The variety Co-2 was suitable for the summer rice fallows of Onattukkara.

iv) *Horsegram:*

- 190 Highest grain yield was obtained under the NPK dose of 10:25:10 kg/ha.
- 191 HPK-2 and HG-93 were high yielders at Pattambi.
- 192 The varieties HPK-2 and IC-11448 gave higher seed yields among 30 varieties evaluated during Rabi at Vellayani.
- 193 Pureline culture no. 2 gave 35% increase in seed yield over the Pattambi local variety.

v) *Redgram*:

- 194 The variety H 77-208 gave the highest grain yield among ten varieties evaluated.
- 195 H 77-208 was the best yielder followed by DL-78-1 in an evaluation of 10 varieties at Pattambi.

H. **Oil Seeds**

(i) *Sesamum*

- 196 The culture No.8 of sesamum was found to be significantly superior to Kayamkulam-1 at all locations in Onattukara.
- 197 NPK at 40:15:30 kg/ha along with cattle manure at 5 tons/ha, produced the highest yield in the multipoded mutant and Kayamkulam-1 varieties of sesamum in Onattukara.
- 198 Different levels and methods of application of K did not differ appreciably in sesamum grown under rice fallow conditions.
- 199 The Culture 8, a derivative from the cross PT 58-35 x Kayamkulam 1 was the best yielder in multilocational trials. This was released as Thilothama.
- 200 The type 42-1 is the most promising among the types evaluated.
- 201 Genetic analysis of multipoded and multiloculed characters showed that these were recessive to normal conditions. The scope for recombining the multipoded and multiloculed characters is indicated.
- 202 The highest yield in Kayamkulam 1 variety (286 kg/ha) was obtained at the NPK dose of 30:15:30 (basal).
- 203 In Thilothama-the multipoded mutant-the maximum yield of 368 kg/ha was obtained at the NPK level of 15:15:15 basal + 15:0:15 at interculture.
- 204 The Culture-8 was the most promising multipoded variety in multilocational trials. This was released as Kayamkulam-2 (Thilothama) for cultivation in summer rice fallows.
- 205 The multiloculed selection no. 42-1 recorded the highest yield among 9 selections evaluated under upland conditions during Rabi and in rice fallows during summer.
- 206 Maximum yield was recorded by the multipoded mutant at the NPK level of 15:15:15 basal + 15:10:15 at interculture + cattle manure 5 tons/ha.
- 207 60 kg K₂O/ha produced the highest seed yield. Oil content increased significantly up to 30 kg K₂O/ha.
- 208 40 and 60 kg K₂O/ha, particularly in split application ($\frac{1}{2}$ basal + $\frac{1}{2}$ at interculture) gave increased seed yield.
- 209 The best time of sowing in rice fallows at Kayamkulam for obtaining optimum plant population and higher seed yield is 5 days after the harvest of the 2nd crop rice.

- 210 Highest yield was recorded in hand weeded plots but maximum profit/ha was in plots treated with Alachlor at 0.75 kg/ha.
- 211 Nitrogen at 30 kg/ha is optimum for irrigated sesamum. The net return per rupee invested on Nitrogen was maximum at 45 kg/ha.
- 212 Maximum percentage of germination at 11 months after storage was for seeds stored in seed bins of tin. Storage in seed bins of tin mixed with ash reduced germination.
- 213 100% transmission of leaf curl disease was obtained by grafting. Sap and seed transmissions were not effective. About 50% transmission was obtained, by the vector *Bemisia tabaci*.
- 214 The variety S-8 was found to be the best in multilocational trials of twenty varieties at the Pattambi, Vellayani and Kayamkulam centres.
- 215 The varieties C-6, B-67 and Cul-38-1 were moderately resistant to the leaf spot disease.

(ii) *Groundnut*

- 216 Highest yield of pods and haulms was recorded by Pollachi-1 under partially shaded conditions in coconut gardens.
- 217 TMV-2 was found to be most suitable for cultivation in summer rice fallows of Onattukara.
- 218 Rhizobia specific to 15 varieties were isolated.
- 219 The NPK dose of 30:60:60 kg/ha was found to be essential to ensure maximum pod yields.
- 220 Maximum yield was recorded at the NPK levels of 30:30:60 per ha.
- 221 Yield of pods and haulms were unaffected by lime application in summer rice fallows at Kayamkulam.
- 222 Raising one row of groundnut at a spacing of 30 cm in tapioca was found to be the best.
- 223 The interaction between varieties and Rhizobium isolates was significant indicating host-Rhizobium isolate specificity.
- 224 The variety, USA-123 and its homologous isolate R2 proved to be the best variety and Rhizobium isolate respectively.
- 225 The Rhizobium isolates tolerated a pH of 5 to 9, the maximum growth being obtained at neutral pH.
- 226 RC-119704, TG-14, TG-3 in summer rice fallows in Onattukara and EC-119704, Co-1 and Spanish Improved in kharif uplands at Vellayani are promising.
- 227 JL-24 recorded the highest yield in command areas.

- 228 EC-119704 is the most promising variety under partially shaded conditions in coconut gardens in Trivandrum Dt.
- 229 The variety EC-115678 gave the highest yield under coconut shade at Mannuthy.
- 230 Dibbling of seeds after regular land preparation followed by hoeing on the 15th and 30th days recorded maximum yield in the summer rice fallows at Kayamkulam.

I. Vegetables and Tuber Crops

- 231 The Brinjal line SM-6 showed moderate level of field resistance against the Bacterial wilt disease.
- 232 In multilocational trials, the performance of the Snake gourd line TA 19 was found to be good.
- 233 The Tomato line LE-79 showed moderate tolerance to the Bacterial wilt disease.
- 234 The improved Bhendi culture-5 gave higher fruit yield than the variety Pusa sawani.
- 235 The 'Blue' variety of Chilli, 'Erandan Keera' of Amaranthus and the line H-4126 of Sweet potato were identified to be relatively more superior among the tested lines.
- 236 The economic optima for Nitrogen in Pumpkin and Cucumber were found to be 71 kg and 46 kg/ha respectively.
- 237 Metham sodium soil drench (25ml/m²) and Phenamiphos granule (0.3g ai/m²) were both effective in suppressing populations of the Root knot nematodes in Brinjal.
- 238 Inter-cropping of Tapioca with Greengram, Black gram and Cowpea was found to be more remunerative than a pure crop of Tapioca.
- 239 In Bhendi, combined seed treatment with Carbofuran (3% ai-w/w) and Thiram (0.2% ai-w/w) was effective in reducing Root knot nematode populations.
- 240 The adoption of deep ploughing, nursery treatment with Metham sodium (25 ml/m²) and spot application of Aldicarb at 1 kg ai/ha at transplanting substantially reduced infestation by Root knot nematodes in Brinjal.
- 241 High volume application of Quinalphos (0.05%) or Fenitrothion (0.05%), 2 months after planting was found to be quite effective in reducing tuber damage by the Sweet potato weevil.
- 242 The culture 5-1, a derivative from Pusa sawani x 'Kilichundan' was identified to be quite promising.
- 243 The deep red Cannanore and Kannara local varieties came to flowering only in September-October and the non-bolting character was found to be quite promising.

- 244 In chillies, solitary fruit character is found to be dominant over clusterness and the pendulous nature as dominant over the erect fruit character.
- 245 Among the sweet potato varieties screened for their self incompatibility, the variety S-378 was the only line which was detected to be self compatible.
- 246 The winged bean accessions PT-37, 38, 39, 40, 41, 14 and 11 were found to be more promising.
- 247 The Dolichos bean line DL-25 performed better than other cultures held in the germplasm reserves.
- 248 The water-melon variety 'Sugar baby' continued to maintain its lead over others in terms of fruit yield and quality.
- 249 The cowpea variety K-1552 excelled others in respect of pod yield.
- 250 The maximum yield of tubers in sweet potato was obtained for most of the varieties at 99-105 days after planting.
- 251 The oriental pickling melon *Cucumis melo* var *canomon* continued to excel others in performance.
- 252 Bacterial wilt resistance in tomato was found to be recessive and the genes for this in different sources were non-allelic.
- 253 The *Capsicum annum* cultures 53 and 57 continued to excel others in fruit quality attributes and productivity.
- 254 Interspecific hybridization involving *Capsicum annum* and *C. frutescens* was successful and the chances of transferring wilt and nematode resistance of the latter to the former appeared to be brighter.
- 255 Pitcher irrigation by keeping water in earthen pots which are sunk close to root zone was found to be distinctly superior to pot watering.
- 256 Snakegourd fruit in the first week after set were found to be highly susceptible to fruit fly infestation. This brings out the necessity for mechanical/chemical exclusion of the pest at the susceptible phase.
- 257 Genotype-environment interaction studies revealed that the sweet potato varieties H-2752 and H-2712 were suitable for general cultivation and H-4024 and H-4126 for poor environments.
- 258 Mass selection and single plant selection were found to be superior to pure line selection and single seed descent methods to improve the level of productivity and resistance to bacterial wilt in brinjal.
- 259 The inheritance studies in tomato indicated that separate gene systems are responsible for resistance to disease in *L. pimpinellifolium* and in the Carolina lines. Complete susceptibility of F_1 s to the wilt disease proved the recessive type of gene action involved in the inheritance of resistance.
- 260 The five botanical varieties of *Cucumis melo* namely, inodrus, conomon, flexuosus, momordica and utilissimus were found to be crossable among each other.

