GOVERNMENT OF KERALA

AGRICULTURAL CENSUS—1976-77

REPORT FOR KERALA STATE

VOLUME I

GENERAL REPORT

AGRICULTURAL CENSUS DIVISION
DIRECTORATE OF ECONOMICS AND STATISTICS
TRIVANDRUM

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PREFACE

As in the case of the country, agriculture is the mainstay of the economy of the Kerala State also, as this sector is the single largest contributor to the total income of the State. The 1971 population census also shows that about 45% of the workers in the State are engaged in occupations connected with this sector. Besides, being the major source of livelihood for the vast majority of the population in the State, agriculture forms the basis of our industries and a source of revenue for the State. Hence the importance of agriculture in this State cannot be over-emphasised.

In agriculture, an operational holding still continues to be the fundamental unit of decision making and therefore information on the structure and characteristics of the holdings particularly in respect of marginal and small holdings is an essential prerequisite for drawing out any well-thought-out plan of development in this sector. Periodical collection of data on the vital aspects of holdings is necessary to assess the impact on society of the socio-economic legislations enacted in the country from time to time so as to ensure social justice to the vast multitude of the weaker sections.

As a result of this realisation, India has also participated in the World Decennial Agricultural Census, 1970 sponsored by the F. A. O. of the U. N. It was the first Agricultural Census conducted in this country extending the coverage of the census to all the States. Kerala also participated in the census. The census provided information on the number of operational holdings and area operated, their size, area irrigated, number and area of holdings by tenure, land utilisation, source of irrigation, area under different crops and inventory of livestock and agricultural machineries.

The information provided by this census was found to be very useful for the preparation of effective plans for the agricultural development in the country. Since vast changes had been taking place in the country in the agricultural sector due to the land reform measures adopted in the various States, it was felt desirable to have the data on the structure and characteristics of holdings at more frequent intervels of time so as to help the process of transmission of the holding pattern to a more desirable pattern for meeting out social justice.

It was under this context, Government of India had decided to carry out another census with the agriculture year 1976-77 as the reference period. The census covered all the States and Union Territories in the country and the Ministry of Agriculture, Government of India provided the necessary technical guidance and financial assistance to the States for carrying out the census.

The preliminary work connected with the conduct of the census in this State such as finalisation of schedules, of enquiry, printing and distribution of the schedules, selection and posting of enumerators and supervisors and imparting training at various levels were all completed towards the end of February 1977.

The field work relating to the listing of operational holdings and the canvassing of schedules relating to the main census part of the Agriculture Census was completed by the 400 Village Assistants drafted from the Revenue and Civil Supplies Departments. This was carried out under the close supervision of 100 Revenue Inspectors and 57 Tahsildars. The Taluk Statistical Inspectors of this Directorate canvassed the schedules relating to the Input Survey part of the Agriculture Census. The District Statistical Officers were closely associated with the entire organisation, conduct and the supervision of the field work relating to the census.

The District Collectors had shown keen interest in the conduct of the census and extended valuable help and co-operation at the various phases of the actual conduct of the census, which made it possible to complete the census within the time schedule fixed. The Tahsildars and Taluk Supply Officers had also participated in the conduct of the census with full enthusiasm and made the task of this Directorate easier. The Superintendent of Government Presses, Trivandrum had extended his whole hearted co-operation in getting the schedules and other census materials printed in time. The wide publicity on the various features of the census arranged by the All India Radio and the District Information Officers through the mass media had helped a lot to remove the misgivings among the general public.

I take this opportunity to record my sincere thanks to each and everyone of them.

I am grateful to the Ministry of Agriculture, Government of India and their Officers particularly to Sri. R. G. Pendse, Joint Director, for the timely and prompt technical guidance given to us at every stage in carrying out the census work.

The tabulation and the preparation of the various tables were completed within the stipulated time. I express my highest appreciation of the work turned out by each and everyone of the staff of this Directorate.

Special mention has to be made in respect of Dr. R. S. Kurup, Additional Director for his valuable services in organising the census, providing guidance in the analysis of the data and the preparation of the report and Sri. K. Ramavarma, Joint Director who undertook the revision of the report incorporating the suggestions of the Government of India. My appreciation is also due to Sri. V. Sankaranarayanan Potti, Additional Director, Sri. N. Gopalakrishnan, Joint Director, Sri. G. Somasekharan Nair, Deputy Director, Sri. G. Kumaraswamy, Asst. Director and Smt. K. Leelakumari, Asst. Director for their active and valuable participation at various stages of the conduct of the census and the preparation of this census report.

I must also place on record my deep sense of gratitude to the Member in the State Board of Revenue (in charge of Land Revenue) who is also the Agricultura Census Commissioner for the State and also to the Members of the State level and District level Co-ordination Committees for their proper guidance and co-operation for the successful conduct of the census in this State.

This report is presented in two volumes. Volume I of the report deals with the background materials of the census and the detailed analysis of the census data and Volume II gives the various statistical tables at the State level, Region level and District level.

Inspite of the various limitations of the census data mentioned in the text of the report, I hope that this report would be found highly useful to planners and Institutions associated with the studies on development in the agricultural field particularly in streamlining plan schemes evolved for the benefit of small and marginal farmers.

Trivandrum,
25-4-1981.

Dr. P. A. Nair,
Director of Agricultural Census.

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REPORT ON THE AGRICULTURAL CENSUS IN KERALA, 1976-77

PART I

CHAPTER I

1.0. INTRODUCTION

1.1. Historical background of Agricultural Census

1.1.1. The importance of the study of agricultural holdings and cultivation practices in relation to the country's agricultural economy was first realised by advanced countries like the U.S.A. and Japan which are also agriculturally prosperous countries. The first agricultural census was conducted in the U.S.A. in 1840. Later, it began conducting quinquennial census of agriculture from 1920 onwards in view of the demand for agricultural data at frequent intervals in the context of increasing application on science for raising productivity. It was also felt necessary to collect agricultural statistics with higher degree of precision.

1.1.2. Though several countries had attempted to enumerate the agricultural holdings to find out the number and size of holdings, land use, crop pattern etc., the reference period and methodology varied from country to country. As a result of the persuasion of the International Institute of ROME, the first world census of agriculture was conducted in the year 1930 on a comparable uniform pattern in which 63 countries participated. The next world census of agriculture was carried out under the guidance of the Food and Agriculture organisation of the United Nations around 1950 with uniform concepts and internationally comparable norms. One hundred and sixty countries participated in that census. The 3rd world census of agriculture was carried out in 1960 with a more comprehensive coverage than the 1950 census. The 1970-71 census was the 4th in the series, but is known as the third world census of agriculture since decennial censuses on a continuing basis were started only from 1950.

1.2. Agricultural Census in India

1.2.1. Government of India had set up a Technical committee on co-ordination of agricultural statistics for examining the scope and methodology of the 1950 world census of agriculture for adoption in this country and they recommended that the census should be conducted on a complete enumeration basis in view of the need for detailed data on agricultural operational holdings for regional units for planning purposes. But due to various reason, the censuses of 1950 and 1960 were conducted as sample surveys only by the National Sample Survey Organisation which could provide only estimates at the all India level. Gradually when the plan policies for improvement of agricultural production were conceived, it was found that detailed statistics on the number of operational holdings, their tenure, relationship, size and cultural practices were necessary. Thus Government of India decided to carry out the agricultural census in the country in 1970 on a complete enumeration basis as part of the third decennial world census in 1970.

1.2.2. Thus the 1970-71 census of agriculture was the first of its kind in India. It involved the collection of data pertaining to nearly 70.4 million holdings in the country. Most of the States in India have a comprehensive system of collection and maintenance of agricultural statistics through the land records maintained by the revenue machinery. In other States where the normal revenue machinery was not concerned with the work the information was collected through sample survey methods. In these States where detailed land records were available the data on essential items included in the 1970-71 census, namely (i) number and size of operational holdings, (ii) Area under crops, (iii) Land utilisation, (iv) irrigation and (v) tenure, the available data in the revenue records were re-tabulated holding wise. This method of re-tabulation was adopted in 14 States and 5 Union Territories. In respect of the remaining states namely Kerala, Orissa, West Bengal, Meghalaya, Nagaland, Manipur and the Union Territories of Goa, Laccadives and Minicoy, Arunachal Pradesh and Amini Islands where detailed land records did not exist, special surveys for the collection of census data were conducted.

1.3. Agricultural Census in Kerala

1.3.1. The agricultural census carried out in the State with the agricultural year 1970-71 as the reference period was the first of its kind in Kerala. It was part of the 3rd decennial world census of agriculture sponsored by the Food and Agriculture Organisation of the United Nations with uniformity and comparability in concepts and definitions in which India took part.

1.3.2. Agricultural census in Kerala was not a complete enumeration but a sample census, ie., a census restricted to an adequately selected sample of agricultural holdings which is a relatively less expensive and less time-consuming process than the complete enumeration. But, such a sample census provides only estimates for the State as a whole (with reasonable accuracy) and its broad regions and district. It will not provide data with reasonable accuracy for small units like the Block or Taluk. Thus information regarding basic items like the number and size of holdings, tenure, number of fragments and land use, cropping patterns, crop-wise and source-wise irrigated area were collected from all the operational holdings in the selected villages while data on other items relating to inputs were collected from a sub-sample only.

1.3.3. Sample Design:

The design adopted for the 1970-71 agricultural census was one of stratified multi-stage random sampling. The taluk was taken as the stratum. The census village/urban block as per the 1971 population census was taken as the first stage unit of sampling and an agricultural operational holder as the second stage unit. From each taluk about 25%

of the census villages and urban blocks were selected separately by simple random sampling subject to the condition that at least one urban block was selected from a taluk having urban area, and also subject to the limitation that the total sample size for the State should not exceed 1600 census villages /blocks. The selection of census villages/urban blocks was done separately from the frame of census villages and blocks. The total sample size consisted of 1400 census villages for the rural and 200 blocks for the urban areas. In each of the selected villages and blocks a list of all the operational holders was prepared. The operational holders were grouped into 3 categories:

A - Holders operating less than 10 cents
B - Holders operating 10 cents and above but less than 1000 cents.
C - Holders operating 1000 cents and above.

Operational holders in category 'A' were not covered for detailed enquiry. From 'B' a sample of 10% was selected by systematic sampling. All the operational holders in category 'C' were covered in the enquiry. Thus the 'main sample' for the general enquiry on operational holdings consisted of the selected holders of category 'B' together with all the holders of category 'C'.

From among the holders of 'B' included in the main sample, a sub-sample of 20% of the holders was again selected systematically. These holders together with all the holders in category 'C' constituted the "sub-sample" for detailed enquiry on operational holdings.

All the agricultural operational holders residing in the State were covered in the enquiry.

1. 3. 4. Objects of the census

The objects of the sample survey were collection of information on—

(i) Number of agricultural operational holdings and their main characteristics such as size, number of parcels, form of tenure and land use pattern;
(ii) Area under various crops in the holdings;
(iii) Irrigation and drainage;
(iv) Use of fertilizers;
(v) Number of livestock and agricultural implements owned;
(vi) Employment in agriculture;
(vii) Age, sex, distribution of farm population; and
(viii) Association of agricultural holdings with other industries.

The unit of enumeration was the agricultural operational holding. There were 3 schedules of enquiry.

1. The listing schedule;
2. General enquiry schedule; and
3. Schedule for collection of inputs from the sub-sample.

All the information required for the census were collected by trained enumerators by house to house visit and contacting the operational holders.

1. 3. 5. Organisation

(a) Headquarters:

The Bureau of Economics and Statistics was responsible for the organisation and conduct of the census. The Director of the Bureau was declared as the Director of Agricultural Census. To assist him the following Technical and Administrative personnel were appointed:

1. Deputy Director	1
2. Assistant Directors	2
3. Administrative Assistant	1
4. Research Assistants	2
5. L.D. Compilers	4
6. L.D. Clerks	2
7. L.D. Typists	2
8. Driver	1
9. Peons	3

(b) Field staff:

The field work was done by the Village Assistants of the Revenue and Civil Supplies Departments under the supervision of the Revenue Inspectors. The services of the District Statistical Officers and the Taluk Statistical Inspectors were also utilised for the organisation and conduct of the field work. The entire work upto the report was completed by the end of November 1973. Though the Deputy Director took charge on 1-2-72, the full complement of the headquarters staff began functioning only from April 1972. In 85% of the samples the field work was completed by May and June 1972 but in the remaining cases the time had to be extended upto September 15th in view of their large area or the hilly nature of the land. The services of 1600 Village Assistants and 200 Revenue Inspectors were utilised for enumeration and supervision respectively.

(c) Co-ordination Committees and Training:

State Level and District Level Co-ordination Committees were constituted and conferences were arranged at various stages from the level of District Collectors to the level of enumerators and supervisors for the timely and efficient completion of the work. The enumerators and supervisors were given training in the conduct of the field work which

started on 1st May, 1972. The first stage training was imparted at various centres by the Deputy Director and Assistant Directors in which the District Officers also took part. At the second, third and fourth stages training was given to Statistical Inspectors, Revenue Inspectors and Village Assistants respectively. In many of the districts the first stage training was inaugurated by the concerned District Collectors.

The printing of schedules and instructions, their distribution etc. were arranged by the headquarters staff. The filled-in-schedules were collected at the Three Tabulation Centres Trivandrum, Ernakulam and Calicut.

1. 3. 6. Scrutiny and Tabulation

The tabulation staff in each centre consisted of 1 Assistant Director, 2 Research Assistants, 4 U.D. Compilers, 12 L. D. Compilers, 1 Clerk, 1 Typist and 2 Peons. The tabulation staff were sanctioned for 18 months and they started functioning from the middle of August, 1972. After scrutiny and tabulation, the preparation of the final report and tables were done by the headquarters staff. The report was completed by the end of November, 1973.

1. 3. 7. Findings of the 1970-71 Census

According to the census estimates the total number of operational holdings in the State during 1970-71 was 28.2 lakhs and the total area of these holdings was 16.0 lakhs hectares. The number of holdings of area less than 0·04 hectare was 5.15 lakhs which is 18.3 % of the total number of holdings and the total area accounted for by these holdings was less than 1%. The main reason for the large number of holdings in this size group of less than 0.04 hectare was the granting of permanent right of land to the 'Kudikidappukars' in the State according to the Kerala Land Reforms Act. When the remaining operational holdings are grouped into 13 sub-groups, it was found that out of the 23.05 lakhs of such holdings the number of holdings in each class and the area contained by them showed an uneven distribution of area. 61.6% of them were below 1 hectare each and they had an area of only 33.9% of the total area. Holdings of size 10 hectares and above formed only 1.50 of the total number of holdings whereas they commanded more than 12% of the total area. It is noteworthy that, out of the 23.05 lakhs of holdings of area 0.04 hectare and above, 10.81 lakhs were in the size group 0.04-0.25 hectare which is 46.9% of the number of holdings. The average area per operational holding including the joint holdings was 0.69 hectare and the average number of parcels per holding was 1.6. The average area per parcel for the State was 0.42 hectare. Considering the distribution of the number of holdings according to 'tenure' it was found that 88.4% of the number of holdings belonged to the 'wholly owned' category 3.4 % partly owned and 8.2 % wholly rented in group whereas according to the area distribution 86.8% was wholly owned and 13.2% rented in.

1. 3. 8. Land use pattern

The district-wise break up figures of the main findings narrated above can be seen from the Agricultural Census Report, Kerala 1970-71 (Vol. II). The estimates of the percentages of area under different land uses show that 86.5% of the total area of holdings come under 'Net area sown', 3.3% under cultivable waste, 5.7% under 'Net available for cultivation' and the remaining under current fallows and fallow lands other than current fallows. The distribution of area according to land use, district-wise details and their variations in the different size classes can be studied by referring to the previous census report.

1. 3. 9. Irrigation facilities

Out of the 23.05 lakhs of holdings 6.3% are wholly irrigated and 11.4% partly irrigated. A holding is considered as wholly or partly irrigated according as the net area sown within the holding was entirely irrigated or not. In terms of the net area sown it was found that 13.3% was irrigated. Analysing the district-wise break up it was found that the percentages of net area irrigated to net area sown was maximum in Trichur District (47.3%). Looking at the source of irrigation it was found that 45.1% of the irrigated area was from canals, 16.1 % from tanks, 15.3% from wells and 23.5% by other sources. When the distribution of the net area irrigated in the districts according to source of Irrigation was considered it was found that the largest proportion (41.2%) of the canals irrigated area was in Palghat District followed by 25.7% in Trichur District.

1. 3. 10. Gross cropped area

The holdings reported an area of 13.8 lakhs hectares of net area sown and 15.8 lakhs hectares of gross cropped area. The intensity of cropping which is expressed as a ratio of the gross cropped area to the net area sown was 114.3% for all the holdings together.

Nearly a third of the gross cropped area in the holdings was under cultivation of rice. Next to this, coconut and tapioca are the most important crops.

1. 3. 11. Area under different crops

The area occupied by the important crops in percentages during the reference year 1970-71 as obtained from the agricultural census are given below:

	Name of crop	*Percentage of the total cropped area*
1.	Rice	32.6
2.	Coconut	16.5
3.	Tapioca	14.9
4.	Rubber	8.3
5.	Cashew	5.1
6.	Tea	4.7
7.	Pepper	3.2
8.	Other cereals and pulses	2.3

	Name of crop	*Percentage of the total cropped area*
9.	Coffee	2.3
10.	Arecanut	2.0
11.	Jack	1.6
12.	Other vegetables	1.6
13.	Mango	1.5
14.	Banana and Plantain	1.0
15.	Other crops	2.4
		100.0

1. 3. 12. Use of chemical fertilizers and pesticides

According to the census results 28.0% of the 23.05 lakhs of holdings were treated with chemical fertilizers whereas 55.9% of the holdings received only organic manures. Reckoned in terms of area it was seen that 36.5% of the area was treated with chemical fertilizers and 21.1% of the area received organic manure only. Considering district-wise break up it was found that Palghat District had the maximum percentage of area treated with chemical fertilizers. Next to that came Trichur and Ernakulam Districts. The different kinds of chemical fertilizers on which information was collected during the last 1970-71 census were (1) Ammonium sulphate, (2) Urea, (3) Calcium Ammonium Nitrate, (4) Super Phosphate, (5) Triple Super Phosphate, (6) Potassic Fertilizers, and (7) Fertilizer mixtures. The average rates of application of different chemical fertilizers and to different crops and other details can be seen by referring to the 1970-71 census report.

Pesticides are unavoidable to the high yielding varieties of paddy whereas they are sometimes applied to local varieties also. From the report it was found that 11.0% of the number of holdings were treated with pesticides whereas in terms of the area it was 17.8%.

1. 3. 13. Livestock

According to the census, the operational holdings numbering 23 lakhs owned a total livestock population of 35.7 lakhs as on 30th June, 1971 which included cattle, buffaloes, sheep and goat. On an average 100 operational holdings owned 155 heads of livestock. Considering the various size classes it was found that this average increased with increase in the holding size. Possession of cattle was reported by about 10 lakhs of operational holdings and that of buffaloes by 1.5 lakhs. The average number of working animals per 100 hectares of paddy area was found to be 125 and the average number of tractors and power trillers per 100 hectares were 0.3 and 0.1 respectively.

1. 3. 14. General appraisal of the 1970-71 census estimates

The detailed estimates of the various characteristics for the State were presented in 23 main Tables in Vol.II of the report. The percentage tables are mostly presented in the text of the report. According to the estimates there were 28.2 lakhs of operational holdings and they had a total area of 16.0 lakhs hectares. A comparison of these estimates with those available from other sources like the Land Reforms Survey conducted in 1966 and the annual Land Utilisation Surveys indicates that while the number of holdings estimated appears to be within reasonable levels of accuracy, the area reported by these holdings seems to be under estimated. The trend of under estimation of area is noticed in other sectors also especially in respect of the area under different crops.

There are several reasons for the under estimation in respect of area since the data were collected by enquiry method as voluntary information by the informants from their memory. Such under estimates were reported in sample census in advanced countries also.

In respect of Kerala there are also other special reasons for under reporting of area by the cultivators some of which are given below:

1. Ceiling provisions of land for an individual and a family as per the Kerala Land Reforms Act, 1964 and Amendments in 1970.

2. The liability to pay levy on the part of paddy cultivators cultivating more than 2 acres.

3. Plots under cultivation of the operational holders in villages other than their place of residence and taluk may not be reported by the informants.

4. Estimation of area under coconut, arecanut, jack trees etc., by writing the number of palms as reported by informant at guess and converting according to certain standard norms.

5. There are several holdings in the State of a number of crops especially cardamom, coffee and rubber, the operational holders of which reside outside the State. The area of these holdings will not figure in the operational area since the data were collected by interviewing the resident cultivators only.

6. Most of the institutional holdings were not enumerated due to various reasons.

Thus, there was bias by way of under reporting in varying extents in the area of holdings acreage under crops, number of perennial trees etc. It was also found that the extent of under reporting was seen largest in the size classes above 4 hectares which shows that the enforcement of the provisions of the Land Reforms Act had heavily influenced the cultivators while reporting the area of these operational holdings.

1. 3. 15. Uses of the last census results

The results of the last census have enabled us to study the various characteristics of agricultural holdings especially in the various size classes and in the various districts of the State so as to formulate socio-economic and district-wise planning and efficient implementation of land reforms and projects designed to increased agricultural production. The Small Farmers Development Agency Projects now going on in some of the districts have enabled the State Government to improve the socio-economic conditions of the small and marginal farmers in the comparatively backward districts. The Land Use Board of the State Government has profitably utilised the data provided by this census eventhough the data were available only at the district level. The data would have been more useful for the Board if taluk level figures were made available from the census. But due to the inadequate size of the sample at the taluk level this has not been possible. Other years of the data included the planners in the agricultural sectors, universities, research institution, banks engaged in providing credit to the agriculturists etc. for developing the credit planning process. Viewed from this point of view, though the absolute quantitative results of the census have not the required degree of precision, due to under reporting, that alone does not reduce the value of census taking. In order to highlight this point the following extract from the book "Sampling Theory of Surveys with Applications" by Dr.P.V. Sukhatine is quoted which says that the census results form a quite valuable and the only source of information for the planning needs inspite of the large deficiencies likely to be present in the data. Planners need data of the census type and that too from periodic census which is the only means of providing data for them. The planners would also see the limitations of such data and their degree of precision and exercise necessary caution in utilising such results for various planning and developmental activities of the State.

1. 4. Why the present census

All the State Governments and Union Territories have been directed by the Central Government to implement speedy land reforms giving more stress for the uplift of the landless and economically weaker sections of the population and to make the tillers of the soil their owners. In order to review the progress achieved by the various States after the previous agricultural census of 1970-71 and for future micro and macro level planning for ensuring regional balanced progress in all spheres of activity it was found necessary to conduct another agricultural census; this would give estimates of increase in the number of operational holders, extent of fragmentation of holdings and average size of holdings. It would be possible to estimate the number of Kudikidappukar and tenants who were benefited by the various sections of the Act, extent of surplus lands available and number of beneficiaries from the distribution of surplus land by Government and the impact of the various land reforms measures on agricultural production and economy. Hence the present census was sponsored by Government of India uniformly in all the States and Union Territories with the reference year 1976-77.

CHAPTER II

2. 0. THE STATE ECONOMY

2. 1. Location

Kerala is situated between north latitude 8° 18′ and 12° 48′ and east longitudes 74° 52′ and 77°22′. It is bounded on the north by the Mysore State, on the east and south by the Tamil Nadu and on the west by the Arabian sea. It was formed on the 1st November, 1956 consequent on the reorganisation of States and includes a major portion of the former state of Travancore, the whole of the Cochin State, the whole of Malabar District and a portion of the South Canara District of the former Madras State. It has an area of 15,000 sq.miles.

2. 2. Physical features

2.2.1. Kerala is a narrow strip of land with a width varying from 130 kms. in the middle to 32 kms. at the extremities. The State has a coastal length of 580 kms. The Western Ghat comprising the mountain tracts almost borders the east side of the State. Due to the high mountain ranges the State has a high intensity of rainfall and a good system of rivers. The altitude of the land is about 3,000 metres on the Ghat, it gradually decreases to the coast. The State can be divided into 3 well defined natural divisions.

(i) The coastal belt with a number of beautiful lakes and inter connecting channels known as the 'low land'.

(ii) The hilly tracts on the west of the Western Ghats covered with dense forests and slopping mountains known as the 'high land'.

(iii) The midland plains between the two.

2.2.2. The three distinct natural divisions have contributed basically to the growth of a number of agricultural crops, plantation crops like rubber, cardamom, tea and coffee in abundent in the highland area. The lowland region consists of paddy fields and coconut and arecanut plantations mainly. The midland consists of crops like paddy, coconut, pepper, ginger, sugarcane, tapioca, etc. The area and population of the three natural divisions are given below:-

Natural Divisions	Area (sq. kms.)	Population (1971 census) (lakhs)
Lowland	3979	55.13
Midland	16231	126.21
Highland	18654	32.13
Total	38654	213.47

2. 3. Administrative Divisions

From 1972 onwards the State is divided into 11 districts. They are Trivandrum, Quilon, Alleppey, Kottayam, Idukki, Ernakulam, Trichur, Palghat, Malappuram, Kozhikode and Cannanore. There are 57 taluks which are further divided into 1327 revenue villages (as in 1976).

2. 4. Development units

For the improvement of agricultural programmes the State is delimited to 144 blocks and they are subdivided into panchayats. During 1976-77 there were 991 panchayats in the State. The district-wise break up of the Block, Panchayats, Corporations and 29 Municipalities are given in the table 2.4. (i) below:—

Table No. 2.4. (i)

District-wise distribution of the N.E.S. Blocks, Panchayats and Municipalities during 1976-77

Name of District	No. of Blocks	No. of Panchayats	No. of Municipalities	No. of Corporations
1	2	3	4	5
Trivandrum	12	83	2	1
Quilon	17	103	2	..
Alleppey	17	93	5	..
Kottayam	11	71	4	..
Idukki	4	52	..	..
Ernakulam	15	87	4	1
Trichur	17	98	4	..
Palghat	12	90	2	..
Malappuram	13	92	2	..
Kozhikode	14	95	1	1
Cannanore	12	127	3	..
State	144	991	29	3

2. 5. Rainfall

2.5.1 Because of the peculiar location of Kerala between the Arabian Sea and the Sahya Mountains, there are two clear rainy seasons. The quantity of rainfall per annum received by the State gradually increases from the western lowland region to the highland region on the east and also from the south to the north. The south-west monsoon rains start in June and extends to the end of August whereas the north-east monsoon period is from October to December. The normal average rainfall in the State (compiled from the data for 50 years from 1901-1950) is about 300 cms. It varies from 200 cms. in Trivandrum District to 380 cms. in Calicut District. Nearly 90% of the annual rainfall is covered by the two rainy seasons.

2.5.2. From a publication of the rainfall data by the Director-General of Observatories it is seen that Kerala tops the list with 2,986 mms. of rain spread on an average over 126 days in the year followed by Assam with 2,516 mms. spread over 114 days. The State has 87 raingauge stations situated at different places in the various districts from which rainfall data are available. Due to the heavy rainfall, Kerala is blessed with 44 rivers starting from the Sahyadri Mountains of which 41 flow towards the west and fall in the Arabian Sea and the remaining 3 flow towards the east. They have great irrigation and power generation potentialities of which only a part has been exploited. A considerable area under the autumn and winter crops of paddy are only rain fed by the south-west and north-east monsoons. Because of the two rainfall seasons there is immense scope for increasing the average under irrigation and intensify agricultural production. From the Table 2.5.2 (i) it may be seen that 1976-77 was an year in which the rainfall was less than the normal. The north-west monsoon from June, 1976 to August, 1976 was almost a failure which is unknown for the last 30 years especially in Trivandrum District.

2. 6. Temperature

Since Kerala is peculiarly situated between the Arabian sea on the west and the mountains on the east and of the two annual rainy seasons, it enjoys a good moderate climate without severe summer and too cold winters. Generally, the maximum temperature during an year is about 35°C except at Palghat and Punaloor where it rises upto 40° at the peak of summer on rare occasion. The lowest temperature during the winter is 18°C in the normal years. The maximum and minimum temperatures at certain selected centres are given in Table 2.6(1). Thus the State enjoys a moderate climate throughout the year without extremes on either side, which is a rare phenomenon in most other States. The humidity in the State is generally high and ranges between 70% and 90%. Because of the good climate the State is a centre of attraction for tourists from outside and inside India.

Table No. 2.5.2 (1)

District-wise distribution of annual rainfall (in cms.) for the agricultural years 1970-71 and 1976-77

District	Normal rain-fall	Annual													
	1901-1950	1970-71	1976-77	1976 Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	77 Jan.	Feb.	March	April	May	June
Trivandrum	200	213	153	15.1	14.1	4.6	14.7	23.0	3.3	0.4	2.0	3.3	8.8	40.3	28.9
Quilon	276	271	259	35.3	26.0	11.1	32.3	36.2	3.8	..	4.4	4.8	14.6	49.8	41.2
Alleppey	302	257	312	45.6	49.9	10.0	27.6	42.7	3.3	..	1.4	7.5	14.0	59.9	69.9
Kottayam	300	288	295	54.9	30.9	10.7	25.0	35.5	4.3	0.3	1.1	6.7	23.4	42.2	60.4
Idukki	N.A.	N.A.	272	67.7	42.4	16.4	25.1	25.4	2.8	..	1.3	2.0	14.6	25.5	48.5
Ernakulam	358	337	313	63.1	39.2	9.4	32.7	36.3	4.5	..	1.3	4.4	20.6	36.9	59.4
Trichur	316	302	282	73.2	44.1	13.1	20.0	21.7	2.1	..	0.8	2.5	4.7	31.7	67.9
Palghat	246	278	197	39.5	20.5	7.4	19.8	33.7	1.1	..	0.6	3.0	9.4	14.4	47.2
Malappuram	N.A.	N.A.	271	65.9	37.2	7.6	23.8	29.7	3.7	..	..	2.8	8.8	27.8	64.1
Kozhikode	346	426	355	97.5	44.6	13.5	21.3	36.0	4.0	..	0.4	1.1	6.0	30.6	100.5
Cannanore	344	345	305	105.5	42.9	18.5	9.0	20.9	1.4	..	1.2	0.8	3.0	20.8	81.2
State	299	302	274	60.7	33.8	11.1	22.8	31.0	3.1	..	1.4	3.5	11.6	34.5	60.3

N.A.—Not available

Table No. 2.6 (1)

Maximum-Minimum temperatures at selected centres (in degree centigrade) 1971-77

Centre	1971		1972		1973		1974		1975		1976		1977	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Trivandrum	32.5	21.7	32.7	20.9	33.3	22.0	32.3	20.4	32.5	21.4	33.0	31.5	33.0	21.5
Punalur	35.7	20.0	37.0	19.9	98.1	18.6	36.6	20.5	36.0	20.6	32.3	19.4	36.2	19.4
Alleppey	33.3	22.7	32.9	21.3	33.8	22.6	32.9	81.5	32.8	22.1	33.1	23.1	33.4	22.5
Cochin (NAS)	32.8	21.9	32.4	20.4	33.2	22.1	32.3	21.4	32.6	21.2	32.1	21.7	33.0	22.4
Palghat	35.9	20.6	38.0	20.8	37.2	20.9	38.6	19.4	39.3	20.3	38.3	19.9	37.6	20.9
Kozhikode	32.9	21.6	33.1	19.9	33.6	21.7	33.0	21.5	32.7	21.3	32.2	20.9	33.5	21.7

Source.—Meteorological Centre, Trivandrum.

2.7. Crop seasons

In Kerala there are two rainy seasons winter and summer. Their periods can be roughly allocated as follows:—

1. The hot weather season (summer) from March to May.
2. The south-west monsoon from June to August.
3. The north-east monsoon rainy season from September to December.
4. The dry weather (winter) from December to February.

The periods of sowing and harvesting of various crops depend mainly on the rainy seasons. The 3 crop seasons for the most important crop paddy, are autumn, winter and summer. The Table given below gives a picture of the seasons of sowing, harvesting etc., of the most important crops in the State.

Table No. 2.7 (I)

Sowing, harvesting and peak marketing seasons of principal crops in Kerala State

Sl. No.	Crop		Sowing	Harvesting	Peak marketing
1	2		3	4	5
1.	Rice	Autumn	April - June	August - October	September - October
		Winter	August - October	December - February	January - February
		Summer	November - December	February - March	March - April
			January - March	April - May	May - June
2.	Ragi	1st crop	April- July	August - October	September - October
		2nd crop	September - October	December - January	December - January
3.	Small millets (samai)	Khariff	May	August	August
		Rabi	September	December	December
4.	Red gram	1st crop	May - June	August - September	September - October
		2nd crop	August - October	November - January	January
		3rd crop	February	April	April
5.	Horsegram	1st crop	August - October	November - January	January - February
		2nd crop	February - March	April - May	May - June
6.	Greengram	..	May - June	August - September	September - October
7.	Blackgram	1st crop	May - June	August - October	October
		2nd crop	October - November	January - February	February
8.	Other pulses	..	May - June	August - September	August - September
9.	Sugarcane	1st crop	October	December - January	January
		2nd crop	November - February	October - December	November - December
			January - March	December - February	February
10.	Ginger (Raw)	..	April - May	November - January	December - January
11.	Pepper	..	..	November - January	December - January
12.	Cotton	..	August - September	February - March	February - March
13.	Sesamum	1st crop	August - October	December - January	December - January
		2nd crop	December - January	March - April	April - May
		3rd crop	February - March	June - July	July - August
14.	Sweet potatoes	1st crop	June - July	September - October	September - October
		2nd crop	September - October	December - January	December - January
		3rd crop	November - December	February - March	February - March
15.	Turmeric	..	April - May	December - January	January - February
16.	Lemongrass	..	..	June - September	September
17.	Tapioca	1st crop	October - November	August - September	August - September
		2nd crop	March - May	November - January	December - January
		3rd crop	July - September	May - July	June - July

2.8. Population characteristics

2.8.1. The State has an area of 38, 864 sq. km. The population of the state as per 1971 census was 213.47 lakhs consisting of 105.87 lakhs males and 107.60 lakhs females. The urban population is only 16.24%. The projected population of the State for 1977 is 241.66 lakhs. Though Kerala accounts for only 1.2% of the area of the Indian Union it has a population of about 3.9% of all India population. The State has the highest density of population (548 sq. km.) which is 3 times that of the all India average of 178 sq. km. The District-wise area and population as per 1971 census and estimated population of Kerala for 1977 (estimated) are given below:-

Table No. 2.8.1 (1)

District-wise area and population of Kerala

District	Area (sq. km.)	Population in lakhs (1971 census)	Estimated population for 1977 (in lakhs)
1	2	3	4
Trivandrum	2192	21.99	24.77
Quilon	4623	24.13	26.90
Alleppey	1884	21.26	22.98
Kottayam	2196	15.39	16.60
Idukki	5087	7.65	8.84
Ernakulam	2377	21.64	24.53
Trichur	3032	21.29	24.75
Palghat	4400	16.85	18.70
Malappuram	3638	18.56	21.65
Kozhikode	3729	21.06	24.46
Cannanore	5706	23.65	27.48
	38854	213.47	241.66

From the Table it is seen that Quilon District with 24.13 lakhs has the highest population and Idukki has the lowest population of 7.65 lakhs during 1971.

2.8.2. The decennial rate of growth of population in Kerala during 1961-71 was 26.29 which was above the All India rate of 24.80%. According to the results of the sample registration, both the birth-rate and death-rate have come down since 1971 census and the rate of increase of the population during this decade is estimated to be about 20%. The activities of the Family Planning Programme in the State have considerably reduced the birth-rate in the State along with the increase in age at marriage. About 84% of the population live in rural areas, 40% of the population is under age 15. There are 1016 females per 1000 males; 60.16% of the population are literate as per 1971 census. Only 62.16 lakhs are workers (29.1%). It is comprised of 47.64 lakh male and 14.52 lakh female workers. Nearly 50% of the workers are engaged in agriculture and allied fields. The number of unemployed persons even according to the registration in Employment Exchanges was 8.5 lakhs and the estimated unemployment persons according to the committee set up to study the same was 15.6 lakhs. The percentage of population below the poverty line is 60.

2.9. (a) Agricultural Economy

2.9.1. The general economic situation in the State during 1976-77 presented a steady and stable picture. Though there was a down fall of nearby 6 per cent in rice production from that of 1975-76 it was possible to ensure a per capita availability of 299 gms. per day, the highest level achieved in recent years. This was due to the relative abundence of foodgrains at the national level and the removal of restrictions on movement of foodgrains. There was increase in the import of rice into Kerala (70%) as compared to the previous year which was responsible for the increase in per capita availability to the extent of 25%.

2.9.2. There was a decline in the consumer price index ranging from 0.6% to 6.6% in different centres in the State, during 1976-77. The retail prices of rice, coconut oil, coriander, tamarind etc. showed a declining while those of dhal, redgram, greengram, chillies etc. showed substantial increase. It may be noted that the large spurt in the prices was for consumer items imported.

2.9.3. The index of agricultural production registered a fall of 1.3 points. Rice production of 12.54 lakh tonnes showed a fall of 5.7% then that of the previous year. However commercial crops like tea, rubber, coffee and pepper, registered an increase in varying degrees.

2.9.4. A major programme launched during the year 1976-77 has been the development of tree crops with the assistance of the World Bank. The project envisages a total investment of Rs. 62 crores spread over a period of 7 years. Addition of 100 more intensive Development Units and expansion of area under cahsew by 11,000 hectares are some of the important programmes started during the year. Distribution of high yielding variety seeds doubled to 5,000 tonnes and distribution of fertilizers and pesticides also increased substantially during the year. Over 3,000 wells and fifty filters were dug during the year benefiting 4,200 hectares of land.

2.9.5. The four small Farmers Development Agency Units in the State benefited 7,000 small farmers, 43,000 marginal farmers and 30000 agricultural labourers.

2.9.6. In the land reforms sector also there was considerable progress during the year. Up to December 1977, 34.37 lakhs of cases were filed or initiated for assignment of the rights of landlords and intermediaries to Kudikidappukara and cultivating tenants of which 33 lakh cases (96%) have already been disposed of. In the matter of acquisition of surplus lands estimated at 62500 hectares, about 27000 hectares have been taken over by the end of 1977. Of these 17110 hectares have been distributed to 61862 persons. The various agrarian reforms implemented in Kerala so far cover 20 lakh beneficiaries. These programmes have led to considerable increase in the number of operational holdings in the farming sector. The number of landless agricultural households during the decade 1960-70 declined from 31.9% to 10.2% as seen from the Economic Review, 1977 of the State Planning Board.

2.9.7. In the field of livestock development in addition to the progress of upgrading of stock, supporting measures like fodder development, provision for cattle feeds and improved animal health services were also made available. The Animal Husbandry Department carried out 4.77 lakh artificial inseminations against 4 lakhs in the previous year. The level of milk production in the State reached 5.10 lakh tonnes in 1976-77 and the per capita availability of milk went up to 58 gms.

