SHIFTING OF PADDY CULTIVATION IN PALAKKAD DISTRICT - AN ECONOMIC ANALYSIS

THESIS

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By

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DECLARATION

I hereby declare that the thesis entitled "***Shifting of paddy cultivation in Palakkad District – An economic analysis***" is a bonafide record of research work done by me during the course of research and that the thesis has not previously been formed the basis for the award of any degree, diploma, fellowship or similar title of any other University or Society.

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CERTIFICATE

Certified that the thesis entitled "***Shifting of paddy cultivation in Palakkad District – An economic analysis***" is a bonafide record of research work done independently by Mrs. P. Rajalakshmy under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or other similar title of any other University or Society.

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Dr. B. Alwin Prakash

Dedicated to

My Elder Brother

The Late Pattathil Santhakumara Panicker

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INTRODUCTION

Since agriculture has a very important role in Kerala economy, it is essential to have a clear picture of the performance of agriculture in the past and present for a proper understanding of the economy. Despite the fact that Kerala produces only far less than its annual requirement of rice thereby remaining a deficit State, the area under paddy cultivation has been continuously declining at an alarming rate over the years, particularly since 1975-76. Rice being the staple food of people in Kerala, an enquiry into the declining trend in paddy cultivation is very important. Such a study should include the total area under cultivation, productivity changes in cropping pattern and also the shifting the variety of crops from one place to another. But a study like this becomes very complex because of the presence of so many uncertain factors that affect agricultural production like rain fall, sunshine, temperature, etc., which are also subject to very wide fluctuations.

The composition of the cultivable area has also undergone significant changes. The area under paddy cultivation is nearly halved during the past two decades in Kerala. This trend has been persistent in the past two decades and it is still continuing. Paddy cultivation reached its maximum area only in the mid seventies, mainly through stabilisation of area under winter and summer crops. It is not difficult to find that the extent under paddy cultivation has been declining due to conversion. This has been taking place continuously over the past two decades. After reclaiming some of the cultivable land it is left fallow presumably for use at a later stage for non-agricultural purposes. The official figures do not present a full picture of the extent of deforestation and conversion of wet land. The land under tapioca cultivation has also gone down considerably, to about one-third. At the same time, it can also be observed that the area under vegetables production has increased by nearly two-third in recent years.

In fact among the crops that have expanded the area under cultivation in Kerala, the most significant one is rubber, which has more than doubled its area. This is followed by coconut and pepper which have increased their area by one-third and three-fourth respectively. Thus in the process of inter-crop adjustment, food crops in general are the loosers and perennial cash crops are the gainers. At the same time the area under cash crops and plantations has registered rapid growth. Though this seems to be paradoxical, it is easy to establish that this is a logical outcome of the rational behaviours of the cultivators in Kerala. The highly labour intensive seasonal nature, the increasing wage rates of the paddy cultivation compared with the relatively higher profitability of the cash crops, the phenomenal increase in the export price of many plantation crops including cashew nuts, the promotional activities by the Government in the area of plantations of cash crops and the like have definitely encouraged the cultivators in Kerala to opt for high valued cash crops, wherever possible. In short, this has resulted in the diminishing of area under paddy and other food grains to the minimum (Pillai, 1994).

The paddy land conversion takes place in three phases. It starts with the shifting of area under paddy to cultivation of vegetables, banana or tapioca. A portion of the land thus converted is later used for growing perennial cash crops like coconut, arecanut and pepper. Some of the converted areas are subsequently used for construction of houses and roads, or else transformed into land for non-agricultural purposes. The ultimate effect is the reduction of wet land and the reduction of area under paddy cultivation. Again, vast areas previously under a multiple crop system are now covered by a mono-crop system, thus reducing the intensity of paddy cultivation.

The large scale shifting of area in favour of highly valued cash crops and plantation crops in the State should be viewed as a matter of serious concern for the economy, as analysed below.

1. In the first place, the decline of the area under paddy, a labour intensive crop certainly leads to contraction of labour in the agricultural sector, resulting in more unemployment in the State.

2. The decline in internal production leads to a decline in the total availability of food grains and thereby it intensifies the food deficit in the State (Draft Five year Plan Kerala, 1978). The uncertainty arising from the deficit in rice production would not be conducive to the growth of other sectors of agriculture in the State, as they would not receive necessary attention and resource support to exploit full production potentials.
3. A sharp decline in the area under paddy reduces the availability of straw, which in turn lead, to a reduction in the number of dependent animals in the farm sector. This again lead to a decline in the availability of farm yard manure and a break-down of the traditional farming sectors as such.
4. A shifting of area under paddy cultivation aggravates the problem of poverty due to mounting unemployment and reduced income.
5. The change in the seasonal pattern of work may affect the ways of life of the villagers. It is in this context, the micro-level study is becoming still more significant.

Paddy is getting replaced by other crops at the rate of about 18500 hectares every year because of rising wage bills in paddy cultivation and tough competition from other more remunerative crops. The future status of paddy cultivation has to be reassured with reference to the State need for internal production of paddy, its labour absorbing capacity and its suitability to the traditional rice areas of the State. The stagnant growth rate of paddy calls for a closer look at our irrigation projects and water management in our farms. The identification of areas which are still persisting on the traditional pattern of crop combination will help in knowing the causes of such stagnation and designing a suitable strategy for agricultural transformation. Because of non-homogenous characteristics of paddy farms in different regions of the State, the economics of the paddy cultivation is likely to differ from region to region within the State and also from season to season. Thus micro studies covering a small homogeneous region alone can give meaningful results.

Even though many attempts have already been made to analyse the nature and extent of agricultural stagnation experienced by the State, most of them are not entering deeply into the real problems. Since the mid seventies much effort were not made to isolate the prime reasons behind the poor performance of paddy fields at micro level. The paddy fields in Palakkad District in general and in Ottapalam block in particular form a category of their own. Therefore, in the present study on the economics of paddy cultivation, the rationality behind the shifting of paddy, the conversion of paddy fields into high value crops are all taken into account in this context for analysis.