- 261 For economic production of *Coleus parviflorus*, a fertiliser dose of 60 kg N, 30 kg P₂O₅ and 120 kg K₂O/ha was found to be the optimum.
- 262 A dose of 18 kg N, 48 kg P₂O₅ and 36 kg K₂O was found to be the optimum nutritional requirement for getting maximum green tender pods in the winged bean.
- 263 The brinjal varieties SM-65, 68, 97 and 105 were found to be resistant to fruit and shoot borer.
- 264 In *Amorphophallus*, corms of 750g planted at 50 x 50 cm spacing gave highest yield.
- 265 The Pant C₁ variety of chilli showed resistance reaction to four of the nine virulent isolates of the virus. KAU cluster was resistant to two isolates and White Kandari to three isolates. The variety Chuna was resistant to TEP-13, a virulent isolate of *P. solanacearum*.

J. Fruit and Floriculture

(i) Banana

- 266 In rainfed Banana crop of the variety Palayankodan, the highest yield was obtained at 300 g N/plant. There was no response to P.
- 267 In the rainfed Banana crop (var. Palayankodan), yield of the first ratoon crop was not reduced even when fertiliser application was skipped for the ratoon crop.
- 268 The yield of Palayankodan variety of banana under rainfed conditions was significantly higher when nitrogen was applied at the rate of 100 g/plant. Phosphorus gave no significant response. Graded doses of K was effective in giving significant increase in the number of fingers per bunch.
- 269 Sucker size had no effect on yield in banana. The smaller the sucker, the longer was the duration of the crop. Bunch size of the parents had no effect on the bunch size of clonal progenies of the Palayankodan variety.
- 270 In Nendran variety of banana, the farmers' practice of irrigating on alternate days at one cm depth yielded better returns than irrigation scheduled at 0.6, 0.9 and 1.2 IW/CPE ratios.
- 271 In the rainfed banana var. Palayankodan, yield was found to increase at increasing levels of potassium and the highest yield was recorded at 600g K₂O/plant.
- 272 Pollen analysis of 72 cultivars of banana were undertaken and methods of pollen germination standardised. Interclonal hybridization in banana met with success. Out of the 27 cross combinations tried 8 combinations, namely, Agniswar x Pisanglilin; Palayankodan x Pisanglilin, Harichal x Pisanglilin; Lactan x Pisanglilin; Mannan x Pisanglilin; Nendra vannan x Pisanglilin; Palayankodan x Sikuzani and Nendran x Sikuzani were found to be compatible. Seed set in the Nendran variety was noticed when crossed with a compatible male parent.

- 273 Among the varieties screened for drought tolerance, Palayankodan and Njalipooan were found to be most tolerant to drought.
- 274 The varieties Nendrapadatti, Palayankodan, Jugmoni, Kuntuali, Booditha Bonth Batheesa, Peyan, Kanchikela and Kapok were found to be highly resistant to anthracnose disease of banana.
- 275 A species of cyst nematode *Heterodera oxyzicola* parasitising banana was reported for first time. Carbofuran @ 1 g ai/plant at planting and again at three months after planting was found to be most effective in controlling root nematodes.

(ii) *Pineapple*

- 276 Pineapple suckers with 501—1000 g weight was found to be relatively better with reference to precocity of flowering and plant vigour.
- 277 The spacing of 30 x 45x105 cm and the trench depth of 30 cm were more promising in terms of the growth attributes and the 'D' leaf morphometrice in Pineapple.
- 278 Foliar application of 150 ppm Ethrel was found to be the best for maximum induction of flowering in pineapple.
- 279 NAA at 300 ppm increased the fruit size in pineapple.

(iii) *Citrus*

- 280 In a varietal-cum-root stock trial, the combination of Kinnow Mandarin on Troyer Citrange gave the maximum number of fruit. In organoleptic tests, fruit of Coorg mandarin on Cleopatra root stock excelled others.

(iv) *Mango*

- 281 Ethephon at 200 ppm as foliar sprays induced heavy flowering in the mango variety Benganappalli.
- 282 The pink disease infection in mango could be reduced considerably by removing dried twigs and branches, scrapping off the pink encrustation on live branches; application of bordeaux paste and also by spraying 1% bordeaux mixture in the last week of June.
- 283 The mango variety, Kalapady was found to be less prone to infestation by the mango hoppers.
- 284 Detailed investigations on veneer and stone grafting were undertaken in mango and the method of grafting, season and age of stock and scion were standardised for the first time in Kerala. Stone grafting could be adopted on a commercial scale during the month of August-September in Kerala.
- 285 Veneer and epicotyl grafting were found successful in mango during August-September.

K. Essential Oils and Medicinal Plants

- 286 For maximising diosgenin output and economic returns from *Costus speciosus*, planting rhizome bits of 100 g at a spacing of 50 x 50 cm appeared to be the best.
- 287 The growth substance Ethrel at 200 ppm increased the yield of rhizomes from *Costus speciosus*.

L. Cocoa and other Beverage Crops

- 288 Cocoa pods weighing more than 350 g collected during February and March gave better seedlings.
- 289 Forkert budding on 8 to 9 month old seedlings and green budding on 3 to 4 month old seedlings were successful.
- 290 Among the 26 species of insects infesting cocoa, the mealy bug was the most common and destructive. Fenthion, monocrotophos, quinalphos and dimethoate (all at 0.05% concentration) effectively controlled the mealy bugs.
- 291 Mini-box and mini basket methods were found suitable for fermenting small quantities of cocoa beans.
- 292 Light intensities of 50 to 60% was found to be the best for the growth of Cocoa seedlings.
- 293 Harvesting the pods at shorter intervals, just as bronzing is initiated in pod furrows, reduced squirrel damage considerably.
- 294 Covering the pods with punched poly bags (150 gauge) or gunny bags smeared with bitumen extended in Kerosene afforded absolute protection against squirrels.
- 295 Bordeaux mixture 1% and Captofol 0.2% were effective in reducing the pod infection by *Botryodiplodia*, *Colletotrichum* and *Phytophthora*.
- 296 Technology for small scale fermentation of Cocoa was standardised.
- 297 A drier, suitable for drying small quantities of cocoa was fabricated and successfully tested.
- 298 In studies on cocoa bean acidity, the frequency distribution of pH values showed that in 30% of the samples, the pH ranged from 4.7 to 4.9.
- 299 Among the different types of containers tried for storage of cocoa beans, poly-lined jute bag was found to be relatively better.
- 300 The microbial assay of beans stored for a period of 11 months showed that *Penicillium* spp., *Aspergillus* spp. and *Rhizopus* sp. were most common.
- 301 Thirteen self-incompatible high-yielding cocoa plants were identified for use in breeding programmes.
- 302 Cultivation of cocoa along with coconut was found to be compatible. Data for twelve years show that the yield of coconut is not adversely affected by raising cocoa in the interspaces.

- 303 Studies on seasonal variations in cocoa pod and bean characters conducted at Trichur and Konny in Kerala and also at the Flemington Estate, Malaysia showed that pod weight and wet bean dry-bean ratio were generally low in Indian cocoa during rainy months.
- 304 A survey on cocoa bean size of samples drawn from different locations in Kerala indicated that maximum number of samples were in the size range of 0.80 to 0.99 g. Taking 1 g as the standard, 48.2 percent of the samples had been size average above 1 g.
- 305 The pH of cocoa beans was found to show significant negative correlations with contents of volatile and total titrable acidity. The correlation between volatile and total acidity was significant and positive.
- 306 The experiment on post-harvest microbial deterioration of cocoa identified the following microorganisms, viz., yeast acidophile yeast, ethanol utilising yeast, acetic acid bacteria and lactic acid bacteria during the fermentation of cocoa beans.
- 307 Investigations on the etiology of fruit drop disease revealed the presence of *Colletotrichum* sp., *Diplodia theobromae* and *Phytophthora palmivora* producing typical disease symptoms by inoculation studies. Phytosanitation along with application of 1% Bordeaux mixture spray was found to reduce the pod damage.
- 308 Studies on the die-back disease of cocoa revealed the presence of *Diplodia theobromae* and *Phytophthora palmivora* causing typical die-back symptoms. Application of thiride paste (2 g thiride + 1 kg of petroleum jelly) at the cut ends along with 0.2% thiride spray or application of Bordeaux paste along with Bordeaux spray reduced disease incidence to the minimum.