2.9.8. The forestry sector also exhibited appreciable improvement during 1976-77. The overall revenue went up from Rs. 21.92 crores in 1975-76 to Rs. 26.18 crores during 1976-77. Between 1971 and 1976 the number of forest based workers is estimated to have gone up from 21000 to 53000. According to an assessment by the Forest Department in 1977, about 3000 sq. kms. could be converted into forest plantations of which about 1300 sq. kms. have been planted with different species of trees. The Forest Development Corporation have taken up a scheme of planting eucalyptus over an area of 445 sq. kms. as a phased programme to be completed in 10 years.

2.10. Contribution to State Income

2.10.1. In an agricultural country like India, the contribution to the national income by agriculture is near about 50%. Kerala also follows more or less the same trend. From 1970-71 to 1976-77 the contribution to the net domestic product by the agriculture sector including animal husbandry increased from Rs. 633 crores to Rs. 1016 crores at current prices when the total net domestic product increased from Rs. 1227 crores to Rs. 2319 crores. In terms of percentage contribution to the net domestic product by the agriculture sector slightly decreased from 51.6 to 43.8 during the period of 7 years. This only shows that the growth in the primary sector including agricultural sector was not as much as that in the non-agricultural sectors together.

2.10.2. During these years there was a gradual increase in the production of certain non-food crops due to increased application of fertilizers and other inputs like improved varieties of seeds etc. though there was a reduction of 1.3 points in the agricultural production due to inadequate rains in the first half of the year. The important crops that

make substantial contribution to the State income of Kerala are coconut, paddy, tapioca, rubber, banana and plantain. Of these, coconut and paddy together contribute more than 50% of the net domestic product from the Agricultural Sector at factor cost. In terms of current prices the contribution by coconuts gradually increased from Rs. 204 crores during 1970-71 to Rs. 303 crores during 1976-77 while that of paddy increased from Rs. 131 crores to 188 crores during the interim period of the 2 agricultural censuses. Tea, coffee, pepper, cardamom, cashewnuts and other fruits also contribute to the State income. Some of the corps like cashewnut, tea, coffee, pepper and cardamom are good earners of foreign exchanges. The following table gives the N.D.P. at current prices of some of the most important crops together with the total net domestic product for seven years.

Table No. 2.10.2(1).

Net domestic product at factor cost at current prices (Rs. in crores)

1	1970-71 2	1971-72 3	1972-73 4	1973-74 5	1974-75 6	1975-76 7	1976-77 8
Agricultural sector	633	577	694	941	1024	969	1016
Total net State domestic product	1227	1321	1423	1798	2032	2134	2319
Percentage contribution by agri-cultural sector	51.6	46.9	48.8	52.3	50.4	45.4	43.8
Major crops:							
1. Coconut	204	157	202	308	291	229	303
2. Paddy	131	137	159	162	179	190	188
3. Tapioca	99	116	143	190	216	216	187
4. Rubber	26	28	30	51	74	65	60
5. Banana	9	8	9	10	13	15	16
6. Plantain	15	15	18	20	27	27	29

2.10.3. The per capita income has gone up from Rs. 584 to Rs. 967 during 1970-71 to 1976-77 when the State income has gone up from Rs. 1227 crores to Rs. 2319 crores at current prices.

2.10.4. In terms of district-wise per capita income Kottayam District tops the list during 1976-77 with Rs. 1151 followed by Idukki and Ernakulam (Rs. 1127) and Malappuram District (Rs. 824) stands at the bottom according to the provisional estimates of State income and per capita income at current prices.

2.11. Land use

2.11.1. The total geographical area of the State is 3,885,497 hectares according to village papers.

2.11.2. Land use statistics in most of the States in India are obtained from the Revenue Department where the patwari system of reporting is prevalent. In those States the statistics is directly obtained from the revenue records of the village. But the States of Kerala, Orissa and West Bengal are not reporting areas. The responsibility of collecting agricultural statistics in Kerala is vested with the Bureau of Economics and Statistics. Till June 1974 the different land use statistics were collected through regular sample surveys conducted twice in each agricultural year following the standard classification adopted by the Government of India. The various items included in this classification and their definitions are given below:-

(i) *Forests:*

All actual forest areas on the lands classed or administered as forests under any legal enactments dealing with forests whether State owned or private.

(ii) *Land put to non-agricultural use:*

Area occupied by buildings, roads, courtyards, play grounds, railways, rivers, canals and other lands put to uses other than agricultural.

(iii) *Barren and uncultivable land:*

Lands like mountains, deserts etc. and lands which cannot be brought under cultivation unless at a high cost.

(iv) *Permanent pastures and grazing lands:*

All grazing land whether they are permanent pastures or not.

(v) *Miscellaneous tree crops:*

All cultivable land which is not included under net area sown, but is put to some agricultural use like lends under thatching grass, bamboo, bushes etc.

(vi) *Cultivable waste:*

All land available for cultivation but not taken up for cultivation or abandoned after a few years for one or other reasons. Land once cultivated, but not cultivated for 5 years in succession is also included in this category.

(vii) *Current fallows:*

These are crop areas which are kept fallow during the current year.

(viii) *Other fallow lands:*

All lands which are taken up for cultivation, but are temporarily out of cultivation for a period of not less than one year and not more than 5 years.

(x) *Net area sown:*

Th is represents the area sown with crops, counting area sown more than once in the same year only once.

(x) Total cropped area is the area obtained by counting twice those areas which are sown twice and so on.

2.11.3. Up to the end of the year 1974-75 the agricultural statistics of the State were being framed on the basis of Regular Land Utilisation Surveys conducted by the Bureau of Economics and Statistics. The sampling design for the Land Utilisation Surveys was one of stratified two stage sampling with taluk as the stratum census villages as the first stage units and cluster of plots as the second stage units. The total sample size for the State as a whole was only 0.6% of the total number of plots in the State. Because of the high order of heterogenity prevalent in the cropping pattern, particularly in the midland region of the State the estimates framed from the Land Utilisation Surveys were not giving firm trends especially in respect of minor crops.

With the adoption of the Timely Reporting Scheme in the State from 1975-76 onwards, the design of the Land Utilisation Survey was suitably changed to cover a larger percentage of the plots with the aim of obtaining more reliable estimates even in the case of minor crops. As per the Sampling design adopted for the Timely Reporting Scheme the taluks continued to be the strata and the first stage units had been changed from census villages to well defined revenue villages within the selected revenue villages all the plots would be enumerated. The survey was designed in such a way that all the plots in the State would be actually enumerated during the course of a period of six years covering a certain percentage of the revenue villages in each taluk in each year.

The first round of the Timely Reporting Scheme was conducted in 1975-76 taking 10% of the revenue villages in each Taluk as the first stage sample size. This sample size was increased to 15% for the next year. Thus by the end of 1976-77 complete enumeration of plots was carried out in 25% of the revenue villages in all the taluks of the State.

The following table 2.11.3. (1) gives the Land Utilisation Particulars for the two years 1970-71 and 1976-77.

Table No. 2.11.3.(1)

Land Utilisation pattern during 1970-71 and 1976-77

Classification of land use	Area (in 1000) hectares		
	1970-71	1976-77	Increase or decrease
1	2	3	4
1. Total geographical area	3885	3885	..
2. Forest	1055	1082	+27
3. Land put to non-agricultural uses	274	260	—14
4. Barren and uncultivable land	71	79	+8
5. Permanent pastures and grazing lands	28	16	—12
6. Land under miscellaneous tree crops	132	73	—59
7. Cultivable waste land	80	116	+56
8. Fallow other than current fallow	23	22	—1
9. Current fallow	24	37	+13
10. Net area sown	2172	2201	+29
11. Area sown more than once	761	733	—28
12. Total cropped area	2933	2933	0

The estimates for the year 1970-71 are those framed from the land utilisation survey and those relating to 1976-77 are estimates based on the Timely Reporting Scheme. Since the Timely Reporting Scheme is having a larger sample size, the estimates framed from this survey are considered to be having greater precision.

2.11.4. District-wise break up of the land use

The distribution of the land use according to the standard classification in the various districts during 1976-77 as estimated from Timely Reporting Survey is given in table No. 2.11.4.(1).

2.11.5. For comparative purposes the district-wise break up of the classification of area as estimated from the Land Utilisation Survey for the year 1970-71 is given in table No. 2.11.5. (1).

Table No. 2.11.4 (1)

Total area and classification of area in each district 1976-77 (Hectares)

District	Total geographical area according to village papers	Forest	Land put to non-agricultural uses	Barren and uncultivable land	Permanent pastures & grazing lands	Land under miscellaneous tree crops	Cultivable waste land	Fallow other than fallow	Current fallow	Net area sown	Area sown more than once	Total cropped area
1	2	3	4	5	6	7	8	9	10	11	12	13
Trivandrum	218600	49861	16999	1466	636	346	1017	1670	1172	146033	95637	241670
Quilon	474290	236048	24269	3302	75	587	1395	1289	1654	205671	130378	336049
Alleppey	182270	518	27855	847	38	287	2068	634	2013	148010	78383	226393
Kottayam	219550	8141	17586	2212	279	803	1947	1614	1856	185012	73332	258344
Idukki	315048	260985	13411	17346	8219	19830	36384	1048	1318	156499	1222	157721
Ernakulam	235319	8123	29380	1561	476	2432	5316	2060	4637	181334	56353	237687
Trichur	299390	103619	18986	4158	328	1803	4968	1379	4067	160082	72491	232573
Palghat	438980	136257	31587	11273	1577	8297	18406	4233	6942	220408	88659	309067
Malappuram	363230	103417	14157	6930	720	2970	13157	2833	5621	213425	69812	283237
Kozhikode	371150	90876	21474	5023	637	8824	6610	969	1572	235165	45067	280222
Cannanore	567670	83658	44584	24719	3710	26489	24458	4535	6557	348962	21525	370487
State	3885497	1081509	260388	78837	16095	72668	115726	22264	37409	2200601	732849	2933450

Source:—Timely Reporting Survey.

Table No. 2.11.5(1)

Total area and classification of area in each district of Kerala during the year 1970-71

(Year ending 30th June 1971)

(Area in hectares)

District	Classification											
	Total geographical area according to village papers	Forest	Land put to non agricultural uses	Permanent barren and uncultivable land	Permanent pastures and other grazing land	Land under miscellaneous tree crops not included in net area sown	Cultivable waste	Fallow land other than current fallow	Current fallow	Net area sown	Area sown more than once	Total cropped area
1	2	3	4	5	6	7	8	9	10	11	12	13
Trivandrum	210096	43649	17423	598	550	593	560	690	273	151560	91436	242996
Quilon	469051	210651	16791	8765	1300	469	2319	801	398	227557	113724	341281
Alleppey	186790	513	12270	750	250	7608	882	1026	568	162923	69233	232136
Kottayam	2626225	252919	18870	7479	3500	3962	14635	1276	3462	320122	51937	372059
Ernakulam	317428	55212	27326	4345	2000	344	3620	2837	3229	218516	58363	276881
Trichur	299149	132369	16547	1937	500	5334	1776	426	1581	138679	107062	245741
Palghat	437087	67185	48050	11270	2810	13668	4140	3387	2284	284283	47016	331299
Malappuram	363045	97627	11617	5700	2369	7671	23736	492	4470	209363	43194	252551
Kozhikode	366991	128607	45439	9660	2521	5837	10225	4065	2937	158700	112668	271368
Cannanore	576661	65932	60183	21142	12000	87690	17625	7678	4431	299979	66226	366305
State	3858523	1054864	274325	71646	27800	132176	79519	22678	23633	2171682	760861	2932543

2.12. Cropping pattern

2.12.1. Kerala is a state having the mixed cropping pattern. Perennial crops like coconut, arecanut, jack, etc., cereal crops, pulses and a variety of hill crops like rubber, cardamom, coffee, tea etc., are grown in the different parts of the state. A notable feature of the agricultural sector in the state is the high intensity of cropping which can be measured by the ratio of the gross cropped area to the net area sown. The intensity of cropping during the year 1970-71 was 135.0%. At the district level the intensity varies from 116.2 to 117.2. The percentage of net area to geographical area of the State is 56.3 which shows the high utility of the land in Kerala. The diversity of the crops and the heterogenity in cultivation are peculiar to this state. The list of important crops grown in the state according to standard classification is given below:—

I. Food Crops

A. Food Grains
(i) Cereals:—(a) Paddy, (b) Jowar, (c) Ragi, (d) Other cereals, (ii) Pulses

B. Sugar crops
(i) Sugarcane, (ii) Others

C. Condiments and spices
(i) Pepper, (ii) Arecanut, (iii) Cardamom, (iv) Ginger, (v) Turmeric, (vi) Chillies, (vii) Others

D. Fruits and vegetables
(i) Fresh Fruits:—(a) Mango, (b) Banana, (c) Other plantains, (d) Citrus fruits, (e) Others
(ii) Dried fruits:—(a) Cashew, (b) Others
(iii) Vegetables:—(a) Tapioca, (b) Sweet potatoes, (c) Onion, (d) Others

II. Non Food Crops

A. Oil seeds
(i) Coconut, (ii) Groundnut, (iii) Sesamum, (iv) Caster, (v) Others

B. Fibres
(i) Cotton, (ii) Others

C. Drugs, Narcotics and Plantation Crops
(i) Rubber, (ii) Tea, (iii) Coffee, (iv) Tobacco, (v) Others

D. Other non-food Crops
(i) Fodder, (ii) Green manure, (iii) Others

2.12.2. Food crops occupied about 63% of the total cropped area. Food crops are grouped into 4 categories and the area occupied by them during 1970-71 were as follows:—

Category (1)	Area (in hectares) (2)
1. Foodgrains	996241
2. Sugar crops	15990
3. Condiments and spices	289835
4. Fruits and vegetables	612240
	1914306

2.12.3A. The following table gives the official estimates on the area under the important crops raised in the State during the two years 1970-71 and 1976-77.

Table No. 2.12.3. (a)

Sl. No.	Name of crop	Area in ('000 hect.)		Percentage increase or decrease
		1970-71	1976-77	
1.	Rice	874.93	854.37	— 2.35
2.	Pulses	39.54	36.53	— 7.61
3.	Pepper	117.54	108.67	— 7.55
4.	Ginger	12.17	10.35	—14.95
5.	Cardamom	47.49	51.68	+ 8.82
6.	Arecanut	85.82	68.36	—20.34
7.	Mangoes	58.10	67.10	+15.79
8.	Banana and other plantains	48.76	51.70	+ 7.03
9.	Cashewnut	102.71	113.33	+10.34
10.	Tapioca	293.55	323.28	+10.13
11.	Other Food crops	163.70	183.52	+12.11
12.	Total Food crops	1844.31	1368.89	+ 1.33
13.	Groundnut	14.69	16.62	13.14
14.	Sesamum	11.92	15.97	33.98
15.	Coconut	719.14	694.99	— 3.36
16.	Tea	37.59	36.16	— 3.80
17.	Coffee	31.56	40.50	28.35
18.	Rubber	179.26	209.72	16.99
19.	Other Non-food crops	94.08	50.60	—46.22
20.	Total Non-food crops	1088.24	1064.56	— 2.18
21.	Total area sown	2932.50	2933.45	0.03

3·12.3B. The following table gives the estimates of area under important crops cultivated in the State during the year 1970-71 as estimated from the land utilisation survey conducted annually for framing the official estimates and from the Agricultural census conducted in the same reference period. While the estimates framed from the Land Utilisation Survey were based on the data collected through actual enumeration of selected plots by the trained Investigators of the Department, the data relating to the agricultural census were collected by the Village Assistants only through an enquiry method by contacting the operational holders. The difference between the two estimates in respect of many crops can be seen to be very large and the major reason for this difference is attributable to the large scale under reporting by cultivators in respect of area cultivated.

An interesting feature of the area estimates is that even though the estimates under the different crops as framed from the two sources have shown much differences in their absolute values, the relative importance of the major crops in the cropping pattern of the State is seen to be maintained in both the set of estimation. The major crops namely rice, coconut, tapioca, rubber and pepper have together accounted for about 75% of the gross cultivated area and the rest of the cultivated area has been shared by a number of other crops among which, cashewnut, tea, coffee, ginger and cardamom form the most important commercial crops.

Table No. 2.12.3. (b)

Area under important crops as estimated from the Land Utilisation Survey and Agricultural Census for the year, 1970-71

Sl. No.	Name of crop	As per land utilisation survey		As per agricultural census	
		Area (Hect.)	% of cultivated area covered	Area (Hect.)	% covered
1	2	3	4	5	6
1.	Rice	874930	29.8	513778	32.6
2.	Pulses	39535	1.3	12785	0.8
3.	Sugar-cane	7652	0.3	3385	0.2
4.	Pepper	117544	4.0	50061	3.2
5.	Ginger	12170	0.4	15973	1.0
6.	Betelnuts	85818	2.9	31730	2.0
7.	Mango	58099	2.0	22425	1.5
8.	Banana	9542	0.3	6127	0.4
9.	Other plantain	39217	1.3	9512	0.6
10.	Dried fruits and condiments	102737	3.5	79596	5.1
11.	Tapioca	293552	10.0	234055	14.9
12.	Sesamum	11919	0.4	5140	0.3
13.	Coconut	719140	24.6	259318	16.5
14.	Tea	37590	1.3	37738	2.4
15.	Coffee	31560	1.1	36680	2.3
16.	Rubber	179260	6.1	130548	8.3
17.	Other crops	312275	10.7	125206	7.9
18.	Total cropped area	2932540	100.0	1576057	100.0

2.12.4. In the cropping pattern of the State, rice occupies the pride of place covering 29% of the total cropped area in the State followed by coconut with 24% during the year under reference 1976-77. The area under rice is the gross area cultivated in the three crop seasons namely Autumn, Winter and Summer. 45% of the gross area under rice is raised during the Autumn season and 44% during Winter season. Summer season covers the rest. Tapioca is the third major crop raised in the district and it accounts for 11% of the gross area cultivated. The three crops together account for about 64% of the gross cultivated area in the State. Pepper, ginger, turmeric and cardamom are the most important crops raised under the spices group and they together account for about 6% of the gross area cultivated. Rubber and cashewnut are other two important cash crops and these two crops together account for about 11% of the total area cultivated. Tea and coffee are the other two major plantation crops in the State and they together hold about 2.6% of the gross area under cultivation. Betel nuts occupy about 2.3% of the cultivated area. Pulses, sugarcane, palmyrahs, banana and other plantains, fruits, vegetables, cotton, etc; account for the rest of the area cultivated.

2.12.5. The gross area under cultivation during 1976-77 does not show any change from the corresponding figures for 1970-71. Area under the major crops raised in the State, rice, coconut and pepper have recorded falls while tapioca, cashewnut and rubber have recorded significant increases in averages in 1976-77, when compared with the corresponding figures for 1970-71. Since the sample design had adopted for the two surveys from which the estimates have been framed, were different, the differences in the acreages under the crops may not be reflecting any real increase or decrease. Since the surveys under Timely Reporting Scheme conducted from 1975-76 onwards are having larger sampling fractions, the estimates framed from these surveys are having greater precisions.

2. 13. Irrigation facilities

2.13.1. Irrigation is an essential input for agricultural production especially for crops like paddy. The State is blessed with 41 west flowing rivers and 3 east flowing rivers giving enough potentialities for irrigation and power generation. Because of the two monsoon seasons of rainfall in Kerala, a number of major, medium and minor irrigation projects were taken up for providing irrigation facilities in the State. There were seven major projects like Malampuzha, Valayar etc. during the 1st plan period and during the 2nd and 3rd plan periods each there were six new major and medium irrigation projects. All these 19 projects together have an irrigation potential of more than 2 lakhs hectares. Besides these, there are minor and lift irrigation projects which serve 2.05 lakhs hectares. During the period 1970-71, the net area irrigated by major and minor projects were 99,000 hectares and 205,000 hectares respectively according to the P.W.D. A major project "Thanneermukkom Project" was designed to solve the problem of affecting agricultural production in the Kuttanad area which is one of the rice producing centres of the State. The project consists of 2 schemes (1) the Spillway at Thottapally and (ii) the Thaneermukkom project which is a barrier to arrest the flow of saline water from seaside to Kuttanad. The spillway at Thottappally enables the cutflow of flood waters in Kuttanad to the sea.

2.13.2. For statistical purposes the sources of irrigation including private ones are broadly classified as (1) Government Canals, (2) Private Canals, (3) Tanks, (4) Wells and (5) Others. The areas actually irrigated by the projects are likely to vary from the ayacut areas for different reasons. The data collected by the Bureau have revealed that the area actually irrigated is only about 80% of the ayacut area in respect of major project and 75% of the ayacut area in respect of minor irrigation projects. The estimates of area under irrigation according to source are those obtained from Land Utilisation Surveys conducted by the Bureau of Economics and Statistics. They are given in the following table.

Table No. 2.13.2. (1)

Area irrigated by different sources

Source	Net area irrigated (in Hect.)	Percentage covered
1	2	3
Government canals	200553	46.5
Private canals	10160	2.4
Tanks	73113	16.9
Wells	5460	1.3
Other sources	141968	32.9
Total	431254	100.0
% of net area irrigated to net area sown	19.9	
Area irrigated more than once in 1 year	170131	
% of total irrigated area to total cropped area	20.5	

Source:—Bureau of Economics and Statistics.

2.13.3. According to P.W.D. during 1976-77 the area additionally brought under irrigation through major, medium and minor irrigation projects was 17600 ha. against 12900 ha. during 1975-76 which has resulted in irrigating crops over a gross area of 36600 ha. in 1976-77 as against 25100 ha. of the previous year. Till the end of 1976-77 the net area brought under irrigation is 228000 ha. corresponding to a gross area of 380000 ha. The total investment during the year according to P.W.D. was 24.06 crores rupees. The physical achievement under major and medium irrigation projects in the year 1976-77 was 7550 ha. (net) and 22900 ha. (gross). The amount invested was Rs. 21.65 crores. The cumulative total of the area irrigated at the end of 1976-77 was 1.19 lakhs. ha. (net) and 2.40 lakhs ha. respectively. These figures were exclusive of the area irrigated by the minor irrigation schemes. Minor irrigation schemes during 1976-77 enabled irrigation over 10070 ha (net) corresponding to a gross area of 13675 ha. This is 57% of the net area and 37% of gross area brought under irrigation during the year. At the end of 1976-77 the net area brought under minor irrigation is 109500 ha. against a gross area of 1.40 lakhs ha.

2.13.4. The important crops in the State which require assured irrigation on a regular basis are paddy and sugar-cane, which occupied an area of 8.75 lakhs hectares and 0.08 lakh hectare respectively during 1970-71. The estimated gross area irrigated under these crops for 1970-71 are given in Table No. 2.13.4. (i).

Table 2.13.4. (i)

Gross area irrigated—crop-wise

Name of crop	Gross area irrigated (crop-wise) in hectares	
	1970-71	Percentage
Paddy	488635	80.0
Sugar-cane	4290	0.7
Other food crops	55690	9.2
Total food crops	548615	89.9
Total non- food crops	52770	10.1
All crops	601385	100.0

2.13.5. According to the results of the timely reporting survey conducted during 1976-77 in the very same villages as the agricultural census, the estimates of the area irrigated by different sources are given below which shows that 42% of the area irrigated is by Government Canals and 21% by minor irrigation.

Source	Net area irrigated (hectares)	Percentage covered
1. Government canals	92125	41.7
2. Private canals	763	0.3
3. Government Tanks and wells	9938	4.5
4. Private Tanks and wells	41424	18.7
5. Minor and lift irrigation (Government scheme)	46496	21.1
6. Other sources	30308	13.7
Total	221054	100.0

2.13.6. The estimates of the crop-wise area irrigated as available from T.R.S. estimates are given below which reveals that 86% of the irrigated area is under paddy.

Table 2.13.6. (1)

Crop-wise break up of irrigated area

Crop	Gross area irrigated (in hectares)	Percentage covered
1. Paddy	321088	86.1
2. Vegetables	4756	1.3
3. Tubers	1042	0.3
4. Coconuts	23145	6.2
5. Clove, Nutmeg and Cinnamon	817	0.2
6. Arecanut	7097	1.9
7. Other condiments and spices	484	0.1
8. Banana	2193	0.6
9. Betel leaves	983	0.3
10. Sugar-cane	121	
11. Others	11111	3.0
Total	372842	100.0

2.13.7. The figures on the net area irrigated are being finalised on the basis of the data on canal irrigation furnished by the Public Works Department, while the figures on the gross area under crops irrigated are being framed from the surveys conducted by the Bureau. With the introduction of Timely Reporting Scheme for framing Agricultural Statistics, an assessment on the actual area under irrigation was taken up in 1975-76 and the figures on irrigation were revised to more realistic levels. As a result the net area irrigated in 1976-77 was found to be only 2.21 lakhs hectares as against 4.31 lakhs hectares reported for the year 1970-71, and the gross area irrigated during 1976-77 was estimated as 3.73 lakhs hectares on against 6.01 lakhs hectares estimated for 1970-71.

2.14. Technique of agriculture—Use of input and improved agricultural practices

2.14.1. According to Agriculture Department the quantities of fertilizers consumed in Kerala during 1970-71 and 1976-77 were 56657 tonnes and 69406 tonnes respectively. There was a gradual increase in the consumption of fertilizers from 1970-71 to 1973-74 when the consumption reached a maximum of 78846 tonnes and then gradually decreased upto 1975-76. The increasing trend has again picked up in 1976-77 with a total consumption of 69406 tonnes. The quantity of fertilizers consumed in the state during each year from 1970-71 to 1976-77 in terms of their nutrient values is given in Table No. 2.14.1 (1).

Table No. 2.14.1. (1)

Consumption of Fertilizers

Year	(quantity in tonnes)
1970-71	56657
1971-72	64974
1972-73	74263
1973-74	78846
1974-75	67362
1975-76	62671
1976-77	69406

2.15. Livestock and poultry

2.15.1. In an agricultural country like India, livestock is an inseparable and unavoidable component of agriculture and rural economy. In Kerala, the Animal Husbandry Department is not in a much developed stage. It has immense scope for development and can contribute much to the prosperity of the agriculturists. At present, the contribution by the Animal Husbandry sector to the State income is below 2%. Adult female cattle including cows, she-buffaloes and she-goats are mainly kept for milk production and the bullocks, and he-buffaloes are used for ploughing the wet lands and also for drawing bullock carts.

2.15.2. The various species of livestock in Kerala are cattle, buffaloes, goats and pigs. Horses, sheep, poneys etc. are also found in Kerala in very few numbers. In Kerala, the two censuses in 1970-71 and 1976-77 show that the livestock population has increased from 49.4 lakhs in 1971 to 53.2 lakhs in 1977. The 1977 livestock population consists of 30.1 lakhs cattle, 4.5 lakhs buffaloes, 16.8 lakhs goats and the rest is accounted by sheep, pigs etc.

2.15.3. Cattle and Buffaloes

The ordinary local breeds of cattle and buffaloes account for the majority of them. The better breeds of cows belong to the Jersy, Sindi, Brown swiss and Holsterin and buffaloes to the Murrah, Swithi and their crosses. The total breedable stock of cows and she-buffaloes as per census in 1977 are 22.5 lakhs and 2 lakhs respectively. The total milk production during 1976-77 was estimated at 5.10 lakhs tonnes which works out to a per capita availability of 60 gms. a day. During 1971, the corresponding figure was 55 gms. per day. In this connection, it is worthy of mention that the per capita availability of milk during 1977 at the All India level is 112 gms. a day while the recommended dose for a balanced diet by the I. C .A. R. and W. H. O. are 210 gms. a day. In order to facilitate easy comparison of the livestock population during the two censuses they are given in the table 2.15.3 (1).

Table 2.15.3. (1)

Bovine population in Kerala as per livestock censuses

	No. of animals in lakh		Percentage variation
	1971	1977	
I. Cattle			
(a) Males over 3 years			
(i) Working	3.72	3.54	— 4.84
(ii) Others	0.19	0.17	—10.43
(iii) Total	3.91	3.71	— 5.11
(b) Females over 3 years			
(i) In milk	6.06	7.05	16.34
(ii) Others	6.94	6.66	— 4.04
(iii) Total	13.00	13.71	5.46
(c) Young stock	11.65	12.64	8.50
Total cattle	28.56	30.06	5.25
II. Buffaloes			
(a) Males over 3 years			
(i) Working	2.11	2.10	— 0.47
(ii) Others	0.14	0.09	—35.71
(iii) Total	2.25	2.19	— 2.67
(b) Females over 3 years			
(i) In milk	0.83	0.87	4.82
(ii) Others	0.73	0.64	—12.34
(iii) Total	1.56	1.51	— 3.21
(c) Young stock	0.90	0.78	—13.33
Total buffaloes	4.71	4.48	— 4.88

2.16.1. Cattle development

2.16.1. The Animal Husbandry Department was implementing various schemes for the improvement of the quality and quantity of the livestock population and poultry during 1976-77 through the 984 institutions under its control. Altogether 22.54 lakhs of cases were treated during the year, and 44.54 lakhs of vaccinations were done against various contageous and infectious diseases. During the year 4.77 lakhs of artificial inseminations were done and 10.55 lakhs of animals were covered partly through the following schemes of the department:

(a) Intensive cattle development projects.
(b) Cross-breeding schemes
(c) Key Village Blocks
(d) Livestock farm/Dry stock farms
(e) Fodder development schemes
(f) Disease investigation and control programmes.

2.16.2. The two intensive cattle development projects at Palghat and Alwaye with their regional centres and more than 100 sub-centres covered a population of about 1 lakh breedable cows and simultaneously attended to all aspects of development such as eradication of diseases by vaccination, balanced feeding and marketing of livestock products. The regional artificial insemination centres functioning at 6 places in the State have conducted 1.62 lakhs of inseminations during the year.

2.16.3. Under the cross-breeding schemes at Chalakudi and Neyyattinkara, chilled semen from Jersey and Jersey cross-breed bulls received from Bangalore thrice a week was utilised for artifical insemination. A total of 5565 inseminations were done during the year. Similarly through the 14 key village blocks and its 158 sub-centres, a total of 1.31 lakhs of inseminations were performed. The Indo-Swiss project at Mattupatty is engaged in the multiplication of Swiss Brown cows and bulls.

2.16.4. Kerala is grossly deficient in the matter of cattle fodder. Kerala is importing groundnut cakes, gingely cakes, cotton seeds etc. from Madras and Andhra in large quantities. The State Government is conducting a starch factory at Malampuzha and is manufacturing cattle feed and poultry feed but the production is far below the requirement. Since the pressure on land in Kerala is very high, permanent pastures and grazing lands are least in this State when compared with other States. Green fodder which is very essential for milch cattle is also a rare item here. The Departments of Animal Husbandry and Dairy Development are running a few fodder grass farms where in nutrient grass like Napier and Guines are grown and distributed. Seedlings are also distributed to farmers just before the rainy season for fodder grass production.

2.17. Poultry Development

2.17.1. Poultry development is one of the easiest and quickest way of increasing the production of nutritive food. The poultry population in the State increased from 12.2 millions during the last census to 13.5 millions during the 1977 census. The annual egg production increased from 69.5 crores to 103 crores. But, the production is still for below the demand. The aim of the Government is to increase the egg-laying capacity of the poultry birds in quality and quantity. The several measures such as the distribution of pure breed exotics upgrading, of the indigenous females with exotic cockerels supply of better quality birds and balanced feed, assistance in marketing of eggs and control and prevention of diseases are adopted by the Animal Husbandry Department for improving the egg production in the State. During the year under report there was an out-break of Duck plague in Kerala and about 75% of the duck population in the State was revaged. The State Government had come forward with a helping hand and sanctioned both loans and grants to the poor duck farmers to revitalise their business.

2.17.2. During the year there were 4 Regional Poultry Farms, 3 District Poultry Farms, 1 Central Hatchery, 1 Broiler Farm, 1 Duck Farm and 2 Intensive Poultry Development Blocks. The flock strength of the existing poultry farms during 1976-77 was 511,035 with a total production of 2,542,146 eggs. During the year 1976-77, 4.19 lakhs of chicks were hatched out in the various poultry farms in the State. The poultry population of the State as per the livestock census of 1977 are given below:

Fowls:				
	Male	Desi	9.28	lakhs
		Improved	9.95	,,
	Female	Desi	32.68	,,
		Improved	38.04	,,
Chicken:		Desi	18.82	,,
		Improved	20.80	,,
Ducks			4.30	
	Total poultry		133.87	,,

2.18. Land legislation and Land records in brief

2.18.1. Since the land tenures that existed in the 3 regions Travancore, Cochin and Malabar were different, uniform legislations became a necessity after the Reorganisations of States in 1956. The important kinds of tenures that existed in the Travancore Region were (1) Jenmom tenures and (2) Sirkar or Pandaravaka tenures. The Jenmom tenure consisted of kanapattom, verumpattom, otti, kuzhikanam and such other systems under which the cultivating tenant had varying right of possession and fixity. The Sirkar or Pandaravaka lands are Government lands. The tenures in respect of such lands are pandarapattom, pandara otti, Inam lands and karam ozhiv lands. In the Cochin region the important land tenures were purvaka and pandaravaka. The subsidiary tenures under purvaka consisted of panayam, kanam, kanam-kushikanam etc. Similarly, in the Malabar region also there were different types of tenures known as jenmom, kanam, kuzhikanam, verumpattam and kudiyirippu. Similar tenures existed in the Kasargode and Hosdurg Taluks of the former South Canara District which are now in Kerala.

2.18.2. The progressive land tenure system now under operation in the State has been the result of a series of such land reform measures evolved through the years particularly after the formation of the State in 1956 and this has led to a silent social revolution in the State. The Kerala Agrarian Relations Act, 1960, The Kerala Land Reforms (Amendment) Acts, 1969, 1971 and 1972 were all aimed in realising the objectives of giving maximum relief to the tenants and for safeguarding against concentrating of land in a few hands, with the ultimate aim of improving the agricultural economy of the State coupled with ensuring social justice to the weaker sections of the society particularly in the agricultural sector.

2.18.3. The progress of implementation of the Land Reforms Act especially those relating to tenancy and purchase of kudikidappu rights is very significant. Till December, 1977, 34.37 lakhs cases were filed by tenants for purchase of the landlord's rights as against 31.49 lakhs by the end of December, 1976. Thus, the number of applications initiated by cases in 1977 was 6.88 lakhs. 33.02 lakhs cases (96%) were disposed of out of which 22.64 lakhs were allowed and certificates of purchases were issued for 20.75 lakhs by December, 1977. The pending applications for disposal numbered 135,000 (4%) and among the allowed cases 189,000 persons more were to be issued certificates of purchase. The following table shows the progress during the year 1977.

Table No. 2.18.3. (1)

Disposal of cases relating to Tenancy and Kudikidappu

Item	Tenancy		Kudikidappu	
	As on 31-12-1976	As on 31-12-1977	As on 31-12-1976	As on 31-12-1977
1	2	3	4	5
1. Total No. of applications received	3149000	3437000	402000	413000
2. Disposal of cases 1. Allowed	1820000	2266400	248000	255000
2. Rejected	463000	640000	133000	138000
3. Other disposals	318000	398000	16800	18400
Total	2601000	3302000	377000	411000
3. Balance to be disposed of	548000	135000	4100	2100
4. No. of certificates of purchase issued	1282000	2075000	210000	234000

Source:—Land Board

2.18.4. According to the ceiling provision of the Act 58,842 ceiling returns were filed upto the end of 1977 out of which 50,426 (86%) were disposed of, ordering surrender of 1.22 lakh acres of land. The estimated extent of surplus lands in the State is 1.5 lakhs acres. The extent already taken over is 64, 784 acres (53%). Of these 41,063 acres have been distributed to 61,862 persons. 11,955 acres are reserved for public purposes, while 10,273 acres are retained undistributed on account of problems relating to gift, dispute etc. and stay against assignment. Compensation for excess lands taken over is paid in bonds. Till December 1977 bonds worth Rs. 78 lakhs have been issued. The total amount of compensation payable for take-over of surplus lands is estimated at 3.15 crores and the receipts by way of purchase price due from assignees of surplus lands is about Rs. 3.50 crores.

2.18.5. Thus the vigorous implementation of the Land Reforms Act especially from 1970 onwards has helped the dispersion of ownership of lands among the cultivators leading to accelerated growth of rural economy, increased employment opportunities and assured social justice to the tillers of the soil by wiping absentee landlordism and intermediaries.

2.19 (1) Changes since last census

2.19.1. The pressure on land in Kerala is very high and the per capita availability of land in Kerala is the lowest among the Indian States. Increase in population, partition among the members of the family, sale deeds of small plots for house sites etc. especially in the urban areas have considerably reduced the holding sizes and increased the number of holdings in Kerala since the last 1970-71 agricultural census. Then the total number of holdings in Kerala was estimated as 28.23 lakhs out of which holdings of size less than 0.04 hectare were 5.19 lakhs (18.3%) and the area accounted for by such holdings was only 0.07 lakh hectares out of a total estimated area of 10.0 lakhs hectares. The total number of operational holdings as per 1976-77 census is estimated as 34.47 lakhs out of which holdings of area less than 0.02 hectare (5 cents) account for 1.70 lakhs. Thus there is an increase of 6.24 lakhs of operational holdings during 1976-77 from that of the 1970-71 census.

2.19.2. The general economy of the State during 1977 was steady and stable though there was a downfall of 6% in rice production. Commercial crops in general, with the exception of cardamom, tea and coffee registered an increase. Availability of raw materials for industry was satisfactory. Consumer prices in Kerala showed a declining trend.

2.20. System of collection agricultural statistics and improvements effected since 1970-71

2.20.1. The collection of agricultural statistics was first started in the former Travancore State in 1949 by the Research Department under the Director of Research when the field work was attended to by 30 Statistical Assistants at the rate of one for each Taluk. Later, the scope of the work was enhanced by the formation of the Board of Statistics in 1951 which gradually developed into the Department of Statistics in 1954. Sample surveys on land utilisation and crop cutting surveys on the autumn, winter and summer crops of paddy were the items of work undertaken

by the Department then. Gradually price collection, computation of cost of living indices and a variety of agricultural and socio-economic surveys were also taken up and the Department developed into a major department. It was re-organised to the present "Bureau of Economics and Statistics" by integration of the Bureau of Economics Studies with the Department of Statistics during 1963.

2.20.2. Agricultural statistics can be conveniently divided into two broad categories, namely current agricultural statistics and basic agricultural statistics. Current agricultural statistics relate to collection of data on land utilisation, crop acreages, crop cutting experiments and production, agricultural labour, wages and prices statistics, cost of cultivation studies, livestock statistics and production of milk and allied products. Data pertaining to current statistics are usually collected every year by the Bureau. The basic agricultural statistics provides information on the structure and basic features of the economy like the number of agricultural holdings and their principal characteristics like the size of holdings, forms of tenure, irrigation , main crops, machinery and implements, agricultural population etc. Most of the countries collected this information usually once in five years or ten years through the agricultural census.