1.1. Review of Literature

The present study is designed to examine the economics of paddy cultivation and shifting of paddy in Palakkad District. Many researchers have tried to study the structure of Indian agriculture and its level of development by analysing the trends in production, productivity and yield on the basis of adoption of improved practices. In Kerala, certain attempts have been made by Government agencies and individual researchers to study the extent and productivity of high-yielding varieties of paddy, which is the principal food crop of the State. Besides, a number of studies have been conducted in several aspects of agricultural price policy and matters related to cost, price and other factors involved in cropping pattern changes. Literary works on land use and cropping pattern changes are not very rare. The farm-size productivity relationship debate is one of the most important debates in the literature on agricultural economics.

Though a large number of studies on different aspects of agriculture at national and international level exist, the present study makes an attempt to analyse the land use and also to measure the pace and direction of land transformation that leads to change in the cropping pattern, relationship between the size of holding, productivity and the economics of crop production. A review of these studies is attempted in this chapter grouping them under the following heads viz., 'Studies on the Economics of Crop Production' and 'Studies on the Relationship between the Farm size and Productivity'.

1.1.1. Studies on the Economics of Crop Production

A beginning was made in the post-independence years by the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, when it sponsored the Farm Management Studies (FMS) in various parts of the country in 1954-55. The first series of these studies which covered important crop zones in the States of Punjab, Uttar Pradesh, West Bengal, Maharashtra and Madras were soon followed in 1957-58, in Bihar, Orissa, Andra Pradesh and Mysore. Kerala, along with some of the other remaining States like Madhya Pradesh, had taken up these studies in 1961-62. The farm management studies have thrown a large volume of highly useful and comprehensive data on cost of cultivation for the different States and the country as a whole had taken up these studies for the first time in the history of the country. Several analytical studies on the economics of farm management conducted on the basis of these data have thrown up significant insights into the pattern and working of our agricultural economy.

The farm management studies were conducted on the basis of scientific statistical methods. The farm management studies adopted a multistage stratified random sampling with villages as primary units and the holding as the ultimate unit. Two alternative methods of investigation were adopted known as the 'Cost Accounting Method' and the 'Survey Method'. In each State, two contiguous districts was first selected representing the typical soil complex of the region. Each district was subdivided into two fairly homogeneous zones on the basis of agricultural and climatic conditions, and the villages were then selected at random with probability proportional to the cultivating population. The ultimate unit of the enquiry was the 'Operational Holding' comprising all the land cultivated by the selected farmers irrespective of location or ownership. Information was collected on the basis of two schedules: 'Village Forms' and 'Holding Forms'. Detailed data relating to the cost incurred in cash or in kind in the cultivation of individual crops as also the total cost incurred in the holdings were collected. In the survey report, estimates were furnished according to size groups of operational holdings. The data on utilisation of family and hired labour (in physical and monetary units), other current inputs like seeds, overhead charges paid in the form of land revenue, rents, irrigation and other cesses, depreciation and interest charges on capital were presented individually for major crops and for total crop production, by size groups of holdings.

For the farm management studies, four different cost concepts were adopted. Cost A_1, Cost A_2, Cost B and Cost C. Cost A_1 is the cash and kind expenses actually incurred or incurred by way of hiring human and animal labour; purchasing of seeds, manures and fertilizers; paying of land revenue, irrigation and other cesses, depreciation charges on fixed assets and interest on crop loans. This would be the cost incurred by an owner cultivator. Cost A_2 is Cost A_1 plus Rent payment: this would naturally be the cost incurred by a tenant cultivator. When the imputed rent on owned land together with the imputed interest on owned capital (farm buildings and implements) are added to Cost A_1, Cost B is obtained. By adding the imputed value of family labour to Cost B, Cost C is derived. Profit or loss is defined as gross income minus Cost C.

In spite of the fact that the farm management studies have thrown up very significant and useful data on farm enterprises in the country for the first time, the scope of the studies was limited as it was confined to a very few selected districts in the States and was carried out at different periods of time.

The first survey in this series in Kerala was conducted in 1962-63 in which samples were selected from two districts in the State, viz., Quilon and Alappuzha. The major crops covered by the survey were paddy, coconut and tapioca. In addition, the milk products which give an additional income to the farm family were also brought under investigation. The income from both crop and milk production had been examined with different concepts of income such as farm returns, farm business income, farm labour earnings, family labour income and returns on capital investment.

One of the interesting facts about crop cultivation in Kerala is that coconut is the only crop, which has yielded an overall surplus among the selected holdings.

Paddy and tapioca, the two important food crops in the State have incurred loss in the year under reference (1962-63). Of the three varieties of paddy crops, such as Virippu, Mundakan and Punja, the Punja was found to be the most expensive crop, but in the matter of yield, it has excelled the other two (Pillai and Panikar, 1962-63).

Following Farm Management studies, the studies made by Pillai and Panikar (1966), Kuttanad Enquiry Commission (1971), the State Planning Board, Kerala (1976) and Radhakrishnan (1981) have also attempted to work out economics of crop production with net returns approach. These studies, which deal with economics of crop production in Kerala agriculture, have used the same concepts of costs used by Farm Management Studies.

Pillai and Panikar (1966) examined the economics of paddy cultivation in Kuttanad, one of the major crop zones in Kerala and concluded that paddy cultivation in the study area is profitable. The Kuttanad Enquiry Commission (1971) also came to a similar conclusion. After the introduction of high yielding variety programme in 1966-67, the State Planning Board (1976) prepared three evaluation studies pertaining to Virippu, Mundakan and Punja crops. According to these studies the cultivation of HYVs is found to be profitable in Virippu and Mundakan seasons, but not in Punja season. A comparison of benefit cost ratios of HYVs and non-HYVs indicates that benefit-cost ratios worked out to be more favourable in respect of non-HYVs both for Mundakan and Punja seasons, where as it slightly higher for HYVs in respect of Virippu season.

The cost and returns of paddy cultivation in three paddy producing districts in Kerala, viz., Alappuzha, Thrissur and Palakkad is examined by Radhakrishnan (1981). This study is based on primary data collected from a sample of 150 cultivators in the three areas. The cost and returns are worked out for HYVs and traditional varieties. The study reports that both the varieties have accrued a surplus over the cost, implying that both the varieties are profitably cultivated in these districts.