M. Sugarcane

- 309 In varietal evaluation trial, Co 62175 out yielded the popular variety Co 997 by 48% in the plant crop and 24.2% in the first ratoon and 32% in the second ratoon.
- 310 In the first ratoon crop, there was significant difference in yield due to levels of nitrogen and there was no response to P and K. In the second ratoon crop, the effect of nitrogen was significant only for the millable cane output and yield.
- 311 Plant crop of Co 62175 gave the highest yield at the fertilizer level of 240 kg N/ha and the optimum level was 164 kg/ha.
- 312 For the early variety Co 997, a spacing of 60 cm between rows was found to be better than 75 and 90 cm.
- 313 In phased planting trials, it was found that, later planting (February and March) adversely affected cane yield in the tested varieties.
- 314 Loss in weight to the tune of 30-38% was caused in canes due to lodging and this brought out the necessity of propping the crop to reduce crop losses.

- 315 Planting sugarcane setts within 5 days after harvest gave maximum number of viable buds.
- 316 Seed materials of Co-62175 and Co-419 raised at higher elevations were more promising for cultivation in the plains than those which were raised in the plains.
- 317 In the central Travancore sugarcane belt, early planting (planting in November-December) is found to be beneficial for better yield.
- 318 Growing sunhemp one month before planting of sugarcane as a companion crop and incorporating the same at the time of earthing up, increased cane yields appreciably.
- 319 The optimum time of harvest for the varieties Co-62175 and Co-449 was 12 months after planting.
- 320 In varietal screening of sugarcane varieties, Co-8129 (132.4 t/ha) and Co-7527 (131.5 t/ha) excelled others.
- 321 In screening trials, the variety Co-76/84 recorded the highest values for brix (21.01%), polarity (19.08%) and purity (90.87%).
- 322 In trials on the fertiliser-cum-gap filling needs of two sugarcane varieties gap filling gave 5.8 t/ha of extra cane yield even at 75% of the recommended NPK fertilisation.
- 323 Surveys showed that grassy shoot was the most serious disease of sugarcane in the Mannom sugar factory and the Chittoor sugar factory areas. In the Pamba river factory area, red rot was the most devastating disease. Screening trials led to the identification of several types/varieties as resistant to the red rot disease.
- 324 A hitherto unreported strain of *Colletotrichum falcatum* was recorded from the Pamba river factory area, Tiruvalla.

N. Fodder Crops

- 325 *Stylosanthes gracilis* (perennial) was rated as the best among the soil conservation-cum-forage crops tried in coconut gardens.
- 326 Among the Dinanath grass varieties, PP-15 was found to give maximum herbage yield.
- 327 The sorghum variety JS-3 was outstanding in fodder production.
- 328 Guinea grass was found to be superior to napier grass under partially shaded and open conditions.
- 329 Dinanath grass variety PP-15 responded to 150 kg N/ha and 700 kg lime/ha. *Stylosanthes gracilis* had responded to the application of 120 kg P₂O₅/ha.
- 330 Grasses grown with *Stylosanthes* produced the maximum total grass fodder yield of 37.69 tons/ha.

- 331 The sweet potato variety 'Kottaramchuvala' was found to be ideal as a fodder-cum-tuber crop. Application of 60 kg N/ha gave 10.72 tons/ha of fodder and 6.69 tons/ha of tuber.
- 332 Application of 80 kg P_2O_5 /ha to soil and 40 kg P_2O_5 /ha as foliar and leaving the crop after two cuts was found to be advantageous to obtain maximum seed production in *Stylosanthes*.
- 333 Growing rice-bean in the inter-row spaces of hybrid napier has increased the grass yield.
- 334 The fodder Cowpea varieties, Russian Giant and UPC 2201 were found to give higher forage production.
- 335 The Silvipastural combination involving Subabul, Guinea grass and Velvet bean was found to be promising in terms of total green fodder production.
- 336 The fodder cowpea varieties UTC-5287, UPC-5288 and UPC-9020 showed the maximum production potential.
- 337 The Dinanath grass variety PS-3 gave the maximum green and dry fodder yields.
- 338 The maize variety JS-4 outranked others in fodder production potential.
- 339 IUSP-77 was identified as a promising fodder variety of bajra.
- 340 The optimum spacing for planting for subabul as a pure crop for fodder production is found to be 150 x 20 cm.
- 341 The guinea grass varieties PGG-3 and PGG-4 excelled all other varieties tested and this was found to be promising for cultivation in Kerala.
- 342 The cowpea varieties UPC-9805, Cowpea-80 were found to give maximum yield of fodder among 26 varieties tried.
- 343 The guinea grass variety Hamil outyielded other 11 varieties by giving 71.8 tons/ha.

O. Soils and Agronomy

- 344 Clay, silt, sesquioxide, iron and calcium content of soils of Kerala were found to influence their P fixing capacity.
- 345 Laterite and Kayal soils need only half the lime requirement for maximum production.
- 346 Solubilisation of iron in Kerala soils increased with the period of submergence.
- 347 Available P status of Kerala soils was best assessed through double acid extraction method.
- 348 Rice did not respond to P application in soils containing more than 5.69 ppm of available P.
- 349 Laterite soils were found to be more acidic and less fertile than red soils.

- 350 Steatite-an indigenous source of Magnesium silicate applied at 400 kg/ha in conjunction with NPK at recommended levels increased straw and grain yield in 'Karappadam' soils.
- 351 Exchangeable Na content of 'Poonthalpadam' soils was found to be implicated in undersirable physical conditions.
- 352 Rice responded favourable to foliar application of Zn at 0.5% (20 kg/ha) in 'Karappadam' soils.
- 353 Sandy alluvium of Onattukara and Karappadam soils of Kuttanad were found to be deficient in Zn and Mn.
- 354 Neutral N Ammonium acetate was identified as the most suitable extractant for estimation of available K.
- 355 Manganese and sulphates present in the factory effluence were implicated in toxic hazards to coconut palms.
- 356 Studies on Kinetics of nitrogen, phosphorus and potassium under rice soil conditions indicated that $\text{NH}_4^+ - \text{N}$ decreased from tillering to harvest stage of the crop, whereas $\text{NO}_3^- - \text{N}$ increased from tillering to panicle initiation state.
- 357 Organic carbon of soils of different organic matter status was found to be positively and significantly correlated with total nitrogen ($r=0.7966^{**}$) and available nitrogen ($r=0.4086^{**}$).
- 358 Among the medium duration high yielding varieties, Jaya and among short duration varieties, Jyothi were found to be most tolerant to acidic soil conditions.
- 359 Second leaf of coconut, third leaf of turmeric and first mature leaf of fruit-bearing laterals of pepper were found to be the best indicators for N, P and K status of plants.
- 360 The third rank leaf petioles were considered ideal for foliar diagnosis of the nutrient status of cocoa plants.
- 361 Among the kayal, karappadam, kole and pokkali soils, the kari soils of Ambalapuzha series only satisfied the requirements of acid sulphate soils.
- 362 Among the six soil series of four taluks of Trivandrum district, the Amaravilla series ranked first with a productivity rating of 47.3%.
- 363 When tapioca was grown on ridges across the slope with groundnut as intercrop, the soil and nutrient losses through run off were reduced substantially.
- 364 Non-edible oil cakes were found to have nitrification inhibitory property at varying degrees and this was found to be in the descending order of neem-mahua-maroti-rubber-karanjia.
- 365 Basal application of 45 kg P_2O_5 as superphosphate was found to be as efficient as application in three splits during different growth stages of rice in the karapadom soils of Moncompu.