2.20.3. Area under different crops in Kerala were being estimated based upon the land utilisation surveys conducted by the Bureau annually from 1951 onwards. The sample sizes of those surveys were gradually increased depending upon the funds available and the increase in the staff strength. The yield estimation of crops like paddy (for all the 3 seasons of the year) and coconut were based upon crop-cutting experiments conducted throughout the state. There were also some special sample surveys sponsored and financed by the I.C.A.R. like the coconut and arecanut palms as well as their production during the years 1959-66 and pepper survey for one year. Since, the standard errors of some of the estimates were outside permissible limits, a new survey aiming at higher accuracy in the agricultural statistics was considered desirable and thus a new scheme "Timely Reporting Survey" (T.R.S.) replaced the L.U.S. and allied sample surveys conducted till 1974-75.

2.20.4. The new scheme T.R.S. was implemented in Kerala State from 1975-76 onwards with the objective of collecting reliable data on agricultural statistics relating to land use, irrigation details, area under perennial and seasonal crops and production rates of some of the most important crops based on crop cutting experiments. The scheme involves the complete enumeration of all the plots in the State as a phased programme spread over 6 years. During 1975-76, a stratified random sample of 10% of the revenue villages (134) was completely enumerated and crop cutting experiments on six major crops, paddy (during all the 3 seasons of the year), tapioca, coconut, arecanut, cashew and pepper were conducted. During the next 2 years, the sample size was increased to 15% of the 1,327 reveune villages (numbering 200 villages) in the State. The taluk was taken as the stratum and within each taluk sample villages were selected by simple random sampling.

2.20.5. The estimates of the land use classification and area under important crops from the data on T.R.S. for the years 1975-76 and 1976-77 are well comparable and very close. The details are given in the T.R.S. reports. In this connection it may be stated that the agricultural census was conducted in the very same 200 revenue villages which were selected for T.R.S. during 1976-77 so that the estimates obtained from the two surveys can be compared.

Chapter III

3.0. CONCEPTS, METHODOLOGY, SCOPE AND COVERAGE OF THE AGRICULTURAL CENSUS 1976-77

3.1. Concepts and definitions

3.1.1. In order to facilitate comparison of the data from the present agricultural census with those relating to the previous census; the concepts and definitions adopted in respect of the various characteristics like household, operational holding, individual/joint holdings, parcels etc. were in conformity with those of the previous census. The detailed explanation of each of the concepts and definitions is given in a separate note attached as an annexure to this report.

3.2. Methodology of Census Taking

3.2.1. Objectives: The present census is sponsored by the Government of India to provide valuable information on the changes that occured in the agricultural sector as a consequence of the land reform measures implemented in the various parts of the country. The main objectives are the following:

(1) To arrive at a distribution of the operational holdings by size classes and to assess the incidence of various tenure systems which by comparison with the results of the earlier census, may provide estimates of the changes during the six year period ending June 1977.

(2) To study the pattern of land use and area under various crops.

(3) To study the agricultural practices and inputs used in cultivation, specifically the quantity and type of seeds fertilizers and pesticides in irrigated and unirrigated areas, along with the sources of irrigation.

(4) To prepare an inventory of livestock and agricultural implements utilised for the various crops in the different seasons.

3.2.2. In general, a study of the trend in the transformation of ownership holding to operational holdings and the consequent changes that have set into make the actual tiller the possessor and benefactor is attempted.

3.3. Sampling Design for the Agricultural Census 1976-77

3.3.1. The Kerala Agricultural Census 1976-77 was conducted by the sample census method. The design adopted was a stratified random sampling method, the taluk being taken as the stratum. The design for this census was slightly different from the previous one. From each of the 57 taluks in the State, 15% of the revenue villages were selected by simple random sampling method. This came to 200 villages for the State. The same villages were covered for collection of agricultural statistics in the State during 1976-77 (T.R.S.) with the survey number as the unit of enumeration for land utilisation and area under crops. In each selected village a complete list of operational holdings was prepared by visiting all the households and institutions in the village. After listing, all the holdings of each village were categorised into 6 size groups i.e. less than 5 cents, 5-99 cents, 100-249 cents, 250-499 cents, 500-999 cents and 1000 cents and above. Holdings with less than 5 cents were omitted from detailed enquiry. From each of the remaining 5 groups a systematic sample of 20% of the holdings were selected for detailed enquiry on tenure, land use, number of parcels, cropping pattern and irrigation. Thus consisted the sample for the main census. From each of the sample groups of holdings selected for the main census, 4 holdings were selected at random for the study of inputs, and inventory of livestock and agricultural implements, This constituted the sample for the input survey.

3.3.2. The following table clearly brings out the differences, between the two censuses.

Table No. 3.3.2. (1)

Particulars of sample designs adopted for two agricultural censuses

Year	Stratum	First stage samples	Sample size for state	Omitted for detailed enquiry	Main sample	Sub-sample for input survey
1	2	3	4	5	6	7
1970-71	Taluk	25% of census villages blocks	1400 census villages and 200 blocks	Holdings of size less than 10 cents	10% of holdings of size 10 to 999 cents and all holdings of 1000 cents and above	20% of main sample in the group 10-999 etc. and all holdings above 1000 cents.
1976-77	Taluk	15% of revenue villages	200 revenue village	Holdings of size less than 5 cents	20% of holdings in size class of 5-99 cents 100-249 ,, 250-499 ,, 500-999 ,, 1000-2499 ,, 2500 and above	4 from each of the 5 six classes

3.4. Organisation and administrative arrangements of 1976-77 census

3.4.1. Headquarters staff

The main responsibility for the organisation and conduct of the agricultural census was vested with the Bureau of Economics and Statistics of the Government of Kerala. The administrative sanction for the conduct of the census was issued by the Government in their order G.O. (Ms) No. 68/76/Plg. dated 17-12-1976. The Director was declared as the Director of Agricultural Census also. To assist him, a separate division with the following technical and administrative personnel was created in the Bureau.

	Designation	*No. of posts*
1.	Joint Director	1
2.	Assistant Director	2
3.	Research Assistant	2
4.	U.D. Compiler	1
5.	L.D. Compiler	3
6.	Administrative Assistant	1
7.	U.D. Clerk	1
8.	L.D. Clerk	1
9.	U.D. Typist	1
10.	L.D. Typist	1
11.	Peon	1
12.	Driver	1

3.4.2. Field Organisation

In the field, 400 Village Assistants of the Revenue and Civil Supplies Departments did the enumeration work under the immediate supervision of 100 Revenue Inspectors and 57 Tahsildars of the Revenue Department. The services of the District Statistical Officers and the Taluk Statistical Inspectors of the Bureau of Economics and Statistics were also utilised for the organisation, conduct and supervision of the field work. For the supervision of the listing work, the services of 27 Revenue Inspectors were also additionally utilised for a period of 3 months. As the field staff had to do the census work in addition to their normal duties they were given honoraria.

3.4.3. The member (in charge of land revenue), Board of Revenue, was nominated as the Agricultural Census Commissioner for the State and the Director, Bureau of Economics and Statistics was declared is the Director of Agricultural Census 1977 as per G.O. (Rt.) No. 32/77/Plg. dated 13-1-1977.

3.4.4. Time-table of operations of the Agricultural Census, 1976-77

	Item of work	*Period*
1.	Posting of field staff and completion of training.	Feb. - March 1977
2.	Listing of holdings	April - June 1977
3.	Sample selection for main census and input survey and conduct of input survey	August - November 1977
4.	Main Census - field work	August 1977 to Feb. 1978
5.	Scrutiny, compilation and tabulation of data	Dec. 1977 to July 1978
6.	Completion of the Census report	September 1979

3.4.5. Arrangement for Supervision for 1976-77 Census

During the present Agricultural Census, the enumeration for the main census was conducted by 400 Village Assistants at the rate of 2 per each selected revenue village. They were chosen from the revenue and civil supplies department. Their work of the listing of all households and canvassing of main census schedules was supervised by the respective Revenue Inspectors and Tahsildars. The Revenue Inspectors inspected the field work of the Village Assistants by visiting 5% of the household both at the listing stage and for the main census. The Taluk Statistical Inspectors of the Bureau of Economics and Statistics also inspected the field work of the Village Assistants in 1% of the households. But, for the input survey, the schedules were canvassed by the Statistical Inspectors themselves from the 20 selected holdings in each village under their jurisdiction. They also canvassed main census schedules in respect of these 20 holdings by conducting spot visits.

3.4.6. At the district level the District Collector was in overall charge of the Census assisted by the District Statistical Officer.

3.4.7. The staff appointed for the census including Village Assistants and Revenue Inspectors were given proper training at the district headquarters by the officers of the Bureau of Economics and Statistics before the commencement of the work.

3.4.8. State Level Co-ordination Committee

Since the conduct of the census involved a large number of personnel from different departments, Government constituted a State Level Co-ordination Committee to watch the progress and smooth functioning of the Census as per Government Order No. (Rt.) 33/77/AG. dated 15-1-1977, consisting of—

1.	Additional Chief Secretary	Chairman
2.	Agricultural Census Commissioner	Member
3.	Commissioner (Civil Supplies)	do.
4.	Agricultural Production Commissioner	do.
5.	Secretary to Government, Planning and Economic Affairs	do.
6.	Director of Public Relations	do.
7.	Director of Agriculture	do.
8.	Director, Bureau of Economics and Statistics	Member, Convener

3.4.9. District Level Committees

In order to remove the bottle-necks if any and for the timely conduct and supervision of the work and progress report at the district level, Government also ordered constitution of District Level Committees in each district consisting of:

1.	District Collector	Chairman
2.	District Supply Officer	Member
3.	District Agricultural Officer	do.
4.	District Information Officer	do.
5.	Nominee of the Director of Agricultural Census	do.
6.	District Statistical Officer	Member-Convener

3.5. Preparatory work relating to updating of records, training of personnel, preparation of schedules and instructions, publicity, etc.

3.5.1. Updating of records

As Kerala is not a reporting State the revenue agency is not keeping up to date data on land records. Even-though that is the system, since the implementation of the Land Reforms Act gained considerable momentum after 1970, all land owners who became so either by kudikidappu right or tenancy through Land Tribunals, did not get "Pattayam" by 1971 or 72 since various legal formalities had to be observed for issue of such ownership certificates. But such tenants who were eligible for ownership right narrated so to the Enumerators during 1970-71 census.

3.5.2. During the 1976-77 census the situation had improved very much as seen from reports of the Land Board. The number of certificates of purchase issued by the various Land Tribunals in the State under section 72 and 80 B as on 30-6-1977 was 20.32 lakhs and 3.2. lakhs were pending issue out of disposed cases. It was

expected that all claims under Land Reforms Act would be finally settled before 1980. But, it was also expected that any delay in updating land records would not affect the accuracy of the agricultural census data in Kerala since the enquiry method by contacting the operational holders was resorted to during the 1976-77 census.

3.5.3. Training of personnel

Before the commencement of the 1976-77 census intensive training was given to all personnel involved in the field work from the Village Assistants to the District Officers. The concepts and definitions of the terms involved in the census and illustrations with the relevant schedules and methods of canvassing then were all included in the training programme.

3.5.4. Preparation of schedules and instructions

For the 1976-77 census there were 4 schedules as shown below for the Main Census and Input Survey together.

Schedule 1.1.	List of households and Operational Holdings.
Schedule 1.2.	List of institutional holdings in the selected revenue villages.
Schedule 1.3.	Summary particulars of complete and part holdings in the selected villages.
Schedule 2.1.	List of Operational Holdings and record of selection for the Main Census
Schedule 2.2.	Record of selection for Input Survey.
Schedule 3.1.	Main Census details such as Number of parcels and area, area under crops tenancy etc.
Schedule 4.1.	Input Survey details such as area using different fertilizers, irrigation, livestock implements etc.

The instructions for filling up the schedules were printed both in English and the local language Malayalam so that all personnel involved in the census especially the Village Assistants can understand them thoroughly. Specimen copies of the schedules and instructions are included in the latter part of the report.

3.5.5. Publicity

Since the census was conducted by the enquiry method by contacting the household operational holders by the Village Assistants, it was necessary to give wide publicity to educate the farmer so that he would give the correct information to be noted in the schedules. Before the commencement of the enumeration, wide publicity was given through the Press and the radio for both the 1970-71 and 1976-77 censuses, dispelling the fears of the farmers that the data furnished by them would not be utilised for taxation of any kind and that their use was only for planning purposes. It was also published in the local Malayalam newspapers that the cultivators might furnish correct information to the Village Assistants who would contact them for collection of data for the 1976-77 agricultural census and that the data would not be used for any taxation purposes. It was also made clear through various measures of publicity that individual information about operational holders would not be tabulated or published. Publicity was also given about the purpose of the agricultural census, training of census personnel, period of enumeration etc., through A.I.R., Press and the local Malayalam newspapers eliciting the co-operation of the cultivators for the success of the census.

3.6. Procedure adopted in the collection of census data

3.6.1. 1970-71 Census: The selection of the 1400 census villages and 200 urban blocks was done at the headquarters and one Village Assistant was allotted for one sample. The Village Assistants used the house list (for used for 1971 population census) pertaining to the sample allotted to him. First, the enumerator ascertained the boundaries of the Census Village/Urban block and then proceeded to prepare the house list of resident operational holders starting from house No. 1 and visiting all houses in the very same order and also noting new houses which were built up after 1971 population census. The listing schedule was filled up by contacting the Heads of household and filled up the relevant columns after briefly explaining to him the purpose of the census and requesting his co-operation. Then, the 10% of operational holders were selected systematically for detailed enumeration for the main census. A separate schedule was then filled up (Schedule II) by contacting these operational holders who were thus selected. All information required for filling up the schedule such as number of parcels, area of each parcel, area under each crop, nature of tenancy, irrigation if any and source of irrigation were collected by putting probing questions to those resident operational holders. Similarly schedule III was also filled up by contacting the operational holders selected for the input survey (20% of the holders from the main sample). Details such as chemical fertilisers applied for each parcel and the quantity and value of such fertilisers, inventory of livestock and agricultural implements owned (as on 30-6-71) were all noted in schedule III by contacting these operational holders and by the enquiry method.

3.6.2. 1976-77 Census: During the recent census there were no substantial changes in the method of collection of data except for some minor changes. Unlike in the previous census this time Revenue Village was the primary unit of sampling which consists of a number of census villages. Hence, the listing of households as well as the canvassing of the schedules by visiting the selected operational holders involved more work and time. When 1600 Village Assistants conducted all the field work in the 1600 census villages/urban blocks selected for the main survey and input survey during 1972 the listing work and canvassing of the main schedules in the 200 Revenue Village selected for 1977 census were attended to by 400 Village Assistants and the canvassing of the schedule for the input survey was conducted by the Statistical Inspectors of the Bureau of Economics and Statistics. The Statistical Inspector had to

collect the data for the main census also from the 20 households from each Revenue Village selected for the input survey at the rate of 4 households from each of the 5 size classes. During the last census the training of the enumerators was conducted in April and the field work was completed by May and June 1972 in almost all the samples since the reference period was the agricultural year 1970-71. For the 1976-77 census, the listing work was done during the period February-April 1977 and the input Survey was conducted by the Statistical Inspector during May and June 1977, i.e. by the close of the reference year itself. The main census was conducted by 2 Village Assistants together in each of the sample Revenue Villages during the period July to August 1977. The Census was conducted by the enquiry method as before. However, the details, of land use and cropping pattern were collected by the Statistical Inspectors by spot visits for the holdings selected for input survey within their jurisdiction, independent of the Village Assistants. Since there was a strike by the Village Assistants in the State, the main census was completed only by the month of February, 1978.

3.6.3. Measures taken to obtain complete and realistic data: Wide publicity through the Press, All India Radio and the important Malayalam newspapers eliciting the co-operation of the operational holders by giving accurate details to the census personnel who would contact them for canvassing the schedules for the agricultural census at the selected households was one of the important measures adopted for both the 1970-71 and 1976-77 agricultural censuses. A brief description of the objects of the census as well as the method of collection of data and the agency responsible for the census etc. were also given to the daily payers and other media like A.I.R. The work of the enumerators was supervised by the Revenue/Civil Supplies Inspectors by inspecting 5% of the work both at the listing stage and for the main census. The Statistical Inspectors, District Statistical Officers and other Officers from the Headquarters also inspected the field work. During the 1976-77 census the Statistical Inspectors canvassed the main census data from 20 operational holders (who were selected for the Input Survey) in each of the selected villages independent of the work of the Village Assistants and the 2 schedules enumerated by the two agencies were compared to assess the accuracy of the work. The District Collector was the Chairman of the District Level Co-ordination Committee in the District for the Agricultural Census. The actual inspection of the work was done by the Revenue/Civil Supplies Inspectors. Tahsildars also inspected the field work.

3.7. Probable reasons for under reporting

3.7.1. From the results of the two agricultural censuses it is evident that there is under reporting in the area reported under the operational holdings as well as the area under various crops though, the number of operational holdings are within reasonable levels of accuracy. This is mainly because the census was conducted by the enquiry method, and the cultivators the vast majority of whom did not keep any accounts were furnishing information from memory which might not be correct in most cases, especially in the case of fertiliser application for paddy and other crops for the different crop seasons of the year.

3.7.2. As far as Kerala is concerned, there are special reasons for this under reporting of area. The most important reason is that there are ceiling provisions for an individual and a family in the Kerala Land Reforms Act. This led to large scale partitions in the families. Secondly, the liability to pay levy by the farmers having more than 2 acres of paddy land has created in them a tendancy to under report the area. Thirdly, the number of coconut palms and other perennial trees reported by the operational holders from which the area under many crops were reckoned would always be on the lower side of the actuals. Fourthly, several estates in the State with crops like cardamom, rubber, coffee and tea cultivated by owners who reside, outside the State might not be reported by the enumerators. The utilisation of holdings under institutional holdings like schools, churches etc. were not enumerated by the primary reporters. Fear of taxation and such other considerations also influenced the operational holders in under reporting the area under crops. Many of the lands held unauthorisedly (encroachments) might not come in census. Added to the causes cited above, there was also under reporting of the plots involved in legal cases pending disposals in the various courts and land Tribunals. It is also noted that under reporting of area was maximum for the holdings of area above 4 Hects. which is the ceiling limit as per Land Reforms Act and its subsequent Amendments. The above reasons hold good for both the censuses.

3.8. Tabulation Procedure and Problems

3.8.1. For the tabulation of the data relating to the 1970-71 Census, Regional Tabulation Centres with sufficient staff strength were set up, one each at Trivandrum, Ernakulam and Kozhikode. The schedules pertaining to the districts falling under their respective jurisdictions were collected in these Regional Centres. Manual tabulation was adopted for the preparation of the various tables relating to census. The tables at the District and Regional Levels were prepared in the respective Regional Tabulation Centres and the State level tables were finalised in the headquarters of the Bureau at Trivandrum. The drawing of the report on the Census was also done in the Head office of the Bureau.

3.8.2. But the entire tabulation of the data canvassed through 1976-77 Agricultural Census was done at the headquarters of the Bureau at Trivandrum alone. No Regional Tabulation Centres were set up for this census. For the tabulation of the data of this census also manual tabulation was resorted to. Some deviations from the original time schedule fixed for the completion of the tabulation of the data were found necessary due to certain unforeseen reasons. Since there was delay in getting the filled-in-schedules from the districts due to the strike of Village Assistants and there was a general strike by non-gazetted staff of the State Government the period of tabulation had to be extended further resulting in the delay for the finalisation of the census report.

3.8.3. A preliminary report on the main findings of the 1976-77 census relating to the distribution pattern of land holdings in the State had been already prepared and sent to Government of India. District-wise break up of the holdings under the different size classes is also given in this report. For purposes of comparison, the corresponding figures relating to the previous census are also included in the report.

3.8.4. The Table No. 1 giving the estimated number of operational holdings and the area covered by these holdings under the different size classes has been prepared on the basis of the listing schedules. Tables No. 2 to 6 furnishing details on Tenure and Tenancy Status Land Use Pattern, Irrigation Status, Sources of irrigation of the operational holdings and particulars of area under the different crops raised in the holdings have been prepared on the basis of the data collected through the Main Census. The data collected through the Input Survey have been used for the preparation of the rest of the tables presented in the report.

3.8.5. Apart from the delay in the completion of the field work and the finalisation of the various tables, no problem of any serious nature had cropped up any time during the course of the census. The tables at the various levels such as District-level, Region-level and State-level were all prepared without any undue time long since the completion of the field work of the census.

3.9. Limitations of the census data

3.9.1. As already mentioned with the reasons therefor, the estimates from the census data are under estimates especially with regard to the area under paddy, coconuts etc. and the total area of operational holdings. The number of operational holders is also on the lower side since operational holders who reside outside the State are not enumerated. This has grossly affected the area under crops like rubber, cardamom, tea and coffee. The institutional holdings were omitted in many cases because of the difficulty in contacting their operational holders. The implementation of the ceiling provisions in the Kerala Land Reforms Act had also affected the accuracy of the number of holdings and area. But, this kind of under estimation is a common feature in a census of this kind where the enquiry method is adopted. Even in countries like U.S.A. and Japan which are much developed countries in Agriculture and Industries, Agricultural Census estimates are on the lower side. Even with these limitations, the agricultural census is the only method of collecting data for micro level planning purposes. But the users of the census results would do well to give proper allowance to the estimates by knowing the limitations and deficiencies of the census data.

3.9.2. The present census has not reported any Joint holdings from anywhere in the State. Whether it is due to the total absence of such holdings or due to any omission committed by the enumerators in classifying the holding appropriately at the time of canvassing the schedules could not be firmly identified. But practice of jointly operating any holding is not normally prevalent in the State and therefore the finding of the census in respect of the total absence of joint holdings is only reasonable. Thus the number of operational holdings and the area covered by these holdings reported in Tables 2 to 6 of the Main Census and Table 7 to 19 of the Input Survey are based on Individual Holdings alone.

3.9.3. The major limitation of the Agricultural Census carried out in the State is that the census was conducted only on a sample survey basis. Only 200 villages farming about 15% of the total Revenue Villages in the State were covered by the census. For the Main Census, only a sample of 20% of the holdings in each of the 200 sample villages was considered and for the Input Survey a sample of 24 holdings allocated at four each among the major six size classes of holdings in each of the 200 Sample Villages was alone surveyed. Thus instead of a holding to holding enumeration, the technique of stratified random sampling method was adopted for the conduct of the Census in this State.

3.9.4. Canvassing of the listing schedules and the schedules for Main Census was done by the Village Assistants attached to the Revenue and Civil Supplies Departments. The schedules for Input Survey along with the schedules of Main Census relating to the holdings selected for Input Survey were canvassed by the Statistical Inspectors of the State Bureau of Economics and Statistics. Since only the enquiry method was adopted for the canvassing of the various schedules it is likely that the memory lapse on the part of informants coupled with the usual reluctance on the part of operational holders in divulging full particulars on area under cultivation to persons associated with the collection of land Revenue and Assessment of levy for procurement purposes would have contributed for the under estimates of the area under operational holdings and area under different crops.

3.9.5. Lack of information from the census in respect of the members of the operational holdings is another serious limitation of the usefulness of the data collected through the census. Information on the demographic particulars and the earning capacities of the members of the operational holdings would have been very useful for initiating various studies on the operational holdings.

3.9.6. The Census could have been made use of to bring out a grading of land in the different strata depending on the soil type, fertility of soil, irrigation status etc. Such a grading of land would have been highly useful for the planners to initiate programmes of development appropriate for the regions concerned.

3.9.7. But even with all these limitations the census has been very useful to throw light on the distribution pattern of the land holdings in the State and also the cultivation practices prevalent in the different parts of the State.

CHAPTER IV

4.0. RESULTS OF THE AGRICULTURAL CENSUS 1976-77

4.1. Part I—Main census

4.1.1. According to the Agricultural Census 1976-77, the total number of operational holdings of all categories and sizes in the State has been estimated as 35.01 lakhs for the year 1976-77 out of which individual holdings have accounted for 98.9% with 34.62 lakhs. Institutional holdings accounted for the rest as no joint holding has been reported from anywhere in the State during the course of the census.

4.1.2. These 35.01 lakhs holdings have together accounted for an operated area of 17.19 lakhs hectares. The institutional holdings numbering 0.39 lakh have shared an area of 1.08 lakhs hectares and the individual holdings accounted for the rest of the operated area. Institutional holdings, covering only 1.1 % of the total number of holdings have held among themselves 6.2% of the total operated area in the State, thereby showing a comparatively very high average size of holding for them.

4.1.3. For classifying the holdings according to the size of holding, fourteen size classes have been originally adopted and the detailed tables have been prepared on the basis of these fourteen size classes. But, for the discussions of the broad aspects of the results of the census these 14 size classes have been grouped into the following 5 size classes, (1) Below 1 hectare, (2) 1 hectare to 2 hectares (3) 2 hectares to 4 hectares (4) 4 hectares to 10 hectares and (5) 10 hectares and above.

4.1.4. The distribution pattern of the operational holdings of both individual and institutional can be seen from the Table No. 4 (1). Out of the total holdings of 35.01 lakhs the size group below 1 hectare takes the lion share of 30.69 lakhs accounting for 87.7% of the total number of holdings. The total area operated by these holdings in the size group below 1 hectare comes to 68743 hectares which works out to 4.0 % of the total operated area of 17.19 lakhs hectares. Among the 30.69 lakhs holding falling in the size group 'Below 1 hecatre' 1.74 lakhs of holdings are reported to be falling in the size group less than 0.02 hectare and these holdings together account for a total area of 2151 hectares.

4.1.5. The institutional holdings numbering 39220 have accounted for an area of 1.08 lakhs hectares. The size group below 1 hectare holds the maximum number of institutional holdings while the size group 10 hectares and above accounts for the bulk of the area under such holdings.

4.1.6. It has to be emphasised that holdings below 0.02 hectare in size and all institutional holdings of all size classes are excluded for detailed study during this agricultural census. Therefore further discussions in this report consider only individual holdings above 0.02 hectare in size.

4.1.7. Excluding institutional holdings and individual holdings of size less than 0.02 hectare the total number of individual holdings of size greater than 0.02 hectare has been estimated as 32.92 lakhs operating an area of 16.08 lakhs hectares. The distribution pattern of these individual holdings is given in Table 4 (2).

Table 4 (1)

Number and area of operational holdings

Sl. No.	Size class	Individual holdings						Joint holdings					
		No.			Area			No.			Area		
		1970-71	1976-77	%variation	1970-71	1976-77	%variation	1970-71	1976-77	%variation	1970-71	1976-77	%variation
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Below 1 Ha.	2393232	3036179	26.87	551958	680343	23.46	4789	..	..	1162	..	..
2.	1.00 - 2.00	267061	276917	3.69	364178	379930	4.33	772	..	..	1021	..	..
3.	2.00 -4.00	125221	112195	—10.40	337064	303139	—10.06	560	..	..	1678	..	..
4.	4.00 -10.00	26420	33047	25.08	146687	181427	23.68	460	..	..	2819	..	..
5.	10.00 & above	4095	3494	—14.68	188919	66612	—64.74	171	..	..	1757	..	..
	Total	2816029	3461832	22.93	1588806	1611451	1.48	6752	..	..	78437	..	..

Table 4 (1)—(*Contd.*)

Sl. No.	Size class	Institutional holdings						Grand total					
		1970-71	1976-77	%variation	1970-71	1976-77	%variation	1970-71	1976-77	%vari ation	1970-71	1976-77	%variation
1	2	15	16	17	18	19	20	21	22	23	24	25	26
1.	Below 1 Ha.	..	33048	..	..	7076	..	2398021	3069227	27.99	552220	687413	24.48
2.	1.00 - 2.00	..	2894	..	..	3914	..	267833	279811	4.47	365199	383844	5.02
3.	2.00 - 4.00	..	1586	..	..	4305	..	125781	113781	—9.54	338742	307444	—9.24
4.	4.00 - 10.00	..	1095	..	..	6444	..	26880	34142	27.02	149506	187871	25.66
5.	10.00 & above	..	597	..	..	85953	..	4266	4091	—4.10	200676	152565	—23.97
	Total	..	39220	..	..	107686	..	2822781	3501052	24.03	1606343	1719137	7.02

The table reveals that the size group 0.02 to 1 hectare commands the bulk of holdings with 87.1% of the total individual holdings of size above 0.02 hectare but holds only 42.2% of the total area operated by these holdings. This shows an high order of concentration of holdings in this group consequent to the implementation of the Kerala Land Reforms Act. The largest size group 10.00 hectare and above holds only 0.1% of the total number of holdings but takes as much as 4.1% of the total area operated.

4.2. Comparison with 1970-71 census

4.2.1. For purposes of comparison, the particulars of the number of holdings and area operated by these holding under the different size classes as estimated from the 1970-71 census are also given in the Table No. 4 (1). The total number of operational holdings under all categories together has increased from 28.23 lakhs in 1970-71 to 35.01 lakhs in 1976-77, recording an increase of 6.78 lakhs during the course of the period 1970-71 to 1976-77. This works out to a percentage increase of 24% over a period of six years. During the 1970-71 census the number of joint holdings in the State had been estimated as 6752 out of a total number of holdings of 28.23 lakhs. Bulk of these joint holdings had been found to be of size less than 1 hectare. Institutional holdings were not separately estimated from the 1970-71 census.

Table 4 (2)

Distribution of individual operational holdings according to size, area and percentage

Sl. No.	Size class (Ha.)	Number of holdings			Total area		
		(No. in '000)	Percentage	Cumulative percentage	Area in (ha.) ('000)	Percentage	Cumulative percentage
1	2	3	4	5	6	7	8
1	0.02— 1.00	2567	87.1	87.1	678	42.2	42.2
2	1.00— 2.00	277	8.4	95.5	380	23.6	65.8
3	2.00— 4.00	112	3.4	98.9	303	18.8	84.6
4	4.00—10.00	32	1.0	99.9	181	11.3	95.9
5	10.00 & above	4	0.1	100.0	66	4.1	100.0
	Total	3292	100.0	100.0	1608	100.0	100.0

4.2.2. The comparative figures regarding the number and area of operational holdings in the various size classes together with the percentage variation and also the average size of holdings during the two reference years 1970-71 and 1976-77 are given in Table No. 4 (3). The figures given in this table can be compared only with the following limitations in mind that (a) Holdings of size less than 0.04 hectare are not included under the size class 0.02 to 1.00 for the year 1970-71, (b) Holdings of size less than 0.02 hectare and institutional holdings have not been included for the year 1976-77.

4.2.3. The number of operational holdings excluding the categories listed above, has increased from 23.05 lakhs in 1970-71 to 32.92 lakhs in 1976-77 recording an increase of 42.8% during the course of the six years. In the size group 0.02 to 1.00 hectare the number of operational holdings has increased from 18.8 lakhs to 28.7 lakhs recording the highest percentage increase of 52.4. The number of operational holdings in the size groups 2.00 to 4.00 hectares and 10.00 hectares and above have shown decrease in 1976-77 over the corresponding figures for 1970-71. The percentage decrease in the number of holdings is most striking in the size group 10.00 hectares and above.

4.2.4. In respect of the area operated by the holdings the increase in the operated area in 1976-77 over that in 1970-71 is only marginal. Only 1.1% increase has been recorded during the course of the six years. Corresponding to the 52.4% increase in the number of holdings in the size groups 0.02 to 1.00 hect. the percentage increase in the area operated in this size class is seen to be only 25.9 showing a high degree of fragmentation of holdings. As in the case of the number of holdings, the size groups 2.00 to 4.00 hectares and 10.00 hectares and above have recorded decrease in the area operated. The percentage decrease in the area operated in the size class 10.00 hectares and above is seen to be as high as 66.8 revealing the excessive nature of fragmentation of large sized holdings. In 1970-71 the area held by holdings of size above 10 hectares came to 12.5 % of the total operated area. But this has come down to 4.1 % in 1976-77.

4.2.5. The average size of an operational holdings has decreased from 0.69 hect. in 1970-71 to 0.49 hect. in 1976-77. The decrease in the average size of holdings is most striking in the size group 10.00 hect. and above. This was as high as 47.04 hect. in 1970-71 and it has come down to 19.03 hect. in 1976-77.

4.2.6. The main reason for the change in the distribution pattern of operational holdings in this State has been due to the implementation of the Kerala Land Reforms Act, 1969 and various Amendments enacted afterwards. The granting of permanent ownership to Kudikidappukars in varying extents ranging upto 10 cents depending upon the rural or urban nature of the locality, granting of full ownership rights to agricultural tenants of a large number of categories, distribution of surplus lands to landless labourers, Scheduled Castes and Tribes and other weaker sections of the society. Large scale per capita partition among agricultural families and sales of small size plots for building purposes were other reasons for the growth of operational holdings in the lower size groups.

4.3. Comparison with evidences from other sources

4.3.1. The land reforms survey conducted by the Bureau of Economics & Statistics in 1966-67 and the land holding survey conducted in 1971-72 as a part of the 26th round of the national sample survey are the other two sources from which information on distribution pattern of operational holdings in the State is available.

4.3.2. In order to facilitate comparison with the findings of these surveys, the percentage distribution of the number of holdings and their area and also the average sizes of holdings as estimated from the 1976-77 agricultural census and these two surveys are presented in the Table 4.3.2 (1). The absolute values of the number of holdings and area of these holdings are also given within brackets under the respective title heads.

4.3.3 The number of operational holdings has increased from 24.79 lakhs in 1966-67 to 35.01 lakhs in 1976-77 and the area operated by these holdings has shown a shrinkage from 18.28 lakhs to 17.19 lakhs during the same period. The percentage of holdings within the size groups less than one hectare has increased both in respect of number of holdings and area operated and that within the groups of 10 hectares and above has decreased considerably. The average size of holdings has decreased from 0.73 in 1966-67 to 0.49 hect. in 1976-77.

4.3.4. As per the land holding survey the number of holdings in 1970-71 has been estimated as 25.97 lakhs with an operated area of 12.37 lakhs hectares. The 1970-71 agricultural census has placed the estimate on the total number of holdings at 28.23 lakhs with a total operated area of 16.0 lakhs hectares.

Table 4 (3)

Number, area and average size of operational holdings in 1970-71 and 1976-1977

Sl. No.	Size class (ha.)	Number of holdings			Area of operational holdings			Average size of holdings (ha.)	
		1970-71	1976-77	% variation	1970-71 (ha.)	1976-77 (ha.)	% variation	1970-71	1976-77
1	2	3	4	5	6	7	8	9	10
1	0.02 - 1.00	1880381	2866518	52.4	538655	678250	25.9	0.29	0.24
2	1.00 - 2.00	267833	276917	3.4	365199	379930	4.0	1.36	1.37
3	2.00 - 4.00	125781	112195	—10.8	338742	303139	—10.5	2.69	2.70
4	4.00 - 10.00	26880	33047	22.9	149506	181427	21.4	5.56	5.49
5	10.00 & above	4266	3494	—18.1	200676	66612	—66.8	47.04	19.07
	Total	2305141	3292171	42.8	1592788	1609358	1.1	0.69	0.49

Table 4.3.2 (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 holding 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. above	0.40	12.40	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 hect.)		(25.97 lakhs)	(12.37 lakhs hect.)		(35.01 lakhs)	(17.19 lakhs)	

The corresponding figures obtained from 1976-77 census are 35.01 lakhs and 17.19 lakhs hectares respectively. The estimates on number of holdings and the area operated by these holdings as framed from the land holding survey are seen to be under estimates particularly in respect of the area operated under the context that the estimates obtained from the two agricultural censuses are themselves considered to be under estimates.

4.4. Variations between Regions–Regional level analysis

4.4.1. During the 1976-77 census the salient results were taken for the North and South regions of Kerala separately. Here, the North region consists of the 4 districts Cannanore, Calicut, Malappuram and Palghat and the remaining 7 districts constitute the South region. These results are intended to throw light on the main differences in

the agricultural set up in the two regions which will enable the formulation of suitable plan schemes for the balanced development of agriculture for the State as a whole wiping out regional differences if any. It is estimated that the North region has 12.24 lakhs of individual operational holdings of size 0.02 and above and 0.13 lakhs institutional holdings. The corresponding figures for the South region are 20.63 lakhs and 0.22 lakh respectively. In terms of percentages, it is seen that the North region has 37.2% of the individual holdings and the balance 62.8% are in the South region. The same percentages are true regarding the institutional holdings also. Analysing the distribution of area it is seen that 7.34 lakhs hec. accounting for 43.6% of the area are in the North region and the balance 54.4% consisting of 8.75 lakhs hec. are in the South region. It is also calculated that the average size of an operational holding in the North region is 0.60 hec. while the corresponding area for the south is 0.42 hec. and the overall State average is 0.49 hec. The above result clearly gives the important conclusion that the individual operational holdings in the North region are comparatively bigger in size than those in the South region.

4.4.2. On the contrary, regarding institutional holdings, the North region has only 12% of the area of all such holdings in the State and the remaining 88% of the institutional area are in the South region. Similarly, the average size of such a holding in the North region is 1.0 hec. while the average area of an institutional holding in the South region is 4.3 hec. It has to be emphasised here that holdings of size less than 0.02 hec. are not considered in the above calculations. Such details are also given in the following Table 4.4.2 (1).

Table 4.4.2 (1)

Number, area and percentage distribution of holdings in the 2 Regions

Size classes	North Region No. of holdings ('000)	Percentage	South Region No. of holdings ('000)	Percentage	State No. of holdings ('000)	Percentage
Individual						
0.02 and above	1324	37.2	2068	62.8	3292	100.00
Less than 0.02	52	30.5	118	69.5	170	100.00
Institutional						
0.02 and above	13	37.1	22	62.9	35	100.00
Less than 0.02	2	40.0	3	60.0	5	100.00
	Area ('000 hec.)		Area ('000 hec.)		Area ('000 hec.)	
Individual						
0.02 and above	734	45.6	875	54.4	1609	100.00
Less than 0.02	0.6	28.3	1.5	71.7	2.1	100.00
Institutional						
0.02 and above	13	12.0	95	88.0	108	100.00
Less than 0.02	..	..	..	..	..	.

4.5. District analysis of number of operational holdings

4.5.1. The Table No. 4.5.1 (1) gives the district-wise break-up of the number of holdings under each size class. Out of the total number of 32.92 lakhs holdings, Quilon district holds the maximum number of 4.09 lakhs holdings and Idukki district has the minimum number of 0.86 lakh holdings. The other districts occupy intermediary positions in respect of the number of holdings.