Jeemol Unni (1981) has made a modest attempt to examine the shift in cropping pattern of Kerala from 1960-61 to 1978-79. She classifies the growth rate in the gross area under three phases, viz., (1) between 1960-61 and 1968-69 when the area under rice increases, (2) between 1969-70 and 1974-75 when the area under rice tended to stagnate and (3) between 1975-76 and 1978-79, when the area under rice fell sharply. The main finding of the study is that there has been a shift in cropping pattern in favour of coconut crop at the expense of paddy crop.

The resource use efficiency in rice cultivation has been examined by Muraleedharan (1982). Findings of his study are based on a case study conducted in Thrissur District. His study revealed that, inputs such as human labour, fertilizers and manures are not effectively used in the study area.

The rationality in the allocation of resources shown by the farmers in traditional agriculture in underdeveloped countries is as pointed out by the first time by Schultz (1964). On the discussion of allocation efficiency of farmers in traditional agriculture, he remarked that "given the land at the disposal of farmers and the state of their knowledge, they are not underutilising the land by the way they farm. Nor are they misallocating the reproducible capital at their disposal.....they are not misallocating their own labour nor other labour that is available to them". The data used in his study were drawn from a study by Hopper (1965). Hopper conducted his study among high caste farmers in a North-Indian village who undertook agricultural operations such as ploughing, sowing, harvesting etc., with hired labour. The study by Schultz (1964), therefore, does not perhaps reflect the allocative efficiency of peasants who cultivate mostly with family labour.

Following Schultz, similar conclusions regarding the allocative efficiency in Indian agriculture were reached by Rajkrishna (1964), Hopper (1965) and Wellisez (1969). All these authors invariably used production function approach in studying allocative efficiency of factors of production. While Rajkrishna's study is based on FMS data collected from Punjab for three years from 1954-55. Hopper (1965) draws data from a sample of cultivators from Sonapur (Uttar Pradesh) for one year.

Wellisez (1969) examined allocative efficiency with respect to Andra Pradesh agriculture. In all these studies, the production function is estimated for all the farms together. The basic assumption in such an analysis is that all the farms operate under same input-output relationship. This is, however, a serious assumption. In reality, this may not be the case. It would be better if the allocative efficiency is studied according to different size groups, since there are differences in the factor endowments and marginal efficiency among different size groups.

Gopinathan and Sundaresan (1990) have attempted to analyse the changes in cropping pattern and the resultant changes in the employment situation in Kerala. They observe that as a contrast with the all India situation, the volume of labour force in the primary sector has been declining in Kerala after 1970s. According to them, the declining share of labour in the agricultural sector is not due to the reduction in the value of the agricultural output in absolute terms but due to reduction in cropped area, shift from labour intensive crop to capital-intensive crops or the introduction of labour saving devices in the agricultural sector. The decline in area under paddy is attributed to a number of factors such as the reversal of the rising trends in paddy prices, marginal increase in yields and poor profitability of paddy. Constraints like the diverse agro-climatic conditions, acidic soil, uneven distribution of rainfall, multiple cropping, high incidence of pests and diseases and low level of fertilizer use etc. are also responsible for the decline in area under paddy cultivation.

Ninan (1984) has attempted to examine the relationship between labour use on the one hand and yield, farm size, crop operation and labour productivity on the other in the case of tapioca and paddy crops. The analysis reveals that average labour productivity of tapioca and paddy will rise only if per acre labour input were declined.

In his study, Pillai (1967) concludes that the resources in paddy cultivation in Kerala are inefficiently used. The data for this study have been drawn from the FMS of 1962-63, 1963-64 and 1964-65. Cobb-Douglas production function with farm size, free human labour, bullock labour and farmyard manure and fertilizers as independent variables has been fitted to test the resource use efficiency in paddy cultivation. Perhaps, this is the pioneering study dealing with resource use efficiency in the cultivation of paddy in Kerala. The study has further been noted due to the fact that the resource use efficiency has been examined for three years with three paddy crops, viz., Virippu, Mundakan and Punja. But this study has one drawback also. It did not attempt to examine the resource use efficiency in different size categories. The size-wise analysis of resource use efficiency was quite impressive since, during the study period, Kerala had not implemented land reforms and consequently, unlike at present, there was glaring disparities in the size of holdings in the State.

An exploratory analysis of the agricultural stagnation in Kerala was taken up by Kannan and Pushpangadan (1988), covering the period 1962-63 to 1985-86. Their study begins with an analysis of the changes in land use pattern and then it examines the growth rates in output, yield and acreage of food grain and non-food crops. The sources of productivity, area under irrigation, rainfall index and fertilizer use per hectare were considered. Their empirical analysis shows that, during the period 1962-63 to 1974-75, there had been an overall increase in the growth rates in area, production and yield of all major commercial crops. However, the period from 1975-76 to 1985-86 was one of near stagnation in the growth rates of aggregate area under cultivation, production and productivity.

In a disaggregate study of the rice economy of Kerala, George and Chandan Mukherjee (1986) analysed the growth trends. The period covered in their study was 1960-61 to 1982-83, which had been divided into two sub periods by taking the year 1975-76 as the break point. According to the study, during the first period, rice production, its acreage and productivity had shown positive growth rates. However, during the second period, rice production declined, in spite of an improvement in productivity. The study also reveals the wide disparities that exist in the compound growth rates of area, production and productivity across different regions and over the various seasons.

Thomas (1996), pointed out that, after a decade of retarded performance, the agricultural sector in Kerala showed clear signs of recovery, during the latter half of the 1980's. However this phase of recovery lasted only for a few years, and since the beginning of 1990's it has once again replaced to a state of recession. The standard agricultural growth trend during the periods is:-

- First Period -1980-81 to 1985-86
- Second period - 1985-86 to 1990-91
- Third period - 1990-91 to 1994-95

During the first period, agricultural performance in terms of area, production and productivity of crops, generally showed declining trends. The second period was marked by better growth rates. However the third period registered a relatively poor growth performance.

In order to capture the spatial and crop dimensions of agricultural stagnation, Kannan and Pushpangadan (1990) in another study analysed the growth performance of individual crops for the State as a whole as well as across regions. Growth rates were estimated by using a kinked exponential model in order to avoid the discontinuity assumption. Their analysis shows that, during the period 1962-63 to 1974-75, seasonal crops such as paddy and tapioca had registered positive growth rates while among the perennial crops, coconut was the only one crop that showed a declining trend. During the second period from 1975-76 to 1985-86, all seasonal and perennial crops in the State except rubber have shown declining growth trends.