- 366 Minerological study of the acid sulphate soil of Kerala by x-ray diffraction and differential thermal analysis indicated that these soils contain mainly kaolinite associated with smectite. Most of these soils contain sulphides of heavy elements, jarosites and calcium carbonate in the lower layers.
- 367 Infiltration rate was found to be maximum for coastal alluvium soils.
- 368 Among the one hundred and twenty four varieties tried for their tolerance to salinity at germination and early stages of growth, seven varieties including, Bhadra, Bharathy, Jaganath, Culture-4, Aswathy and Pavizham were found tolerant to salinity at germination. Four varieties, Kalinga, Ratna, IR-8 and Cul-25315 were found tolerant to salinity in the early stages of growth.
- 369 Out of one hundred and twenty four rice varieties screened, fourteen varieties were found tolerant to iron toxicity up to 400 ppm, which include Rohini, Jaya, Supriya, PTB-26, Cul-88-22-49 and Cul-25337.
- 370 Investigations carried out to assess the nutritional status of cardamom plants and soils of healthy and 'Chenthal' affected areas of Pampadumpara indicated that none of the nutritional factors could be ascribed as a pre-disposing factor for the incidence of the disease. The imbalance in $K/(Ca+Mg)$ ratio observed in diseased plants might probably be due to change in the metabolism of the disease affected plants.
- 371 The major cause for acidity in uplands and rice fallows appears to be due to excessive Al^{3+} and Mn^{4+} . Varietal screening indicated that the cowpea variety S-488 and the blackgram variety Vellore could tolerate acidity.
- 372 In the karappadom soil during punja and additional cropping season of 1983-84, rock phosphate with iron pyrite at 1:1 ratio by weight recorded the highest yield at 60 kg P_2O_5 level. At 60 kg P_2O_5 level, rock phosphate is superior to super phosphate in karappadom soil even without iron pyrites.

P. Plant Protection

- 373 Prawn dust was found to be the most attractive bait carrier for *Bandicota bengalensis*, while for the rice field rats (*Rattus norvegicus*), the preference was to the lime shell flesh.
- 374 The maximum fecundity of *Bracon brevicornis* was recorded at a host density level of 2 larvae/female parasite and when the parental sex-ratio was kept at 2:1 and 3:1 (Female:male).
- 375 In banana, disulfoton persisted longer than phorate and carbofuran when applied in soil/leaf axil.
- 376 When chopped leaves of neem/*Clerodendron* were mixed with cowdung at 0.75 kg/60 kg, the mortality of *Oryctes* grubs was absolute.
- 377 Among the various substrates used for spawn production of the paddy mushroom, *Salvinia molesta* bio-mass was rated as quite good.

378. Diflubenzuron at 0.1% was found to be effective against the Black headed caterpillar *Nephantis serinopa*. This was far less toxic to the associated parasitoids.
- 379 Bacteriosis of *Henosepilachna* and of *Anadevidia peponis* due to *Bacillus pumilus* have been reported for the first time.
- 380 Quinalphos at sublethal concentrations of 0.475, 0.500 and 0.600 ppm and NPV of *Spodoptera mauritia* at 48×10^1 , 48×10^2 , 48×10^3 PIB/ml showed remarkable synergism.
- 381 Standing water in the rice field influenced population of the predatory mirid *Cyrtorhinus lividipennis*. The populations were higher in dewatered fields.
- 382 Leaf extracts of *Ageratum conyzoides* and *Mentha arvensis* showed biocidal action against Red cotton bug *Dysdercus cingulatus*. Leaf extracts of *Mentha arvensis* revealed antifeedant properties against Epilachna beetles.
- 383 Fenitrothion at 0.500 kg, BHC at 1.25 kg and Carbaryl at 0.9375 kg, Quinalphos at 0.200 kg and 0.250 kg ai/ha showed remarkable efficiency in subjugating BPH populations. The relative efficiency was in the above order of descending toxicity.
- 384 Phoxim 600 mg ai/m² applied on gunny bag surface containing paddy grains afforded good protection against storage pests. Coconut oil and gingelly oil at 1% w/w also gave good protection.
- 385 The uptake and translocation of Carbofuran in rice plants were not found to be influenced by growth stages of the crop. The residues persisted at high concentration for 7 days and thereafter declined progressively.
- 386 Maximum lateral movement of granular toxicants occurred in sandy soils. In red soils the insecticides moved vertically to a depth of 20 cm.
- 387 The native rhizobium isolate C-14 and the exotic isolate no. 6050 appeared to be promising in acidic situation.
- 388 In combination with Fytolan, Dithane M 45 and Thiram, quinalphos showed enhanced insecticidal action, without affecting the fungicidal properties.
- 389 Techniques for the large-scale cultivation of the paddy straw mushroom *Volvariella* were standardised.
- 390 Spent Lemongrass was found to be a very good substratum for growth and development of the paddy straw mushroom *Volvariella*. The formation of chlamydospores was more in spawns from Lemongrass substratum.
- 391 For controlling the vectors of the bunchy top disease, phorate and disulfoton can be applied up to 140 days prior to harvest without residue hazards.
- 392 The bacterium *Bacillus cereus* produced a mortality of 60-70% to the different instars of *Spodoptera mauritia* and 83-97% mortality to the rhinoceros beetle grubs.

- 393 The fungal pathogens *Syncephalastrum racemosus* and *Paecilomyces farinosus* were found to be pathogenic to the brown plant hopper.
- 394 *Rotylenchulus* and *Helicotylenchus* were the dominant and widely occurring genera of nematodes associated with pineapple in Kerala.
- 395 The optimum temperature for the growth of spore of the oyster mushroom *Pleurotes* was 10°C. Among the twelve substrates used for spawn production, cotton seed, maize grain, paddy straw, spent lemon grass and wheat grain were found to be good.
- 396 Waiting period for fenthion 0.05% on bhindi was two days in summer and autumn seasons. For carbaryl, this was four days in summer and two days in autumn season. The waiting period of carbaryl on bittergourd was 10 days.
- 397 *Paradasynus rostratus*, a serious pest of coconut was found to be capable of injuring the nuts upto 80 days after the setting of buttons.
- 398 Application of 0.5 kg ai/ha of carbofuran or 1.25 kg ai/ha of thimet in nursery appeared to have significant phytotonic effect on rice plants.
- 399 Fish oil rosin soap at concentrations of 2.5% and 1.25% controlled the aphid on brinjal and bhindi.
- 400 Difluobenzuron at 0.1% controlled the rice leaf roller *Cnaphalocrocis medinalis* effectively. It was, however, ineffective against the brown plant hopper of paddy.
- 401 The first, second and third instar larvae of the black headed caterpillar *Opisina arinosella* was found to be highly susceptible to a new polyhedrosis virus isolated from the pest.
- 402 In red banana, effective absorption of phorate was detected only from 30 days after planting even when the insecticide was applied in the soil at the time of planting.
- 403 Phosalone, quinalphos, fenthion and carbaryl at recommended doses did not leave residues above tolerance limits on pepper, cardamom and ginger, when applied even upto 7 days prior to harvest.
- 404 Bionomics, ecology and control of the coconut cockchafer beetle *Leucropholis coneophora* were studied in detail. Application of HCH at 5 kg/ai in June and once again in September or one application of heptachlor at 1.4 kg ai/ha in June gave excellent control of the grubs. The pesticides are to be incorporated into the soil in view of the lack of mobility of these materials in soil.
- 405 The NPV when used at 12×10^5 of PIB/ml of spray preparation was found to be superior to carbaryl in controlling the snakegourd semilooper caterpillar, *Phytometra peponis*.

406 The haunting nightmare of the farmers of Kuttanad could be controlled effectively by sustained periodic releases of the exotic weevil *Cyrtobagous salviniae*. Releases were taken up in 1982 in the Kuttanad region and by 1985-86 the weed over 1000 sqm in the Kuttanad could be brought under effective control. This is considered as an outstanding successful case of a biocontrol agent against weeds. *C. salviniae* is a monotypic and monophagous weevil with remarkable endurance to hostile environment. So far records defied chemical and mechanical methods of control and the successful control using biological methods is a remarkable contribution by the Agricultural University.

407 Quinalphos at LC 10 level and permethrin at LC 30 and LC 40 levels had significant synergistic effect on the nuclear polyhedrosis of *Spodoptera litura*.

Q. Post harvest Technology & Nutrition.

408 Roasting of Cocoa beans for 15 minutes at 120°C was found to give rise to superior quality of cocoa powder and butter required for chocolate making.

409 Among the insulating materials used for fermentation of the beans during the rainy season, double layers of gunny bags appeared to be the best.

410 Soybean milk could be used instead of coconut milk for the preparation of traditional Kerala snacks such as 'Achappam' and 'Kozhalappam'.