Table 4.5.1 (1)

District-wise distribution of number of operational holdings in the different size classes

Sl. No.	Size class (ha.)	Trivandrum	Quilon	Alleppey	Kottayam	Idukki	Ernakulam	Trichur	Palghat	Malappuram	Kozhikode	Cannanore	State
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	310765	378322	336107	187189	57166	291538	279065	210602	251948	278339	2585477	2866518
2.	1·00 - 1·99	14310	23169	19946	30287	17885	29969	23698	26072	25366	24710	41505	276917
3.	2·00 - 3·99	3984	6219	5970	13483	8263	9857	6973	15890	11944	10371	19941	112195
4.	4·00 - 9·99	794	854	1422	3293	2470	2278	1208	7073	3553	3221	6876	33047
5.	10·00 & above	127	97	107	350	530	59	46	773	398	487	510	3494
	Total	319980	408661	363552	234602	86314	333711	310990	260415	292509	317128	354309	3292171

4.5.2. Out of the total number of 32.92 lakhs holdings 28.67 lakhs holdings fall under the size class 0.02 hect. to 1 hect., Quilon district with 3.78 lakhs holdings, tops the list of such holdings closely followed by Trivandrum district with 3·11 lakhs holdings. The size class 1 hect. to 2 hect. covers a total number of 2·80 lakhs holdings in the State. Cannanore district with 0.42 lakh holds the maximum number of such holdings.

4.6 District-wise break-up of area of operational holdings

4.6.1. The district-wise break-up of the operational holdings under each of the five size classes is given in Table No. 4·6·1 (1)

Table 4·6·1 (1)

District-wise distribution of area of operational holdings in different size classes

Sl. No.	Size class (ha.)	Trivandrum	Quilon	Alleppey	Kottayam	Idukki	Ernakulam	Trichur	Palghat	Malappuram	Kozhikode	Cannanore	State
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	63492	96881	67625	50504	19401	57472	59655	50779	63708	65297	82986	678250
2.	1·00 - 1·99	19300	31428	27234	42604	25051	40206	32875	36032	33470	33838	57847	379930
3.	2·00 - 3·99	10551	16677	15656	34816	22029	27090	18380	43424	29828	29372	55316	303139
4.	4·00 - 9·99	4360	4563	8586	17971	13158	12085	5962	40273	18838	17668	37963	181427
5.	10·00 & above	1772	1671	1445	6938	15434	942	1233	10908	8930	9008	8321	66612
	Total	99475	151220	120546	152833	95073	137805	118805	181416	154774	155228	242433	1609358

4·6·2. Cannanore district holds the maximum area of 2·42 lakhs hectares out of the total area of 16·09 lakhs hectares followed by Palghat district with 1.81 lakhs hectares. Quilon, Kottayam, Malappuram and Kozhikode districts have accounted for an area of 1.5 lakhs hectares each. The area under operational holdings is minimum in the Idukki district with only 0·95 lakh hectares.

4·6·3. As in the case of number of holdings, the size class '0·02—0·99' holds the largest share of 6·72 lakhs hectares out of the total area of 16·09 lakhs hectares followed by the size class 1·00—1·99 hectares with 3·80 lakhs hectares.

4·7 Inter se percentage distribution of operational holdings

4·7·1. The Table No. 4·7·1 (1) gives the inter se percentage distribution of operational holdings in each district according to the size of the holdings.

4·7·2. From the table it will be seen that more than 90% of the operational holdings in the districts of Trivandrum, Quilon & Alleppey belong to the smallest size class. In Trivandrum district this percentage is as high as 94·2. The percentage of holdings in the lowest size class is lowest in Idukki with only 66·3% of the total holdings in the district.

4·7·3. In the case of large-size holdings the percentage of holdings in the size-class 10·00 hectares and above is significant only in Idukki district with 0·6% of the total holdings in the district.

4·7·4. In terms of the percentage of area of operational holdings the lowest size class covers the bulk with 42·1% of the total holdings at the state level. Except in the case of Idukki, in all other districts the lowest size class takes the maximum percentage of area of operational holdings. This percentage varies from 64·1 in Quilon district to 28·0 in Palghat district. In Idukki district the lowest size class covers only 20·4% of the total area of operational holdings in the district. In this district the size class '1 hect. to 1·99 hect. covers the maximum area with 26·3% and large-sized holdings ie. holding of size 10 hectares and above hold a sizeable area with 16·3% of the total area in the district.

Table 4·7·1 (1)

District-wise inter se percentage distribution of the operational holdings

Size class (ha.)	Trivandrum		Quilon		Alleppey		Kottayam		Idukki		Ernakulam		Trichur	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0·02 to 0·99	94·2	63·8	92·6	64·1	92·5	56·1	79·8	33·0	66·3	20·4	77·4	41·6	89·3	50·5
1·00 - 1·99	4·3	19,4	5·7	20·8	5·5	22·6	12·9	27·9	20·7	26·3	9·0	29·2	7·6	27·3
2·00 - 3·99	1·2	10·6	1·5	11·0	1·7	13·0	5·7	22·8	9·6	23·2	2·9	19·7	2·2	15·6
4·00 - 9·99	0·2	4·4	0·2	3·0	0·3	7·1	1·5	11·8	2·8	13·8	0·7	8·8	0·4	5·1
10·00 & above	0·1	1·8	0·0	1·1	0·0	1·2	0·1	4·5	0·6	16·3	0·0	0·7	0·0	1·0
0·02 & above	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
(Actual values in lakhs)	3·30	0·99	4·09	1·51	3·64	1·21	2·34	1·53	0·86	0·95	3·34	1·38	3·11	1·18

Table 4.7.1 (1)—(*Contd.*)

Size class (ha.)	Palghat		Malappuram		Kozhikode		Cannanore		State	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
	16	17	18	19	20	21	22	23	24	25
0·02 to 0·99	80·9	28·0	86·1	41·2	87·8	42·1	80·6	34·2	87·1	42·1
1·00 to 1·99	10·0	19·9	8·7	21·6	7·8	21·8	11·7	23·9	8·4	23·6
2·00 - 3·99	0·1	23·9	3·9	19·3	3·3	18·9	5·6	22·8	3·4	18·8
4·00 - 9·99	2·7	22·2	1·2	12·2	1·0	11·4	2·0	15·7	1·0	11·3
10·00 & above	0·3	6·0	0·1	5·7	0·1	5·8	0·1	3·4	0·1	4·2
0·02 & above	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
(Actual values)	2·60	1·81	2·93	1·55	3·17	1·55	3·54	2·42	32·92	16·09

4.8 Tenure of operational holdings and tenancy—owned and self operated holdings

4·8·1. An operational holding as already defined consists of one or more plots of land situated in the native village of the holder or in other villages and in the same taluk or in other taluks or even in other districts. These plots may be wholly owned and self operated; or wholly rented in or partly owned and partly rented in depending upon their location. The distribution of the total holdings in the State in the different size classes and according to the different kinds of tenures are given in table 2 (A) under Part II of the report and their percentage distributions are given in Table 2 (B) in Part II of the report. Table 2 (A) shows that, out of the 33·92 lakhs of holdings, 32·42 lakhs (98·5%) are wholly owned and self operated, 0·16 lakh (0·5%) are wholly leased in and 0·10 lakh are partly owned and partly leased in holdings. Holdings having some lands otherwise operated come to 0·31 lakh. The percentages of the area under these various tenures are 98·0%, 0·2%, 0·9% respectively.

4.8.2. Considering the various size classes in Table 2 (C) given in Part II of the report it is seen that 74.2% of the number of holdings are owned and self-operated in the size class 0·02 to 0·5 ha. and 12·9% in the next group 0.5 to 1.0 ha. The area under these tenure in the lowest two size class 1·0 to 2·0 ha. has 8·4% of its holdings in the wholly owned and self operated tenure accounting for 23·6% of the area.

4.9. Leased in holdings

Out of the wholly leased in holdings 87·3% are in the size class 0·02 to 0·5 and 8·2% are in the next size class 1·0 to 2 ha. Details of the percentage of holdings and area under this tenure in the various size classes can be seen in the Table 2 (C) in Part II of the report. It is evident from the Table that the system of leasing out lands is practically becoming extinct and even if they are given the vast majority of them are less than 0·5 ha. in area and in the other size classes especially those above 2·0 ha. the numbers are very small. The partly owned and partly leased in holdings cover only 0·3% of the total holdings and of them the leased-in portion of the area is only half of the owned area. The holdings having some land otherwise operated cover 0·9% of the total holdings and the area covered by them is also 0·9% of the total area. The holdings under this category are distributed in all the size classes and in the highest size class, namely, 10 ha. and above, 7·2% of the holdings belong to this category covering 5·9% of the area in that size class.

4·10. Comparison with the last census results

4·10·1. On a perusal of the Table No. 4·10·1 (1) showing the percentage distribution of the number and area of operational holdings according to tenure in the different size classes during 1970-71 census it is seen that the percentages of holdings under partly owned and partly leased in holdings was 3·4%. In the present census it is only 0·3%. Similarly the area leased in under these kinds of tenures are only 0·5% in this census whereas it was 13·2% in the previous census. The percentage of owned and self operated holdings is 99·2% in place of the 86·6% in the previous census. These results show that the operational holdings in the state have undergone vast changes in the nature of their tenancies during the period of the 6 years after the previous census in 1970-71. These effects are due to the rigorous implementation of the various clauses including tenancies in the Kerala Land Reforms Act.

Table 4·10·1 (1)

Percentage distribution of the number of holdings and area according to tenure in different size groups*

Size class	Percentage distribution of holdings								Percentage distribution of area							
	Wholly owned		Partly owned		Wholly rented in		Total		Owned		Rented in		Otherwise operated		Total	
	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
0·02 - 0·99	90·2	99·2	2·0	0·2	7·8	0·6	100·0	100·0	89·5	98·9	10·5	0·5	..	0·6	100·0	100·0
1·00 - 1·99	82·2	98·9	8·3	0·9	9·5	0·2	100·0	100·0	86·3	93·6	13·7	0·5	..	0·9	100·0	100·0
2·00 - 3·99	78·9	98·8	10·9	1·1	10·2	0·1	100·0	100·0	84·0	98·5	16·0	0·3	..	1·2	100·0	100·0
4·00 - 9·99	78·4	98·7	11·0	1·1	10·6	0·2	100·0	100·0	83·7	98·2	16·3	0·6	..	1·2	100·0	100·0
10·00 & above	81·2	98·0	12·5	2·0	6·3	..	100·0	100·0	87·6	97·0	12·4	0·4	..	2·6	100·0	100·0
Total	86·6	99·2	3·4	0·3	8·2	0·5	100·0	100·0	86·8	93·6	13·2	0·5	..	0·9	100·0	100·0

* Particulars of holding of size less than 0.04 Ha. during 1970-71 and those of holding of size of less than 0.02 Ha. during 1976-77 are not included in the Table.

4·10·2. On an analysis of the Table 2 (D) of Part II of the report it is seen that, out of the total leased area of 8070 ha., 2517 ha. are leased for fixed money out of which 1356 ha. are under wholly leased in tenancy and 1161 ha. under partly owned and partly leased in group of tenancy. Other areas leased under fixed produce and share produce are 1055 ha. and 854 ha. respectively from both kinds of tenancies together. The pattern of leased in area according to different terms of leasing during the last census was also not widely different from the pattern during 1976-77 though the total area under the tenancy lease is far less in the present census.

4·11. Area under different land uses

4·11·1. As a part of the main census data on the area under the different land uses in the holdings have also been collected and on the basis of these data the estimates on the land uses have been framed. The Table No. 4·11·1 (1) given below provides both the absolute and the percentages of the respective uses separately for both the census.

Table No. 4·11·1 (i)

Estimates of area under different land uses

	1970-71	Percentages	1976-77	Percentages
1. Net area sown (ha.)	1378433	86·5	1377362	85·6
2. Area under current fallows	23226	1·5	23206	1·7
3. Other uncultivated land excluding fallow land	35244	2·2	25486	1·6
4. Fallow land other than current fallows	12201	0·8	12316	0·8
5. Cultivable waste lands	51981	3·3	69242	4·3
6. Land not available for cultivation	91701	5·7	96746	6·0
7. Total area of holdings	1592788	100·0	1609358	100·0

4·11·2. The total area of holdings as estimated for the year 1976-77 has shown an increase of only 1% over the corresponding estimates for the 1970-71 census. Significant difference between the two estimates is seen only in respect of "other uncultivated land" and cultivable waste lands. While the former has shown a decrease of 9758 hectares the latter has shown an increase of 1731 hectares over the 1970-71 estimates.

4·11·3. The decrease in the area of the uncultivated land can be attributed to extension of cultivation to areas formerly occupied by miscellaneous crops.

4·11·4. In the case of the increase in area under cultivable waste lands, uneconomic nature of cultivation due to the fall of the prices of farm produces and the increase in the cost of cultivation has been cited as the major reason for leaving the land uncultivated.

4·11·5. Table 3 (B) given under Part II presents the percentage distribution of area by different land uses and by various size classes. The net area sown is 85·6% of the total area of the holdings. If the various size classes are taken separately, the net area sown varies from 87·7% in the 0·5 to 1 ha. range to 79·5% in the size group 20—30 ha. The net cultivated area for the state is 87·3% the land not available for cultivation is only 6% and the total uncultivated land during the year is only 6·7% of the area of all holdings. Uncultivated area is only 4·2% in 0·02 to 0·5 ha. size class.

4·12. Comparison of the Land use estimates with the Timely Reporting Survey Estimates 1976-77

4·12·1. It is interesting to compare the census estimates with the Timely Reporting Survey estimates during 1976-77 since the revenue villages selected for both are the same the difference is that the data for the agricultural census are collected through Village Assistants by enquiry with the resident operational holders while for the Timely Reporting Survey the data on all agricultural statistics are collected by visiting all the survey numbers without any omission by the regular Investigators of the Bureau. It is also important to note here that the institutional holdings as well as holdings of non-resident operational holders are not enumerated for the main census while all plots are completely enumerated for the Timely Reporting Survey. Further in the census only 20% of the operational holders are selected for the collection of data for the main census. It is estimated that there are 1·08 lakh hectares owned by institutions which are not enumerated for details of land use. Because of the higher sample size, it is clear that the Timely Reporting Survey Estimates of land use have higher degree of precise. If the area of the institutional holdings (1.08 lakhs hectares) is deducted from the Timely Reporting Survey Estimate of 22·0 lakh hectares of net area sown for 1976-77 we got 17.54 lakhs hectares as the net area sown whereas the actual estimate from the agricultural census is 13·77 lakhs hectares. The net area sown, current fallows, cultivable waste land etc. for the year 1976-77 according to the agricultural census and Timely Reporting Survey are given below to enable easy comparison.

Table 4·12·1 (i)

Area under different Land uses—Timely Reporting Survey and Agricultural Census Estimates

	T.R.S.	Agrl. Census
1. Net area sown (Ha.)	2200601	1377344
2. Area under current fallows (ha.)	37409	23206
3. Uncultivable land (ha.)	78837	25486
4. Fallow lands other than current fallows (ha.)	22264	12316
5. Cultivable waste lands (ha.)	115726	69242

In the case of cultivable waste lands there is considerable variation between the two estimates 115,726 hectares and 69,242 hectares.

4·12·2. As can be seen from the table given above the difference between the two sets of estimates on land uses give an idea on the extent of under reporting in the agricultural census. Since the estimates framed from Timely Reporting Survey are based in the data collected through actual enumeration of the plots selected for the survey and the estimates show a reasonable degree of consistency with the estimates for previous years in respect of area under different utilisation, it can be concluded that the estimates framed from the agricultural census are under estimates.

4·12·3. Table 3 (C) of Part II of the report gives the distribution of the net area sown among the various size classes. It is seen that 24·1% are in the size class 1 to 2 hectares, 23·1% in the lowest size class 0·02 - 0·5 hectares and 19·0% in the 0·5 to 1 ha. size group. Thus it is found that more than 66% of the net area sown are in the range 0·02 to 2 hectares. The same trend is observed in the case of the cultivable waste lands also though the percentage is only 52. Of the uncultivated lands 66% are in the size classes below 3 hectares.

4.13. District-wise distribution and comparison with Timely Reporting Survey

4.13.1 If we analyse the district-wise distribution of the various kinds of land uses according to the census estimates, the net area sown is maximum in Cannanore district with (1.92 lakhs ha. followed by Palghat with 1.49 lakhs hectares and Kozhikode with (1.36 lakhs ha.) and the minimum is 0.74 lakh ha. in Idukki district as seen from Table 4.13.1 (1)

Table 4.13.1 (1)

TRS and Agricultural Census (1976-77) Estimates

District	Net area sown		Current fallow		Uncultivable land		Fallow other than current fallow		Cultivable land	
	TRS ha.	Agricultural census ha.	TRS ha.	Agricultural census ha.	TRS ha.	Agricultural census ha.	TRS ha.	Agricultural census ha.	TRS ha.	Agricultural census ha.
1	2	3	4	5	6	7	8	9	10	11
Trivandrum	146033	91181	1172	445	1466	219	1670	139	1017	864
Quilon	205671	135786	1654	541	3302	963	1289	522	1395	2726
Alleppey	148010	107707	2013	528	847	305	634	883	2068	2135
Kottayam	185012	141387	1856	2144	2212	317	1614	361	1947	1008
Idukki	156499	74224	1318	7601	17346	2354	1048	2502	36384	3539
Ernakulam	131334	124476	4637	1087	1561	1674	2080	421	5316	2633
Trichur	160082	100495	4067	4690	4158	3353	1379	605	4863	2425
Palghat	220408	149177	6942	3674	11273	7958	4233	3457	18406	7638
Malappuram	213425	124031	5621	3611	6930	4416	2833	1011	13157	10731
Kozhikode	235165	136820	1572	1289	5023	934	969	573	6610	7633
Cannanore	348962	192078	6557	2596	24719	2993	4535	1842	24458	27913
State	2200601	1377344	37409	28206	73837	25486	22264	12316	115726	69242

4.13.2 In respect of the cultivable waste lands, out of the estimated area of 69,242 ha. for the state during 1976-77 Census, 27,913 ha. are in the Cannanore district followed by 10,731 ha. in Malappuram.

4.13.3 The estimates on 'Net area Sown' as framed from the TRS and Agricultural Census show considerable variation. At the State-level this variation is as much as 8.24 lakhs hectares and is shared by all districts in varying degrees. Cannanore district shows the highest variation with 1.57 lakh hectares and Kottayam district, the lowest with only 0.44 lakh hectares. With regard to cultivable waste lands, the estimate framed from Agricultural Census has been only 0.69 lakhs hectares as against 1.16 lakhs hectares framed from Timely Reporting Survey. Bulk of this variation is confined to Idukki district, Palghat district also shows sizable variation in respect of the estimates framed from these two sources. These two districts together have accounted for about 90 % of the total variation of 0.4 lakh hectares. Under reporting of cultivable waste lands during the Agricultural Census is the only possible reason for this wide variation in the two estimates since no other specific reason could be identified in these two districts. Since the average size of holding is comparatively very high, the variation due to under reporting would be more pronounced in these two districts.

4.13.4 The relative position of each district in respect of the coverage of the area under different utilisation as revealed from the Timely Reporting Scheme and Agricultural Census 1976-77 can be assessed from the Table No. 4.13.1 (1). In respect of 'Net area Sown' the districts maintain more or less the same relative position but the positions are not the same in respect of other utilisations.

Table 4.13.4 (1)

Percentage distribution of the various types of land utilisation from the TRS & Agricultural Census 1976-77

District	Net area sown		Current fallow		Uncultivable waste		Fallow land		Cultivable waste	
	TRS	Agricultural census	TRS	Agricultural census	TRS	Agricultural census	TRS	Agricultural census	TRS	Agricultural census
1	2	3	4	5	6	7	8	9	10	11
Trivandrum	6.6	6.6	3.1	1.6	1.8	0.9	7.5	1.1	0.9	1.2
Quilon	9.4	9.9	4.4	1.9	4.2	3.8	5.8	4.2	1.2	3.2
Alleppey	6.7	7.8	5.4	1.9	1.1	1.2	2.8	7.2	1.8	3.1
Kottayam	8.4	10.3	5.0	7.6	2.8	1.2	7.2	2.9	1.7	1.5
Idukki	7.1	5.4	3.5	26.9	22.0	9.2	4.7	20.3	31.4	5.1
Ernakulam	8.2	9.0	12.4	3.9	2.0	6.6	9.8	3.4	4.6	3.8
Trichur	7.3	7.3	10.9	16.6	5.3	13.2	6.2	4.9	4.3	3.5
Palghat	10.0	10.8	18.6	13.0	14.3	31.2	19.0	28.1	15.9	11.0
Malappuram	9.7	9.0	15.0	12.8	8.8	17.3	12.7	8.2	11.4	15.5
Kozhikode	10.7	9.9	4.2	4.6	6.4	3.7	4.4	4.7	5.7	11.0
Cannanore	15.9	14.0	17.5	9.2	31.3	11.7	20.4	15.9	21.1	40.3
State	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Actuals in lakh Hectares	22.01	13.77	0.37	0.28	0.74	0.25	0.22	0.12	1.16	0.69

4.14. *Irrigation facilities within the operational holdings*

4.14.1. Table 4 (A) given in Part II of the report shows that there are 32.92 lakhs of holdings in the state of size 0·02 hectares and above as per the Agricultural Census 1976-77. Of these only 0·37 lakhs are wholly irrigated, 28.93 lakhs are wholly unirrigated and the balance 3·62 lakhs are partly irrigated. In terms of area, only 1·83 lakhs hectares out of a total of 16·09 lakhs hectares are reported to be irrigated and this irrigated area is spread over 0.37 lakh wholly irrigated holdings and 3·63 lakhs partly irrigated holdings. Table 4 (B) gives the percentage distributions of the number of holdings and area in the various size classes wherein irrigation is received and also of the net irrigated area. It is seen that 69% of the number of irrigated holdings and 34% of the net irrigated area are in the lowest size classes 0.02 to 1·0 ha. 19·4% of the holdings receiving irrigation and nearly 30% of the net irrigated area are in the group 1·2 ha. 38% of the irrigated holdings and 54% of the irrigated area are under wholly irrigated category and in the size class less than one hectare. This table shows that higher the size of holding less will be the percentage of area benefited by irrigation.

4.14.2. Considering the district-wise distribution of the number of holdings which are wholly irrigated, partly irrigated during 1976-77 it is found that Ernakulam district has the maximum percentage of 32·0% of wholly irrigated holdings in the state and 16·5% of the partly irrigated holdings. In Trichur District the corresponding percentages are 21.7 and 27.5. When the wholly irrigated and partly irrigated holdings are taken together, the percentage distribution among the districts during 1976-77 follows very nearly the pattern during the previous census. In order to enable comparison, actual distribution and percentage distribution during the 1970-71 and 1976-77 census are given side by side in the Table No. 4.14·2 (1). From the Table No. 4·14·2 (2) showing percentage distributions of the number of holdings receiving irrigation among the many size classes and districts it is seen that more than 75% of such holdings are in the range 0·02 to 1·0 ha. in most of the districts and there is also an increase of nearly 5% than that of the 1970-71 census results. It can also be seen that nearly 90% of the irrigated holdings come with the range 0·02 to 2 ha. in most of the districts during 1976-77. It is worth noting that only about 2% of the irrigated holdings are of size above 5 ha.

Table 4·14·2 (1)

District-wise percentage distribution of the number of holdings irrigated

District	Wholly irrigated		Wholly unirrigated		Partly irrigated		Wholly irrigated		Wholly unirrigated		Partly irrigated	
	No. of holdings	Per-cent	No. of holdings	Per-cent	No. of holdings	Per-cent	No. of holdings	Per-cent	No. of holdings	Per-cent	No. of holdings	Per-cent
1	2	3	4	5	6	7	8	9	10	11	12	13
Trivandrum	1075	0.7	203965	10.7	12810	4.9	4001	10.9	306692	10.6	19287	5.3
Quilon	1260	0.9	290548	15.4	9260	3.6	29	0.1	403858	14.0	4776	1·3
Alleppey	43875	30·4	161537	8·5	54412	20·7	399	1·1	300773	10·4	52380	17·2
Kottayam	215	0·1	156312	3·3	7965	3·0	..	..	223276	7·7	11326	3·2
Idukki	528	0·3	67218	3·5	657	0·3	39	0·1	82573	2·8	3702	1·0
Ernakulam	8371	5·8	156086	8·2	52775	20·1	11760	32·0	262232	0·1	59719	16·5
Trichur	63996	44·3	126268	6·7	49923	19·0	7971	21·7	203322	7·0	99697	27.5
Palghat	11811	8·2	79904	4·2	32237	12·3	4454	12·1	207269	7·2	48692	13·4
Malappuram	7740	5·4	162980	8·6	21572	8·2	6076	16·5	268449	9·2	20584	5·7
Kozhikode	43	.0	228308	12·0	1369	0·5	36	0·1	313412	10·8	2936	0·8
Cannanore	5605	3·9	264629	13·9	19586	7·5	2001	5·4	322763	11·2	29545	8·1
State	144519	100·0	1898055	100·0	262567	100·0	36766	100·0	2892019	100·0	362642	100·0

Table 4·14·2 (2)

District-wise percentage distribution of irrigated holdings in different size groups during 1970-71 and 1976-77

Holding size groups	Trivandrum		Quilon		Alleppey		Kottayam		Idukki		Ernakulam	
	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77
1	2	3	4	5	6	7	8	9	10	11	12	13
0.02 to 1 hect.	77·7	84·1	79·5	65·8	86·8	83·6	42·3	49·8	51·9	36·0	64·9	60·6
1·0 to 2·0 hect.	14·9	12·3	13·6	24·6	8·6	12·2	35·0	33·1	29·4	28·2	21·6	28.2
2·0 to 4·0 hect.	6·5	2·9	6·4	8·1	3·7	3·6	16·2	13·6	14·2	17·8	10·3	8·7
4·0 to 10·0 hect.	0·7	0·7	0·5	1·5	0·8	0·6	5·9	2·5	4·2	15·5	2·5	2·5
10·0 hect. & above	0·2	..	..	..	0·1	..	0·6	·0	0·3	2·5	0·2	0·0
All Classes	100·0	100·0	100·0	100·0	100·0	100·0	100.0	100·0	100·0	100·0	100·0	100·0

Table 4·14·2 (2) (*Contd.*)

Holding size groups	Trichur		Palghat		Malappuram		Kozhikode		Cannanore		State	
	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77	1970-71	1976-77
	14	15	16	17	18	19	20	21	22	23	24	25
0·02 to 1·0 hect.	77·9	80·2	42·1	49·3	64·5	69·0	39·1	23·4	58·6	63·6	71·1	69·4
1·0 to 2·0 hect.	14·4	14·6	26·4	24·0	21·5	17·7	29·9	44·3	25·4	20·2	17·1	19·4
2·0 to 4·0 hect.	6·4	4·5	23·3	16·6	11·3	9·8	20·5	24·2	13·0	11·7	9·3	8·1
4·0 to 10·0 hect.	1·1	0·7	7·1	9·0	2·7	3·3	8·5	7·0	2·6	4·3	2·2	2·8
10·0 hect. & above	0·2	0·0	1·1	1·1	0·0	0·2	2·0	1·1	0·4	0·2	0·3	0.3
All classes	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

4·14·3 Area irrigated

Table 4(A) also gives the area irrigated by irrigation status in addition to the number of holdings. An area of 0·17 lakh ha. comprised in 0·37 lakh holdings are under wholly irrigated category. Under partly irrigated group area 1·66 lakhs ha. are irrigated comprised in 3·62 lakhs holdings having a total area of 3·28 lakh ha. Thus a total area of 1·83 lakh hectares are irrigated which are spread under 3·99 lakh holdings in the State. This is only 12% of the operational holdings in the State. Considering the distribution among the various size classes it is seen that 2·77 lakh holdings having a net irrigated area of 0·62 lakh ha. are in the size classes 0·02 to 1 hectare.

Thus, about 1/3 of the irrigated area is covered by holdings of size 0·02 to 1·00 hectare though in terms of the number of holdings this size class covers about 70% of the total number of irrigated holdings. Complete distributions of both number and area of holdings among all the size classes can be seen from the Table 4 (A).

4·14·4. The inter se percentage distribution among the size classes in the three categories, wholly irrigated, wholly unirrigated and partly irrigated are given in Table 4 (B).

4·15· Irrigated area and sources of irrigations

4·15·1 Table 5 (a) of Part II of the report presents the number of operational holdings receiving irrigation and area irrigated by different sources. Out of the 1·83 lakhs ha. receiving irrigation 1.09 lakhs are irrigated from canals, 0·11 lakh ha. from tanks, 0·07 lakh ha. from Tube wells and 0.29 lakh hectares from other sources. Among the size classes the first 3 together i.e. holdings of size up to 2 ha. having a total area of 1.16 lakh ha. cover the bulk of the irrigated area. An analysis of the irrigated area according to source of irrigation in Table 5 (B) shows that 59·41 of the irrigated area are from canals, 6·0% from Tanks, 14.9% from wells, 4.1% from Tube wells and 15·6% through other sources. The actual distribution of the number of holdings and area irrigated by different sources and in the various size classes can be seen in Table 5. As the size classes increase both the number of holdings and area irrigated gradually decrease. The percentage distributions of the number of holdings and area irrigated due to various sources and in the various size classes are given in Table 5 (B). The percentage distribution of both show a gradually decreasingt rend towards the higher size classes. In the highest size class of 50 ha. and above, only 12·9% of the irrigated area is from canals and 44·9% is from Tanks and 38% from other sources.

4·15·2· The percentage distribution of irrigated area by sources in the two regions is given in the following table.

Table 4·15·2 (1)

Percentage distribution of source-wise irrigated area

Source	Northern region	Southern region	State
1. Canals	73·2	49·7	59·4
2. Tanks	4·5	7·1	6·0
3. Wells	8·6	19·2	14·9
4. Tube wells	1·0	6·3	4·1
5. Other sources	12·7	17·7	15·6
All sources	100·0	100·0	100·0

From this table it can be seen that Canal is the main source of irrigation covering 59·4 percent of irrigated area of the State. In the Northern region canal irrigation is used in 73% of area while in the Southern region, only 50% is covered by canal irrigation. Wells form another major source of irrigation with about 15% of the irrigated area in the State and with 9% and 19% respectively in the Northern and Southern regions. Irrigation by Tube wells is almost negligible in the Northern region while the area irrigated by Tube wells in the Southern region has come to 6·3%.

4·15·3· In the Table No. 4·15·3· (1) the district-wise percentage distribution of net irrigated area according to sources of irrigation is given.

Table 4·15·3 (1)

District-wise percentage distribution of net irrigated area according to sources of irrigation

District	Sources of irrigation					
	Canals	Tanks	Wells	Tube-wells	Other sources	All sources
1	2	3	4	5	6	7
Trivandrum	63·4	11·9	8·2	..	16·5	100·0
Quilon	72·6	0·2	..	20·9	6·3	100·0
Alleppey	18·2	22·8	14·4	0·9	43·7	100·0
Kottayam	32·7	3·4	1·1	0·1	62·7	100·0
Idukki	45·5	5·3	9.1	4·6	35·5	100·0
Ernakulam	59·8	2·2	11·5	16·3	10·2	100·0
Trichur	54·1	4·6	31·1	1·4	8·8	100·0
Palghat	80·2	3·8	4·6	1·2	10·2	100·0
Malappuram	77·3	5·4	9·8	0·1	6·8	100·0
Kozhikode	61·1	..	12·4	5·6	20·9	100·0
Cannanore	23·6	8·6	31·7	0·5	35·6	100·0
State	59·4	6·0	14·9	4·1	15·6	100·0

4·15·4· Analysing the district-wise distribution it is seen that canal is the major source of irrigation in all the Districts except Alleppey, Kottayam and Cannanore. In Alleppey and Kottayam canal occupies second place and unspecified sources (others) irrigate the maximum area. But in Cannanore District canal irrigation is seen relegated to the third place, giving the second place to well irrigation. Unspecified sources cover the bulk of the irrigated area in this district also. Percentage of canal irrigation is highest in Palghat district and is followed by Kozhikode district. The percentage is lowest in Alleppey district. Proportion of area irrigated by Tanks is highest in Alleppey district. No area is reported under tank irrigation from Kozhikode district.

4.16. Percentage distribution of area irrigated by different sources

The inter se percentage distribution of holdings receiving irrigation and area irrigated under different sources of irrigation for all size classes is presented in Table 5 (c) of Part II of the report. The following Table No. 4·16 1 (1) give this distribution for the holdings grouped into 5 size-classes. It will be noticed that more than 80% of the area irrigated by each source (except in the case of Tanks) is availed by holdings of size less than 4 hectares. Holdings of size 10 hectares and above share only small percentages of the area irrigated by the different sources except in the case of irrigation with tanks in which case the share is as high as 3.4.

Table No. 4·16·1 (1)

Inter se percentage distribution of area irrigated under different sources of irrigation in each size class

Size Class	Canals	Tanks	Wells	Tube wells	Other sources	All sources
1·	2	3	4	5	6	7
0·02 to 1·0 ha.	30·6	39·0	45·1	30·5	34·2	33·8
1·00 to 2·0 ha.	29·8	19·3	30·4	36·3	30·9	29·7
2·0 to 4·00 ha.	22·2	17·2	14·4	19·9	21·5	20·5
4·0 to 10·0 ha.	15·1	16·1	9·6	12·3	11·5	13·7
10·0 & above	2·3	8·4	0·5	1·0	1·9	2·3
All classes	100·0	100·0	100·0	100·0	100.0	100·0

4.16.1 Percentage distribution of gross irrigated area according to major crops

The following table gives the distribution of gross irrigated area according to the crops irrigated during 1976-77. Bulk of the area under irrigation is seen to have been covered by the Paddy Crop. Among the three crops of Paddy Viz. Viruppu (Autum) Mundakan (Winter) and Punja (Summer) raised in the year Mundakan crop of paddy is seen to have shared the maximum percentage of area irrigated with 36·2 followed by viruppu crop of paddy with 31·2. The three crops of paddy together are seen to have accounted for about 82 % of the gross irrigated area in the State. Coconut Crop also covered a significant portion of the irrigated area with 7·4% of the total irrigated area. Rest or the irrigated area is seen to have been shared by tapioca, arecanut, banana and other minor Crops.

Table No. 4·16·1· (2)

Percentage distribution of area under irrigated crops to gross irrigated area during 1976-77

No.	Name of crop	Percentage of irrigated area under each crop to total irrigated area
1.	Paddy Viruppu	31·2
2.	Paddy Mundakan	36·2
3.	Paddy Punja	14·4
4.	Coconut	7·4
5.	Tapioca	2·8
6.	Cashew	0·2
7.	Pepper	0·4
8.	Arecanut	2·1
9.	Sugar cane	0·4
10.	Banana	1·6
11.	Mango	0·3
12.	Others	3·0
	Total	100·0
		(310211)

4·16·2· Percentage distribution of net area irrigated according to districts by the type of irrigation sources is given below.

Table No. 4.16.2 (1)

District	Sources of irrigation					
	Canals	Tanks	Wells	Tube wells	Other sources	All sources
1	2	3	4	5	6	7
Trivandrum	2·5	4·7	1·3	5·0	2·5	2·4
Quilon	0·9	0·0	0·0	3·9	0·3	0·8
Alleppey	3·0	36·9	9·4	2·1	27·0	9·7
Kottayam	1·2	1·3	0·2	0·1	8·9	2·2
Idukki	0·6	0·7	0·5	0·9	1·8	0·8
Ernakulam	18·8	6·8	14·5	74·5	12·1	18·7
Trichur	21·7	18·4	50·2	8·0	13·5	23·9
Palghat	40·9	18·9	9·4	9·1	19·8	30·3
Malappuram	7·9	5·5	4·0	0·1	2·6	6·0
Kozhikode	0·6	0·0	0·4	0·7	0·7	0·5
Cannanore	1·9	6·8	10·1	0·6	10·8	4·7
State	100·0	100·0	100·0	100.0	100·0	100·0

4·16·3· This table shows that largest proportion of the canal irrigated area is shared by Palghat District (40·9%). Next comes Trichur district (21·7%) and than Ernakulam 18·8%. The lowest proportions are reported from Kozhikode and Idukki districts.

4·16·4· Regarding irrigation by tanks Alleppey district stands first (36·9%) followed by Palghat and Trichur districts (18·9 and 18·4). No area under tank irrigation has been reported from Kozhikode and Quilon districts.

4·16·5· In the case of wells, largest proportion 50·2% of net area irrigated is reported in Trichur district while the largest proportion in the case of tube wells is shared by Ernakulam district (74·5%). Largest proportion of net area irrigated from other sources is shared by Alleppey district.

4·16·6· Comparison of percentage distribution of net irrigated area under different sources during the year 1976-77 with that during the year 1970-71 is presented below.

Table No. 4·16·6·(1)

Sources of Irrigation

Year	Canal	Tanks	Wells	Tube-wells	Other	All sources
1	2	3	4	5	6	7
1970-71	45·1	16·0	15·3	1·3	22·3	100·0
1976-77	59·4	6·0	14·9	4·1	15·6	100·0

Percentage of area irrigated by canals has increased to 59.4 from 45·1 while that by tank has decreased to 6·0 from 16·1.

The area irrigated by tube wells also shows increase

4·17. Estimated number of wells and tube wells

4·17·1. Information regarding estimated number of wells and tubewells is presented in table 5(D). Number of wells in use with pumpsets is reported to be 953 while that without pumpsets is 117499. 3382 wells are found to be not in use. Number of tubewells, diesel and electric are estimated as 13616 and 3130 respectively. Out of the 118452 wells Northern region contributes 17549 while southern region contributes. 160903. Similarly 1018 tube-wells are in the Northern region while 15728 are in the southern region.

4·18. Intensity of irrigation

4·18·1· A better idea of the irrigated area in the various size classes can be had by considering the intensity of irrigation i.e. $100 \times \frac{\text{gross irrigated area}}{\text{net irrigated area}}$ Intensity of irrigation (region-wise) according to size classes is furnished in the subjoined table.

Table No. 4·18·1 (ii)

Intensity of Irrigation

Size class	State	Northern Region	Southern Region
1	2	3	4
0·02 - 0·99	169·3	187·4	162·8
1·00 - 1·99	170·1	169·9	170·4
2·00 - 3·99	173·5	178·0	168·2
4·00 - 9·99	164·6	166·0	157·5
10·00 & above	150·8	143·8	173·0
Total	169·7	175·0	166·0

4·18·2. The intensity of irrigation ranges from 150·8 to 173·5 in the State. The intensity of irrigation is not found to be a function of the size of the holdings. It is observed to be low and high both in smaller and larger operational holdings.

4.19. Gross cropped area and area under various crops

4·19·1. Table 4 presents details regarding gross cropped area and area under various crops according to size classes. For each crop irrigated and unirrigated area are shown separately. Gross cropped area in the State is estimated as 1,821,091 ha. Out of this northern region contributes 7,75,644 ha. and southern region 1,045,447 ha. District-wise percentage distribution of gross cropped area is furnished on the following table.