A crop specific analysis of agricultural stagnation attempted by Pushpangadan (1990) also shows that the symptoms of stagnation had been more severe among food crops, especially paddy and tapioca. His empirical analysis identifies the sources of stagnation and the falling demand coupled with instability in the market, resulting in loss of income to the farmers of food crops.

Recent indications by Lalithabhai (1993) shows that the agricultural income of the State has been growing since the mid eighties. Compared to this, in the period between mid seventies to mid eighties, it showed a mere stagnation. This revival of growth in agriculture was mainly due to the increase in yield and shift in cropping pattern to high valued crops.

Narayana (1990) made it clear that most of the earlier studies on the agricultural performance of the State economy are based on methods of analysis suitable for an agrarian economy predominated by seasonal and annual crops. His study concludes that the period from mid-seventies has not been one of the agricultural stagnation in Kerala, instead, it is a period of investment activities in replanting, under planting and inter mixed cropping.

The National Council of Applied Economic Research (NCAER) survey (1962) was the pioneer official attempt to assess the problems and prospectus of paddy cultivation in Kerala. After examining the cost price structure of the various major crops in the State, assessing the relative profitability of these crops, the study comes to the conclusion that under the topographical and climatic conditions of Kerala, commercial crops are more suitable than paddy. The survey report criticises the Government policy of giving too much importance to paddy at the cost of plantation crops and cash crops.

Panikar (1980) examines the trend in the area, production and yield rate of rice in Kerala between 1960-61 and 1978-79, the reasons for the decline and its implications. The causes attributed to the decline are fall in the price of paddy since 1974-75, the rise in the cost of cultivation particularly due to increase in wages and improvement in the supply position of rice due to imports.

In order to conduct a comprehensive study in the major rice producing areas of Kerala, the Kuttanad Enquiry Commission (1972) was appointed by the State Government. After making a thorough study, the commission in its report recommended cultivation of jute in deep waters and Kayal lands where second crop of paddy cannot be raised. The commission also recommended the formation of Kuttanad Development Authority, construction of permanent bunds and engine basements, provision of statutory policies to Padashekhara Committees, installation of soil testing laboratories, introduction of crop insurance etc.

Suseelan (1988) after analysing the problems and prospects of the paddy sector of the State economy arrived at the conclusion that improved technology is available in Kerala in order to make it self-sufficient in rice production. The reason for not realising this potential is the high cost of production. Therefore, he warns that rice production in Kerala will continue to stagnate till the cost of production in the State is equalised with the cost of production of rice in other States from which it is imported.

After considering the drastic decrease in area under paddy in Kerala, Radhakrishnan *et al.* (1994) single out falling profitability of the crop as the prime cause for this situation. According to the authors, rice cultivation in the State can be made more attractive by adopting any one or more of the measures aimed to:

i. Reduce the cost of production of paddy,

ii. Improve paddy productivity, and

iii. Subsidise paddy cultivation.

In order to improve relative profitability of paddy crop their study suggests the fixation of ceiling prices for competing crops.

Ommen (1994) had highlighted the role of absentee landowners and the high prices of land that prevail in Kerala, in the decline of paddy cultivation. According to him, following the gulf boom, land prices have skyrocketed and far from being a means of production land has become a prominent commodity of exchange in the State. Many of the landowners have become employees in the service sector and to them farming are not an occupation but a secure asset or at best a secondary source of income. His study concludes that the system of absentee landlordism has paved the way for a shift of cropping area from seasonal crops such as paddy and tapioca to perennial crops which do not require personal supervision.

Relationship between the abnormal increase in land prices and decline in area under paddy had been pointed out by Venugopal (1994). He observes that after the crash of share market, investors in Kerala have turned to real estate investment and as a result of it land prices are shooting up in the State. According to his study, in order to take advantage of the rising demand for land, paddy field owners convert their wet lands to saleable plots after filling it with soil and it results in the decline of area under paddy.

Thomas (1996) has studied the economic causes of decline of paddy cultivation in Kerala. According to the author, the most important problem involved in paddy cultivation in the study area (Kuttanad in Alappuzha District) is the shortage of farm labourers.

An analysis of the changes in the wages of both male and female paddy field workers and the index of farm price for paddy attempted by George (1982) indicates that the wage rates had increased much faster than the farm prices. Further, among the agricultural commodities paddy price increase was much smaller than the increase in the price of many other items.

A major contribution to the literature of Kerala agricultural development is by Pillai (1982). In his paper, it is noted that growth in productivity of Kerala agriculture always lagged behind Indian agriculture and the only way to increase production is to concentrate on productivity.

Using a simultaneous equation model of supply and demand, the wage formation in the rural labour market of Kerala has been examined by Pushpangadan (1992). The reduced wages of the paddy field labourers in Kerala is solely determined by the degree of unionization. He observes that because of the reduced rental value of paddy land, the land owners have an incentive for allocation of such land for the next best use which leads to the further decline in area under paddy. The only way to reverse the declining trend in paddy is through the introduction of a cost reducing innovation in production technology.

A study conducted by the Centre for Development Studies (1975) in the early seventies had pointed out that the growth of production in Kerala had been accompanied by a significant shift of work force from the primary sector to the secondary sector even though the output per worker in the agricultural sector was not relatively low.

Gopinathan and Sundaresan (1990) observed that the declining share of labour in agricultural sector is mainly due to the shift of cultivating area from labour intensive crops to capital-intensive crops. The decline in the area under paddy is attributed to a number of factors such as the reversal of the rising trend in paddy prices, marginal increase in yield and low profitability of rice.

Narayana (1983) has examined the impact of irrigation in stabilising and increasing the yield of paddy and the proper use of water for paddy cultivation. He observes that the contribution of irrigation in stabilising and increasing paddy productivity has been marginal in Kerala and it is mainly due to the poor management of irrigation water.