411 Cashew apple, juice clarification procedures have been standardised. Among the different materials evaluated, PVP was found to be relatively more effective.

412 The shelf-life of Nendran (raw) fruit could be prolonged by 10 days by storing in polythene bags containing Potassium permanganate crystals.

413 The dormancy of HYVs was more in the case of the produce from the autumn crop (8-62 days) as compared to the winter crop (2-40 days).

414 The methods of preparing fermented and unfermented beverages from cashew apple and for clarification of juice were standardised.

415 Maximum extraction of Cocoa butter (44.80%) was obtained at 70°C by applying a pressure 248.67 kg/m².

416 A method for eliminating the characteristic soya flavour in soybean products was standardised recipes developed based on soya flour.

417 Bennet Alphoso and Neelum fruit showed the maximum keeping quality and the latter variety was found to be ideal for canning.

418 Paddy seeds stored inside poly-bags (700 gauge) retained viability for 9-12 months.

419 The viability of gingelly seeds was retained at 90% for up to 11 months under storage in tin bins. Admixture of ash caused drastic reduction in seed germinability.

- 420 Cassava tubers can be preserved upto ten days without deterioration in dealwood boxes or reed baskets interlaid with cassava leaves.
- 421 Process for the preparation of a cheap weaning food based on banana, ragi and soybean flours was standardised.
- 422 A process for pre-treatment of bitter citrus fruits with sodium chloride and sodium bicarbonate was developed to remove the bitter principles so as use them for pickling.

R. Cropping patterns and Farming systems

- 423 The Banana varieties Robusta, Nendran and Palayamkoda can be profitably grown in Coconut gardens under un-irrigated conditions.
- 424 The tuber crops Elephant foot yam, Turmeric, Tapioca and Ginger could be successfully cultivated in the Coconut shade.
- 425 The highest berry yield was obtained from Panniyur-1, Marikunda and Balankotta in that order when intercropped in Coconut garden,
- 426 Among the intercrops tried in Pepper gardens, Banana was found to reduce yields of Pepper, while Turmeric increased the yield of the main crop.
- 427 Tapioca recorded the maximum profit/ha as an intercrop in coconut gardens. The overall net return was maximum for tapioca intercropped with groundnut under 93.75-75, 0-93.75 kg N, P₂O₅, K₂O/ha.
- 428 Cucumber and amaranthus could be raised along with Nendran banana in October-November planting season successfully and economically.
- 429 During second crop season, rice crop needs irrigation only three days after the disappearance of ponded water, but in summer months for better yield the crop required irrigation only one day after the disappearance of ponded water.

S. Farm Economics, Extension & Agricultural Statistics

- 430 Lectures followed by method demonstrations or simultaneous use of lectures and flash cards were quite effective in imparting knowledge on food and nutrition.
- 431 Farm leaders in progressive villages had their farm size greater than 5 acres with agriculture as their main occupation. In the non-progressive village, leaders had their farm size ranging from 1.5 to 5 acres.
- 432 Majority of the trained and untrained farmers preferred the months of January, February and March as the appropriate time for peripatotic and institutional training programmes.
- 433 An analysis of the income pattern of farm families showed that agricultural income contributed only 36.98% of the total income. Coconut was the predominant crop contributing 78% of the income from crops.
- 434 Friends and relatives were the most frequently utilised sources of information by small farmers.

- 435 There was significant association between the efficiency of agricultural labourers and extent of adoption of recommended practices of crops grown by the farmers employing them.
- 436 Extent of adoption of recommended practices was highest in rubber followed by paddy and coconut and least tapioca.
- 437 A study of rubber cultivation in small holding in Kottayam district showed that the benefit-cost ratio was little over two while the internal rate of return was 24 per cent.
- 438 A study on production and marketing of milk in Trichur district revealed that cross-bred cows were more economical than 'desi' cows or buffaloes because of the higher productivity of the former.
- 439 A sample survey of paddy cultivation in Kuttanad revealed that out of 128.8 man days/ha of human labour utilised, the family labour was contributed hardly to the extent of 10%.
- 440 Producer's share in consumer price was only 50% in respect of some of the common vegetables produced in Malappuram District.
- 441 The majority of agricultural demonstrators in Trivandrum district was found to belong to medium level of communication effectiveness.
- 442 Among the different time series models tried to study the trends in crop production of crops, exponential models were found to be better than linear and quadratic ones.
- 443 The optimum plot size for banana for experimental purposes was found to be 3-4 plants.
- 444 Nendran banana cultivation in the Chalakudy area of Trichur district was found to be profitable with an output/input ratio of 1.55.
- 445 Age, experience and training acquired by T & V officials had a positive influence on their performance.
- 446 In Kerala, annual compound growth rates of productivity of coconut, pepper and cashew was negative during the period 1952-53 to 1981-82.
- 447 Rainfall received during the 8th week after sowing of paddy was found to have strong negative correlation with yield.
- 448 Selection indices were developed for the selection of white leghorn birds, using body weight, egg weight and egg production.

T. Soil conservation & Farm mechanisation

- 449 The *Salvinia* harvesting Machine with multiple applications was fabricated and field tested. The average working capacity of the machine was found to be 15t/hour.

- 450 The fabrication of light-weight garden tractor (125 kg) with several implement attachment including a ring bund former of original design was completed. The ring bund former will be of considerable value to take ring bunds around coconut palms. Many improvements were made in the 5.4 hp light weight garden tractor designed and fabricated by the KAU. These included the overrunning clutch, which eliminated the need for separate steering clutches, wheel flanges and split final axle.
- 451 Preliminary studies revealed that 4 kg of *Salvinia* biomass produces as much bio-gas as 1 Kg of cowdung could release, under anaerobic fermentation. The scope of utilising *Salvinia* weed mass for bio-gas production appeared to be quite promising.
- 452 Two units of the modified IRR1 type paddy winnower were fabricated for field testing. The capacity of the modified paddy winnower is 500 kg/hr for seed and 750 kg/hr for grain. The paddy winnower-cum-cleaner was further improved and its capacity is now 1 ton per hour of seeds meant for grain purpose and 650 kg/hr for those meant for seed purpose.
- 453 A jet pump powered by diesel engine with specially designed drag head hydrocyclone and floating platform could dredge four tons of sand per hour with much less drudgery, while two men could dredge only 1.3 tons of sand per hour by the diving method.
- 454 The performance of clay drains in the Kari soils were found superior to slotted PVC pipes. The zone of influence of tile drain was up 7.5 m on either side. In the case of PVC drain, the zone of influence was between 2.5 to 5.0 m. In the Kari soil lands where tile drain were provided to improve sub-surface drainage rice crop productivity increased by 50%.

(ii) FACULTY OF VETERINARY AND ANIMAL SCIENCES

- 1 The cause and magnitude of infertility and sub-fertility in cross-bred cattle were identified. Among other things hypothyroidism was found to be one of the etiological factors in cases of anoestrus and repeat breeding.
- 2 Some of the reproductive disorders in goats were demonstrated to be associated with hypothyroidism. The changes seen in organs in subclinical hypothyroidism were shown to be reversible in nature and therefore could be corrected by the practice.
- 3 An effective test for tubal impotency in cows was evolved and suitable equipment fabricated as diagnostic device.
- 4 Investigation of abortion in cattle was studied and IBR virus was found to be one of the etiological factors causing the abortion in cattle.
- 5 Using immuno gel diffusion and isoelectric focussing methods, techniques were standardised for identifying different meat types.



Tomato—L. E. 79—a variety released by K. A. U.



Austrowhite birds—a promising bird for backyard rearing

- 6 Presence of additional band in the low molecular weight region for the myofibrillar protein fraction, absence of distinguishing band in the low molecular weight region of the sarcoplasmic protein fraction, in gel electrophoresis and presence of loose wavy bundles of muscle have been found to be of value to identify buffalo meat as against leaf from other cattle sources.
- 7 The various toxic principles of leaf fodders were identified. The relatively high content of tannic acid was found to be one of the factors responsible for low digestibility coefficients.
- 8 Manurial and varietal studies were conducted for fodder at different geographical location and a fodder calendar was proposed for the State.
- 9 The nutritive value and chemical composition of 50 items of unconventional feeds and fodders were determined, on the basis of which some items have been recommended for incorporation in commercial feeds to economic advantage.
- 10 The oestrogenic activity of common fodders was established.
- 11 Studied the influence of various kinds of dietary carbohydrates on protein utilisation in animal feed metabolism trials.
- 12 The toxic effect of methionine on the growth and reproduction of animals was studied and established.
- 13 The etiological factors involved in the incidence of urinary calculi in goats were investigated and identified.
- 14 The physiological responses of animals maintained on qualitatively and quantitatively different proteins with and without supplementation of amino acids was assessed. Inter-relationship of copper and zinc in pig nutrition was worked out.
- 15 The standard has been prescribed for the nutrient needs of cross-bred kids.
- 16 A low cost feed for use as Calf starter was developed using leaf meal.
- 17 Optimum levels of degradable and undegradable protein in the ration of growing calves was assessed.
- 18 The value of fish solage as a feed addition in poultry feeds was established.
- 19 Nutritional factors influencing production and hatchability and also egg yolk colour were worked out.
- 20 Optimum level of dietary protein was prescribed for optimal growth and feed efficiency in pigs under local condition and environment.
- 21 The microanatomy, digestive physiology and nutritive requirements of ducks were studied.
- 22 The nutrient requirements of elephants under captivity was formulated for general adoption.
- 23 Chemical tranquilisation and control of elephants for routine operations was standardised.