Table No. 4·19·1 (1)

District-wise percentage distribution of gross cropped area

District	Irrigated	Unirrigated	Total
1	2	3	4
Trivandrum	2·3	7·2	6·4
Quilon	0·8	11·6	9·7
Alleppey	6·9	7·9	7·8
Kottayam	1·3	10·5	9·0
Idukki	0·6	7·9	6·6
Ernakulam	23·2	7·7	10·3
Trichur	21·9	4·7	7·6
Palghat	31·7	8·8	12·7
Malappuram	6·1	9·0	8·5
Kozhikode	1·3	10·6	9·0
Cannanore	3·9	14·1	12·4
State	100·0	100·0	100·0

Out of the 18,21,091 ha. of cropped area in the State 12·7% is in Palghat district which is highest while the lowest percentage is in Trivandrum District (6·4%). The main crops cultivated are the following.

4·19·2. Paddy (Virippu, Mundakan and Punja), jowar, ragi, other cereals and millets, grams, tar, urd, other pulses, sugarcane, ginger, pepper, other spices and condiments, banana, plantain, jack, mango, cashew, other fruit trees, tapioca, vegetables, other food crops, groundnut sesamum, caster, coconut, other oil seeds, arecanut, cotton, other fibers, tea, coffee, rubber, other plantation crops, plaintain crops tobacco, cinchona, others fodder crops and other non-food crops. The percentage of gross cropped area occupied by the important crops, during the reference year 1976-77 and 1970-71 are given below.

Table No. 4·19·2 (1)

Percentage of crop area to the total cropped area

Sl. No.	Name of crop	1976-77	1970-71
1	2	3	4
1.	Paddy	31·6	32·6
2.	Coconut	16·6	16·5
3.	Tapioca	15·1	14·9
4.	Rubber	8·6	8·3
5.	Cashew	3·7	5·1
6.	Tea	0·1	4·7
7.	Pepper	3·2	3·2
8.	Coffee	2·2	2·3
9.	Arecanut	2·3	2·0
10.	Mango	2·0	1·5
11.	Banana	1·4	1·5
12.	Other crops	13·2	7·9
	All crops	100·0	100·0

4.20. Percentage distribution of gross cropped areas

4·20·1. The percentage distribution of gross cropped area among various crops shows that all the crops contribute more or less same percentages during the year under study and 1970-71 except in the case of tea. The reason may be that institutional holdings, which may include a large number of tea estates were not taken for this census for detailed enquiry. This time also nearly one third of the gross cropped area in the holdings is devoted to the cultivation of paddy. Next to this, coconut and tapioca occupy their important positions.

4·20·2. The table No. 4·20·2 (1) presents the percentage of area under each crop covered by each size classes.

Table No. 4·20·2 (1)

Percentage distribution of area under principal crops to different size classes of holdings

Holding size	Virippu paddy	Mundakam paddy	Punja paddy	Sugarcane	Pepper	Banana	Mango	Cashew	Tapioca	Coconut	Arecanut	Tea	Coffee	Rubber	Others
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0·02-0·99	29·7	27·4	33·2	30·1	49·7	55·3	68·0	36·5	56·6	39·3	46·6	10·6	18·4	10·2	52·7
1·00-1·99	30·5	30·6	37·6	31·6	22·5	22·4	16·2	19·9	22·9	19·8	21·2	25·7	15·8	19·8	19·2
2·00-3·99	23·9	24·5	20·6	21·8	16·1	14·5	10·3	27·6	14·5	13·5	20·7	34·8	20·1	23·0	15·6
4·00-9·99	14·3	14·6	8·1	14·8	9·7	5·8	4·6	13·4	5·4	6·3	9·7	19·0	22·7	16·8	8·7
10·00 & above	1·6	2·9	0·5	1·7	2·0	2·0	0·9	2·6	0·6	1·1	1·8	9·9	23·0	30·2	3·8
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

4·20·3. Major proportion of area under crops like coconut, tapioca, pepper and mango is covered by the holdings of size class less than 1 hectare. In the case of crops like tea, coffee and rubber large sized holdings cover the bulk of the area under these crops.

4·20·4. The table given below shows the percentage distribution of gross cropped area under food crops and non-food crops.

Table No. 4·20·4 (1)

Region	Gross cropped area		Area under food crops		Area under non-food crops	
	Irrigated	unirrigated	Irrigated	un irrigated	Irrigated	unirrigated
1	2	3	4	5	6	7
Northern region	100·0	100·0	92·7	65·5	7·3	33·5
Southern region	100·0	100·0	88·0	60·1	12·0	99·9
State	100·0	100·0	90·0	62·8	10·0	37·2

Out of the Gross cropped area (irrigated) 310,211 ha. in the State 90% comes under food crops and 10% under non-food crops. Percentages of unirrigated cropped area coming under food crops and non-food crops are 62.8 and 37·2 respectively.

4·21. Intensity of cropping

4·21·1. Intensity of cropping is one of the factors indicating the development of agriculture. The following table gives the region-wise and district-wise intensity of cropping.

Table No. 4·21·1 (1)

Region	Net area sown	Gross cropped area	Intensity of cropping
1	2	3	4
	ha.	ha.	
Northern region	602106	776644	128·8
Southern region	773256	1045447	134·9
State	1377362	1821091	132.2

Table No. 4·21.1 (2)

Districts	Net area sown	Gross cropped area	Intensity of cropping
1	2	3	4
	(ha.)	(ha.)	(ha.)
Trivandrum	91131	116407	127·7
Quilon	135786	177449	130·7
Alleppey	107707	141113	131·0
Kottayam	141387	163045	115·3
Idukki	74224	190422	162·2
Ernakulam	124476	128182	151·2
Trichur	100495	128829	138·1
Palghat	149177	230931	154·8
Malappuram	124031	155412	125·3
Kozhikode	136820	163851	119·8
Cannanore	192078	225450	117·4
State	1377362	1821091	132·2

Intensity of cropping $\frac{(\text{Gross cropped area} \times 100)}{\text{Net area sown}}$ is worked out to be 132. 2, 128.8 and 134.9 for the State and the two regions respectively.

4·21·2. District-wise intensity varies from 115·3 (Kottayam District) to 162·2 (Idukki District). Comparison with 1970-71 census is presented below.

Table 4·21·2 (1)

Intensity of cropping in 1970-71 and 1976-77

	1970-71	1976-77
State	114·3	132·2
Northern Region	122·6	128·8
Southern Region	115·9	124·9

PART II

INPUT SURVEY

4·22· Fragmentation of holdings

4·22·1. The number of parcels per holding and average area per parcel are presented in Table 7. Average number of parcels per holding is 1·9 for the State, 1·7 for the northern region and 2·0 for the southern region. Average area per parcel is 0·26 ha. for the State. No. of parcels varies from 1·7 (in the size class 0. 02—0·99) to 4·5 (in the size class 4·00—9·99). Average area of a parcel in the size group is 0·14 hec. and it gradually increases from one size class to the higher classes while it is 4·69 hec. in the group 10·00 and above. Total number of parcels in the State is estimated as 6,280,426.

4·22·2. The following table presents region-wise number of parcels and average area per parcel. Among the size classes number of parcels per holding varies between 1·7 and 4·5. Both the regions show similar trend in both the cases of number of parcels and average area per parcel.

Average area per parcel for the State increases with the increase in the holding size.

Table No. 4·22·2 (1)

Region-wise No. of parcels per operational holdings and average area per parcel

Size class	Northern region		Southern region		State	
	No.	Area (ha.)	No.	Area (ha.)	No.	Area (ha.)
1	2	3	4	5	6	7
0·02 - 0·99	1·4	0·18	1·8	0·12	1·7	0·14
1·00 - 1·99	2·7	0·51	3·2	0·43	3·0	0·46
2·00 - 3·99	3·8	0·72	3·9	0·68	3·8	0·70
4·00 - 9·99	4·5	1·24	4·7	1·16	4·5	1·21
10.00 & above	4·8	3·55	2·8	7·85	4·1	4·69
Total	1·7	0·35	2·0	0·21	1·9	0·26

4.22.3. The corresponding figures of number of parcels and area per parcel were 1·6 and 0·42 hec. in 1970-71 census as against 1·9 and 0·26 hec. in the present census respectively.

4.23. Multiple cropping

4.23.1. Area cropped once and more than once in irrigated and unirrigated areas

Table 8 (A) and 8 (B) of Part II of the report present the percentage distribution of area cropped once and more than once in irrigated and unirrigated areas respectively. The extent of area under multiple crops indicates the efficiency of cultivation. The following table shows the percentage of irrigated area and unirrigated area under single and multiple crops according to different size classes.

Table No. 4·23·1 (1)

Percentage of irrigated and unirrigated area cropped once, twice and more than twice to total irrigated and unirrigated cropped area

Holdings size	Irrigated area				Unirrigated area		
	Cropped once	Cropped twice	Cropped more than twice	Total	Cropped once	Cropped more than once	Total
1	2	3	4	5	6	7	8
0·02 - 0·99	54·9	34·8	10·3	100·0	87·9	12·1	100·0
1·00 - 1·99	46·0	42·1	11·9	100·0	86·7	13·3	100·0
2·00 - 3·99	43·4	48·6	8·0	100·0	85·3	14·7	100·0
4·00 - 9·99	41·9	50·2	7·9	100·0	85·6	14·4	100·0
10·00 & above	25·4	65·5	9·1	100·0	93·6	6·4	100·0
Total	49·7	40·3	10·0	100·0	87·3	12·7	100·0

4·23·2. It is revealed that 49·7% of the irrigated area under crops yields only once, 40·3% twice and 10·1% more than twice. Similarly 87·3% of the unirrigated area falls under 'cropped once' while 12.7% falls under cropped more than once.

4·23·3. From the Table No. 4·23·3 (1) given below showing region-wise percentage of irrigated and unirrigated area under multiple cropping, it is seen that percentage of area under cropped once is larger in Southern region while area cropped more than once is larger in Northern region in both the cases of irrigated and unirrigated areas.

Table No. 4·23·3 (1)

	Irrigated area		Unirrigated area		
	Cropped once	Cropped twice	Cropped more than twice	Cropped once	Cropped more than once
State	49·7	40·3	10·0	87·3	12·7
Northern region	40·7	52·4	6·9	85·9	14·1
Southern region	56·3	31·4	12·3	88·1	11·9

4·24· Water logged area and salined lands

4·24·1. Table 8(B) shows the percentage number of holdings and area affected by water logging and salinity also. In the State 49,828 holdings are seen to be affected by water logging which is 1·5% of the total number of holdings and the area covered by these holdings comes to 9536 ha. of which 2065 ha. have drainage facility. The remaining area without such drainage facility is 7371 ha. The table 8(B) gives that 0·5% of the total area under holdings is affected from water logging., 0·1% have drainage facility ie. out of the total area under water logging 80% do not have drainage facility.

4·24·2. The number of holdings reported under salined lands is 43868 (1·3%) covering an area of 6507 ha.

District-wise table shows that there is considerable area under water logging in the districts of Trivandrum. Alleppey, Trichur, Palghat, Malappuram and Cannanore. No area is reported under water logging in Quilon. Kottayam and Idukki. The area affected by water logging in Ernakulam District is negligible ie. only 58 ha.

4·25· Use of chemical fertilizers

4·25·1· Table 9 gives the percentage distribution of holdings as well as area treated with chemical fertilizers, organic manures and pesticides in irrigted areas growing the selected crops. 15% of the holdings covering 68% of the irrigated cropped area was treated with chemical fertilizers, 21% of holdings having 71% of the area was treated with organic manures. Plant protection measures were adopted only in 9% of the holdings covering 48% of the area as shown in the Table below.

Table No. 4·25·1 (i)

Percentage distribution of the number and area of operational holdings in irrigated area treated with chemical fertilizers, organic manures and pesticides

Holding size	Total holdings	% number of holdings treated with			% area treated with			
		Chemical fertilizers	Organic manure	Pesticides	Total cropped area	Chemical fertilizers	Organic manure	Pesticides
1	2	3	4	5	6	7	8	9
0·02 - 1·0	100·0	12·6	19·2	7·8	100·0	64·4	76·6	47·5
1·0 - 2·0	100·0	26·5	30·1	17·7	100·0	73·5	69·1	51·0
2·0 - 4·0	100·0	30·8	34·5	20·5	100·0	69·7	68·1	49·5
4·0 - 10·0	100·0	33·8	35·9	22·4	100·0	71·0	50·9	45·7
10·0 & above	100·0	22·2	29·1	20·6	100·0	34·9	52·9	44·9
Total	100·0	14·0	20·8	9·2	100·0	68·0	71·7	48·4

4·25·2. It is seen from the Table that higher proportion of area covered by the use of chemical fertilizers is in the highest size class 10·0 hectares and above, but in the case of organic manures better coverage is noticed in the lowest size class. There is a decreasing trend as the holding size increases. It seems that plant protection measures are not inevitable for local variety. The proportion of area treated with pesticides comes only below half of the total cropped area. The proportion of area treated with chemical fertilizers, organic manures and pesticides is on the increase, when compared with that of the 1970-71 census figures. Thus it is evident that improved agricultural practices became popular as years go by along with the introduction of high yielding varieties of crops.

4·25·3· Types of chemical fertilizers used

Information on the use of the chemical fertilizers mentioned below was collected through the agricultural census.

1. Ammonium sulphate 2. Super phosphate 3. Urea 4. Other chemical fertilizers.

The percentage number and area of operational holdings in the different size classes benefited by different chemical fertilizers in irrigated area are given in Table 11 (A) of Part II of the report.

In the following Table 4.25.4 (1) the percentage of area using different types of fertilizers by holdings falling under the broad five size groups is presented:—

Table No. 4·25·4 (1)

Size class	Percentage of area using			
	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizers
1	2	3	4	5
0·02 - 1·0	14·4	7·5	42·2	49·4
1·0 - 2·0	17·3	8·3	53·0	53·5
2·0 - 4·0	18·1	9·4	52·3	52·5
4·0 - 10·0	20·1	8·6	49·7	40·5
10·0 and above	18·7	9·6	64·5	70·8
Total	16·3	8·1	46·9	50·2

The application of other chemical fertilizers is found to be the most common practice by all the size class holdings. In 46·9% of the area, urea is applied, 8·1% with super phosphate and 16·3% with ammonium sulphate. The higher proportion of area receiving urea and super phosphate are in the higher size classes and that of ammonium sulphate in the 4·0—10·0 hect. size class. In the size class 10 hect. and above the percentage of area benefited by other chemical fertilizers is maximum (70·8) and more than 40% in all other size classes. The above percentages are all with respect to irrigated areas only.

4·26. Application of organic manures

4·26·1. Table 11 (b) of Part II of the report presents the percentage distribution of the number and area of irrigated holdings receiving farm yard manures, oil cakes and other manures, as well as pesticides. It is seen that 5% of area is treated with farm yard manures considering all sizes. In respect of size class distribution the maximum percentage of area wherein farm yard is applied is in the holdings of size less than 1 hec. that is 64·8, this gradually decreases as size class increases. Similarly in 10% of whole area oil cakes are supplied and in the lowest size class the percentage of area treated is maximum (13·4). In regard to pesticide application, 49.1% of the total irrigated area is seen to have received this benefit.

4·27· Application of chemical fertilizers to paddy

4·27·1· Table 10 (a), (b) etc. give the percentage distribution of the number of holdings and area under irrigated crops and treated with important kinds of fertilizers during 1976-77. In respect of paddy separate tables showing percentage distribution of area treated with ammonium sulphate, super phosphate, urea and other chemical fertilizers for each of the virippu, mundakan and punja crops are presented.

4·28· Virippu paddy

4·28·1. Table 10 (a) shows that 18% of the number of holdings where in virippu paddy is cultivated with irrigation were receiving ammonium sulphate and the area accounted for was 17%. The quantity applied per ha. was 115 kg. It is also seen that 62·4% of the irrigated area under virippu paddy and treated with ammonium sulphate was cultivated with high yielding varieties of paddy and only the remaining 37·6% was under other varieties.

4·28·2. From Table 10 (b) it may be seen that 30% of the holdings cultivated with virippu paddy and irrigated were applied with super phosphate whereas the percentage of the area was 19·6% and the overall state average quantity applied per ha. was 98 kg.

4·28·3. Similarly it can be seen from Table 10 (c) that 61·6% of the area under irrigated virippu paddy received urea and the rate of application per ha. was 79 kg.

4·28·4. Other chemical fertilizers include fertilizer mixtures potassium manures, ammonium phosphate etc. and 57·5% of the virippu irrigated paddy was receiving other chemical fertilizers and the average dose of application was found to be 97 kg. per ha.

4·28·5. Farm yard manure

4.28.5 It is seen that 47·8% of the irrigated virippu paddy received farm yard manure in the State during 1976-77 and the average rate was found to be 1,943 kg. per ha. Another important finding is that, unlike in the case of chemical fertilizers applied, more percentage of area ie. 57·1 were not having high yielding varieties. In other words it can be stated that chemical fertilizers were applied more to high yielding varieties of paddy than to local varieties.

4·28·6. Another important finding from the input survey is that oil cakes were applied to irrigated virippu paddy only in 12·3% of the area. The average rate of application per ha. was 498 kg. per ha. But, in the case of other organic manures, the area benefited by their application was 42·2% and the average dose per ha. was 1,230 kg. It was found that pesticides were applied to 53·9% of virippu irrigated area. Considering the 5 broad size classes it is seen that the percentage of area treated with chemical fertilizers increased as the size class increased.

4·29. Mundakan crop of paddy

4·29·1. Out of the 13·1% of the number of holdings wherein irrigated mundakan paddy was cultivated 22·6% was treated with ammonium sulphate covering an area of 20·6% of the irrigated area wherein paddy was cultivated. The average rate of application of this fertilizer for the State as a whole was 142 kg. per ha. Table 10 (b) shows that super phosphate at an average rate of 100 kg. per ha. was applied to 9·1% of the area cultivated with irrigated mundakan paddy. But in the case of urea it is seen that 55·1% of the area received the benefit of urea with respect to irrigated mundakan paddy and the rate of application was 90 kg. per ha. More or less the same area (56·2%) received the benefit of other chemical fertilizers mainly mixtures during the 1976-77 mundakan crop of paddy and the average rate of application was 98 kg./ha.

4·29·2. Regarding the application of farm yard manure it is seen that 61·9% of the irrigated mundakan paddy crop was benefited by it. The average rate of application for the entire state was found to be 2071 kg./ha. Other organic manures were applied to 44·9% of the mundakan crop of paddy during 1976-77 at an average rate of application of 1,390 kg./ha.

4·30. Punja crop of paddy

4·30·1. During the punja season 1976-77, 22·9% of the paddy crop received ammonium sulphate at an average rate of 128 kg./ha. Also 63·5% of the punja crop was cultivated with high yielding varieties of paddy. It is seen that 13·0% of the area received super phosphate while 61·9% of the area received urea during the 1976-77 punja crop of paddy. But the maximum application was in the case of other fertilizers at an average rate of 199 kg./ha. in 75.2% of the punja crop. Farm yard manure was applied at an average rate of 1722 kg./ha. in 61·9% of the area under punja paddy.

4·30·2. Table 11 (a) presents the percentage distribution of the number and area of operational holdings benefited by different chemical fertilizers in irrigated areas. It is seen that 50·2% of the area under irrigated crops received other chemical fertilizers while 46·9% of area received urea. The area benefited by ammonium sulphate was 16·3% and only 8·1% of the area was benefited by super phosphate. On the whole only 20·2% of the irrigated area under the selected crops received the benefit of chemical fertilizers.

4·31. Other irrigated crops for which organic and chemical fertilizers were used

4.31.1. In respect of chemical fertilizers applied to crops other than paddy, the acreage and quantities applied are seen to be very low. The crops are coconut, arecanut, tapioca, sugarcane, banana, tea, coffee, rubber and others.

4·31·2. The estimates of the quantities of ammonium sulphate, urea, super phosphate and other chemical fertilizers applied to irrigated holdings with coconut totalled up to only 1,065 m. tonnes. But the coconut crop received about 1,23,000 m. tonnes of organic manures such as farm yard manure, oil cakes and others. This shows that more organic manures were applied to coconut palms than chemical fertilizers on a large scale. Similarly banana crop received only just about 600 m. tonnes of chemical fertilizers whereas organic manures of all kinds

totalled to 16,000 m. tonnes. Sugarcane, arecanut and tapioca crops received only very little chemical fertilizers. The estimate of organic manures applied to irrigated arecanut crop was above 29,000 m. tonnes. In respect of tea, coffee and rubber neither chemical fertilizers nor organic manures are seen to have been applied. Whereas in respect of other crops about 24,000 m. tonnes of organic manures were applied in the form of farm yard manure and other organic manures.

4·32· Application of organic manures in irrigated area

4·32·1. Table 11 (B) gives the percentage distribution of the number and area of operational holdings benefited by different organic manures in irrigated area. It is seen that only 20·2% of the gross area under the selected crops received irrigation during 1976-77. Of the irrigated area the area benefited by farm yard manure was 56·3% while 10·0% received oil cakes and 38·5% of other organic manures in the state as a whole. Considering the broad size classes less than 1 ha., 1 to 1.99 ha., 2 to 3·99 ha., 4 to 9·99 ha., 10 ha. and above it is seen that the percentage area benefited by farm yard manure was highest in the case of less than 1 ha. category (64.8%) and minimum of 36% in the 4 to 10 ha. group. But in the case of other organic manures the maximum percentage of area benefited was in the size class 2 to 4 ha. (43·1%). Area benefited by pesticides was 48·9% of the irrigated area while the variation between the different size classes was seen in the range 45 to 53%.

4·32·2. Of the 3 different types of manures 3·84 lakhs m. tonnes are farm yard manure out of a total of 5.93 lakhs m. tonnes while 0·22 lakh tonnes were oil cakes and the balance other organic manures.

4·33· Percentage distribution of area of operational holdings using chemical fertilizers and organic manures in unirrigated areas

4·33·1. Table 12 shows the percentage distribution of the area treated with chemical fertilizers in area covering 88·9% of the unirrigated area under selected crops. It is seen that 27·2% of the holdings covering an area of 22·3% received chemical fertilizers while 63·6% of the holdings accounting for 49·5% of the area received organic manures. Thus, it is clear that the major portion of the area under the selected crops was unirrigated but chemical fertilizers were applied to only about a quarter of that area. Further it is also notable that about half the area received the organic manures in one form or the other. If we analyse the percentage of area benefited by chemical fertilizers among the size classes, it is seen that the percentage increased as the size classes, increased from 23·2 to 50·6%. There was no substantial change in the percentage of area benefited by organic manures between the size classes.

4·34· Percentage distribution of unirrigated area under virippu paddy using ammonium sulphate

4·34·1. Table 13 (a) shows that only 26% of the holdings under unirrigated virippu paddy received ammonium sulphate during 1976-77 of which only 27% was cultivated with high yielding varieties and 73% local varieties. In terms of area it was found that 22·4% received ammonium sulphate. Among the size classes it may be noted that the percentage of area which received ammonium sulphate was maximum (34·2) in the size class above 10 ha. The average amount applied was 117 kg./ha. In the case of super phosphate the area treated was only 8·1% while that of area was 35·3%. The area benefited by other chemical fertilizers was nearly 35%. In large holdings of area 10 ha. and above the area benefited was as high as 70% and those areas were under high yielding variety.

4·34·2. In regard to farm yard manure, nearly half the area (47·6%) received it and the rate of application was 231 kg. per ha.

4·35· Unirrigated mundakan paddy 1976-77

4·35·1. During this season, 20·7% of area under the crop received ammonium sulphate at an average rate of 105 kg./ha., 10·8% super phosphate at 135 kg./ha. and 89·2% urea at 84 kg./ha. Out of the area benefited by urea 68% were cultivated with high yielding varieties. The percentage of area which got other chemical fertilizers was 52·1 and 81·1% of that area was under high yielding varieties of paddy. The average rate of application was 108 kg./ha. Area benefited by farm yard manure was 56·6%.

4·35·2. During the punja crop 1976-77, the percentage of area under paddy benefited by ammonium sulphate, super phosphate, urea and other chemical fertilizers were respectively 10.3, 8.9, 36.2 and 50.2. The average quantity applied were 188 kg./ha., 111 kg./ha., 85 kg./ha. and 175 kg./ha. respectively. The percentage of the area benefited by urea and other chemical fertilizers of the area benefitted by urea and other chemical fertilizers under high yielding varieties were as high as 58·8 and 82·9 respectively. The area under punja which received farm yard manure was low as 20·3%. The rate of application of pesticides was maximum for punja crops.

4·36. Other crops which received chemical fertilizers

4·36·1. In the case of tapioca only "other chemical fertilizers were applied on a substantial area (20·5%)", farm yard manure was applied to 44·3% of area. Other chemical fertilizers were used in 30·5 % of area under sugarcane and 36·8% received farm yard manure. It is worthy of special mention here that in the case of banana crop also only other chemical fertilizers were applied at an average rate of 429 kg./ha. on a substantial area (30·8%) as in the case of tapioca and sugarcane. In respect of coconut crop 6·6% of area received other chemical fertilizers at an average rate of 215 kg./ha. and 44·1% farm yard manure at 3,750 kg./ha. Other organic manures benefited 28·5% of area under coconuts. In the case of tea 6·6% of area received other chemical fertilizers at 132 kg./ha. and 18·5% of area were benefited by farm yard manure at an average of 1,850 kg./ha. 24·9% of area under

coffee received other chemical fertilizers at a low doze of 74 kg./ha. and 58·2% of area benefited by application of farm yard manure at an average rate of 1,450 kg./ha. But it is worthy of special mention that a high percentage (60·3) of the area under coffee received other organic manures at an average rate of 2,267 kg. per ha.

4·36·2. One of the important commercial crops—rubber received the benefit of urea in 14% of area at a doze of 295 kg./ha. and 36·8% of area by other chemical fertilizers at an average rate of 127 kg. /ha. Farm yard manure was applied to 18·9% of area under rubber at about 630 kg./ha. and 17·9% of area was benefited by other organic manures. The application of the different fertilizers among the various size classes to the selected crops are presented in Table No.4·36·2(1) shown below:

Table No. 4.36.2 (1)

Percentage distribution of the number and area of operational holdings benefited by different chemical fertilizers in unirrigated area

Size class	No. of holding growing one or more of selected crops	Gross unirrigated area under crops	Chemical fertilizers							
			Ammonium sulphate		Super phosphate		Urea		Other chemical fertilizers	
			No.	Area	No.	Area	No.	Area	No.	Area
1	2	3	4	5	6	7	8	9	10	11
0·02 - 1·0	100·0	90·5	6·7	6·8	2·1	2·4	8·2	9·2	19·9	17·1
1·0 - 2·0	100·0	88·5	11·9	6·0	6·9	3·1	20·4	14·2	38·8	22·8
2·0 - 4·0	100·0	91·1	11·6	5·0	7·4	3·1	26·7	12·6	51·4	27·1
4·0 - 10·0	100·0	83·7	13·0	7·8	8·4	5·2	31·3	18·9	56·6	28·5
10·0 and above	100.0	68·7	11·9	5·4	13·0	1·8	30·1	11·0	55·6	41·4
Total	100·0	88·9	7·4	6·4	2·8	2·8	10·1	11·8	23·0	21·2

4·36·3. The percentage distribution in respect of organic manures and chemical fertilizers applied crop-wise to irrigated and unirrigated areas separately are presented in the 2 tables given below:—

Table No. 4·36·3 (1)

Percentage of area treated with chemical fertilizers and farm yard manure to total area of the different irrigated crops in the State and for the three paddy seasons

Sl. No.	Irrigated crop	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizers	Farm yard manure	Oil cake	Other organic manures
1	2	3	4	5	6	7	8	9
1.	Paddy (Virippu)	17·0	9·6	61·6	57·5	47·8	12·3	42·2
2.	Paddy (Mundakan)	16·2	9·4	55·1	56·6	61·9	6·9	44·9
3.	Paddy (Punja)	22·9	13·0	61·9	75·2	61·9	17·6	34·8
4.	Coconut	0·8	0·7	0·7	7·7	57·5	11·0	26.1
5.	Arecanut	0·3	0·1	..	5·7	37·3	0·2	14·6
6.	Banana	1·5	0·5	0·4	22·0	64·7	23·0	44·1
7.	Tea	..	..	..	..	..	..	..
8.	Coffee	..	..	..	..	5.3	..	..
9.	Rubber	..	..	..	..	..	..	..
10.	Tapioca	1·5	..	1·2	21·5	77·4	0·2	22·3
11.	Others	5·1	1·5	4·3	12·4	39·9	9·3	22·3

Table No. 4·36·3 (2)

Percentage of area treated with chemical fertilizers and farm yard manure to total area of different unirrigated crops in the State and for the three paddy seasons

Sl. No.	Crop	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizers	Farm yard manure	Oil cake	Other organic manures
1	2	3	4	5	6	7	8	9
1.	Paddy (Virippu)	22·4	8·1	38·3	34·2	47·6	2·3	39·7
2.	Paddy (Mundakan)	20·7	10·8	39·2	52·1	56·6	1·7	44·0
3.	Paddy (Punja)	10·3	8·9	36·2	50·2	20·3	1·1	19·6
4.	Coconut	0·1	0·2	0·1	16·6	44·1	2·1	28·5
5.	Arecanut	..	..	..	0·2	3·0	..	1·4
6.	Sugarcane	..	3·9	0·3	80·5	36·3	..	6·6
7.	Banana	14·2	6·0	3·6	30·8	42·5	6·3	28·7
8.	Tea	..	..	..	6·6	18·5	..	..
9.	Coffee	..	1·1	1·1	24·9	58·2	9·2	60·3
10.	Rubber	0·1	0·3	14·0	35·8	12·9	1·7	17·9
11.	Tapioca	0·2	..	0·1	20·5	44·3	0·2	34·8
12.	Others	1·0	0·3	0·5	3·9	12·7	1·2	5·9

4·36·4. From the above two tables it may be seen that chemical fertilizers are applied in higher proportions to irrigated paddy, during all the 3 seasons than to unirrigated paddy area. The percentage of area benefited by urea varied from 55 to 62 between the three seasons whereas in respect of unirrigated paddy the area benefited varies from 35 to 62 among the 3 seasons. Other chemical fertilizers are applied in percentages varying from 57 to 75 during the 3 paddy seasons wherein there was irrigated but only from 34 to 52 for unirrigated paddy between the seasons. Area benefited by ammonium sulphate varied round about 20% during the 3 seasons and in regard to super phosphate the area benefited was round about 10% only.

4·36·5. In respect of organic manures, one or more combinations of farm yard manure, oil cakes and other organic manures are applied to irrigated paddy crop during all the 3 seasons whereas in regard to unirrigated paddy one or more of organic manures were applied to round about 90% during virippu and mundakan crops whereas in regard to punja crop only 40% of area was benefited by organic manures.

4·36·6. Regarding other crops, only coconut, sugarcane, banana, tapioca and others received other chemical fertilizers in varying percentages from 10 to 22 and urea, ammonium sulphate and super phosphate benefit very few percentage of area. Farm yard manure was applied to all the selected crops except tea and rubber on a major portion of their respective areas.

4·37· Comparison between regions

4·37·1. From table 8 (A) it is seen that only 40·7% of the irrigated area was cropped once in the north region whereas in the south region 56·3% was cropped only once. In the north region, one crop alone was irrigated in 31·1% of the irrigated area and 21·3% irrigated twice. In the south region the crorresponding percentages were 12·4 and 19·0.

4·37·2. Regarding application of chemical fertilizers and organic manures in irrigated areas in the north and south regions it is found that 58·7% of the area under the selected crops received chemical fertilizers and 69·8% of area was benefited by organic manures in the north region. The corresponding percentage for the south region were 67·5% and 72·1% respectively.

4·37·3. In the north region during irrigated virippu paddy 70% of area was benefited by urea whereas in the south region it was only 54%. But in the case of other fertilizers, 23·1% of area was benefited in the north region whereas the corresponding area benefited by other fertilizers in the south region.

4.38. Percentage distribution of irrigated area treated with chemical fertilizers, organic manures etc. in the districts.

4·38. (a) Virippu crop of paddy 1976-77

4·38 (a) (1) The percentage of irrigated area treated with different chemical fertilizers, organic manures etc. in each of the district is presented in the Table No. 4·38 (a) (1).

Table 4·38 (a) (1)

Percentage distribution of irrigated area treated with chemical fertilizers, organic manures and pesticides

Name of Crop: Paddy: Virippu

Sl. No.	Name of District	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizers	Farm yard manure	Oil cake	Other organic manures	Pesticide
1	2	3	4	5	6	7	8	9	10
1.	Trivandrum	48·7	35·5	46·6	74·5	86·5	0·4	28·8	46·8
2.	Quilon	38·9	15·6	65·5	60·1	36·6	..	33·2	67·7
3.	Alleppey	100.0	..	100·0	100·0	68·8	..	..	100·0
4.	Kottayam	2·3	..	2·3	100·0	100·0	..	..	100·0
5.	Idukki	..	..	..	..	100·0	..	100·0	..
6.	Ernakulam	6·1	1·9	56·1	86·6	51·6	35·4	60·6	55·6
7.	Trichur	13·7	14·5	47·9	34·7	53·0	1·9	27·5	49·6
8.	Palghat	12·9	7·7	74·0	56·5	18·0	5·2	45·7	47·8
9.	Malappuram	25·0	16·1	64·3	37·4	86·6	..	43·6	74·5
10.	Kozhikode	..	..	..	100·0	..	..	..	100·0
11.	Cannanore	21·3	1·6	61·3	34·5	54·2	42·2	10·6	11·1
	State	17·0	9·6	61·8	57·5	47·8	12·3	42·2	53·9

4·38·(a) (2) It is seen that the entire irrigated paddy in Alleppey district received the benefit of ammonium sulphate, urea and other chemical fertilizers, followed by Trivandrum district where 48·7% received ammonium sulphate and Quilon with 38·9% area using it. In Idukki and Kozhikode no ammonium sulphate was used and in Kottayam only 2·3% of its paddy area was benefited by ammonium sulphate. The overall state average was 17% of the paddy area received ammonium sulphate. Super phosphate was used only in 35·5% of paddy area in Trivandrum district followed by Malappuram with 16·1%. Urea was applied comparatively in larger percentage of area in each district with 100% in Alleppey and Palghat with 74% followed by Quilon with 65·5%. Other districts in descending order of % in the use of urea were Malappuram (64.3%), Cannanore (61·3%), Ernakulam (56·1%) and other districts below 50%.

4·38 (a) (3). In regard to application of other chemical fertilizers also Alleppey comes first with 100%. The entire irrigated virippu paddy in Kottayam and Kozhikode Districts also received the benefit of other chemical fertilizers during 1976-77. In Ernakulam 86 ·6% area was benefited and in Trivandrum 74·5% of area. It is worthy of mention that major portions of the paddy area in almost all districts except Palghat and Kozhikode were benefited by farm yard manures and the maximum percentages were in Kottayam and Idukki Districts (100%).

4·38 · (b) Mundakan crop of paddy

4·38 (b) (1). Table No. 4·38 (b) (1) given below presents the percentage distribution of area benefited by different fertilizers and organic manures in respect of Mundakan crop of paddy in each district. It is seen from the Table that the percentage of area benefited by ammonium sulphate varied from 63·2% in Quilon to nil in Kozhikode with a State average of 20·6% area. The area benefited by super phosphate was still less in all the districts. It is worthy of mention that urea was applied in higher percentage of area in all the districts ranging from 74·3% in Palghat followed by Quilon with 65% and nil in Kozhikode. The state average of area benefited by urea was 55·1%. Regarding other fertilizers it is praise worthy that 100% area under Mundakan paddy in Kottayam District was benefited by it followed by 83·2% area in Ernakulam and 74·9% in Alleppey. In most of the districts the major portion of area was benefited by other chemical fertilizers as well as farm yard manure with state average of 56·6% and 61.6% of area respectively.

Table No. 4·38 (b) (1)

Percentage distribution of irrigated area treated with chemical fertilizers, organic manures and pesticides

Paddy: Mundakan

Sl. No.	Name of District	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizer	Farm yard manure	Oil cake	Other organic manure	Pesticides
1	2	3	4	5	6	7	8	9	10
1.	Trivandrum	38·2	25·9	66·3	76·3	90·5	0·3	10·9	65·1
2.	Quilon	63·2	27·6	65·0	70·3	73·2	..	51·3	48·5
3.	Alleppey	29·1	9·9	55·4	74·9	42·1	..	20·3	75·3
4.	Kottayam	18·5	..	9·0	100·0	78·5	1·8	45·7	100.0
5.	Idukki	7·7	..	26·7	60·7	31·0	..	3·2	61·9
6.	Ernakulam	9·8	2·3	30·6	83·2	68·7	25·4	56·9	54·2
7.	Trichur	11·1	12·4	40·0	57·3	79·1	4·9	44·6	60·0
8.	Palghat	26·3	5·9	74·3	52·2	39·0	1·5	46·8	59·9
9.	Malappuram	19·7	15·4	56·8	22·8	93·3	..	51·5	64.9
10.	Kozhikode	..	..	..	57·1	57·1	..	35·9	20·8
11.	Cannanore	15·5	6·4	23·8	34·9	50·1	8·5	20·7	26·1
	State	20·6	9·1	55·1	56·6	61·9	6·9	44·9	57·8

4·38. (c) Punja crop of paddy

4·38 (c)(1). Table No. 4·38 (ii) given below gives the percentage of area benefited by different manures in respect of punja crop of paddy. The major portion of the punja paddy is in Alleppey District. The percentage of area benefited by other chemical fertilizers was maximum in Alleppey District with 94·5% followed by 84·5% in Kottayam and 81·6% in Ernakulam though the entire area in Trivandrum District was benefited by other chemical fertilizers wherein the punja crop area was very small. Urea was applied to a major portion of the punja paddy in almost all the districts with the State average of 61.9% of area. The proportion of area benefited by other chemical fertilizers for punja crop for the State was high at 75·2 %. The % of area under punja benefited by ammonium sulphate and super phosphate for the State were low at 22·9 % and 13·0% respectively. Farm yard manure was applied to 61·9% area under punja in the State and pesticides to 79·2% of the area.

Table 4·38 (c) (1)

Percentage distribution of irrigated area treated with chemical fertilizers, organic manures and pesticides

Paddy: Punja

Sl. No.	District	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizer	Farm yard manure	Oil cake	Other organic manure	Pesticides
1	2	3	4	5	6	7	8	9	10
1.	Trivandrum	73·8	8·6	65·2	100·0	65·2	..	28·0	90·8
2.	Quilon	100·0	81·7	89·0	24·6	13·6	..	75·4	81·1
3.	Alleppey	37·6	9·4	59·3	94·5	46·6	..	6·0	90·3
4.	Kottayam	17·8	9·5	78·9	84·5	43·9	3·8	2·1	25·1
5.	Idukki	21·8	..	16·7	1·1	61·5	..	37·0	46·3
6.	Ernakulam	7·1	1·7	69·6	81·6	69·2	40·1	57·0	78·8
7.	Trichur	31·2	26·3	57·6	75·6	55·5	9·4	25·9	81·1
8.	Palghat	3·3	17·1	54·6	58·7	87·9	0·3	24·5	54·0
9.	Malappuram	48·3	26·9	59·8	15·2	92·5	7·6	48·0	70·9
10.	Kozhikode	..	1·1	51·2	73·2	61·2	..	64·3	79·8
11.	Cannanore	16·7	15·5	37·4	65·4	67·1	..	21·6	22·0
	State	22·9	13·0	61·9	75·2	61·9	17·6	34·8	79·2

4.39. Percentage of area benefited by differentc hemical fertilizers and organic manures in unirrigated three paddy seasons in the districts during 1976-77.