On the basis of a case study conducted in Piravam village, Joseph (1984) examined the economic aspects of minor irrigation in Kerala. The major conclusion emerged from his study is that minor irrigation has helped rich farmers in the State to intensify cropping, increase the application of modern inputs and thereby to increase productivity.

The State Planning Board (1975) has conducted an evaluation of the minor irrigation schemes implemented during the first three years of the Fourth Plan. The major findings of the evaluation are:-

1. There is inordinate delay in the execution of minor irrigation projects
2. In spite of the large expenditure on minor irrigation, the addition to cultivated area remained low.
3. Most of the projects were mainly aimed at stabilizing the second crop rather than raising an additional crop, and

4. The major reason for under-utilisation of the irrigation projects is the lack of adequate maintenance.

Joseph (1989) observed that a fall in the income from agriculture points to a fall in the production of agricultural crops. He adds that a number of crops raised in Kerala have been recording falling trends in production. Simultaneously, there is also a fall in the area under cultivation in respect of a number of crops. He suggested to raise the land tax in the State to increase the agricultural productivity, introduction of graded system of tax with lower rates for paddy fields and higher ratios for garden lands and plantations would certainly curb the tendency to convert the paddy lands into coconut gardens and other types of land.

In another study Panikar (1981) presents the findings of a survey conducted in Palakkad and Kuttanad areas to examine the trends in the adoption of HYVs, their yield rates and other factors affecting its adoption in Kerala. According to the study, yield rates of HYVs in the study areas have not shown any significant positive relationship with either the size of holding or the application of fertilizers. On the other hand, the high and rising prices of fertilizers and plant protection costs had pushed up the cost of cultivation of HYV paddy over the years. Therefore, the study concludes that the rice economy of the study areas is caught in a paradox of modernisation without commensurate improvement in net returns.

In order to examine the role of technological progress in the agricultural sector of Kerala economy, Pillai (1994) has examined the contributions of irrigation, fertilizers, pesticides, HYV seeds and modern implements in improving further productivity. According to his analysis, role of irrigation and HYV coverage in the state in improving paddy productivity is doubtful. However, the study points out that even though at the aggregate level the link between agricultural productivity and fertilizer use has been very week during the sixties and the seventies, increase in paddy productivity recorded since the early eighties in Kerala can be partly attributed to the increase in fertilizer consumption.

Agro-climatic features are one of the factors, which shaped Kerala agriculture. These features determine the crop-set that can be grown in a zone and in a particular land holding. The rainfall pattern and topography impose several restrictions on the absorption of modern technology in rice (Santha Kumari and Rajagopalan, 1996).

Lalithabhai (1993) analysed that micro level studies indicate that the use of inputs and productivity are much below the potentials for a number of crops especially in the case of paddy, coconut and associated homestead crops. Similar tendencies are visible for a number of other crops, except rubber.

Several attempts have been made to identify and measure changes in price levels and price variances of Kerala's agricultural commodities that accompanied economic reform.

The relation between prices, production and productivity is important and useful because it is the degree of responsiveness of output and production to changing prices on which effectiveness of a price policy depends. It is a known fact that price and productivity are two important components, which influence acreage under any crop. Increase in productivity supported by a price helps in increasing acreage under any crop (Ahmed and Bhowmick, 1991). Also growth rates in relative to farm prices of crops were able to explain the shift in area of the crops like rice, coconut, tapioca etc (Sivanandan, 1985).

Jaikrishna (1972) observed that the objectives of price policy vary with the stage of production. In the initial stage, when there is an overriding concern with attaining self-sufficiency in food production, the price policy has to be oriented towards providing adequate incentives for adoption of new technology and even of shifting of resources in favour of food crops. As the economy moves to a stage of self-sufficiency or near it, the instrument of price policy is used for generating a balanced structure of production. In the last and third phase, the main task of price policy becomes the transfer of surpluses from agricultural sector to the non-agricultural sector.

In order to examine the cost price structure and thereby to assess the profitability of paddy cultivation in the major rice producing areas in Kerala, the Kuttanad Enquiry Commission (1972) was appointed by the State Government and the Commission submitted its report to the government in November 1971. The terms of reference of the Commission were:

1. The cost of cultivation of paddy in Kuttanad compared to similar areas like Cole lands of Thrissur
2. The prevailing wage rates of agricultural labour in Kuttanad and their relation to paddy prices in comparison with the wage structure in Palakkad District
3. Other matters including methods for the reduction of cost of cultivation.

After comparing the increase in wages and paddy prices the Commission came to the conclusion that wage rates had increased at higher rates than paddy in the study area. For the improvement of paddy cultivation it recommended the provision of certain infrastructural facilities and the formulation of certain statutory bodies in the major rice producing areas of the state.

Kuttappan (1979) conducted empirical test of hypothesis that farmers in Kerala respond favourably to the changes in prices and profit in the allocation of resources. He has found that the response is significant only in the allocation of land not in non-land resources. The study shows that there had been a shift in cropping pattern in favour of coconut crops at the expense of paddy, tapioca and other crops. The continuous increase in the area under coconut is attributed to the higher profitability of coconut per hectare compared to paddy and tapioca.

Narayana and Nair (1989) proved that the decline in the yield of coconut in Kerala can be attributed to the root-will disease and the existence of old palms. Other factors such as cultivation practices, input use etc. also affected the yield of coconuts over the years.

Although supply response has become heavily researched topic, the literature on the response of aggregate output to price changes is rather sparse. The review of available literature on the response of aggregate output to price changes reveals that most of the studies were concentrated on the Northern States of India. No one, so far has made any attempt to study the characteristics of individual agricultural commodities of Kerala from the micro level or regional level. Hence the present study makes an earnest attempt to fill this research gap in the field of agriculture.

The relevant issues related to fertilizer subsidy in the Indian agricultural context were analysed by Asok Gulati and Kalra (1992). In their paper they examined the desirability of a trade off between fertilizer subsidy and investment in irrigation. According to the findings of their study, resource allocation becomes more effective by a shift in favour of irrigation.

Bal and Singh (1970) in a comparative study of the per capita distribution of income among farm families, farm labour families and non-farm families of Ludhiana District using random sampling procedure showed that the farm families enjoyed the highest income and the farm labour families the lowest. Lorenz curve was drawn to depict the concentration of income. Gini ratio for income distribution showed that household income was more evenly distributed among non-farm families.