- 24 The haematological and serum enzyme profiles of elephants were investigated and physiological norms established.
- 25 The metabolic activity of the avian ovary was investigated to establish the mechanism of lipid transfer in the ovary of poultry.
- 26 Evaluation of pure-breds and cross-breds as against cross-bred Austrowhite as a suitable bird for rearing under backyard conditions was completed.
- 27 The economic traits of Desi ducks were investigated along with their cross-bred Khaki Campbell. Body weight and egg yield were found to be higher as expected and disease resistance with special reference to aflatoxicosis was found to be lower in the cross-bred birds.
- 28 Genetic effects influencing egg traits from diallel matern system was investigated to a genetically superior white leghorn strain of birds.
- 29 Studies conducted on the therapeutic efficiency of selected indigenous drugs in the treatment of experimental liver damage in dogs have revealed the beneficial effects of *Andrographis Paniculata*.
- 30 Among the indigenous plants taken up for trials *Sesamum indicum*, *Butea superba*, *Bamboosa arudinacia* and *Tribulus terrestris* were found to have oestrogenic activity and with *Mamordia charantia* showed maximum hypoglycaemic effect.
- 31 The combination of atropine and Bis (Pyridinium 4-aldoxine) was identified as extremely effective and controlling toxic action of the insecticide Dichlorvos.
- 32 A comprehensive survey was carried out to assess the incidence of various parasitic conditions causing morbidity and mortality in livestock in Kerala. Eleven new species of parasites were recorded and seven new host records were made. Life cycle of 5 of these parasites were also worked out for the first time.
- 33 Investigation was carried out on the incidence of helminth parasites in elephants, and new species *Indofilaria elephantis* recorded. Treatments for parasitic infections and the dose schedule of 12 new anthelmintics for elephants were standardised.
- 34 Extensive studies were carried out on parasites of ducks. 5 new species were recorded and the life cycle of eight parasites of ducks were worked out for the first time. Pathogenicity of duck nematodes were also studied and effective treatment methods standardised.
- 35 The intertransmissibility and pathology of *Schistosoma nasalis* of cattle and buffaloes were worked out which revealed that buffaloes are the normal definitive host of *S. nasalis* and cattle the unusual host.
- 36 Control measures effective against ticks using newer organophosphorus compounds and pyrethroids were standardised.

- 37 Studies were conducted on the pathogenesis and treatment of common nematodes of goats in Kerala and the effect of irradiated larval vaccines against *Haemonchus contortus* in goats was assessed.
- 38 In a study on polymorphism of haemoglobin, transferrin albumin and amylase in Malabari goats and their exotic crosses, it was revealed that there are two different types of Haemoglobin, HbA and HbB in the population.
- 39 Extensive investigation on mycotoxicosis with special reference to aflatoxicosis and ochratoxicosis were carried out. In addition to cellular damage it was found that they were oncogenic under certain situations.
- 40 Alleviation of symptoms of mycotoxicoses and methods for destroying the toxins as a preventive measure were investigated.
- 41 Studies on comparative oncology with special reference to neoplasms of ethmoid in domestic animals were carried out. Ultrastructural studies revealed association of a virus with neoplastic cells and epidemiology, symptomatology, enzymology and immunology of ethmoid cancer were studied in detail. A diagnostic test-exfoliative cytological technique was evolved for early detection. The value of macrophage-lymphoid reaction and the use of tumour antigen for diagnostic tests were explored.
- 42 Studies on basic cellular and vascular response in the inflammatory reaction in Chicken and ducks were carried out. Detailed etiology, pathology, and treatment of Bangkok haemorrhagic disease were determined.
- 43 The association of mycotoxin infected straw in the causation of 'Necrosis of extremities syndrome' in buffaloes was brought out and Pathogenesis was described.
- 44 The etiology and pathology of pneumonia and enteritis in goats were described to enable practice of appropriate preventive measures.
- 45 The neuropathology, organellar changes and enzymology associated with toxicity of *Ficus taels* Red were studied.
- 46 The various factors associated with hepatic disorders in domestic animals were elucidated.
- 47 The residual effect of different insecticides on the health and productivity of animals and poultry were established.
- 48 Investigations were conducted on the microbial etiology of infectious abortions in livestock, and it was found that among other things Brucellosis and Leptospirosis were important entities.
- 49 The microbiological etiology of mastitis and their antibiotic responses were studied and suitable preventive measures recommended.
- 50 The efficacy of various anaesthetic agents were evaluated for use in goats.

- 51 The clinical manifestation of selenium toxicity in cattle was found to be anorexia and general depression associated with toxic hepatitis and degenerative changes in the Kidney and cardiac and intestinal musculature ending in death.
- 52 It was found bone marrow and meat extract are suitable antigens for producing antibodies for serologic tests.
- 53 Investigation on the role of free flying birds in the epizootiology of Newcastle disease, showed the involvement of many species of birds in the spread of the disease. A strain of RD virus isolated from a Mynah was found to be a mesogenic one and suitable as a vaccine strain as different from the Komarov Strain.
- 54 Abortions in Livestock caused by aflatoxins, and chlamydia infections were brought out.
- 55 The cellular and humoral immune response to *Corynebacterium pseudotuberculosis* in goats were determined.
- 56 The nature, properties and immunogenicity of the strain of the virus causing duck plague and the pathogenesis and pathology have been worked out.
- 57 Methods were designed for the construction of balanced tertiary designs making use of for its geometrics and modules.
- 58 Corticosteroids have been found to be good as a supportive therapeutic measure for treatment of snake venom poisoning.
- 59 Changes in the rumen in non-specific anorexia syndrome were identified and an effective therapy put into practice.
- 60 The neoplastic cells in ethmoid carcinoma were found to be sensitive to Cobalt in radiation. The ocular lesions were found to be secondary only Anacarcia was found effective for local treatment of ethmoid tumour.
- 61 Studies were carried out on the role of Burea and Lavamisole therapy, have established their involvement in immune reaction associated with Ranikhet disease of chicken.
- 62 Administration of 500 mg Estrumate, a prostaglandin F2 alpha analogue was found to improve the breeding efficiency in cases of suboestrus.
- 63 Coconut cake has been found to be a good source of by-pass protein.
- 64 Mature and tender coconut water have been found to be good plasma restorer to combat de-hydration in cases of calf diarrhoea.
- 65 Studies on the growth rate of poultry, have shown that traditional method of comparing growth rate by Rao's method can be replaced by alternative procedures based on parameters of fitted curves.

iii) FACULTY OF FISHERIES

1. Puthuveypu, near the Cochin harbour mouth was found to be a good collection centre for the seed of cultivable species of brackishwater prawns such as *Penaeus monodon*, *Mugil cephalus* and *Chanos chanos* and fishes.
2. A production of 1353/Kg/ha in 7½ months was obtained when *Etroplus chanos* and *Mugil cephalus* were cultured together.
3. Mixed culture *Mugil cephalus* and *Chanos chanos* in brackishwater ponds without supplementary feeding, recorded a net production of 1,021/Kg/ha/year. Net profit from this worked out to Rs. 17,457/ha/year.
4. Mixed culture of the tiger prawn, *Penaeus monodon* with fishes like *Mugil cephalus* and *Etroplus suratensis*, yielded a net production of 845.49 kg/ha/110 days. The net profit from mixed culture worked out to Rs. 11,737/ha/110 days.
5. A production of upto 3160 kg/ha/year was obtained when *Cirrhinus mrigala*, *Labeo fimbriatus* and *Cyprinus carpio* were cultured at a stocking rate of 5000/ha in homestead ponds extending upto to three cents.
6. A net production of 363 kg prawn and 94 kg fish per hectare was obtained in 63 days from the mixed culture of *Penaeus indicus* and fishes, without any supplementary feeding.
7. From the short-term culture, of *Chanos chanos*, *Etroplus suratensis* and *Lizaparsia*, a net production of 971 kg/ha/6 months was achieved without any supplementary feeding.
8. Production of 3,700 kg/ha/year was obtained from homestead ponds when rohu, mrigal, silver carp and grass carp were cultured together @ 5,000/ha.
9. A retrieval rate of 53% was obtained from nursery rearing of *Penaeus monodon* when stocked at a density of 50,000/ha.
10. A net production of 575.5 kg/ha/3 months was achieved without any supplementary feeding when the tiger prawn *Penaeus monodon* was cultured after nursery rearing in brackish water ponds at Vyttila.
11. From the mixed culture of the prawn *Penaeus indicus* and the fish *Chanos chanos*, a total net production of 318.20 kg/ha/3 months was obtained, the prawn contributing to 221.8 kg.
12. When carps were cultured along with brackish water fishes in brackish water ponds during the low saline phase, a production rate of 1,400 kg/ha/4months was achieved, demonstrating that fresh water fishes could supplement production in brackish water ponds during monsoon months.