4·39 (a) Unirrigated virippu paddy

4·39 (a) (1). Table 4.39 (a) (1) shown below presents the percentages of area benefited by each fertilizer in the districts. Ammonium sulphate was applied to 63% of area under unirrigated paddy in Quilon District and to 71·1% of area in Tivandrum District. In Alleppey and Palghat District the % were 29·6 and 35·1 respectively with a state average of 22·4% of area only. Super phosphate was applied to only a small % of area in all the district. Urea and other fertilizers were applied to 35% and 34% of area respectively in the state during the season. Among the districts the percentage of area benefited by urea in order of descending magnitude were Palghat (66·4), Quilon (54.9) and Alleppey (46·7), Kottayam (41·2) etc. the lowest being Idukki (9·5). In respect of other chemical fertilizers Trivandrum with 83·3% topped the list with Kottayam 72·0% and Quilon 59·7% following it. The lowest % of area benefited by other chemical fertilizer was Malappuram (8·4%). Farm yard manures were supplied in the districts with percentages of area benefited ranging from 80·6% in Trichur to 11% in Ernakulam with an average of 47.6% for the State.

Table 4·39. (a) (1)

Percentage distribution of unirrigated area treated with various chemical fertilizers, organic manures and pesticides in the Districts

Paddy: Virippu

Sl. No.	District	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizer	Farm yard manure	Oil cake	Other organic manure	Pesticides
1	2	3	4	5	6	7	8	9	10
1.	Trivandrum	71·1	17·0	30·5	83·3	64·1	..	41·1	66·0
2.	Quilon	66·0	26·2	54·9	59·7	66·7	4·0	58·2	24·3
3.	Alleppey	29·6	12·1	46·7	55·2	44·6	0·4	13·8	45·8
4.	Kottayam	4·1	6·1	41·2	79·0	31·9	..	52·1	81·1
5.	Idukki	0·5	10·1	9·5	34·6	23·1	..	22·2	27·5
6.	Ernakulam	1·1	0·6	8·5	10·3	11·0	1·5	18·1	12·4
7.	Trichur	5·4	4·5	30·6	22·9	30·6	10·9	32·2	35·7
8.	Palghat	35·1	3·5	66·4	28·1	48·8	1·6	59·0	41·5
9.	Malappuram	6·2	6·2	9·7	8·4	38·6	..	65·4	5·0
10.	Kozhikode	2·2	0·4	15·6	23·3	51·5	4·0	27·7	27·0
11.	Cannanore	10·1	1·4	19·8	21·9	65·9	2·8	34·6	8·2
	State	22·4	8·1	35·3	34·2	47·6	2·3	39·7	30·5

4·39 (b) Unirrigated mundakan paddy

4·39. (b) (1). Table 4·39 (b) (1) gives the percentage of area benefited by different fertilizers in the districts. Regarding ammonium sulphate the maximum % of area benefited was in Trivandrum (80·0) followed by Quilon (60·6%). A maximum of 29% of area was benefited by super phosphate in Alleppey District while in 7 other districts the percentages were below 10. Area benefited by urea varied from 62·5 % in Palghat followed by 61·4% in Alleppey and 52% in Quilon and in other districts the percentage varied from 50 to 20. As regards other chemical fertilizers the maximum of 89·3% of area in Kottayam District was benefited by its application followed by Alleppey in 84·3% of area and 80·2% area in Idukki. In other districts the percentage of area benefited varied from 56% and below upto 14 %. The area benefited by farm-yard manure varied from 25% in Kottayam to 74% in Kozhikode District. Other farm-yard manures were applied in varying percentages from 16·4 in Alleppey to 64% in Palghat District.

Table 4·39 (b) (i)

Percentage distribution of unirrigated area treated with various chemical fertilizers, organic manures and pesticides in the Districts

Paddy: Mundakan

Sl. No.	District	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizers	Farm yard manure	Oil cake	Other organic manure	Pesticides
1	2	3	4	5	6	7	8	9	10
1.	Trivandrum	80·0	18·1	24·7	..	62·4	0·2	37·0	59·6
2.	Quilon	60·1	24·6	52·0	56·2	68·1	4·0	49·0	34·3
3.	Alleppey	32·5	29·0	61·4	84·3	67·5	0·3	16·4	59·5
4.	Kottayam	3·2	6·3	46·1	89·3	25·1	..	29·5	77·9
5.	Idukki	..	20·8	21·4	80·2	60·0	..	50·1	41·5
6.	Ernakulam	2·2	1·5	30·7	21·7	27·2	1·3	52·7	23·3
7.	Trichur	14·8	11·8	46·3	38·2	60·5	8·4	32·0	43·2
8.	Palghat	12·8	4·1	62·5	47·5	44·4	..	63·8	40·4
9.	Malappuram	7·1	6·6	15·9	18·9	27·1	0·4	55·6	9·6
10.	Kozhikode	1·8	1·0	27·0	55·5	73·7	0·6	54·4	27·6
11.	Cannanore	1·3	0·1	31·1	33·9	69·7	1·7	35·1	24·8
	State	20·7	10·8	39·2	52·1	56·6	1·7	44·0	37·3

Table 4·39 (ii)

Percentage distribution of unirrigated area treated with various chemical fertilizers, organic manures and pesticides in the District

Paddy: Punja

Sl. No.	District	Ammonium sulphate	Super phosphate	Urea	Other chemical fertilizers	Farm yard manure	Oil cake	Other organic manure	Pesticides
1	2	3	4	5	6	7	8	9	10
1.	Trivandrum	91·3	35·1	19·3	49·8	34·5	..	15·3	11·9
2.	Quilon	22·4		6·7	22·4	25·3	..	22·4	2·5
3.	Alleppey	19·6	17·4	48·9	64·2	12·3	1·2	13·1	61·2
4.	Kottayam	4·1	6·3	64·1	82·9	4·3	..	38·4	95·7
5.	Idukki	..	..	..	..	..	..	..	..
6.	Ernakulam	18·5	..	22·1	68·3	64·7	18·5	46·9	64·7
7.	Trichur	32·9	9·9	22·4	22·4	51·3	16.0	..	37.2
8.	Palghat	..	..	72·9	72·9	26·4	..	100·0	49·6
9.	Malappuram	..	1·3	29·6	35·2	100·0	..	16·1	93·4
10.	Kozhikode	0·2	3·0	8·5	18·1	18.7	..	16·0	12.4
11.	Cannanore	..	..	37·7	51·4	100·0	..	2·7	64·3
	State	10·3	8·9	36·2	50·2	20·3	1·1	19·6	51·1

4·39·(c) Unirrigated punja crop in districts

4·39· (c) (1). For unirrigated paddy during this season in 1976-77, other chemical fertilizers were applied to 82·9% of area in Kottayam District followed by 72·9% in Palghat and 68·3% in Ernakulam as can be seen from the table No. 4·39 (c) (1). In other Districts the area benefited are comparatively small. In regard to urea, the maximum % of area benefited was in Palghat with 73 % followed by 64·1 % on Kottayam. In Kozhikode and Quilon Districts the % of area benefited by urea was very low to 8.5 % and 6.7 %. The use of ammonium sulphate and super phosphate were round about 10·3 and 8·9% of the area for the state and in districts the percentages of area benefited varied from 0·91 and 0·35 respectively. Farm yard manures and other organic manures were also applied in varying percentages of area from 0—100 in different districts without any uniformity.

4·40. Livestock

4·40·1. Table 15 (A) shows the No. of cattle reported by operating households as on 15th April 1977. It is seen that only 3·98 lakhs of holdings out of 32·92 lakhs own male cattle whereas 11·7 lakhs holdings reported female cattle and 9·3 lakhs reported youngstock. On the whole only 13·7 lakhs holdings reported one or more categories of cattle and the total No. of all such cattle was 30·2 lakhs on the reference date. Thus, the remaining 19·2 lakhs holdings (59%) did not report owning any cattle.

4·40·2. Among the size classes it is seen that 10·6 lakhs holdings below 1 ha. reported owning cattle to the extent of 20·3 lakhs out of the total of 30·2 lakhs; of the 20·3 lakhs, 10·9 lakhs were females over 3 years.

4·40·3. Regarding milch cows it is seen that there were 8·6 lakhs and 6·9 lakhs were others on the reference date. The total No. of working cattle was only 3·85 lakhs.

4·41· Buffaloes

4·41·1. Table 15 (B) presents the No. of buffaloes reported by operating households as on 15-4-1977. The total No. of working buffaloes were 3·6 lakhs. She buffaloes in milk were 0·99 lakh. The No. of holdings reporting buffaloes was only 2·5 lakhs which is only round about 20% of cattle reporting households. Considering the size classes it is found that holdings below 1 ha. came to 1·7 lakhs who owned 3·85 lakhs of buffaloes out of a total of 5·95 lakhs buffaloes.

4·42· Cattle per 100 hectares

4·42·1. Estimated number of cattle per 100 hectares of area of operational households, size class-wise is given in 16 (A) of part II of the report. It may be seen that there were only 57 working cattle and 129 cattle in milk on an average per 100 ha. on the reference date. Including all categories the No. of cattle for 100 ha. was 449. Considering the distribution of cattle per 100 ha. among the size classes it is seen that in the lowest size class less than 1 ha. there are maximum No. of working cattle 47 and also females in milk 168 and overall total of all categories 562.

42·3. Similarly, from Table 16 (B) it is seen that the average No. of buffaloes per 100 ha. were 477 out of which 288 were working bullocks, 80 she-buffaloes in milk and the remaining others and young stock. As in the case of cattle, between the size classes, the lowest upto 1 ha. has the maximum No. of 344 working bullocks, 135 she-buffaloes in milk and 659 including all categories and youngstock per 100 ha. The average No. per 100 ha. decreased gradually as the size class increased.

4·43. Number of cattle per 100 operational households

4·43·1. Table 17 (A) presents the estimated number of cattle per 100 operating households as on 15-4-1977. On the average there were 28 working cattle, 63 females in milk and a total of 220 including young stock per 100 operating households. These numbers gradually increase as the size classes increase in size. In the size group 10 ha. and above the average number of working cattle, females in milk and overall total including all categories and young stock were 138, 153 and 601 respectively.

4·43·2. Similar information in respect of buffaloes are presented in Table 17(B) of Part II of the report.

4·43·3. The average number of working buffaloes, she buffaloes in milk and total cattle per 100 operating households are seen to be 141, 39 and 233 respectively. Between size classes it may be noted that size group 4 hectares to 10 hectares tops the list in respect of working buffaloes with 312 and size class less than one ha. tops in respect of she buffaloes in milk with 46. Taking all categories together the size class 4 hectares to 10 hectares has the maximum number with 395.

4·44. Sheep, goats, pigs and others

4·44·1. Kerala is a State wherein goat, sheep etc. population is very thin. From Table 18 (A) it is seen that the average number of goats, sheep, pig etc. owned by 100 operating households on 15-4-1977 was 146, 33 and 5 respectively including young ones below 1 year which numbered 66, 14 and 0 respectively.

4·45. Poultry population

4·45·1. The estimated number of poultry per 100 operational holdings by size class is presented in the table No. 18 (B) of Part II of the report.

4·45·2. It may be seen from the above that 100 operational holdings owned an average of 322 hens on the reference date. Including ducks, cocks and chickens and the average was 616 per 100 operational holdings. Considering the distribution among the size classes it is seen that the number of hens owned by 100 operational households in the 10 ha. and above class was 657 of which 179 were improved varieties and in the 4·0 to 10·0 ha. size it was 645 and gradually decreased thereafter as the size class decreased. The lowest rate of 294 hens per 100 operating households was in the size class 0·02—1.

4·46. Agricultural machinery

4·46·1. Table 19(A) gives the average number of electric pumps, diesel pumps and others, persian wheels and tractors etc. individually owned by 100 operating households on the reference date 15-4-1977.

4·46·2. Considering the distribution among the size classes, it is seen that the maximum number of 20 electric pumps, 23 diesel pump and 1 "others" per 100 operating households were in the highest size class of 10 ha. and above. The number of tractors of different H.P. in that group was 10.

4·46·3. Table 19 (B) presents the average No. of agricultural machinery owned jointly by 100 operating households. In this category the number of electric pumps, diesel pumps and tractors of high horse power owned jointly in the size class 10 ha. and above on 15-4-1977 were 67,105 and 38 respectively.

4·46·4. The estimated number of agricultural machinery owned individually per 100 ha. are presented in Table 19 (C). The average number of wooden ploughs, iron ploughs and sprayers as on the reference date were 48, 12 and 4, respectively.

Chapter V

5.0 PROBLEMS AND PERSPECTIVE

5.1. Problems faced during the agricultural census

5·1·1. The suitability of the schedules, concepts, the time and trained staff required etc. for the proper conduct of the agricultural census should be ascertained well before-hand by pre-testing the schedules in the field. Unfortunately, this could not be done in Kerala. Only by visiting the operational holders and filling up the relevant schedules by enquiry the difficulties in filling up the schedule, the time required and other connected matters could be properly ascertained especially in hilly regions.

5·1·2. The field Investigators should be thoroughly trained in filling up the schedules along with the Inspectors and other supervisors before actually starting the enumeration for the agricultural census. It is felt that the statistical training to the Village Assistants, Revenue Inspectors etc. should be elaborate and intensive to be sufficient for the proper conduct of the field work especially in regard to the concept, definitions etc. and allocation of total area among the various crops in a State like Kerala wherein the mixed crop pattern is the usual practice which is not so common in many other parts of India.

5·1·3· Early publicity is another important matter in an elaborate survey like the agricultural census. The illiterate farmers should be dispelled of their fear about the purpose of the enquiry by giving wide publicity through newspapers, All India Radio etc. that the information furnished by them would not be put

to purposes like taxation, irrigation cess, procurement of paddy as per levy programme, ceiling purposes as per the ceiling provisions of the Kerala Land Reforms Act etc. without which the operational holder would be giving only under estimated areas for their operational holdings. From the results of the estimates of area under major crops like paddy, coconut etc. during the 1970-71 and 1976-77 census it is very clear that those are under estimates when compared with the results of the Timely Reporting Survey which was also conducted during 1976-77 in the very same 200 villages. Since the Timely Reporting Survey involved the complete enumeration of all the plots in 15% of the revenue villages in the State the results therefrom have definitely more precision.

5·1·4. Another defect is the omission of certain operational holdings whose owners lived outside the selected villages and in the case of many plantation holdings the owners live even outside the State. So some practical method should be evolved to canvass the schedules from them also during future agricultural censuses. So that the results would be comparable with those of the Timely Reporting Survey.

5·1·5. During the 1976-77 agricultural census, operational holdings belonging to Institutions were enumerated in respect of number and area only and were omitted from the purview of detailed study for the main census as well as the Input Survey. Steps should be taken to include them also for the detailed study for the future census.

5·1·6. The computation of area and allocation of total area of a plot among the various crops based on the number of trees like coconut, arecanut, jack, mango, tamarind etc. given by the operational holder according to certain norms like the stand/acre is a difficult and complicated process. So, a comprehensive method for the allocation of area under various crops based on number of trees should be evolved at least for the future censuses.

5·1·7. A post enumeration check survey should be conducted by visiting a fixed percentage of the operational holders again by senior officers which will enable the computation of a correction factor for the census results.

Chapter VI

6·0. SUMMARY AND CONCLUSIONS

6·1. Main Census

1. The number of operational holdings have increased from 28·23 lakhs during 1970-71 to 34·62 lakhs in 1976-77 (excluding the institutional holdings) which shows an increase of 22.6% over a period of 6 years.

2. The area comprised in those holdings during the respective years are 16·06 lakh hec. and 16·11 lakh hec. registering an increase of 0·32%.

3. The overall average area of a holding has decreased from 0·57 hec. in 1970-71 to 0.47 hec. in 1976-77.

4. The number of holdings below 1 hec. was 84.9% during 1970-71 whereas it increased to 87·7% in 1976-77.

5. Large holdings above 10 hec. in size was only 0·2% in 1970-71 and it gradually decreased to 0·1% during 1976-77.

6. The names of the districts according to the percentage number of holdings to the State in descending order are:

1. Quilon
2. Alleppey
3. Ernakulam
4. Cannanore
5. Trivandrum
6. Kozhikode
7. Trichur
8. Malappuram
9. Palghat
10. Kottayam
11. Idukki

7. The number of Institutional holdings has been estimated as 39,220 and these holdings have accounted for an area of 1·08 lakh hectares.

8. 98·5% of the Individual operational holdings covering 98% of the area of the holdings fall under the tenure category of wholly owned and self operated holdings.

9. The category wholly leased in holdings accounts for only 0.5% of the total number of holdings and covers only 0·2% of the total area of the holdings.

10. 87% of the holdings in the State are seen to be falling under the size-class 'Less than 1 hectare' and these holdings together cover only about 42% of the total area of the holdings.

11. 'Net cultivated area' is seen to be covering 87·3% of the total area of the holdings and 'uncultivated land is seen to be 6·7% of the total area. Rest of the area is accounted by land not available for cultivation.

12. The percentages of irrigated holdings are seen to be 12·1% in terms of number of holdings and 11·3% in terms of area of the holdings.

13. Source-wise irrigation shows that canals form the major source of irrigation in respect of both number of irrigated holdings and area irrigated followed by the source 'Wells'.

14. The gross cropped area in 1976-77 has been estimated to be 1,821,091 hectares and only 1·7% of the cropped area has also been reported to be irrigated.

15. The percentages of gross cropped area occupied by the major crops in the State are listed below:

Crops	% of gross cropped area covered
1. Paddy	31·6
2. Coconut	16·6
3. Tapioca	15·1
4. Rubber	8·6
5. Cashew	3·7
6. Pepper	3·2
7. Other Crops	21·2
Total	100·0

6·2. Input Survey

1. Average number of parcels per operational holdings has been found to be 1·9 and the average area per parcel has been worked out as 0·26 hectare.

2. Only one crop is being raised in a year in 49·7% of the irrigated area.

3. In 87·3% of the unirrigated area only one crop is being raised in a year.

4. In the irrigated area, chemical fertilizers are seen to have been applied in 68% of the area of the holdings, while in unirrigated area this percentage is seen to be only 22·3.

5. Organic manures are seen to have been applied in 71·1% of the irrigated area and in 49·5% of the unirrigated area.

6. In irrigated area, pesticides are seen to have been applied in 48·4% of the area while this percentage is seen to be only 12·6 in unirrigated area.

7. Urea is seen to be the nitrogeneous fertilizer widely used in the irrigated area.

8. Potassic fertilizers and other chemical fertilizers like Factomphos, fertilizer mixture etc. are seen to have together covered 50·2% of the irrigated area.

9. Among organic manure Farm yard manure is seen to have been applied in 56·3% of the irrigated area while this percentage is seen to be only 36·5 in unirrigated area.

10. In irrigated area pesticides are seen to have been applied in 48·9% of the area but only 12·7% of the unirrigated area is seen to have been benefited from the application of pesticides.

11. The number of operational households reporting one or more categories of cattle is seen to be 1374104.

12. The total number of cattle is reported to be 30,21,484 consisting of 4,29,873 males over 3 years, 15,46,970 females over 3 years and 1044641 youngstock.

13. The number of cattle per 100 hectares of area operated by households is worked out to be 449 consisting of 63 males over 3 years, 231 females over 3 years and 155 youngstock.

14. The number of cattle per 100 operating households is seen to be 220 consisting of 31 males over 3 years, 113 females over 3 years and 76 youngstock.

15. The number of households reporting one or more categories of buffaloes is seen to be 2,54,213.

16. The total number of buffaloes is reported to be 5,94,843 consisting of 369963 males over 3 years 142869 females over 3 years and 83011 youngstock.

17. The number of buffaloes per 100 hectares of area operated by households has come to 477 consisting of 298 males over 3 years, 115 females over 3 years and 64 youngstock.

18. The number of buffaloes per 100 operating households is worked to be 233 consisting of 146 males over 3 years, 56 females over 3 years and 31 youngstock.

19. The number of sheep per 100 operational households is reported to be 33 and the number of goats, 146.

20. The total number of poultry per 100 operating households has been worked out as 616 consisting of 72 cocks, 322 hens, 139 chicken below 5 months and 83 ducks.

21. Among agricultural machineries, only ploughs earth levellers and harraws and hoes are seen to be significant.

22. The number of ploughs owned by 100 operating households has been estimated as 47 consisting of 38 wooden ploughs and 9 iron ploughs. The number of ploughs per 100 households is maximum with 293 in the size-class 10·00 hectares and above and minimum with only 28 in the size-class 'Below one hectare.'

23. The practice of jointly owing agricultural machinery is seen to be significant only in respect of pumpsets and tractors. The number of pumpsets operated jointly per 100 such holdings is seen to be as high as 172 in the size-class 10·00 hectares and above.

24. The number of tractors operated jointly by 100 such holdings is very significant with 28 in the size-class 10.00 hectares and above.

CHAPTER VII

7·0 A NOTE ON THE STANDARD ERRORS OF THE VARIOUS ESTIMATES RELATING TO THE AGRICULTURAL CENSUS 1976-77

7·1. As explained in the earlier chapters, the Agricultural Census was conducted in this State on the model of a sample survey. Stratified two stage sampling method was adopted for the conduct of the census with taluk as a stratum, Revenue Villages as the first stage units and holdings as the second stage units. The survey was carried out in two parts namely Main Census and the Input Survey. For the Input Survey, a sub-sample of holdings selected for the Main Census was considered as the sample of holdings. Estimates on major characteristics were framed from the data relating to the Main Census and there on the Inputs were framed from the Input Survey.

7.2. The workshop held in June 1978 at New Delhi in connection with the finalisation of Tabulation Programme for the Agricultural Census 1976-77 had decided among other things that standard errors had to be worked out in respect of the estimates on certain important characteristics framed from the Main Census and Input Survey of the Agricultural Census 1976-77.

7·3. According to this decision the standard errors on the following estimates from the Main Census had to be calculated.

A. Main Census

(i) Total number of operational holdings
(ii) Total operated area
(iii) Net area sown
(iv) Net irrigated area
(v) Number of holdings receiving irrigation
(vi) Total area under the crop in respect of five important crops grown in the State.
(vii) Number of holdings growing the crops in respect of five important crops as in (vi) above.

In respect of the Input Survey standard errors in respect of the following estimates had to be calculated.

7·4· **(B) Input Survey**

(i) Number of holdings using chemical fertilizers
(ii) Area treated with chemical fertilizers.
(iii) Number of holdings using organic manures
(iv) Area treated with organic manures

7·5. Due to the heavy workload involved in the computation of the standard errors and also due to the shortage of staff for completing the work connected with the census, it was not possible to calculate the standard errors in respect of all the items listed under the Main Census. Only the standard errors in respect of the two items namely:

(i) Total number of holdings and
(ii) Total operated area could be calculated in time.

7·6. The standard errors on all the estimates listed under Input Survey on which the workshop had suggested to calculate the standard errors had been computed in time.

7·7. The table No. 7. 7 (i) gives the region-wise and State-wise estimates in the number of holdings and area under holdings under each of the major five size classes and also for all the size-classes together along with their respective standard errors expressed as percentages of the estimates.

Table No. 7·7·1

Estimated number of operational holdings and area of holdings with their percentage standard errors

Sl. No.	Size Class (ha.)	Southern Region				Northern Region				State			
		No. of holdings	Percentage standard error	Area	Percentage standard error	No. of holdings	Percentage standard error	Area	Percentage standard error	No. of holdings	Percentage standard error	Area	Percentage standard error
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	1840152	3·6	415480	8·5	1026366	3·6	262770	3·3	2866518	2·7	678250	5·4
2.	1·00 - 1·99	159264	6·4	218698	4·1	117653	3·4	161232	5·9	276917	3·6	379930	3·5
3.	2·00 - 3·99	54749	5·3	145199	4·6	57446	3·9	157940	6·4	112195	3·2	303139	4·2
4.	4·00 - 9·99	12319	7·2	66685	6·6	20728	7·2	114742	7·2	33047	5·3	181427	5·1
5.	10·00 and above	1326	8·9	29445	17·5	2168	11·4	37167	9·6	3494	7·7	66612	10·6
	Total	2067810	3·9	875507	4·3	1224361	2·9	733851	2·8	3292171	2·6	1609358	2·6

7·8. Except in the case of the size class 10·00 hectares and above the standard errors of the estimates are well within reasonable limits showing that the estimates are fairly reasonable and reliable. The high percentage standard errors in respect of the estimates under the size class '10 hect. and above' can be attributed to the 'Between Village variation' in respect of the presence of large size holdings within the same stratum;

particularly in respect of taluks growing plantation crops, the cultivation of which crops is necessarily confined to certain suitable areas in the taluks. Considering all the size-classes together, the estimates at the state-level and even at the regional levels are fairly reliable and it can therefore be concluded that sampling design adopted for the main census is adequate enough to provide reliable estimates at the Regional levels. The Northern region is comprised of the 5 districts namely Cannanore, Kozhikode, Wynad, Malappuram and Palghat and the Southern region the remaining 7 districts.

7·9. The tables under the series 7·9 (A) and 7·9 (B) give the estimates on the number of holdings and area of holdings treated with chemical fertilizers and organic manures separately for each size-class along with their respective standard errors expressed as percentages. Tables under A series covers the irrigated area and Tables under B series, the unirrigated area. The three tables under the series A give the estimates for the irrigated area in the State, Northern Region and Southern Region separately along with their respective standard errors. Similarly the tables under the series B give the corresponding estimates for the unirrigated area in the State and for the two regions separately.

Table No. 7·9 (A)(1)

Estimated number and area of holdings using Chemical Fertilizers and Organic Manures in Irrigated area

Sl. No.	Size-class (ha.)	Total holdings				Chemical Fertilizers				Organic Manures			
		No.	Area (ha.)	Number of holdings growing one or more of the selected crops	Irrigated area under selected crops (ha.)	No. of holdings treated	Percentage standard error	Area treated (ha.)	Percentage standard error	No. of holdings treated	Percentage standard error	Area treated (ha.)	Percentage standard error
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	2866518	1143817	2866518	219408	361360	4·4	141219	8·9	549276	6·3	168702	8·5
2.	1·00 - 1·99	276917	385569	276917	90282	73319	6·1	66401	7·8	83459	7·9	62423	9·7
3.	2·00 - 3·99	112195	314671	112195	70090	34539	5·6	48821	10·8	38732	6·3	47756	13·2
4.	4·00 - 9·99	33047	178648	33047	38862	11179	6·8	27600	14·1	11871	6·4	19786	20·0
5.	10·00 and above	3494	74017	3494	4003	777	18·3	3381	29·5	1017	11·6	2117	53·3
6.	All Classes	3292171	2096722	3292171	422645	481174	3·5	287422	5·3	684355	5·3	300784	7·1

Table No. 7·9 (A) (2)

Estimated number and area of holdings using Chemical Fertilizers and Organic Manures in Irrigated area

Region: North

Sl. No.	Size-class (Ha.)	Total holdings				Chemical Fertilizers				Organic Manures			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	1026366	393539	1026366	62544	83074	11·9	40747	11·9	121929	9·7	47196	14·0
2.	1·00 - 1·99	117653	166004	117653	36716	24737	11·5	24845	12·1	32258	17·7	27243	15·4
3.	2·00 - 3·99	57446	169949	57446	39062	17855	7·2	29122	13·3	20529	7·9	28609	15·2
4.	4·00 - 9·99	20728	116948	20728	27517	6596	9·4	18633	17·5	7311	9·4	13197	27·5
5.	10·00 and above	2168	53555	2168	3539	568	25·0	3000	24·8	729	15·1	1934	58·3
6.	All Classes	1224361	900045	1224361	169378	132830	7·8	116347	6·6	182756	7·7	118179	8·7

Table No. 7·9 (A) (3)

Estimated number and area of holdings using Chemical Fertilizers and Organic Manures in Irrigated area

Region: South

Sl. No.	Size-class (Ha.)	Total holdings				Chemical Fertilizers				Organic Manures			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	1840152	750228	1840152	156864	278286	4·5	100472	10·6	427347	7·7	121506	11·3
2.	1·00 - 1·99	159264	219565	159264	53566	48582	7·1	41556	9·5	51201	6·4	35180	12·4
3.	2·00 - 3·99	54749	144722	54749	31028	16684	8·5	19699	13·2	18203	10·0	19147	13·5
4.	4·00 - 9·99	12319	61700	12319	11345	4583	9·6	8967	22·7	4560	7·1	6589	11·5
5.	10·00 and above	1326	20462	1326	464	209	0	381	30·2	288	15·6	183	21·5
6.	All Classes	2067810	1196677	2067810	253267	348344	3·8	171075	6·8	501599	6·6	182605	7·7

Table No. 7·9·(B) (1)

Estimated number and area of holdings using Chemical Fertilizers and Organic Manures in Unirrigated area

Sl. No.	Size-class (ha.)	Total holdings				Chemical Fertilizers				Organic Manures			
		No.	Area (ha.)	Number of holdings growing one or more of the selected crops	Unirrigated area under selected crops (ha.)	No. of holdings treated	Percentage standard error	Area treated (ha.)	Percentage standard error	No. of holdings treated	Percentage standard error	Area treated (ha.)	Percentage standard error
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	2866518	1143817	2866518	1034933	663808	7·0	240611	10·9	1751491	3·7	518191	6·2
2.	1·00 - 1·99	276917	385669	276917	341165	134291	4·2	99871	8·2	217085	5·2	164811	7·6
3.	2·00 - 3·99	112195	314671	112195	286618	70850	5·8	102572	7·6	96818	4·8	144092	9·5
4.	4·00 - 9·99	33047	178648	33047	149486	32241	5·3	58277	11·1	26343	5·8	72808	11·2
5.	10·22 and above	3494	74017	3494	50874	2510	6·9	25741	15·9	2804	7·9	21773	12·0
6.	All Classes	3292171	2096722	3292171	1863076	894300	5·2	527022	5·5	2094541	3·1	921675	4·0

Table 7·9·(B) (2)

Estimated number and area of holdings using Chemical Fertilizers and Organic Manures in Unirrigated area

Region: North

Sl. No.	Size-class	Total Holding				Chemical Fertilizers				Organic Manures			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	1026366	393589	1026366	344271	125888	9·1	40269	15·4	670747	4·9	152237	9·8
2.	1·00 - 1·99	117653	166004	117653	129409	41881	6·7	27051	13·1	94604	6·5	65791	12·8
3.	2·00 - 3·99	57446	169949	57446	154484	30166	7·3	39590	13·7	51880	6·8	80553	13·9
4.	4·00 - 9·99	20728	116948	20728	93540	12599	8·3	31396	18·3	17102	3·2	47804	16·4
5.	10·00 and above	2168	53555	2168	31123	1629	8·9	13366	26·7	1954	9·7	14875	15·4
6.	All Classes	1224316	900045	1224361	752827	212163	5·7	151672	7·4	836287	4·1	361260	6·1

Table 7·9·(B) (3)

Estimated number and area of holdings using Chemical Fertilizers and Organic Manures in Unirrigated area

Region: South

Sl. No.	Size-class	Total holdings				Chemical Fertilizers				Organic Manures			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0·02 - 0·99	1840152	750228	1840152	690662	537920	8·3	200342	12·7	1080744	5·1	365954	7·4
2.	1·00 - 1·99	159264	219565	159264	211756	93010	5·2	72820	10·2	122481	7·7	99020	9·4
3.	2·00 - 3·99	54749	144722	54749	132134	40684	8·5	62982	8·9	44938	6·7	63539	12·6
4.	4·00 - 9·99	12319	61700	12319	55946	9642	5·6	26831	11·1	9241	6·5	25004	14·0
5.	10·00 and above	1326	20462	1326	19751	881	12·3	12375	16·2	850	13·5	6898	15·0
6.	All Classes	2067810	1196677	2067810	1110249	682137	6·6	375350	7·1	1258254	4·4	560415	5·3

7·10. In both irrigated and unirrigated holdings the larger the size classes the percentage standard error is also higher showing that in large sized holdings the practices of application of chemical fertilizers of organic manures is not uniformly practiced. Variation in the practices is seen to be more striking in respect of the application of organic manures in irrigated holdings particularly in the Northern Region.

ANNEXURE I

District-wise number of villages, panchayats, town, C.D. blocks, and taluks

Name of District	No. of villages	No. of panchayats	No. of municipal towns	C.D. Blocks	Taluks
Trivandrum	94	83	2	12	4
Quilon	99	103	2	17	6
Alleppey	99	93	5	17	7
Kottayam	74	71	4	11	5
Idukky	42	52	..	4	4
Ernakulam	100	87	4	15	7
Trichur	234	98	4	17	5
Palghat	152	90	2	12	5
Malappuram	122	92	2	13	4
Kozhikode	123	95	1	14	7
Cannanore	188	127	3	12	6
State	1327	991	29	144	57

ANNEXURE II

District-wise number of primary reporting agency and supervisory officers

Sl. No.	Name of District	No. of primary reporting agency (Village Assistants)	Number of supervisory officers		
			Revenue Inspectors	Tahsildars	District Statistical Officers
1.	Trivandrum	28	7	4	1
2.	Quilon	32	8	6	1
3.	Alleppey	32	8	7	1
4.	Kottayam	24	6	5	1
5.	Idukky	12	3	4	1
6.	Ernakulam	32	8	7	1
7.	Trichur	66	15	5	1
8.	Palghat	46	13	5	1
9.	Malappuram	36	9	4	1
10.	Kozhikode	36	9	4	1
11.	Cannanore	56	12	6	1
	Total	400	98	57	11

ANNEXURE III

The Kerala Land Reforms (Amendment) Act, 1969

Which came into effect from 1st January 1970 was enacted with the following objectives

(a) To plug certain loopholes and to supplement certain provisions in the matter of procedure in the implementation of the main Act.

(b) To expand the scope of tenancy, to abolish landlordism and to create peasant proprietorship.

(c) To scale down the liability to pay arrears of rent according to the paying capacity of tenants.

(d) To take away the unnecessary and unscientific exemptions in ceiling limit existed in favour of certain classes of lands like kayal nilams and certain plantations like cashew estates, pepper gardens, arecanut gardens.

(e) To reduce the ceiling limit.

(f) To provide an opportunity to kudikidappukars for emancipation from the shackles of their landlords grips.

Though there was ceiling provision from 1st April 1964 according to the K.L.R. Act of 1963, the Act did not contain any obligatory provision or date line for filing ceiling returns. The amended Act of 1969 remedied this defect by notifying a date and period of filing the ceiling returns showing the excess land above the ceiling and also prohibiting holding in excess of ceiling limit with effect from 1st January 1970. According to the Act the ceiling returns should be filed within three months from 1st January 1970.

The amended Act of 1969 extended protection to a wide category of kudikidappukars and tenants. The term 'tenant' was so broadly defined as to make it difficult to evict a person in occupation of land.

In the 1963 Act certain persons like Odacharthuthars, certain mortgagees with possession, certain persons who were cultivating the land on Varam arrangement and certain persons who surrendered leasehold rights but continued in possession were deemed as tenants. But according to 1969 Act certain mortgagees and lessees of

mortgagees, certain persons who were holding land on or after 1st December 1930, certain mortgagees in areas to which the Malabar Tenancy Act extended, certain persons occupying land honestly believing to be tenants, certain persons occupying lands for not less than 10 years as on 1st January 1970 under leases granted by incompetent persons, certain persons who have paid amounts for occupation of land and certain persons occupying private forests or unsurveyed lands were deemed as tenants.

The purchase of landlords' rights was optional to the tenants according to the 1963 Act. But according to the amendment Act of 1969 the right, title and interest of the landlords and intermediaries in respect of the tenanted lands were vested in Government who will compulsorily assign such rights to the cultivating tenant.

As per the 1963 Act the kudikidappukars had fixity only for the occupation of the kudikidappu. The provisions of the Principal Act offered them some protection against arbitrary evictions and made their right of residence heritable. The amended Act of 1969 bestowed on the kudikidappukars the option to purchase the kudikidappu and the land adjoining thereto not exceeding 3 cents in cities and major municipalities, 5 cents in municipalities and 10 cents in panchayat and township areas. The purchase price payable for such land was fixed as 25 per cent of the market value. Kudikidappukaran has to pay only 50 per cent of the purchase price. The remaining 50 per cent of the purchase price would be paid by Government from the Kudikidappukars Benefit Fund. The remaining 5. per cent of the purchase price would be paid by Government from the Kudikidappukars Benefit Fund. The grounds of their evictions are very severely restricted. They are allowed to extend the plinth area of the hut or home-steads at their own expense without any reference to the landowner and his consent. They are also allowed to electrify their residence and get protected water supply if they so desire without consulting the landowner. The customary rights were made on to statutory rights and violations were made cognizable offences and punishable with imprisonment.

In respect of fair rent the Act of 1963 did not specify maximum and minimum ranges. The amended Act of 1969 introduced several progressive changes.

According to the 1963 Act, the annuity payable by Government to a religious, charitable or educational institution of a public nature was equal to the income that it was deriving before 21st January 1961 from all its lands held by tenants. But the amended Act of 1969 reduced the annuity to the fair rent after deducting 21½ per cent by way of collection charges, the cultivating tenants under the institutions applied for annuity also had the right to purchase the landlords' rights vested on Government in respect of these institutions, the purchase price being payable to Government and not to the institution, concerned.

The amended Act of 1969 altered the ceiling limit as follows:-

1. in respect of an adult unmarried person as 5 standard acres.
2. in respect of a family of two or more persons but not more than 5 members 10 standard acres.
3. in case of a family of more than five members 10 standard acres increased by one standard acre for each member in excess of five so that the ceiling area shall not be less than 12 more than 20 acres in extent.

The amended Act of 1969 also, took away the exemptions that existed in favour of certain classes of lands like kayal lands in Kuttanad, pepper, arecanut and cashew gardens, etc.

(viii) Kerala Land Reforms (Amendment) Act, 1971:- Certain difficulties that slowed down the expeditious implementation of the Act came into light in due course. These difficulties to a large extent have been removed by the K.L.R. (A) Act of 1971. The Act fixed that rates of compensation per area for surplus lands depending upon the classification of the lands with a slab system and overall ceiling for the amount of compensation irrespective of the extent of lands surrendered. Further provisions were made in the amended Act for immediate distribution of the surplus lands and when they are surrendered. Besides this, the amended Act was purported to simplify the procedural difficulties in respect of allowing the purchase of land by Kudikidappukaran.