The above studies have dealt with only economic efficiency in traditional and modern Indian agriculture. In order to know the allocative efficiency in modern agriculture, a series of new studies using data pertaining to recent years are called for.

1.1.2. Studies on Farm Size and Productivity

The farm-size productivity relationship debate is one of the most important debates in the Indian agricultural economics literature. When the debate concluded in the mid-seventies, there was a near consensus among scholars that small farms are more productive as compared to their large counterparts. In fact, the impact of the debate was so pervasive that Michael Todaro (1981) observed. "Evidence on a wide range of third world countries...Clearly demonstrates that small farmers are more efficient producers of most agricultural commodities." Like wise commenting on the policy implications of the inverse farm size productivity debate, Berry and Cline (1979) remarked: "The central policy implication of the analysis is that land redistribution into the family farms (assuming it to be small) is an attractive policy instrument for raising production and improving rural employment and equality of income distribution." The wide spread empirical evidence on the inverse farm-size productivity relationship provided theoretical and logical support to the numerous land reform measures and small farm bias in development strategy in a number of developing countries including India.

More recently, some scholars have argued that the much publicised inverse farm productivity relationship has either weakened or has even disappeared on account of numerous changes witnessed in Indian agriculture since the mid-seventies (Sharma and Sharma, 2000). It has been increasingly argued that these changes and development lead to capitalist relations of production and as the process of capital deepening gets intensified, the inverse relationship breaks down (Ghosh, 1979 and Dyer Grahm, 1991). All the changes warrant a fresh look at the farm-size productivity relationship.

Against this background, the present study examines the studies relating to farm-size productivity in traditional as well as in modern agriculture.

Sen (1962), Deepak (1963), Khusro (1964), Rajkrishna (1964), Hanumanth rao (1966), Rao (1967), Rudra (1968), Saini (1969) and Krishna Bharadwaj (1975) are some of the scholars who have examined this relationship in traditional agriculture. The inverse relationship was established for the first time by Sen (1962), using FMS data of fifties. He offered three explanations for the existence of the inverse relationship.

(i) Small farms are, by and large, more fertile than large farms.
(ii) Unlike large farms, small farms have surplus family labour; therefore they use more family labour which causes higher productivity in these farms.

(iii)Small farms are using better technique than large farms.

Being one of the pioneering studies in this area, the assumptions made and explanations given by Sen have attracted the attention of several scholars. Some of the assumptions have been questioned as they appear rather unsatisfactory. For instance, he assumes that small farms use only family labour and large farms the hired labour. It is, however, true that a good percentage of small farms in India use only family labour but not all the farms. This is evident from the FMS data of 1950s itself.

Following Sen, same systematic analysis in the area have been done by Deepak (1963), Khusro (1964), Rajkrishna (1964) and Hanumanth Rao (1966). Using the same FMS data all of them have invariably agreed with Sen regarding the nature of relationship between the farm size and productivity. But they do not agree with the explanations given by Sen. For instance, according to Deepak (1963), the productivity in small farms are either owner operated or tenant holding with lower incidence of rent. But Khusro (1964) maintains that as farm size increases, the proportion of bad and indifferent land to the total land would be high and this, according to him, is the main reason for the inverse relationship. Hanumanth Rao (1966) holds yet another explanation to the inverse relationship. He observes that yield per acre in large farms is low because large farms suffer from management bottlenecks, arising from the situation that, in the large farm, the hired labourers employed by them are supervised by insufficient number of paid managers.

While studying some production functions in Punjab agriculture, Rajkrishna (1964) also found the same inverse relationship in Punjab agriculture. He, however, does not seem to be inclined to give any specific explanation to this phenomenon.

By the end of 1960s same scholars began to suspect the propriety of using the aggregate data for analysing this relationship. Their argument is that the aggregate data in some cases, give spurious statistical result (Rudra, 1968). On this ground, the validity of earlier conclusions has been questioned. Attempts then have been made by them to examine this relationship with disaggregate data which, according to them, would give a more realistic picture regarding this relationship. The studies undertaken by Rao (1967) Rudra (1968) and Saini (1969) are in this category. Rao (1967) selected five villages covered by the FMS, for the detailed analysis and came out with conflicting results. That is, he did not find any uniform relationships between farm size and output per acre in sample villages. Similar is the case of study of Rudra, who examined the relationship in twenty villages. Rudra reported that 15 out of 17 rank correlation coefficients between farm size and productivity per acre to have a negative sign and nine of these to have a negative coefficient statistically significant too. He contends that although inverse relationship does operate in certain areas, it cannot be accepted as a rule.

The study conducted by Saini (1969), contradicts the results of the earlier studies in this group. Drawing data from FMS of 1950's, he correlated net yield per acre to net area. The result supports the inverse relationship between the farm size and productivity.

Attempts have been made by scholars to examine the validity of inverse relationship both at macro (combined all crops) and micro (individual) levels in the traditional settings. Krishna Bharadwaj's (1975) study belongs to this category. Her study, using the aggregate FMS data of 1950's establishes an inverse relationship between the yield per acre and farm size at macro level. At micro level, this relationship is not seen. While analysing this result, she, however, suspects that the recent technological change in the agricultural sector may alter this relationship.

These above mentioned studies have not examined the role of technology in determining the size-productivity relationship as they are mainly based on the FMS data of 1950's and majority of the studies were conducted during early 1960's. The relationship between the farm size and productivity in the context of new technological development has been examined by Usha Rani (1971), Singh and Patel (1973) and Chanda (1978).

Usha Rani, whose data base of the study was the FMS of 1967, selected 15 AIADP districts for detailed study. The result shows that though the correlation coefficients in 14 out of 15 cases are negative, they are statistically insignificant. Thus, the study concludes that in the context of new technology, the yield per acre remained constant over different size groups.

Using primary data collected from cultivators of Mexican varieties of wheat in Meerut District of Utter Pradesh, Singh and Patel (1973) point out that there is no indication of a decrease of output per hectare with an increase of farm size. A systematic discussion about this relationship in Punjab agriculture is given by Chanda. The study observes that in areas where capital expansion in relation to labour inputs is yet at comparatively low rate, the inverse relationship still holds good.