Appendix IV

DIRECTORATE OF PHYSICAL PLANT, KAU STATEMENT ON BUDGET ALLOCATION AND WORKS ON HAND AT DIFFERENT CENTRES

I. Budget for last five years

	Works Plan	M & R
1985-86	3,50,00,000/-	26,25,000/-
84-85	3,50,00,000/-	25,00,000/-
83-84	62,10,000/-	8,00,000/-
82-83	75,00,000/-	17,00,000/-
81-82	74,04,400/-	9,50,000/-

II. a) New Construction of buildings, Vellanikkara

- 1 Ladies hostel block No. 1, Vellanikkara
- 2 Radio isotope laboratory Vellanikkara
- 3 Farmers hostel, Vellanikkara
- 4 Type II quarters for 50 families, Vellanikkara
Type II quarters for 10 families, Vellanikkara
- 5 Associate Dean's quarters
- 6 Assistant warden's quarters—2 Nos.
- 7 Type IV quarters—6 Nos.
- 8 Type V quarters—4 Nos.
- 9 Type VI quarters—6 Nos.
- 10 Bachelor's hostel
- 11 Trainees hostel
- 12 School building
- 13 Type I quarters for 8 families
- 14 Labour line for 6 families
- 15 Glass house
- 16 Net House
- 17 Ladies hostel block II
- 18 Canteen building
- 19 Gymnasium shed in men's hostel
- 20 Labour lines—one block

b) New works to be taken up

- 1 Construction of administrative block at Main campus
- 2 Construction of guest house at Main campus
- 3 Construction of library building
- 4 Construction of workshop building
- 5 Construction of Type III quarters
- 6 Construction of Type V quarters

- 7 Construction of teachers hostel
- 8 Construction of P. G. Hostel
- 9 Construction of working women's hostel

Apart from these, one type III flat, teachers' hostel 2 blocks, Insectory, staff club and a creche building are in progress.

III. Roads: Main Campus, Vellanikkara

- 1 Formation and black topping to the road leading to ladies hostel and radio isotope laboratory.
- 2 Black topping to the yards of glass house and net house.
- 3 Formation and black topping to the road leading to type IV, V and VI quarters.
- 4 Formation of roads to farmers hostel & mens hostel.
- 5 Formation of roads to store building.

IV. Water Supply System: Main Campus, Vellanikkara

Water supply arrangements are provided in all the building in the Main campus.

Following works are completed.

- 1 Ground level tank of 5 lakhs litre capacity one number.
- 2 One pumpset of 3 HP for the bore well in vegetable garden.
- 3 Construction of a sump in Main campus.
- 4 Construction of pump house and providing distribution system etc. from the GL tank of 5 lakhs litre capacity.

V. Cattle Breeding Farm, Thumburmuzhi

- 1 Toilets for labourers.
- 2 Pump house

Water supply arrangement

15 HP motor pumpset has been installed and re-laying of pipe line has been done for improving water supply system.

VI. Cardamom Research Station, Pampadumpara

Following works are in progress.

- 1 Constructing trainees hostel for 10 beds under NARP
- 2 Remodelling and extension of existing laboratory building under NARP.
- 3 Constructing type II quarters 2 Nos. for four families.
- 4 Constructing type IV quarters 2 Nos. for four families.
- 5 *Water supply system*: has been provided to all quarters and waiting shed for the labourers.

VII. A. M. P. R. S. Odakkali—Construction of a type IV quarters

Water supply system has been provided to all the quarters except watchman quarters.

VIII. Livestock Farm, Thiruvazhamkundu

- 1 Construction of type IV quarters—2 nos.—work in progress.
- 2 Construction of cow barns for 100 cows.
- 3 Construction of milk chilling plant.
- 4 Construction of laboratory.
- 5 Construction of Silo, A. I. centre and formation of the farm road.
For improving water supply system the pipelines have been re-laid. Construction of an overhead water tank is in progress.

IX. C. R. S. Anakkayam

Water supply to the office and quarters from the Panchayat Scheme effected

X. College of Veterinary and Animal Sciences, Mannuthy

a) Construction of buildings

- 1 Construction of dairy technology building.
- 2 Construction of additional lecture hall.
- 3 Construction of firewood store for ladies hostel.
- 4 Construction of additional ladies hostel.
- 5 Construction of waiting shed for farm workers.
- 6 Construction of building for 100 experimental animals.
- 7 Construction of meat technology building, Mannuthy.
- 8 Construction of rearing houses.
- 9 Construction of breeder houses.
- 10 Construction of Layer Houses
- 11 Construction of dormitory building connected to mens hostel.
- 12 Construction of additional floor to P. G. hostel.
- 13 U. G. hostel, metabolism centre and small animal breeding centre are in progress.

b) Roads

- 1 Surface dressing to roads in Mannuthy campus.
- 2 Surface dressing to road from Veterinary College.

c) Water supply

Construction of additional pump house, ground level tank, pipelines and pumping mainly for drinking water supply.

XI. R. A. R. S. Pattambi

a) Completed structures

- 1 Implement shed under NARP.
- 2 Fertilizer store under NARP.
- 3 Sales counter under NARP.
- 4 Jeep shed under NARP.
- 5 Meteorological laboratory under NARP.
- 6 Seed store and drying yard under NARP.
- 7 Laboratory building under NARP.
- 8 K. V. K. office and hostel.
- 9 K. V. K. office and laboratory

- 10 K. V. K. quarters for training associates.
- 11 NARP seed testing laboratory.
- 12 NARP green house.
- 13 NARP net house.
- 14 NARP—glass house.
- 15 Type I quarters (quaduplex)
- 16 Type II quarters(1 duplex)
- 17 Type IV quarters (1 duplex)
- 18 Type V quarters (2 Nos.)
- 19 NARP seed drying yard.

b) Work in progress

- 1 NARP seed store
- 2 NARP covered threshing floor.
- 3 KVK quarters for training organiser.
- 4 KVK quarters office superintendent.
- 5 Type II quarters duplex—5 units.
- 6 Type III quarters—flat type.

c) Water supply system

New PVC pipe lines were laid replacing the old damaged G. I. pipe lines.

XII. Fisheries College, Panangad

a) Construction of buildings

- 1 Semi-permanent sheds— 4 nos.
- 2 Type V quarters — 5 nos.
- 3 Type IV quarters —10 nos.
- 4 Dormitory building for men's hostel—

Arrangements have been made for construction of two academic blocks and 5 duplex type II quarters.

b) Roads

To quarters have been formed.

c) Water supply

Provided for quarters and semi-permanent shed.

XIII. Instructional Farm, Puduveypu

a) Construction of buildings

- 1 Laboratory building
- 2 Experimental ponds – 6 nos.
- 3 Type V quarters – 1 no
- 4 Type IV quarters single unit – 1 no.
- 5 Watchmen's quarters – 2 nos.

b) Water supply

Construction of pump and over head tank is in progress.

c) *Road:* An approach road to station has been formed.

XIV. Vyttila

a) *Construction of buildings*

- 1 Rice research office
- 2 Laboratory for fisheries research
- 3 Laboratory building and seed store under ICAR and Type V quarters.
- 4 Fish ponds with sluices – 8 nos.