(ix) The K. L. R. (Amendment) Act, 1972:- The important amendment made in this Act was with reference to the voluntary transfers of land in excess of ceiling area. The 1963 Act declared all voluntary transfers of land effected after 18th December 1957 as invalid except when the transfers were made (a) by way of partition (b) on account of natural love and affection (c) in favour of a tenant and (d) in favour of a religious, charitable or educational institution of a public nature. This provision of the Act for the retrospective invalidation of the transactions from 18th December 1957 was challenged in the court and the court up-held the objection. In the amended Act of 1971 provision was made validating all voluntary transfers of land effected from 18th December. 1957 to 15th September 1963 (the date of publication of the Land Reforms Bill, 1963)

The amended Act of 1972 also makes provision for the people's participation in the implementation of the Act by the following measures.

1. Constitution of Village Committees to advise the Land Tribunals on certain matters.
2. Constitution of Taluk Land Boards for decentralising the functions of the State Land Board.
3. Constitution of a Land Reforms Review Board.

The amended Act also, inter alia, makes provision for the following:-

1. Lump sum payment of compensation to small holders.
2. Assignment of land on mutual agreement by landlord and tenant.
3. Setting at nought certain voluntary transfers of land of the following kind with retrospective effect—
   (a) Transfers on account of natural love and affection except to sons and daughters and children and predeceased sons and daughters.
   (b) Transfers in favour of religious, charitable and educational institutions of public nature.

6·12. Economic impact of Land Reforms Act, 1963

Based on the common belief that a direct relationship exists between land reforms and agricultural productivity and output, an attempt was made to study certain aspects of the economic impact of the Kerala Land Reforms Act of 1963 through the Land Reforms Survey conducted by the Bureau of Economics and Statistics in the year 1966-67. It was a sample survey conducted with the intention of bringing out a comprehensive picture of the history and evolution of the early land legislations in general and the impact of the Kerala Land Reforms Act, 1963 in particular. The study on the economic aspect was confined to two factors only, namely, capital formation and adoption of improved agricultural practices. No assessment on the increase in agricultural productivity as a result of the land reforms was made in view of the complicities involved in making the assessment. The extent to which capital formation and adoption of improved agricultural practices took place in fields resumed by the landlords or purchased by the tenants was taken as a measure of the impact of the Kerala Land Reforms Act. The finding given in the survey report in respect of the above aspects are extracted below:—

(a) *Capital formation*: Between the years 1964-66, some of the lands subjected to the influence of the K.L.R. Act of 1963 have been brought under certain permanent improvements like provision of irrigation facilities, land development, planting of perennial trees and construction of farm houses and residential houses. The area of lands resumed on which improvements have been made was rather small and formed only 11 per cent of such lands. The improvements made on such lands amounted to about Rs. 185 per acre. A major part of this cost was incurred for providing irrigation facilities and land development.

The cost of improvements made on lands of which ownership has been purchased by tenants came to Rs. 447 per acre. The extent of land so improved was 42 per cent of all such lands. The interests of the new owners turned towards putting up some residential structures and planting of perennial trees.

The assurance of fixity of tenure provided by the law has brought sizeable capital formation in agriculture. The lands so developed formed 12 per cent of the total land for which fixity of tenure was obtained. The improvements brought on land by the tenants during the years 1964-66 on an average amounted to Rs. 349 per acre. Just as in the case of the lands of which ownership rights have been purchased the bulk of the expenditure was directed towards raising residential houses. There has been overall development of the land since the tenants improved the irrigation facilities, bunding and terracing of land and planting of perennial crops.

Evidently, those lands which were either purchased by the tenants or those for which fixity of tenure was obtained have been better developed than those resumed.

(b) *Improved agricultural practices*:— The impact of the Land Reforms Act of 1963 on agricultural practices has been very little in respect of the lands resumed or lands purchased by tenants. However in the case of lands for which fixity of tenure has been obtained, the position is better. 6 per cent of such lands came under the use of fertilizers and pesticides and 4 per cent under improved seeds since 1964. The area under improved agricultural implements is negligible.

It may be said in conclusion that the various attempts on the part of State Government over a decade have brought the land reform programmes in Kerala to maturity. An acknowledgement of this fact was the inclusion of the Land Reforms Act of Kerala in the IX Schedule of the Constitution through a suitable amendment of it by the Parliament. The objectives achieved by the various legislative measures can be summed up as:—

1. The total abolition of landlordism and elimination of intermediaries.
2. Tenancy reforms, ie. regulation of rent, security of tenure for tenants and conferment of full ownership on them.
3. Ceiling on land holdings.

In the land reforms programme currently in force there are also some incidental schemes like the payment of annuity to religious and charitable institutions in lieu of the income from the tenanted lands, the constitution of a Kudikidappukars' Benefit Fund and an Agriculturists' Rehabilitation Fund.

ANNEXURE IV

Details of staff engaged for the Agricultural Census, 1976-77

(a) Headquarters

Sl. No.	Designation	Scale of pay	No. of post	Period
1.	Joint Director	850-1450	1	Dec. 1976—Feb. 1979
2.	Assistant Director	560-1100	2	do.
3.	Research Assistant	405-660	2	do.
4.	U.D. Compiler	275-525	1	do.
5.	L.D. Compiler	230-385	3	do.
6.	Administrative Asst.	560-1100	1	do.
7.	L.D. Clerk	230-385	2	do.
8.	U.D. Typist (Stenographer)	275-525	1	do.
9.	L.D. Typist	230-385	1	do.
10.	Peon	196-265	1	do.

Tabulation

(b) Main Census

Sl. No.	Designation	Scale of pay	No. of post	Period
1.	Deputy Director	750-1250	1	1-11-77 to 28-2-79
2.	Research Assistants	405-660	6	1-11-77 to 31-7-78
3.	U.D. Compilers	275-525	11	do.
4.	L.D. Compilers	230-385	33	do.
5.	U.D. Clerk	275-525	1	do.
6.	L.D. Clerk	230-385	1	do.
7.	Peon	196-265	2	do.
(c) Input survey				
1.	Research Assistant	405-660	1	15-11-77 to 15-2-78
2.	U.D. Compilers	275-525	2	do.
3.	L.D. Compilers	230-385	8	do.

ANNEXURE V

Agricultural Census, 1976-77

EXPENDITURE STATEMENT

Pay and allowances and honorarium Rs.	T.A. Rs.	Contingencies Rs.	Total Rs.
752483.00	70249 ·00	43706 ·00	866438 ·00

ANNEXURE VI

Agricultural Census, 1976–77

DETAILS OF TABULATIONS AND ESTIMATION PROCEDURE

I. Design adopted

1. **Main census**:—A stratified two-stage sampling design, with the taluk as the stratum, revenue village as the first stage sampling unit and the operational holding as the second stage sampling unit, is adopted for the agricultural census in Kerala during 1976-77. In each taluk 15% of the revenue villages is selected by simple random sampling method. In each selected village 20% of the resident operational holdings (excluding those with area less than 5 cents) is selected by systematic sampling from a complete list of resident operational holdings prepared by a house-to-house visit in the selected village. The selection of holdings is made after stratifying the holdings in the village into the following 7 size groups:

Size group	Percentage of holdings selected for the main census
1. Less than 5 cents	Nil
2. 5—99 ,,	20%
3. 100—249 ,,	20%
4. 250—499 ,,	20%
5. 500—999 ,,	20%
6. 1000—2499 ,,	20%
7. 2500 and above	20%

2. **Input survey**:—For the Input Survey, a sub-sample of 24 holdings is selected at the rate of 4 households in each of the last six size classes given above.

II. Tabulation procedure

(a) **Main census**:—For the main census the taluk will be considered as the stratum and estimates will be formed for each stratum since the sample size will be sufficient to obtain reliable estimates at the stratum level. The estimates for all the taluks in each district will be pooled to get the district-wise estimates. Only district-wise and state figures are proposed to be published in the final report as was done during the last census.

After scrutiny the main census schedules relating to each village will be grouped into 13 size classes as given below, based on the area of the operational holding.

1.	5 to 10 cents	
	10 to 62 ,,	
	62 to 100 ,,	
	100 to 125 ,,	
2.	125 to 250 ,,	
3.	250 to 500 ,,	
4.	500 to 750 ,,	
5.	750 to 1000 ,,	
6.	1000 to 1250 ,,	
7.	1250 to 1875 ,,	
8.	1875 to 2500 ,,	
9.	2500 to 5000 ,,	
10.	5000 to 7500 ,,	
11.	7500 to 10000 ,,	
12.	10000 to 12000 ,,	
13.	12500 cents and above.	

This classification is adopted to enable comparisons of figures with those of the previous census as well as to meet the requirements of the Government of India for the present census.

The entries in the schedules will be copied into the tabulation sheets and the totals of the entries for each size group of holdings in each village will be maintained. Separate tabulation sheets will be used for each size group.

From this information the sample values at the taluk-level will be obtained by adding the corresponding values for all the villages selected from the taluk. This will be available for each size class and the estimation of the stratum totals will be done for each size class in the stratum as far as data permit.

III. Estimation procedure from (a) the listing schedules and (b) the main census schedule

(a) Listing schedules

(i) **Schedule 1 ·1**.—For estimating the number (A) and area(B) of holdings with less than 5 cents, from the listing schedule (1), the following procedure will be adopted:

$$\hat{A}_{<5} = \frac{N}{n} \sum_{i=1}^{n} ai \quad \text{and}$$

$$\hat{B}_{<5} = \frac{N}{n} \sum_{i=1}^{n} bi \quad \text{where}$$

'ai' and 'bi' are the number and area respectively of holdings with area less than 5 cents in the ith selected village in the taluk. N is the number of villages in the taluk and n is the number of villages selected in the taluk.

Further the proportion of holdings falling under each of the 16 size classes mentioned earlier will also be worked out for the sample villages in the taluk.

(ii) Schedule 1 ·2

Let N be the total number of villages in the taluk, n be the number of villages selected in the taluk, yij-be the number of institutional holdings in the ith size class in the jth villages. yij-be the area of the institutional holdings in the ith size class in the jth village and yi and y'i be the values to be estimated for the ith size class in the taluk.

Then

$$\hat{y}_i = \frac{N}{n} \sum_{j=1}^{n} yij \quad \text{and} \quad \hat{y'}_i = \frac{N}{n} \sum_{j=1}^{n} yij$$

The taluk totals y and y^1 will be estimated by

$$\hat{y} \sum_{i=1}^{17} \hat{y}_i \quad \text{and} \quad \hat{y^1}_i \sum_{i=1}^{17} \hat{y^1}_i$$

The details of yil and yij will be obtained from the listing schedule 1 ·2.

(b) Main census—schedule 3 ·1

Let N-be the total number of village in the taluk, n-be the number of villages selected in the taluk, Mij-be the number of holdings in ith size class in the jth selected village (j=1, 2.....n)

mij - be the number of holdings selected for the main census in the ith size class in the jth selected village (j=1, 2, 3.....n) and

xijk - be the value of the characteristics of the kth holder in the jth village in the ith size class so that $\sum_{j=i}^{n}$ Mij = total number of holdings in the ith size class in the selected villages, and

$\sum_{j=1}^{n}$ mij -the number of holdings selected in the ith size class in the selected villages.

An estimate of Xi- the value of the characteristic for the ith size class in the taluk will be given by

$$\hat{Xi} = \frac{N}{n} \sum_{j=1}^{n} \frac{Mij}{mij} \sum_{k=1}^{mij} xijk \quad \text{and the estimate of the taluk total will be given by} \quad \hat{X} = \sum_{i=1}^{6} \hat{Xi}$$

Note:—Estimation from main census data will be done separately for each size class used for selection of holdings for main census. These will be distributed among the different size classes required for the main census tables using the proportions worked out from schedule 1 ·1.

(Vide M.N. Murthy, Sampling Theory and Methods, Statistical Publishing Society, Calcutta-1967, PP. 280). The values of Mij and mij will be obtained from schedule 2 ·1 (list of operational holdings and record of selection for main census).

In the main census schedule the area under the crop is noted for seasonal crops while the number is noted for perennial tree crops. For converting the number into area the average stand per acre given below* will be used.

Sl. No.	Name of crop	Average stand/acre
1.	Coconut	100
2.	Arecanut	800
3.	Cashewnut	100
4.	Jack	100
5.	Mango	100
6.	Tamarind	100
7.	Banana	500
8.	Plantation pits	500
9.	Pepper	200
10.	Other fruit trees	100
11.	Other trees	100

The figures are based on the information from the land utilisation surveys conducted in the state.

IV. Estimation from Input survey data:-

For the input survey tables, the distribution of holdings from the main census tables will be utilised. Regarding the other items of information required for input survey tables, the relevant rates and ratios will be worked out from the sample in each taluk as far as data permits; otherwise estimates will be provided for the district as the sample size at district-level may be sufficient to yield reliable estimates. These rates and ratios will be applied to the population totals estimated from the main census and the tables will be prepared.

V. Standard error of the estimates

(a) Main census data:- An estimate of the variance of $\hat{Xi}$ will be given by

$$\hat{V}\left\{\hat{Xi}\right\} = \frac{\frac{N}{n}\sum_{j=1}^{n} Mij\left\{\frac{N}{n}\sum_{j=1}^{n} Mij - \sum_{j=1}^{n} mij\right\}}{\sum_{j=1}^{n} mij} Si^2 \text{ where}$$

$$Si^2 = \frac{1}{\left\{\sum_{j=1}^{n} mij - 1\right\}} \sum_{j=1}^{n} \frac{\left\{xijk - \sum_{j=1}^{n}\sum_{k=1}^{mij} xijk\right\}^2}{\sum_{j=1}^{n} mij}$$

which will take into account the variations between villages as well as within villages. Here the sampling variation occurring in estimating the total number of holdings from mij and Mij has not been considered. The standard error will be given by $\text{S. E.} = \sqrt{\hat{V}\,(\hat{Xi})}$ and will be worked out for all the major utilisations and area under major crops.

(b) Input Survey data:- The usual formula for estimation of standard error of a ratio will be used here in respect of the major inputs. In view of the small sample size for input survey, the estimation of standard error at the taluk level may not be efficient.

GOVERNMENT OF KERALA

BUREAU OF ECONOMICS AND STATISTICS

AGRICULTURAL CENSUS 1976-77

Input Survey

SCHEDULE 4.1

Block 1—Identification Particulars of Holder

1. District ..
2. Taluk ..
3. Firka ..
4. Village ..
5. House number ..
6. Name of the holder/holders
7. Name of informant and his/her relation with the holder ..

Block 2—Classificatory Characteristics

1. Extent of land owned and self operated by holder (in cents) ..
2. Extent of land leased in (in cents) ..
3. Extent of land operated otherwise (in cents) ..
4. Extent of land operated (col. 1+2+3) (in cents) ..
5. Total number of parcels in the holding ..
6. (a) No. of parcels within the village ..
   (b) No. of parcels outside the village but within the taluk ..
   (c) No. of parcels outside the taluk ..
7. Status of the holder : Individual/Joint ..
8. Group code of the holding ..

Block 3—Parcel-wise cropping pattern and area water logged with drainage facilities in the operational holding during the Agricultural year 1976-77

Serial Number	Parcel Number	Identification particulars of the parcel	Location code within the selected village (1)/outside the village (2)	Cropped area (in cents)										Area water logged (in cents)			Area salined (in cents)
				Irrigated							Unirrigated						
				Cropped once	Cropped twice		Cropped more than twice										
					One crop irrigated	Both crops irrigated	One crop irrigated	Two crops irrigated	More than two crops irrigated	Total gross cropped area (5+6+7+8+9+10)	Cropped once	Cropped more than once	Total gross cropped area	Area with drainage facilities	Area without drainage facilities	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

SCHEDULE 4.1—(*Contd.*)

Block 4—Area under Irrigated crops and use of Fertilisers, Pesticides etc. during Agricultural year 1976–77

Sl. No.	Item	Irrigated crops																
		Crop 1 Virippu		Crop 2 Mundakan		Crop 3 Punja		Crop 4 Tapioca		Crop 5 Sugarcane		Crop 6 Banana	Crop 7 Coconut	Crop 8 Arecanut	Crop 9 Tea	Crop 10 Coffee	Crop 11 Rubber	Crop 12 Others (specify)
		HYV	Others	HYV	Others	HYV	Others	HYV	Others	HYV	Others							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Area irrigated (in cents)																	
2	Area not treated with chemical fertilisers (in cents)																	
	PARTICULARS OF LAND TREATED WITH CHEMICAL FERTILISERS																	
	(*a*) *Ammonium Sulphate*																	
3	Area (in cents)																	
4	Quantity (kg.)																	
	(*b*) *Super Phosphate*																	
5	Area (in cents)																	
6	Quantity (kg.)																	
	(*c*) *Urea*																	
7	Area (in cents)																	
8	Quantity (kg.)																	
	(*d*) *Mixed* (*specify*)																	
9	Area (in cents)																	
10	Quantity (kg.)																	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	(*e*) *Others* (*specify*)																	
11	Area (in cents)																	
12	Quantity (kg.)																	
	(*f*) *Others* (*specify*)																	
13	Area (in cents)																	
14	Quantity (kg.)																	
	(*g*) *Others* (*specify*)																	
15	Area (in cents)																	
16	Quantity (kg.)																	
	PARTICULARS OF LAND TREATED WITH ORGANIC MANURES ONLY																	
	(*a*) *Farm-yard*																	
17	Area (in cents)																	
18	Quantity (kg.)																	
	(*b*) *Oil cakes*																	
19	Area (in cents)																	
20	Quantity (kg.)																	
	(*c*) *Others* (*specify*)																	
21	Area (in cents)																	
22	Quantity (kg.)																	
23	Area not treated with any manure (in cents)																	
	AREA TREATED WITH PESTICIDES																	
24	Area (in cents)																	
25	Quantity (Litres/kg.)																	
26	Area not treated with any pesticides (in cents)																	

SCHEDULE 4.1—(*Contd.*)

Block 5—Area under Unirrigated crops and use of Fertilisers, Pesticides etc. during Agricultural year 1976–77

Sl. No.	Item	Unirrigated crops																
		Crop 1 Virippu		Crop 2 Mundakan		Crop 3 Punja		Crop 4 Tapioca		Crop 5 Sugarcane		Crop 6	Crop 7	Crop 8	Crop 9	Crop 10	Crop 11	Crop 12
		HYV	Others	HYV	Others	HYV	Others	HYV	Others	HYV	Others	Banana	Coconut	Arecanut	Tea	Coffee	Rubber	Others (specify)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Area unirrigated (in cents)																	
2	Area not treated with chemical fertilisers (in cents)																	
	PARTICULARS OF LAND TREATED WITH CHEMICAL FERTILISERS																	
	(*a*) *Ammonium Sulphate*																	
3	Area (in cents)																	
4	Quantity (kg.)																	
	(*b*) *Super Phosphate*																	
5	Area (in cents)																	
6	Quantity (kg.)																	
	(*c*) *Urea*																	
7	Area (in cents)																	
8	Quantity (kg.)																	
	(*d*) *Mixed (specify)*																	
9	Area (in cents)																	
10	Quantity (kg.)																	
	(*e*) *Others (specify)*																	
11	Area (in cents)																	
12	Quantity (kg.)																	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	(*f*) *Others (specify)*																	
13	Area (in cents)																	
14	Quantity (kg.)																	
	(*g*) *Others (specify)*																	
15	Area (in cents)																	
16	Quantity (kg.)																	
	PARTICULARS OF LAND TREATED WITH ORGANIC MANURES ONLY																	
	(*a*) *Farm-yard*																	
17	Area (in cents)																	
18	Quantity (kg.)																	
	(*b*) *Oil cakes*																	
19	Area (in cents)																	
20	Quantity (kg.)																	
	(*c*) *Others (specify)*																	
21	Area (in cents)																	
22	Quantity (kg.)																	
23	Area not treated with any manure (in cents)																	
	AREA TREATED WITH PESTICIDES																	
24	Area (in cents)																	
25	Quantity (Litres/kg.)																	
26	Area not treated with any pesticides (in cents)																	

Block 6—Inventory of Cattle and Buffaloes owned on 15-4.1977

Sl. No.	Item	Cattle (No.)	Buffaloes (No.)
	MALES OVER 3 YEARS		
1	Working		
2	Others		
3	Sub total		
	FEMALES OVER 3 YEARS		
4	In milk		
5	Others		
6	Sub total		
7	Young stock		
8	Total		

Block 7—Inventory of other Livestock and Poultry owned on 15-4-1977

Sl. No.	Item	Number	Sl. No.	Item	Number
1	Sheep under 1 year		8	Camels	
2	Sheep of 1 year and above		9	Pigs under 6 months	
3	Goats under 1 year		10	Pigs of 6 months and above	
4	Goats of 1 year and above		11	Other livestock	
5	Horses and ponies		12	Poultry :	
6	Mules			(a) Cocks (b) Hens (c) Chickens (d) Ducks	
7	Donkeys/Asses			Total poultry	

SCHEDULE 4.1—(*Contd.*)

Block 8—Inventory of Agricultural Machinery and Implements owned as on 15-4-1977

Sl. No.	Item	Number	
		Individually	Jointly
1	Ploughs (wooden)		
2	Ploughs (iron)		
3	Earth level scrapers		
4	Harrows and hoes		
5	Hand tractors or power tillers		
6	Seed drills		
7	Maize shellers		
8	Sprayers		
9	Dusters		
10	Harvestors		
11	Chaff cutters		
12	Tractors (H.P.) (used for agricultural purposes)		
13	Threshers		
14	Pumps—Electric		
15	Pumps—Diesel		
16	Pumps—Others		
17	Bullock carts		
18	Cane crushers		
19	Oil crushers		
20	Persian Wheels or Rahats		
21	Others (specify)		

Signature of Statistical Inspector

Date .....

ANNEXURE VII

Instructions for carrying out the input survey

1. **Introduction**:—As part of the World Agricultural Census, the Bureau of Economics and Statistics had conducted during 1972 an Agricultural Census in the State with 1970-71 as the reference year. In order to study the variations in tenancy and land use Government of India have now sanctioned a scheme for an agricultural census in the State as part of an All India Agricultural Census with 1976-77 as the reference year. Accordingly to this scheme the census will be conducted in 200 selected revenue villages in the State.

Objectives:—The census consists of three parts, preparation of a list of operational holdings, the main census and the input survey. The list of operational holdings will be prepared by visiting all the resident cultivators in the selected villages. In the main census information on area of operational holdings, tenancy, number of parcels of land, land utilisation, irrigation and cropping pattern will be collected from a sample of 2% of the operational holdings, while in the input survey for area irrigated, and unirrigated, details of input like quantity and type of fertilizers, manures and pesticides used for each crop and inventory of livestock and agricultural implements will be collected from 24 selected holdings in each village.

2. **Listing**:—For the selection of 20% holdings for the main census and 24 holdings for the input survey, a complete listing of resident cultivators and their operational holdings and also holdings of institutions has been done by the Village Assistants under the supervision of Revenue Inspectors and Tahsildars.

The input survey is to be conducted by the Statistical Inspector after scrutiny of the filled-in schedule (1·1) and selection of samples (scrutiny programme appended). Before undertaking that job they may fill in the schedule 1·3.

3. **Schedule 1·3**:—This schedule should be filled in by the Statistical Inspectors. One form is to be used for one village. The entries area to be made by referring to the schedules 1·1 and 1·2. Location code 1 refers to a complete holding in the village. Codes 2 and 3 are part-holdings. In the schedule, separate entries may be made of code 2 and code 3 in separate lines as 2·0 (a) code 2

2·0 (b) code 3

The area under part-holdings should be entered under (2) household operational holdings besides the number of holdings. In order to get the area of the part of the operational holding lying in other villages in the taluk, reference may be made to the rough work of the Village Assistant in the note book supplied to him. If this does not give information, the Inspector may visit the house-hold and enquire. As the number of such holdings is small, it will be possible to do this work when he goes for input survey or other work in the village.

The entries against items 4, 5 and 6 can be made by reference to the filled-in forms 1·1 and 1·2. It may be noted that for item 6, the remarks column should be consulted and the Village Assistant might have put an X mark in the remarks column against those holders who have land outside the State.

4. **Method of selection**:—The schedule 2·1 and 2·2 are meant for recording the particulars of selection of household operational holdings for the main census and input survey respectively.

All the household operational holdings listed in schedule 1·1 will be classified into the following 7 groups based on the total area of the holding.

1. Less than 5 cents
2. Between 5 cents and 99 cents
3. Between 100 cents and 249 cents
4. Between 250 cents and 499 cents
5. Between 500 cents and 999 cents
6. Between 1000 cents and 2499 cents
7. 2500 cents and above.

Col. (1):—The serial number of the household operational holdings as given in col. 9 of schedule 1·1 is to be given in this column. A tick mark is to be put against each serial number in any of the columns 2, 3, 5, 7, 9, 11 and 13 based on the area of the holding, (1000 cents and above may be deleted and the column heading may be written as 1000-2499 cents. Two additional columns 13 and 14 may be added for the class 2500 cents and above, i.e. the class 1000 cents and above is to be divided into two (1) 1000-2499 cents and 2 2500 cents and above. For example, if the area of a holdings is 4 cents a tick mark is to be put in col. 2 and if it is 125 cents, a tick mark is to be put in col. 5 and so on. It should be noted that for each serial number given in col. 1 of the schedule, there will be one and only one tick mark in any of the seven columns mentioned earlier.

After puting the tick marks for all the holdings, separate serial numbers are to be given continuously for the tick marks in each of the seven columns so that the last serial number in each column will give the number of operational holdings in each group.

It may be noted that the sum of the last entries in columns 2, 3, 5, 7, 9, 11 and 13 will give the total number of household operational holdings as given in col. 1 of the schedule which will also be the same as the last serial number in column 9 of schedule 1.1.

5. Sch. 2·1: Selection of holdings for the main census:—No holding is to be selected for the main census from the group of holdings with area less than 5 cents. From each of the remaining six groups a systematic sample of 20% of the holdings will be selected for the main census by the following procedure.

Let the total number of holdings in a group (say, holdings with area between 100 to 249 cents) be 128. From this group 26 holdings are to be selected for the main census (126 divided by 5 given 26 correcting to the nearest integer ie. 20% of 128 is 26). These 26 holdings should be selected by systematic sampling with a random start. The random number column to be used is the same as the column with serial number equal to the serial number of the village. As there are only 13 columns in the table of random numbers supplied for villages with serial numbers greater than 13, the remainder after dividing by 13 will give the number of the random number column. If the remainder is zero, the last column 13 is to be used. From this column find out a number equal to or less than the number of holdings in a class, which will be the random start (R). The sampling internal is 5 because we are selecting 20% (ie. 100/20=5). The holding with serial number same as the random start will be the first holdings selected for the main census from that group. This serial number in col. 5 should be circled and against the serial number of that holding enter 1 in column 6 to indicate that the order of selection is 1. The other 25 holdings to be selected from this group will be obtained by adding the interval 5 successively to the serial number of the holding selected first. Against the serial numbers of the holding selected, the order of selection should be entered in col. 6 and corresponding serial numbers in col. 5 should be circled. The required number of holdings from the other groups may also be selected by the same procedure. If by adding the sampling interval successively, the number obtained is greater than the total, take the balance after subtracting the total as the selected holding number. If the number of holdings in a class is 7 or less, select 1 holding from that class. Selection of holdings should be done by the Statistical Inspector.

From all the holdings selected for the main census, the Village Assistants will collect the details required in schedule 3.1 from July 1977 onwards, by contacting the operational holder or a responsible informant The list of selected holdings should therefore be made available to the Village Assistants by 1st July 1977.

Sch. 2.2.: Record of Selection for the input survey:—As in the case of schedule 2·1, the title of columns 10 and 11 may be changed to 1000-2499 cents; two columns 12 and 13 may be added and in the title space, write 2500 cents and above.

From each of the six size groups of holdings above 5 cents, four holdings from among the holdings selected for the main census are to be selected for canvassing the schedule for input survey. If the number of holdings in any group except the last group is 4, then the remaining number is to be selected from the immediately preceding group, in the last group. If the number of holdings is less than 4, all these holdings are automatically to be included for the input survey. The deficiency need not be made up from the other groups. Thus the total number of holdings to be selected for input survey for a village will be between 20 and 24.

Col. 1:—Here enter the serial number of the holdings selected for the main census as entered in col. 9 of schedule 1·1 which will be the same as entered in col. 1 of schedule 2·1.

Put a tick mark in columns 2, 4, 6, 8, 10 or 12 against each serial number given in col. 1 depending on the group from which the particular holding is selected for the main census. For example, if the holding is selected from the group 5-99 cents, a tick mark is to be put in col. 2 if it is from the group 100-249 cents, a tick mark is to be put in col. 4 and so on.

Separate serial numbers are to be given for the tick marks in each of the columns 2, 4, 6, 8 or 10 so that the last serial number in each column will give the total number of holdings selected from each group for the main census. This constitutes the frame for selection of holdings for the Input Survey.

From each size group, four holdings are to be selected for canvassing the input survey schedule. The following procedure is to be adopted for the selection.

Let the total number of holdings selected for the main census from a particular size group be 81. The number of holdings to be selected from this group is 4. Divide 81 by 4, and obtain the quotient, which will be the sampling interval (20). From the random number column you have already chosen for the village, as instructed, consider the next number after selection of holdings for main census. That number equal to or less than, 81 and having the same number of digits as 81 (two digits) will be the random start (R). The holding with serial number same as the random start will be the first holding selected for input survey from that group. The order of selection is to be given in the respective columns provided for each group. The other three holdings to be selected from the group will be obtained by adding the sampling interval once, twice and thrice to the random start (ie. R+21 and R+31). If by adding the interval, the number obtained is greater than the total take the balance after subtraction of the total as the number of the holding to be selected. The required number of holding is to be selected from each size group in the same manner.

7. Sch. 4·1: Input Survey:—This schedule is to be canvassed from all the household operational holdings included in the sample for input survey. The field work is to be done by the Statistical Inspectors in respect of the selected villages under their jurisdiction. The field work is to be done during June 1977. The statistical Inspector will, in addition, canvass the schedule 3·1 (main census) from these holdings by observation of the parcels in the holdings with the restriction that the observation will be confined to the parcels situated within the taluk.

The schedule contains eight blocks.

Block I—Identification particulars of the holder:—All the seven items are self-explanatory

Block 2—Classificatory characteristics:—The particulars of the selected holdings such as the extent of land operated by different categories, the number of parcels in the holding, status of the holder (whether joint or individual) and the group code of the holding as classified in schedule 2·1 are to be noted in this Block in the appropriate places. (Group codes are less than 5 cents-1, 3-99 cents-2. 100-349 cents-3, 250-499 cents-4, 500-999 cents-5, 1000-2499 cents-6, 2500 cents and above-7)

Here, 'parcel' denotes a piece of land operated by the household or individual, surrounded by the village boundary or taluk boundary or by holdings of other persons or by a road, river, canal or other natural boundary. It may contain one or more survey number or sub-division number.

Block 3—Parcel-wise cropping pattern and area water-logged with or without drainage facilities in the operational holding during the agricultural year 1976-77:—A separate schedule has to be filled in for each selected operational holding. The information in this schedule is to be filled in parcel-wise.

Cols. 1 to 4:—The details of the identification for each parcel are to be entered here. The survey numbers of the land will give the identification. If the survey number cannot be obtained write the name of the plot or give some other indication to identify the parcel of its constituent survey numbers. One line is to be used for recording details of one survey number contained in the parcel in these and subsequent columns.

Column 2:—In numbering the parcels, first take the parcel located within the village, if two or more parcels are located within the sample village, the parcel comprising the lowest survey number or numbers will be numbered one parcel with next higher survey number will be given number 2 and so on. Assuming that two parcels in the sample village are made up of survey numbers 221 and 222 and survey number 325, the parcel with numbers 221 and 222 will be given serial number 1 and parcel with survey number 325 will be number 2.

Col. 3:—Write the survey number or numbers for identification as already said, if the operator does not remember the survey number write some other identification like the name given to the plot, or specify "near .....temple" or the like.

Col. 4:—If the parcel is located within the selected village, code 1 is to be given and if it is outside the village, code 2 is to be given.

Cols. 5 to 11:—These columns are for recording the details of irrigated area in the parcel. Irrigated area means area which received water from any source of irrigation such as well, tubewell, canal, tank etc. irrespective of the number of waterings and quantity of water. These columns have to be filled up very carefully. Cultivators may not be able to answer direct questions on double cropping or multiple cropping. Ascertain from them the position about each crop season, make rough notes or the information work out double cropped or multiple cropped area and confirm the figure with the cultivator before filling up the schedule.

Consider each irrigated patch of land in the survey number constituting the parcel. Find out how many crops were raised in that patch. If only one crop is raised, the entry will be in col. 5 (irrigated, cropped once). If two crops were raised, and irrigation was therefor one crop, the area of the patch, will be entered, in col. 6. Similarly if 3 or more crops were raised, the entry will be in column 8, 9 or 10 according as one crop was irrigated, two crops irrigated or all crops irrigated. Those patches of land which were not irrigated will fall under columns 12 or 13 according as there was one crop or more than one crop. Perennial crops and annual crops will be considered as one crop only while seasonal crops can be considered as many times as they are cropped. Standing seasonal crop which will be harvested during the next agricultural year will not be considered as a crop of the current agricultural year.

Example:—Suppose there is a survey number with area 200 cents. A patch of 75 cents of this survey number was irrigated, in autumn season in 1976-77 and paddy was cultivated. In summer, there was pulses in the same area. In the remaining 125 cents there was no irrigation and coconut and arecanut were grown.

The entries in this case will be as follows.

In column 6 the entry will be 75 cents. In column 12, the entry will be 125. Here the gross area sown will be 75 x 2 + 125=275 cents while the irrigated area will be 75 cents and net area sown 200 cents. Though two separate cultivations are there in the land of 125 cents during the year there is no separate cropping and hence the number of crops can be taken as one. (If however tapioca is cultivated which can be taken as an annual crop besides coconut and arecanut, then there are two crops.)

Col. 11 and col. 14 need not be filled in by the Statistical Inspector.

Cols. 12—14:—The details of unirrigated area are to be noted under each column, the headings of which are self-explanatory.

Cols. 15 & 17:—These columns are for recording the details of water-logged area, if any in the parcel with or without drainage facilities.

If there is accumulation of water which obstructs cultivation or makes the land less productive, the area in which water is accumulated may be considered as water-logged.

Drainage is to be considered as the removal of excess water from the surface of land by artificial means for making non-productive lands productive and productive lands more productive. Natural drainage i.e. the automatic flow of excess water from fields by virtue of the position of the field will not be taken into account.

Col. 18:—The area affected by salinity is to be given here. Salinity may be due to salt water flowing inside or because of the malignancy created by the use of fertilizers. If this affects cultivation by reducing the productivity or if the land is not cultivated because of the malignancy created by the use of fertilizers. If this affects cultivation by reducing the productivity or if the land is not cultivated because of salinity the area affected may be entered here.

Block 4: Area under irrigated crops and use of fertilizers, pesticides etc. during the Agricultural year 1976-77:—The details of irrigated area, area treated with different fertilizers, pesticides etc. during 1976-77 for the important crops given in the block area to be entered under the corresponding columns against each item. The details required are to be noted only in respect of the major crops given if the same is cultivated in the holding.

In the case of fertilizers and pesticides the area treated as well as the quantity used is to be noted separately for each crop.

Delete the word only after organic manures (col. 2) in block (4) and block (5).

All these items are independent each other. It may happen that in an area whether ammonium sulphate was put, super phosphate was also put. In this case, the area will be written under both. Similarly if in the same area, organic manures are put, then the area will be repeated again. When pesticides are considered, again the total area is to be considered.

Block 5: Area under unirrigated crops and use of fertilizers, pesticides, etc. during the agricultural year 1976-77:—The details required in this block are the same as those in Block 4. But in this block the details in respect of unirrigated crops are to be entered while in block 4 the details of irrigated crops are recorded.

If pesticides are sprayed by the Government or a co-operative society the quantity may be estimated from the knowledge of the normal practice of spraying.

Blocks: 6, 7 & 8: Inventory of cattle and buffaloes, other inventory poultries and agricultural implements owned by the household as on 15-4-1977:—These three blocks are for providing information on the stock of cattle and buffaloes, livestock and poultry and agricultural implements owned by the household. These blocks are intended for the collection of details of the household operating the holdings and not of the individual holding. It may happen that there are two or more holders living in the same household, in that case the entries relate to the holdings of the two persons. This should be noted on the top of these blocks. If however, there are two holdings selected for input survey in the same household that fact should be specified on the top of these blocks. The area of the operational holding of the household is also to be written on the top of the three blocks.

The reference date for these three blocks is 15-4-1977 as against the reference period of the year 1976-77 in respect of all other blocks in the schedule.

All the items in these 3 blocks are self explanatory. The following points are to be noted.

Block 6, Item 7:—Young stock—this may be divided into 7 (a) male and 7 (b) female. The details are to be furnished against items 7 (a) and 7 (b) separately.

Item 8:—Here enter the total of items 3, 6, 7 (a) and (b)

Block 7:—Against item 12 (poultry) the column headed, "number" should be divided into two, improved and local (Desi) and entries may be made separately under improved and local variations. Chickens include those of age 3 months and below in general; the intention is that if the unit has not laid eggs it may be taken as female chicken; similarly if the stage of crowing has not been reached it is a male chicken.

Block 8:—If the household owns the items jointly with a household which comes within the group of selected households (for the input survey) then it may be indicated at the top. The names of the item listed may be noted in Malayalam also. All the items specified may be shown irrespective of whethere they are used for cultivation or not. If they are not used for cultivation at least partly, relevant remarks may be given to that effect. Under other (specify) only important items may be specified.

It may be noted that as the reference date is 15-4-1977 and the Inspector's visit will be in June or July, the items owned should be enumerated as on the date of survey and those purchased or born after 15-4-1977 should be deducted while those which were sold out/disposed of/dead after 15-4-1977 may be added. 'Jointly' refers to more than one household and 'individually' refers to one household. Also only items owned are to be considered and not those used for cultivation, from other sources—it may happen that the household migh have hired the items and used these are not to be entered.

GOVERNMENT OF KERALA

Bureau of Economics and Statistics

AGRICULTURAL CENSUS 1976–77

Schedule 1.1.—List of Households and Operational holdings in the selected village

District: Taluk: Village:

Sl. No.	House No.	Household No.	Name of the head of the household	Does any member of the hh. operate any land (Yes 1/No 2)	If answer to Col. (5) is No, do you own any land (Yes 1/No 2)	If answer to Col. (6) is 'Yes' the extent of land owned (cents)	If answer to Col. (5) is 'Yes' No. of operational holdings in the hh.	Sl. No. of the operational holdings	Name(s) of the operators	Extent of area operated (in cents)					Name of the village(s) where the part holding is located	Remarks, if any
										Owned and self operated	Leased in	Operated otherwise	Total operated area	Location code* of the holdings		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

*Location Code:—1. Entire area of the holding located in the sample village.

2. Partly within the sample village and partly outside the sample village but within the taluk.
3. Wholly outside the sample village but within the taluk.
4. Partly within the sample village and partly outside the taluk.
5. Wholly outside the village, partly within the taluk and partly outside the taluk, but within the State.
6. Wholly outside the taluk but within the State.
7. Others (specify).