Recently, Ghosh (1986) has also confirmed that the inverse size-productivity relation is found to be reversed in areas undergoing technological change.

We may here refer to another study of Patiala District (Punjab) by Soni and Bagai (1983). This study also confirms the assertion that green revolution had taken place in one part of the district; agriculture in the other region was still traditional in character. They found that where as productivity per acre increased as the size of the farm increased in the region where green revolution had taken place; it declined with an increase in the size of the farm in the region where agriculture was still traditional. They further discovered that relatively higher productivity per acre on large farms in the region where agriculture had been transformed was accompanied by a relatively greater use per acre, of modern inputs namely fertilizers, other bio-chemical inputs and machinery. It was also found that in the region with traditional agriculture, the amount spent per acre on the modern inputs was smaller on large farms than on small farms. According to the authors, the common experience in both the regions was that it was the relative position of the modern inputs in the overall input structure on the farms which determined whether the output per acre would increase or decrease as the size of the farm increased. A study by Heady and Sircar (1983) also arrived at the same conclusion.

Conclusion by Bardhan (1973) was a little different. He felt that it was the use of total inputs and not of modern inputs alone, which explained the higher productivity on large farms. According to him, it is the amount of all inputs used (not labour alone) that influences the relationship between size of the farm and its productivity per acre.

Use of new inputs on larger farms in larger quantities was made possible not solely because of greater resources available with the large farms. Chaudhari (1973) proved that large farmers were equipped with a higher level of formal education. This enabled them to know more about the nature of new inputs, their right combinations and the necessary farm practices accompanying these inputs. Such knowledge minimised the uncertainty in yield that is generally associated with new inputs. The adoption of these inputs thus became easier in large farms.

Nulty (1972) found that tube wells in Pakistan were owned mainly by farmers with holdings more than 10 acres in size.

Recently some studies have shown that the inverse relationship between size and productivity is again appearing. These studies are by Heady and Sircar (1983), Sankhayan (1978), Bhalla and Chadha (1983) and Shergill (1987). The small farms seem to be catching up with the large farms with regard to their capital intensity in addition to the advantage of labour intensity which they always possess. However, more confirmatory studies, covering wider areas are necessary before this trend can be accepted as a general nature.

Size-productivity relationship is essentially a relationship between outputs on the one hand and a single input, that is, land, on the other. From this relationship, some economists tried to draw inferences about the nature of returns to scale in Indian agriculture. But this is not correct as the returns to scale are indicated by sum of regression coefficients of all inputs and not by the returns to one single input, say, land. Their conclusion was that returns to scale in Indian agriculture were constant. Both these conclusions are valid and are quite compatible with each other. Khusro and Saini (1964)[1] arrived at both of these conclusions.

On the basis of 'a priori' reasoning, Sen (1962, 1964) offered a general explanation for the observed phenomenon of the profits per acre rising as the size of the farm increased. He concluded as such on the basis of two assumptions:

(1) The ratio of family labour to hired labour used per acre declined as the size of the farm increased.

(2) Family labour was used much beyond the point where its marginal productivity was equal to the prevailing wage rate.

In such a situation, Sen was of the opinion that when family labour was given an imputed value at the ruling wage rate, much of the Indian agriculture would seem unremunerative. The hired labour is used up to the point where the marginal value productivity is just equal to the prevailing wage rate.

Saini (1971) suggested that the negative figures of profit on small farms, wherever these exist can be better explained in terms of the imputation of a rental value to owned land which is highly arbitrary and high cost of maintenance of draught power on the farms and the relatively greater under-utilisation of the bullock capacity especially on small farms. Capacity utilization improves with an increase in the farm size. Hence a positive association between size and profitability. The study by Bagai and Soni (1983) also confirms this trend of rising profits.

All the above studies conclude that profits per acre seem to be increasing as the size of the farm increases whatever be the state of technology in agriculture, though there is a difference of opinion about the reasons for this trend.

[1] Returns to one variable input - land decline by inverse relationship between productivity and the size of the farm and that the returns to scale in Indian agriculture were found to be constant.

The above studies have not arrived at any unambiguous conclusion regarding the impact of farm size on the utilisation of different inputs, profitability of farming etc. Regarding the economics of farming, especially paddy, the different studies have identified different factors. According to them, high cost of cultivation, negative growth trends in paddy prices, low profitability of the crop compared to its alternate crops, use of paddy lands for non-agricultural purposes are some of the factors attributed to poor performance of paddy crop in the State. Thus the literature reviewed leaves enough scope for this research, viz., shifting of paddy cultivation in Palakkad District.

1.2. The Problem and the Significance of the Study

Land can be used for several purposes and allocation of land among alternative uses is a complex economic problem since population pressure is very high and per capita availability of land is very low. The pattern of land use at any particular time is determined by the physical, economical and institutional frame work taken together. Further, land use is determined by the relative importance of its produce in sustaining the population. During the past three decades, the gap between internal production and requirement of paddy in the State has been widening.

The gap between demand for and supply of paddy in the State gives rise to the problem of importing food grains which is unsafe from the economic point of view. Hence it is very important to revitalise the paddy sector of the State. Recovery of the paddy sector is also important on many other grounds like providing employment and income to the people.

Thus development of the agricultural sector is considered to be a necessary condition for the overall progress of a developing country. Agricultural development in Kerala, in spite of all measures remains stagnant and paddy sector of the State economy has been showing declining trends both in area and production since mid seventies.

Palakkad District is the granary of Kerala State. Paddy is the principal crop here and it is cultivated in three seasons, viz; autumn, winter and summer. Being one of the interior districts of the State, Palakkad is geographically unique in many aspects. The continuity of the majestic Western Ghats, which stretches over 1000 km, is broken at Palakkad known as Palakkad Gap, with a width of 3.2 km. The climate of the district is greatly influenced by the gap, as it enables the North-East winds, to blow spreading its wing through out the breadth of the Ghats. Since the district gets the benefit of South-West and North-East winds, rainfall is heavy in both seasons and consequently Palakkad District has got extensive paddy fields and it is aptly known as the granary of Kerala. To the west of this region are the plains broken here and there by some isolated hills and drained mainly by Bharathapuzha and its tributaries. There are extensive paddy fields in this track. There are neither low lying areas nor seacoast embracing the District.