Construction of a type III quarter is arranged. Construction of 6 nos. of fish ponds is in progress.

b) *Roads:* Formation of an approach road to this station is in progress.

c) *Water supply*

Arrangements for water supply have been made in the laboratory and residential quarters.

XV. R. A. R. S. Pilicode

a) *Construction of buildings*

- 1 Type V quarters — 5 nos.
- 2 Type IV quarters — 1 no.
- 3 Type II quarters — 4 nos.
- 4 Trainees hostel — 1 no.
- 5 Office cum-lab. building — 1 no.
- 6 Green house
- 7 Net house
- 8 Farm office
- 9 Store
- 10 Fencing

b) *Roads:*

Black topping of approach road to R. A. R. S. Pilicode is completed.

c) *Water supply:* Arrangements are provided for all quarters and office cum. lab. for improving general water supply system by deepening the well. Pipe laying have been completed.

XVI. R. A. R. S. Ambalavayal

a) *Construction of buildings*

Following works are in progress under KVK

- | | |
|------------------------------------|---------|
| 1 Office and hostel | — 1 no. |
| 2 Lab. and office | — 1 no. |
| 3 Quarters for training associates | — 1 no. |
| 4 Quarters for training supdt. | — 1 no. |
| 5 Quarters for training assistants | — 1 no. |

- b) *Roads:* The existing roads are in good condition
- c) *Water supply :* Arrangements are provided in the office and staff quarters.

XVII Agriculture College, Vellayani

a) *Construction of buildings*

- 1 Teachers hostel
- 2 Soil processing cum digestion room
- 3 Poultry house
- 4 Glass house under NARP
- 5 Net house under NARP

Construction of Laboratory and library buildings and indoor stadium is in progress.

- b) *Roads:* Back topping the roads have been completed.

c) *Water supply:* There is water supply in all buildings. Relaying of pipeline and other improvements to water supply has been done recently.

XVIII. R. A. R. S. Kumarakom

a) *Construction of buildings*

- 1 Type IV quarters (duplex) 1 no.
- 2 Type V quarters 1 no.
- 3 Type II quarters (duplex) 1 no.
- 4 Trainees hostel
- 5 Implement shed
- 6 Seed store
- 7 Glass house
- 8 Net house
- 9 Cattle shed
- 10 Threshing yard

Construction of a Laboratory building is in progress.

- b) *Roads:* There is only an approach road to the station office. Formation of roads is in progress.

c) *Water supply:* The existing water supply system has to be improved.

XIX. Rice Research Station, Moncompu

a) *Construction of buildings*

- 1 Type V quarters 1 no.
- 2 Type IV quarters single unit 1 no.
- 3 Type II quarters -do- 1 no.
- 4 Seed store
- 5 Glass house
- 6 Net house
- 7 Threshing yard

Construction of a laboratory building is in progress.

b) Roads:

The approach road to the station is in good condition.

c) Water supply:

Improvement to the existing water supply system is to be done.

XX. R. A. R. S. Kayamkulam

Construction of a laboratory is completed.

XXI. Kelappaji College of Agri. Engg. & Technology, Tavanur

a) Completed Structures:

- 1 Poultry house
- 2 Type IV quarters (duplex)
- 3 Type V quarters
- 4 Seed store
- 5 Labourers waiting shed

b) Work in progress

- 1 Type II quarter (duplex) 2 Units
- 2 Canteen building
- 3 Cattle barn

Appendix V

PROFORMA FOR ANNUAL ASSESSMENT OF SCIENTIFIC PERSONNEL

PART I (Particulars to be filled by the Administrative branch)

- 1 Reported period :
- 2 Name :
- 3 Date of birth/age :
- 4 Date of entry into service :
- 5 Date of appointment to the present grade :
- 6 Present position :
- 7 Date of posting to the present division/unit :
- 8 Present salary and scale of pay :
- 9 Period of absence from duty on leave/training/health etc., grounds during the period under report :
- 10 Duties assigned to the post held by him during the year :
- 11 Duration of service, if any, in difficult areas e. g. hilly, tribal, neglected, backward rural etc., :

PART II (To be filled in by the Scientist reported upon)

- 1 Additional qualifications/training acquired in India and/or abroad during the year under report. (List of all part-time or short-term training with details and duration of course to be enclosed) :
- 2 What were the priority areas of work during the period under report? Please mark priorities against each area as 1,2,3, etc., one being the highest and so on; and indicate the percentage of time approximately allotted to each priority area. Normally you should not assign more than three priorities. (The area should be considered a priority area, if it takes at least 25% of your working time) :

AREA	PRIORITY	TIME ALLOCATION
Research		
Teaching/Training/Guiding		
Extension (including items like National Demonstrations, Operational Research Projects, etc.)		
Research Management/Co-ordination		
Farm Management		
Administration		
Any other		

Please furnish the most salient features of the work done in each of the top 3 priority areas as marked in question number (2). This should include the following points: (a) description of project (s)/assignment (s) include code numbers where available (b) objectives of the stated project (s)/assignment (s): (c) any major progress, accomplishments, utilisation, etc., for the work done. (Be sure that this is not a detailed description of various projects/activities you may have undertaken during the year, rather a summary statement of the most significant aspects of your overall professional performance (with supporting evidence).

Priority Area I

Priority Area II

Priority Area III

- 3 (a) Contribution in difficult areas served, if any (Areas to be clearly defined).
- (b) Special attainments, if any
- (c) Any further information not covered by (a) & (b) above which the Scientist may like to furnish to enable the Reporting scientist to make an objective assessment of the Scientist's accomplishments.
- 4 Name of the Centre/Sub-station visited with the date of visit (to be filled in by the Project Co-ordinator)
- 5 Any difficulty in terms of facilities etc., experienced by the Scientist.

Signature :

Name :

Designation: .

Dated :

PART III (For the use of the Reporting scientist only)

Is the information provided by the Scientist correct to the best of your knowledge?

PRESENT ASSESSMENT

(Please tick appropriate markings, based on your first hand knowledge)

	out- standing	above aver- age	aver- age	below aver- age	unsa- tisfa- ctory	not app- lica- ble
	1	2	3	4	5	6
1 Intellect						
<hr/>						
2 Personal qualities						
<hr/>						
a) Personality and general behaviour						
b) Initiative						
c) Sense of responsibility						
d) Self-reliance						
e) Amenability to discipline						
f) Punctuality						
g) Co-operative and team spirit						
h) Devotion to duty						
<hr/>						
3 Professional ability						
<hr/>						
a) Theoretical ability and capacity for interpreting data						
b) Experimental or practical ability						
c) Scientific dependability						
d) Originality						
e) Technical judgement to discern the essence of the problem and to select the best line of attack						
f) Power of expression orally						
g) Power of expression in writing						
h) General professional knowledge						
<hr/>						

- i) Teaching:
 - i) Lecturing ability
 - ii) Research guidance
 - iii) Attitude towards students
- j) Extension education work:
 - i) Field extension work
 - ii) Training
 - iii) Operational research
 - iv) Communication
 - v) Any other
- 4 Organisational ability
 - a) Administrative judgement and foresight
 - b) Readiness to take decisions
 - c) Ability to lead and get the best out of subordinates
 - d) Group work
 - e) Relations with non-officials
- 5 Special skill
(Specify particular skills)
 - a)
 - b)
 - c)
- 6 Integrity
- 7 Assessment of Scientific Integrity

Signature of the
Reporting Scientist:

Name :
(in block letters)

Date:

Designation:

Recommendation of the Director (in case of employees of Institution) DDG/DG (ICAR) (in case of employees of the headquarters and/or the centrally administered programmes.)

- 1 Total length of service under Reviewing Scientist upto end of period under report

-
- 2 Do you agree with the markings of the Reporting Scientist? If there are any important differences, please indicate.

-
- 3 Assessment of the Scientist's overall work in his particular field irrespective of age. (Please initial and put a ring round the appropriate rating below and and strike out what ever is inapplicable).

A+. Exceptionally brilliant

A Outstanding

A- Well above average standard

B+ Good average man

B Average man, reasonably competent but without special ability or initiative.

B- Insufficient initiative and perception to work without constant supervision.

C Indifferent but just worth, retaining in the present grade

D Not worth retaining in the present grade

If marking is 'C' or 'D' you should comment fully—under General remarks paragraph (4)

-
- 4 General remarks

5 What type of duties do you consider this Scientist best fitted for?
Would be benefited by a transfer to another job?

6 Has the Scientist been informed orally, or in writing about the shortcomings leading to a rating below 'Average' with which you agree?

Signature of the Reviewing Scientist:

Name (in block letters):

Date:

Designation:



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