Signature:

Date:

GOVERNMENT OF KERALA

Bureau of Economics and Statistics

AGRICULTURAL CENSUS, 1976-77

Schedule 1.2—List of Institutional holdings in the Non-household sector

District: Taluk: Village:

Sl. No.	Identification particulars of the holding	Type of holding i.e. Institution/Trust/Govt. Farm/Co-operative Farm, etc.	Extent of area operated (in cents)				Location code* of the holding	Name of the village within the taluk where the holding is located	Remarks, if any
			Owned and self operated	Leased in	Operated otherwise	Total operated area			
1	2	3	4	5	6	7	8	9	10

*Location Code:—1. Entire area of the holding located in the sample village.
2. Partly within the sample village and partly outside the sample village, but within the taluk.
3. Wholly outside the sample village but within the taluk.
4. Partly within the sample village and partly outside the taluk.
5. Wholly outside the village, partly within the taluk and partly outside the taluk, but within the State.
6. Wholly outside the taluk, but within the State.
7. Others (specify).

Signature:

Date:

37/567—22

GOVERNMENT OF KERALA

Bureau of Economics and Statistics

AGRICULTURAL CENSUS, 1976-77

Schedule 1.3—Summary particulars of complete and part holdings of operational holders in the selected villages

1. District.....
2. Taluk.....
3. Village.....

Particulars	Household holdings	Institutional holdings	Total
1	2	3	4
1.0 Number of complete holdings (location code 1)			
2.0 Number of part holdings which get completed at the taluk level (location codes 2 and 3)			
3.0 Total number of holdings (1.0+2.0)			
4.0 Number of other holdings (location code 4, 5, 6 and 7)			
5.0 Total number of holdings (items 3.0 and 4.0)			
6.0 Number of holdings which operate land outside the State (i.e. No. of holdings with 'x' marks in the remarks column of Schedule 1.1 or 1.2)			

Signature:

Date:

GOVERNMENT OF KERALA

Bureau of Economics and Statistics

AGRICULTURAL CENSUS, 1976-77

Main Census

SCHEDULE 3.1

Block 1—Identification particulars of Holder		**Block 2—Classificatory characteristics**	
1. District		1. Extent of land owned and self-operated by the holder (cents)	
2. Taluk		2. Extent of land leased in (cents)	
3. Firka		3. Extent of land operated otherwise (cents)	
4. Village		4. Total extent of land operated (col. 1+2+3) (cents)	
5. House Number		5. Total No. of parcels in the holding:	
6. Name of the holder/holders		(a) No. of parcels within the village	
7. Name of informant and his/her relation with the holder		(b) No. of parcels outside the village but within the taluk	
		(c) No. of parcels outside the taluk	
		6. Status of the holder (individual/joint)	
		7. Group code of the holding	

Block 3—Tenancy and Land Utilisation particulars of parcels in the operational holding during the Agricultural Year, 1976-77

Serial Number	Parcel Number	Identification particulars	Location code within the village (1)/ outside the village (2)	Area operated (in cents)								Area under utilisation (in cents)						
				Total	Owned and self operated	Leased in					Total	Land operated otherwise	Net area sown	Current fallow	Net cultivated area (14+15)	Other uncultivated land excluding fallow land	Fallow land other than current fallow	Cultivable waste land	Not available for cultivation
						For fixed money	For fixed produce	For share of produce	For usufructuary mortgage	Others									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

SCHEDULE 3.1—(*Contd.*)

Block 4—Parcel-wise Irrigated area in the operational holding during the Agricultural Year, 1976-77

Serial number	Parcel number	Net area irrigated (in cents)							Number of wells		Number of tube wells	
		Source										
		Canals	Tanks	Tube wells		Wells	Others	Total	In use	Not in use	Diesel	Electric
				Government	Private							
1	2	3	4	5	6	7	8	9	10	11	12	13

SCHEDULE 3.1—(*Contd.*)

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77

Serial number	Parcel number	Identification particulars	Location code within the village (1)/ outside the village (2)	Area under (in cents)											
				Virippu (Paddy)			Mundakan (Paddy)			Punja (Paddy)			Total of paddy (all seasons)		
				I	U	T	I	U	T	I	U	T	I	U	T
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

I—Irrigated U—Unirrigated T—Total

SCHEDULE 3.1—(*Contd.*)

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Serial number	Parcel number	Identification particulars	Location code within the village (1)/outside the village (2)	Area under (in cents)														
				Jowar			Ragi			Other cereals and millets			Total cereals			Gram		
				I	U	T	I	U	T	I	U	T	I	U	T	I	U	T
1	2	3	4	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

SCHEDULE 3.1—(*Contd.*)

Block 5.—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Sl. No.	Parcel number	Identification particulars	Location code within the village (1)/ outside the village (2)	Area under (in cents)																	
				Tur/Arhar			Urd			Other pulses			Total pulses			Total foodgrains			Sugarcane		
				I	U	T	I	U	T	I	U	T	I	U	T	I	U	T	I	U	T
1	2	3	4	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49

SCHEDULE 3.1—(*Contd.*)

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Sl. No.	Parcel number	Identification particulars	Location code within the village (1)/outside the village (2)	Area under (in cents)														
				Ginger			Pepper vines (Number)			Other spices & condiments			Banana			Plantain (Number)		
				I	U	T	I	U	T	I	U	T	I	U	T	I	U	T
1	2	3	4	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

SCHEDULE 3.1—(*Contd.*)

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Sl. No.	Parcel number	Identification particulars	Location code within the village (1)/ outside the village (2)	Area under (in cents)/number of trees																	
				Jack (No. of trees)			Mango (No. of trees)			Cashew (No. of trees)			Other fruit trees			Tapioca			Vegetables		
				I	U	T	I	U	T	I	U	T	I	U	T	I	U	T	I	U	T
1	2	3	4	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Sl. No.	Parcel number	Identification particulars	Location code within the village (1)/outside the village (2)	Area under (in cents)/number														
				Other food crops			Total food crops			Ground-nut			Sesamum			Castor seed (Number)		
				I	U	T	I	U	T	I	U	T	I	U	T	I	U	T
1	2	3	4	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97

SCHEDULE 3.1—(*Contd.*)

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Serial number	Parcel number	Identification particulars	Location code within the village (1)/outside the village (2)	Area under (in cents)/number														
				Coconut (Number)			Other oilseeds			Arecanut (Number)			Cotton			Other fibres		
				I	U	T	I	U	T	I	U	T	I	U	T	I	U	T
1	2	3	4	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112

SCHEDULE 3.1—(*Contd.*)

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Serial number	Parcel number	Identification particulars	Location code within the village (1)/ outside the village (2)	Area under (in cents)												
				Total fibres			Plantation crops				Drugs and Narcotics			Fodder crops		
				I	U	T	Tea	Coffee	Rubber	Others	Toba-cco	Cin-chona	Others	I	U	T
1	2	3	4	113	114	115	116	117	118	119	120	121	122	123	124	125

SCHEDULE 3.1—(*Contd.*)

Block 5—Parcel-wise area under crops sown during Agricultural Year, 1976-77—(*Contd.*)

Serial number	Parcel number	Identification particulars	Location code within the village (1)/outside the village (2)	Area under (in cents)								
				Other non-food crops			Total non-food crops			Total gross cropped area		
				I	U	T	I	U	T	I	U	T
1	2	3	4	126	127	128	129	130	131	132	133	134

Signature of Village Assistant

Date.....

Signature of Revenue Inspector

Date.....

ANNEXURE VIII

AGRICULTURAL CENSUS, 1976-77

Instructions for carrying out the main census

Introduction:—For the main census operations, 20% of the operational holdings listed by the village assistants in each of the 200 revenue villages are randomly selected by the Statistical Inspectors. This is done after categorising the holdings into seven classes. From the first class of holdings with area less than 5 cents selection is not made. All the institutional holding listed are also included for the main census.

Schedule 3.1:—Main census:—This schedule is to be canvassed from all the household operational holders selected for the main census as well as from all the institutional holders in the village. One schedule should be used for entering the details of one holding, if the entire area of the holding is situated within the taluk. For part of the holding situated outside the taluk, a separate supplementary schedule should be filled in with the identification particulars and other details and should be tagged to the main schedule for the holding.

The details are to be collected by enquiry from the respective holders or by a responsible member of the household and the details gathered are to be entered in the appropriate places in the schedule. The field work is to be done during the period of four months from 1-7-1977 to 31-10-1977.

Schedule 3.1 is divided into five Blocks and the details of each Block are given below:—

Block I: Identification particulars of the holder:—The identification particulars such as name of district, taluk, village, house number, name of holder, name of informant etc., are to be entered against the respective items given in the block.

Block II: Classificatory characteristics:—The particulars of the selected holdings such as extent of land operated by different categories, the number of parcels in the holding, status of the holder (either joint or individual) and the group code of the holding as classified in Schedule 2.1 are to be noted in this Block in the appropriate places.

Block III: Tenancy land and use particulars:—The reference period for this Block will be the agricultural year 1976-77 (1st July 1976 to 30th June 1977). The details required in this block and the subsequent blocks are to be collected parcel-wise.

Columns 1, 2 and 3:—The serial number, parcel number and the identification particulars of each parcel, such as the survey number or the name of the 'purayidom' or 'nilam' are to be entered in these three columns. One line is to be used for one parcel as mentioned earlier.

Column 4:—The location code of the parcel is to be entered against each parcel. If the parcel is located within the selected village, put code 1 and if it is outside the village, put code 2.

Column 5:—The total area of each parcel listed in column 2 is to be given in Col. 5 and the break-up of the area according to tenure status is to be given in columns 6 to 13.

Column 6:—The extent of land owned and self-operated is to be given under this column.

Columns 7 to 12:—The extent of leased in land according to the terms of the lease is to be entered in these columns. The different terms of lease to be considered are:

1. Leased in for fixed money
2. Leased in for fixed produce
3. Leased in for share of produce
4. Leased in for usufructuary mortgage
5. Leased in for other terms

The total leased in land is to be given under Column 12 which will be the sum of the entries in columns 7 to 11.

Column 13:—The extent of land operated otherwise (viz. neither owned and operated nor leased in) is to be given under column 13 of this Block.

It may be noted that the entry in Col. 5 will be the sum of the entries in columns 6, 12 and 13.

Columns 14 to 20:—The pattern of utilisation of the area given in col. 5 is to be entered under these columns for each parcel. For the purpose of agricultural census, the utilisation of land is classified under the following six categories.

1. **Net area sown (Col. 14):**—This represents the total area sown with the crops and orchards, counting area sown more than once in the same year or only once.

2. **Current fallow (Col. 15):**—Cropped area which is kept fallow during the current agricultural year is termed as current fallow. If any seedling area is not cropped in the same year, it may be treated as current fallow.

3. **Net cultivated area (Col. 16:)**—This represents the total of net area sown and current fallow which is the sum of the entries in columns 14 and 15.

4. Other uncultivated land excluding fallow land (Col. 17):—This category includes permanent pastures and other grazing lands and lands under miscellaneous tree crops and groves (eg. thatching grass, bamboo bushes, other fuel trees etc.) not included under net area sown. Permanent pastures include all grazing lands. But common grazing lands in the village, which are not with any holder shall be excluded for the purpose of the census.

5. Fallow land other than current fallow (Col. 18):—All lands which were taken up for cultivation once but temporarily out of cultivation for a period of not less than a year and not more than five years will come under this categcry. The reasons for keeping such lands fallow may be:

(1) Lack of resources for the cultivators.
(2) Inadequate supply of water
(3) Malarial climate
(4) Silting from canals and rivers.
(5) Unremunerative nature of farming.

6. Cultivable waste (Col. 19):—This category includes all land available for cultivation, whether not taken up for cultivation or taken up for cultivation, but not cultivated during the current year and the last five years or more in succession for one reason or other.

7. Not available for cultivation (Col. 20):—This would include (a) area under non-agricultural uses, (b) barren and uncultivable land and (c) forests area under non-agricultural uses. Includes all land occupied by building and courtyard and land put to uses other than agricultural, within the holding.

It may be noted that the sum of the entries in columns 16 to 20 should be equal to the entry in col. 5.

Block IV: Parcel-wise irrigated area during 1976-77

Irrigation:—For the purpose of the census, irrigation is defined as the process of providing water for the benefit of the crops grown, which involves some artificial (either mechanical or manual) effort, sufficient at least for one wetting. Thus rainfed areas will not be considered as irrigated.

The serial number and the parcel number (as entered in Block III) are to be given in columns 1 and 2.

Columns 3 to 8:—The net area irrigated by the different sources, like canals, tanks, wells etc. in each parcel is to be given under the respective columns.

Column 9:—This gives the sum of the entries in columns 3 to 8.

Columns 10 & 11:—The number of wells situated in the parcel land meant for irrigation is to be given in col. (10) if the well is in use at present, and in Col. 11 if the well is not in use.

Columns 12 & 13:—The number of tube wells used for irrigation and situated in the parcel is to be entered in these columns. If the tube well is operated by diesel, the number is to be given in Col. 12 and if by electric power in column 13.

Block V: Area under crops during 1976-77:—The details of all crops cultivated in the holding during 1976-77 are to be given in this block separately for each parcel.

Columns 1 to 4:—The identification particulars of each parcel are to be given in the first four columns on each page.

The remaining columns are for recording the area or the number, as the case may be, for each crop. There are three columns provided for each crop, the first for entering the area or number, as the case may be, for irrigated crop and the second for recording the details of unirrigated crop. In the third column the sum of the entries in the first two columns is to be entered.

It may be noted that since the number of trees or plants is to be given for the perennial crops, some of the columns giving the totals and the total cropped area to be given in columns 132 to 134 cannot be filled-in. These columns may, therefore, be left blank.

ANNEXURE IX

Instructions for scrutiny of listing schedules

Some instructions for scrutinising entries in the listing schedules are given below. If there is any discrepancy seen, the entry may be rounded. Corrections will be made after reference to the concerned staff who prepared the schedules or to the superior officer.

A. Schedule I.1:—1. See that the entries against district, taluk and village are furnished on the top of the schedule.

2. Columns 1, 2, 3 & 4:—See that the entries under columns are written correctly. There should be entries in all these columns if there is a household living in the house. Otherwise, the use to which the house is put will

be entered in the columns 3 and 4. See that all the houses are entered in column 2. If there is any omission of number, see whether there is any remark or entry towards the end of the schedule or bunch of schedules as to why there is an omission.

3. **Column 5:**—Code 1 or 2 is to be reported here. If the entry is (1) the columns 5, 6, 7 will be blank.

4. **Column 6:**—If code '2' is entered in column 5 then there will be entry in column 6, code '1' or '2' will occur here.

5. **Column 7:**— If code '1' is given in column 6 then see that area owned is written here in cents.

6. **Column 8:**—If code '1' is entered in column 5, number of holdings is to be given here. In most cases, the entry will be '1'.

7. **Column 9:**—See that the serial number of the holdings is furnished correctly under this column.

8. **Column 10** is for writing the name of operator of the holding.

9. **Columns 11, 12, 13, & 14:**—If code '1' is furnished in column 5, then the area is to be given under any of these columns 11, 12, and 13 in cents. Entries may be there under any of these three columns. The total of the entries on the three columns 11 to 13 is to be written against Col. 14.

10. **Column 15:**—See that one of the seven codes (1 to 7) is given here. (codes are furnished in the schedule itself.)

Column 16:—For codes 2 to 7 under column 15 there will be entry (name of village) under this column.

Column 17:—Note the remarks also if any under this column. For code 7 in column 15 it is possible that the operational holding is outside the State; there should be an 'X' mark in the remarks column and the area operated will be found there.

B. Schedule 1.2.

1. **Column 1:**—See that each holding is serially numbered.

2. **Column 2:**—Note whether the identification particulars of the holding are given clearly.

3. **Column 3:**—See that the type of holding is entered correctly.

4. **Column 4, 5, 6 & 7:**—See that the area operated is written in cents in any of the three columns 4 to 6, column 7 is the total of the columns 4, 5 and 6.

5. **Column 8:**—One of the codes 1 to 7 is to be written here. (Codes are given in the schedule itself)

6. **Column 9:**—See that the name of the village within the taluk where the holding is located is written here.

7. **Column 10:**—For code 7 in Col. 9, if the operational holding is outside the State then see that an 'Z' mark is put in the column and the area operated is entered.

AGRICULTURAL CENSUS, 1976-77

Main Census (Schedule 3.1)

I. Scrutiny Programme

Block 1: See whether all the 7 items in this block are filled in.

Block 2: 1. Check whether (1) item 4=item 1+item 2+item 3

2. Item 5=sum of items 5 (a+b+c)

3. See whether the group code (item 7) (given below) is correctly entered based on the entry against item 4 If not the group code should be *corrected*

Area	Group code
Less than 5 cents	1
5-99 "	2
100-249 "	3
250-499 "	4
500-999 "	5
1000-2499 "	6
2500 cents & above	7

Block 3:—1. See whether the details of all the parcels entered against items 3a and 3b are entered in the "Main schedule" and those shown against item 3c are entered in the "supplementary schedule" for the name holding. It should be noted that if there is an entry against item 3c in block 2 there should be a supplementary schedule for the holding (2). In the case of columns 5 to 13 of block 3, the following checks should be made.

(a) for each line Col. 5=Col. 6+Col. 12+Col. 13; Col. 12=Col. 7+Col. 8+Col. 9+Col. 10+Col. 11

(b) for each operational holding (including the main and supplementary schedules)

1. The sum of the entries in Col. 5 should be the same as the entry against item 4 of block 2
2. The sum of the entries in Col. 6 should be the same as the entry against item 1 of block 2
3. Sum of the entries in Col. 12 should be the same as the entry against item 2 of block 2
4. Sum of the entries in Col. 13 should be the same as the entry against item 3 of block 2
5. For each line Col. 16=Col. 14+Col. 15
6. For each line Col. 5=Col. 16+Col. 17+Col. 18

Thus for each line

Col. 5=Col. 6×Col. 12+Col. 13=Col. 16+Col. 17
Col. 18+Col. 19+Col. 20

and as such none of the columns 6 to 20 will exceed column 5.

Block 4:—See whether all the parcels given in block 3 are accounted for in this block also. In case of parcels where there is no irrigated area, there will not be any entry in columns 3 to 9. It may be noted that against those parcels there can be entries in columns 10 to 14 if there is a well used for irrigation now or before and located within the boundaries of the parcel, even if water from the well is not used for irrigating the crops within the parcel, but is used for irrigating the crops in other parcels not necessarily belonging to the holder.

Block 5:—This block is for entering the details of the area (or the number) under each crop grown/cultivated in each parcel.

Details of all the parcels given in the previous block should be given in this block also and this should be checked.

1. If there is no entry for a particular parcel in Col. 14 of block 3 there will not be any entry in this block.

2. If there is no entry in columns 3 to 9 of the block 4, then there will not be any entry under the columns handed "irrigated" in block 5.

3. During the training classes it was instructed that the "total" column in this block need not be filled in. This should be checked. The "total" columns in this block need not be filled in, for each of the parcels in the holding but only for the holding as a whole at the time of tabulation.

4. If the total area under all crops in block 5 of the schedule (both irrigated and unirrigated) does not account for the entire area shown under "net area sown" given in block 3, then clearly there is a mistake either in estimating the net area sown or in estimating the area under (or the number of) different crops entered in the schedule. If the area under all crops given in block 5 falls short of the net area sown by a considerable margin, then such schedules need be taken up for tabulation only after further check with reference to the field diary of the Village Assistants or independent field check.

For some of the crops the area is to be given while for some others the number of trees/plants is to be given. For calculating the corresponding area of the crops for which the details are given in numbers, the following average stand per acre may be used.

Sl. No.	Name of crops	Average stand per acre
1.	Coconut	100
2.	Arecanut	800
3.	Cashewnut	100
4.	Jack	100
5.	Mango	100
6.	Tamarind	100
7.	Banana	500
8.	Plantain pits	500
9.	Pepper	200
10.	Other fruit trees	100
11.	Other trees	100

It may be noted that theoretically the total of the area under each crop can exceed the net area sown but *it would not be less than the net area sown.*

Input Survey—Scrutiny Programme

1. Scrutiny of Schedule 4.1.

Block 1. Identification particulars:—Verify whether all the items are correctly filled in.

Block 2. Classificatory characteristics:—1. Verify whether item 4 given the total of the entires against item 1, 2 and 3.

2. Item 5 should be the total of the entries in items 6(a), (b) and (c).

3. Check whether the group code (item 8) is entered correctly based on the entry against item '4'.

Block 3. Parcel-wise cropping patterns:—1. Verify whether the details of all the parcels noted against item 5, block 2 are given in this block.

2. The total of the entries in Col. 5 to 10, Col. 12 and Col. 13 should not exceed the total extent of land operated (item 4 block 2).

3. Col. 11 and Col. 14 are not to be filled in each schedule. This will be done at the tabulation stage.

4. Col. 17 or Col. 18 should never exceed the extent of land operated (item 4 block 2).

5. Areas shown under the columns for irrigated (col. 5 to 10) should never be repeated under the columns for unirrigated (col. 12 and 13). This should be checked.

Block 4. Use of fertilisers for irrigated crops:—1. There should be entries in this block if there is any entry in columns 5 to 10 of block 3, otherwise this block will be left blank.

2. If there are entries in this block, it is necessary that against item 1 there should be an entry at least in any of the columns 3 to 19.

3. For areas entered against item 2 for each crop, there will not be any entry against items 3 to 16.

4. For areas reported against item 25 there will not be any entry against items 17 to 22.

5. For areas reported against item 26, there will not be any entry against items 24 and 25.

6. The entries for each crop, against items 2, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 24 or 25 should not in any case exceed the area against item 1 for that crop.

7. The total of the entries against item 1 for all the crop (ie. columns 3 to 19) *can exceed* the sum of the entries in columns 5 to 10 of block 3 for all the parcels together. In fact this figure ie. sum of the entries in columns 3 to 19 against item 1 in block 4 should be equal to the sum of the entries in Col. 5+Col. 6+2 × Col. 7+Col. 8+2 Col. 9 and 3 × Col. 10 of block 3. Col. 3 to 19 of block 4—Col. 5+ Col. 6+1 Col. 7+Col. 8+2 Col. 9+3 item 1.

This should be checked.

Block 5. Use of fertilisers for unirrigated crops:—1. The first 6 points mentioned for block 4 should be checked for this block also.

2. The total of entries against item 1 for all crops (ie. Col. 3 to 19) *can exceed* the sum of the entries in Col. 12 and 13 of block 3 for all the parcels together. The sum of the entries against item 1 (ie. Col. 3 to 19) of block 4 *should be equal* to the sum of the entries in Col. 6, 2 x Col. 8 Col. 9, Col. 12 and 2 x Col. 13 of block 3

Col. 3 to 19 of item 7 in block 5 = Col. 6 = 2 Col. 8+Col. 9+Col. 12+2 Col. 13 of block 3.

Block 6, 7, 8 Inventory of cattle and buffaloes, poultry and agricultural implements owned as on 15-4-1977.

For these blocks, the household and not the operational holding is the unit of enumeration. Further the reference date for these three blocks is 15-4-1977 as against the agricultural year reference year of 1976-77 for the previous blocks.

1. See whether item 7 - young stock has been split into two male and female and entries are made against each.

2. Check whether the entries against poultry (items 12 block, made separately for local and improved varieties.

3. It was instructed in the training classes to indicate the area of the holdings of the household as well as the number of holdings in the household at the top of block 6. See whether this entry has been made in the case of households, if any, possessing of more than one holding.

ANNEXURE X

Concepts and Definitions

1. Operational holding: 1.1. The data are to be collected in respect of each operational holding which has been defined as "all land which is used wholly or partly for agricultural production and is operated as one technical unit by one person alone or with others, without regard to the title, legal form, size or location." The technical unit has been defined as "that unit which is under the same management and has the same means of production such as labour force, machinery and animals". It would be seen from this definition that actual cultivator and not the owner is the unit for collection of date.

1.2. An operational holding would include both cultivated and uncultivated area. If, for example, an operational holding consists of four survey numbers out of which one survey number is put to non-agricultural uses, the total area of the operational holding would be equal to the total geographical area of the four survey numbers. The holding will exclude Govt. Forest land, Govt. Waste land and Village Common Grazing land. If Govt. Waste land is allotted to an individual then it will be included in the holding.

1.3. If all the survey numbers of an operational holding are put to non-agricultural uses, then it would not be considered for the purpose of agricultural census. 'Abadi Area' (Residential Area) is also excluded from the total area of the holding.

1.4. If during the reference year, the entire area of the Operational Holding is under current fallow, this would still be considered as an Operational Holding. If the entire area of the holding is under old fallow it will not be considered as an Operational Holding.

1.5. In some cases land is divided amongst all the members of the family. Where it is divided between the husband, wife and minor children and the cultivation is being done by the husband as the head of the family, the land may appropriately be treated as one Operational Holding.

1.6. There might be cases where in the records, a holding is shown jointly in the name of more than one co-sharer while in fact the land may have been privately divided and the co-sharers are independently ultivating. In such cases where there is no dispute they should be treated as many operational holdings as the number of independent cultivators.

1.7. In some States, in the Jamabandi register against a Khata, names of three or four persons are shown. While from the records, it would appear that there is only one holding, in practice, all the three or four brothers are actually cultivating the land independently of each other although there is no legal partition of land. From the census point of view, this would constitute three or four operational holdings.

1.8. For cultivated areas in the State Forests, no detailed and records are prepared. In the absence of the and records and revenue agency such areas are excluded for census purposes.

2. Agricultural production:—2.1. For census purposes Agricultural Production includes the growing of field-crops, fruits, grapes, nuts, seeds, tree nurseries (except those of forest trees), bulbs, vegetables and flowers production of coffee, tea, cocoa, rubber, jute, oilseeds, fodder, grasses etc.

2.2. In places where special efforts are made to raise grass, grass should be treated as a crop for Agricultural Census purposes.

3. Total area of the holding:—3.1. The total area of the holding should include the total of all land forming part of a unit which is under the same technical responsibility and management. It should also comprise the land occupied by the farm buildings, including the house of the holders provided such buildings are within the cultivated area. If the farm buildings are located outside the cultivated area and are covered under Abadi area then such building will not be included in the area of the holding.

4. Holder of the operator:—4.1. The holder, for census purposes, is the person who has the responsibility for the operation of the agricultural holding. He exercises the technical initiative and responsibility for the operation of the holding and may have full economic responsibility (ie. as an owner) for it or share this with others (as a tenant). When two or more persons share jointly (as partners) in the economic and technical responsibility for the operation of an agricultural holding, each is to be considered as the holder if they belong to different households.

5. Complete/part holding:—5.1. A holding may consist of one or more than one parcel of land. All the parcels of land of a holding may be situated in one village or more than one village. A holding is said to be a complete holding if all the parcels of land of that holding are in the same village. If any parcel of land of a holding is outside the village it is to be considered as part holding.

5.2. The criteria to be adopted in allocating the incomplete holdings in different villages to any specific village is that of residence of the operational holder. The incomplete holding in different villages of a particualr operational holder would be included in the village in which the holder is residing.

6. Individual/joint holding:—6.1. If the holding under study is being operated either by one person alone or by a group of persons, being members of the same household, the holding is said to be 'Individual'. If two or more persons belonging to different households share jointly (as partners) in the economic and technical responsibility for the operation of an agricultural holding' the holding is said to be 'joint'.

7. Parcel:—7.1. A parcel is all land entirely surrounded by land of other holdings or by land not forming part of any holding. It may consist of one or more cadestral units, plots or fields.

8. Tensure and Tenancy

Land Owned and Self Operated

Land owned:—8.1. A person is considered to own a piece of land if he has the right of permanent heritable possession over it. Land held under owner like possession is also considered as owned. Owner like possessions include (i) land held from Govt. or others under a grant of lease or assignment with right of permanent heritable possession with or without the right of transfer, and (ii) land operated under perpetual lease.

Self operated:—8.2. This term refers to the operated area, part of which may be uncultivated also. In some cases, the entire land owned may not be under cultivation in the reference year. A part of holding may be cultivated and a part may be kept fallow or uncultivated for some reason or the other. In all such cases the entire extent of land should be taken into account. The modes of farming may be (i) self cultivation (ii) Cultivator getting the land cultivated through members of the family and (iii) owned but cultivated with the help of hired labour. Land owned and self operated should not include land leased out to others. For example a holder owns 10 has of land, out of which 7 hectares of land is being operated by himself and the remaining 3 hectares of land has been leased out to others. Then the area owned and self operated is 7 hectares.

Area Leased in or Land Leased in:—8.3. Area leased in is defined as land taken on lease from others without any permanent right of possession for the lessee. Land leased in may be for (a) fixed amount of money (b) fixedquantity of produce (c) share of produce (d) usufructuary mortgage, and (e) Others.

Usufructuary mortgage:—8.4. Under this, the ownership of property is with the mortgage or but the possession is with the mortgage (ie. the person to whom the mortgage is made or given). Income from the property accrues to the mortgages and the mortgage is terminated as soon as the full amount is realised.

Land Leased in for others:—8.5. It means land leased in for which lease is partly paid in cash and partly in kind or area given on the condition of rendering service either to the village community or the Govt. and area held free of lease etc. It also includes cases when labourers are given some land for cultivation without permanent rights.

Area operated otherwise:—8.6. This will include all encroached land or occupied in an unauthorised way and being cultivated by the operator.

Total operated area:—8.7. Total of (1) area owned and self operated (2) leased in land (3) area operated otherwise would give the total operated area of the operational holding.

9. Land Utilization—9.1. The area under operational holding is to be classified into six categories according to the utilisation of land. The categories under which the classification is to be given are:—

(i) Net area sown
(ii) Current Fallows
(iii) Other uncultivated land excluding fallow land
(iv) Fallow land other than current fallows
(v) Cultivable waste land
(vi) Not available for cultivation

Net area sown:—9.2. This should represent the total area sown with crops and orchards counting area sown more than once in the same year only once.

Current Fallow:—9.3. This should represent cropped areas which are kept fallow during the current year. For example; if any seedling area is not cropped in the same year, it may be treated as current fallow.

Other Uncultivated Land excluding fallow land:—9.4. This would include permanent pastures and other grazing lands and land under miscellaneous tree crops etc.

(a) Permanent pastures and other grazing lands:—This should include all grazing lands, whether they are permanent pastures and meadows or not. Village common grazing land shall be excluded for the purpose of Agriculture Census.

(b) Land under *miscellaneous* tree crops etc:—This would include cultivable land which is not included in the net area sown but put to some agricultural use. Lands under Casurina trees, thatching grasses, bamboo bushes and other groves for fule etc. which are not included under 'Orchards' should be classed under this category. Lands of this type outside the holdings will not be included.

Fallow land other than current fallows:—9.5. This should include all lands which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years. The reasons for keeping such lands fallow may be one or more or the following:—

(i) Poverty of the cultivators;
(ii) Inadequate supply of water;
(iii) Malaria climate;
(iv) Silting of canals and rivers; and
(v) Unremunerative nature of farming.

Cultivable Waste:—9.6 This should include lands available for cultivation, whether not taken up for cultivation or taken up for cultivation once but not cultivated during the current year and the last five years or more in succession for one reason or the other. Such lands may be either fallow or covered with shrubs and jungles which are not put to any use. Land once cultivated but not cultivated for five years in succession should also be included in this category at the end of the five years. Cultivable waste land within the holdings would alone be covered by the Census.

Not available for cultivation:—9.7. This would include forests, area under non-agricultural uses, and Barren and uncultivable land.

(i) Forests:—This should include all lands classed as 'Forests', under any legal enactment dealing with forests or administered as forests, whether State owned or private, and whether wooded or maintained as potentia forest land. The area of crops raised in the forests and grazing lands or areas open for grazing within the forests should remain included under the forest area. *Only private forests would be covered for the purposes of Agricultural Census.*

(ii) Area under non-agricultural uses:—This should include all lands occupied by buildings and other lands put to uses other than agriculture within the holdings.

(iii) Barren and uncultivable land: This should include all lands barren and uncultivable land within cultivated holding.

10. *Cropwise area (irrigated and unirrigated)*

10.1. The crops may be enumerated in the order mentioned below. Against each crops, the irrigated area, unirrigated area and total area (irrigated and unirrigated) may be given in the space specified for the purpose. Information in respect of important crops should be given cropwise. Area under crops unimportant for the State may be given combined under 'others' under each category separately. Wherever possible crops may be enumerated in the order (i) Khariff (ii) Rabi and (iii) Summer.

Cereals:—Cereals include Rice, Jowar, Bajra, Maize, Ragi, Wheat, small Millets, Barley and other cereals.

Pulses:—The area under important pulses may be given cropwise. Pulses include Gram, Tur, Urad, Moongs Masur, etc. and other pulses.

Foodgrains:—The total area under cereals plus total area under pulses gives the total area under Foodgrains.

Spices and Condiments:—Spices and condiments include Pepper Black, Chillies, Ginger, Turmeric, cardamoms, Betelnuts (Arecanuts), Garlic, Coriander and others.

Fruits:—Fruits include Mangoes, Citrus fruits, Bananas, Apples, Guavas, Grapes, Pome Fruits, Papayas and others. Dried fruit includes cashewnuts and others. Total fruits include green fruits as well as dried fruits.

Vegetables:—Vegetables includes potato, carrot, sweet potato, tomato, spinach, bringal, cauliflower, etc.

Food crops:—Food crops include food grains, sugarcane, spices and condiments, fruits, vegetables and other food crops.

Non-Food crops:—Non-food crops include oilseeds, fibres, dyes and tanning material, drugs and narcotics, plantation crops, fooder crops, green manure crops and other non-food crops.

Oil seeds:—Include groundnut (nuts in shell), castor seeds, sesamum, rapeseed and mustard, linseed, coconut, nigerseed safflower seed, cotton seed and other oil seeds.

Fibres:—Fibres include cotton (Lint), cotton (Kapas), Jute, Mesta, Sannhemp (fibre) and other fibres.

Plantation crops:—Include tea, coffee and rubber.

Dyes and Tanning materials:—Include Indigo and others.

Drugs and Narcotics:—Include opium, Tobacco, Cinchona, Indian Hemp and others.

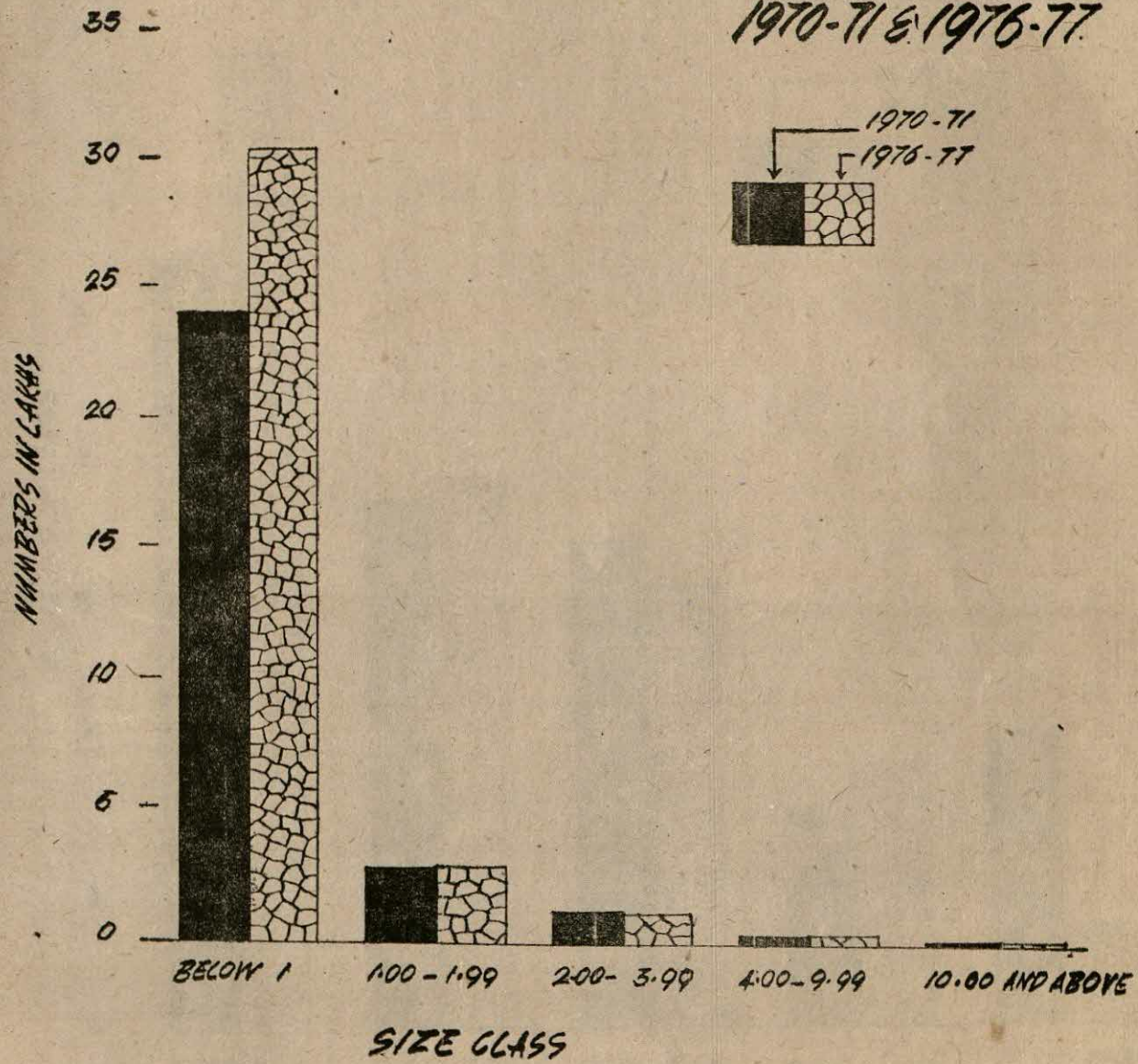
Fodder crops:—Include Guar, Oats, and other fodder crops.

10.2. Total area under food crops added to the total area under non-food crops amounts to 'Total gross cropped area', so that gross cropped area includes the total area under all the crops viz. food crops as well as non-food crops. Cross checks should be carried out to see that the total gross cropped area tallies with the total of area under food crops plus area under non-food crops. This may be done for irrigated, unirrigated and total area separately.

10.3. It is necessary to ensure that the total gross cropped area is greater than the net area sown. It may also be necessary to check that the total gross irrigated area is greater than total net irrigated area. These checks are necessary at the compilation stage in order to avoid complications at the tabulation stage.

11. Institutional Holdings:—Holdings like Government Farms, Sugarcane Factories, Co-operative Farms, Temple lands managed by Trust through hired labour are to be treated as Institutional Holdings. If temple lands are leasedout to individuals then they are to be considered as individual holdings.

NUMBER OF AGRICULTURAL HOLDINGS IN 1970-71 & 1976-77



AREA OF AGRICULTURAC HOLDINGS IN 1970-71 & 1976-77