The district-wise analysis of performance of the crop shows that, the productivity in 1995-96 is higher in Palakkad District than the State average. The traditional paddy growing districts, (Kottayam, Alappuzha, Ernakulam, Trichur and Palakkad) still account for about two-third area, under this crop in Kerala. It is also significant to note that the rate of decline in area under paddy was less in these tracks compared to other parts of the State. Most of the major irrigation projects in Kerala are also located in these districts. If we look at the present situation from all these angles, the strategy for rice production calls for a new reorientation under an integrated approach with an emphasis on productivity improvement. Agricultural technology should be directed towards specific local conditions and thereby identifying homogeneous agro-climatic regions for crop specialisation at micro level.

This type of micro-level planning enables the planners to step up the rate of economic growth by mobilising and utilising the local resources, which may in turn help in reducing regional imbalances and social tensions. For this it is important to assess the development potential of the dominant sector of the economy, i.e.

agriculture. It can also be noted that agriculture is the predominant sector from which majority of the population draws its sustenance.

Again in the context of decentralised planning it is essential to have data consolidated at lower levels than State and district. The recent trend in National Planning seems to adopt block as the unit for planning and therefore the database using block as the strata is an essential prelude. Many attempts have been made to study the agrarian structure and economic development in recent periods. But none of these studies has arrived at an unambiguous conclusion regarding the farm size, productivity and profitability of the farming. Moreover, these studies have failed to identify the prime reasons behind the dismal performance of the paddy sector especially from a micro-point of view. The declining trend in productivity is to be attributed to a very large extent to the high cost of cultivation and unattractive returns. With the heterogeneity in rice cultivating situations that prevail in the State it is not correct to assume that the cost of cultivation is same through out the State.

Disparity in cultivation operations due to inherent agro-ecological factors and disparity in wage rates are the major factors which contribute to differences in cost of cultivation. A very relevant question which arises in this context is whether there is any attempt to assess the land utilisation in paddy production sector or regions in order to prevent the conversion of paddy lands for other purposes? Or is there any concentrated effort to minimise it? Even though many attempts have already been made to analyse the nature and extent of agricultural stagnation in general, much efforts were not yet made to identify the problems faced by paddy farmers and also the causes of shifting from paddy to alternate crops in the micro level which is affecting the income and employment position of the farmers in the State.

So, with a view to bridge this research gap, an intensive study is attempted here to investigate into the declining trend of area under paddy cultivation in Palakkad District and also to identify the factors responsible for shifting from paddy to other alternate crops along with the implications of such shifting.

1.3. Objectives of the Study

The important objectives of the present study are:

1. To examine the economics of paddy cultivation in Kerala
2. To identify the determinants of shifting
3. To identify the current problems faced by the paddy cultivators

Keeping the above objectives in view, the present study focuses on examination of the following aspects of study.

1. Cost and price of paddy
2. Comparative profitability of paddy and substitute crops
3. Conversion of paddy fields to other purposes
4. Farm size and productivity relationship

1.4. Hypothesis

1. Lower profitability of paddy cultivation and lower relative profitability of paddy among others caused shifting.
2. Shifting takes place owing to small size of per capita holding, part time nature of cultivation and other non-economic factors favouring cash and perennial crops.

1.5. Methodology and Data Source

The methodology and data source used in this study are given below.

1.5.1. Methodology

This is essentially an empirical study based on primary data.

To understand the factors contributing to changing pattern and declining trend of area under paddy cultivation, an area specific survey is conducted in the six

Development Blocks of Palakkad District in Kerala State. The rationality behind the selection of Palakkad District for the present study is many:

1. Palakkad District reserves an important place in the field of agriculture and it is the granary of Kerala State. The district is having the greatest proportion of wet lands in which paddy cultivation is foremost. It is again, the Palakkad District that gives the highest output of paddy when compared with the other districts of Kerala. The level of production is higher than the State average.
2. The district is endowed with a number of water resources though rainfall is comparatively less. As a corollary, agriculture gets great impetus and a good percentage of population of the district is engaged in agriculture pursuits. "The only article of any consequences that is cultivated in the padam land is rice."(Kareem, 1976)
3. It has the maximum land area under semiarid condition
4. The crop loss due to drought in respect of paddy production is maximum (91774 MT) as reported by the Government of Kerala in 1987 and recently in 2003-04. (Memorandum presented to Govt. of India for drought relief measures by Government of Kerala, 1987)
5. It is the most drought prone district in the State. Drought affects the various classes of farmers and people of other occupation and it affects their levels of living, income and assets.

The various steps of the adopted methodology are given in Chapter II, Section 3. Period covered in this study is the post formation period of the State. Overall performance of paddy crop is assessed by estimating the growth rates in output, area and its productivity by using the semi-log linear curve: ln y = a + bt, where the growth rate G (t) = b had been used. In cases where time series data are not given, Compound Growth Rates are used. Compound Growth Rates are estimated as:

$$G(t) = \pi\sqrt{\frac{y_t}{y_0}} - \pi$$

Where y_t and y_0 are termed as the terminal and the base year value respectively.

In the present study, growth rates in the performance of paddy crop and its alternate crops are estimated period-wise and season-wise.

In order to compare the profit and profitability of paddy with its alternate crops viz. banana, tapioca, coconut and mixed crops, per hectare profit of paddy and its alternate crops for the year has been estimated by finding the difference between per hectare cost of cultivation and value of product including the value of byproducts, if any. Profitability of crops has been estimated as the ratio of per hectare profit and cost of cultivation.

A generalised Cobb-Douglas production function is used to find out the coefficient of elasticity with respect to the various inputs. The inputs considered in the study are area of land, Cost of seedling, ploughing, labour, organic fertilizer, inorganic fertilizer and plant protection. Production function of the following form is assumed

$$Y = a_0 X_1^{a_1} X_2^{a_2} X_3^{a_3} X_4^{a_4} X_5^{a_5} X_6^{a_6} X_7^{a_7} \varepsilon$$

where,

Y = Yield of paddy ((in Rs)

X_1 = Farm size (in hectare)

X_2 = Seedling cost

X_3 = Ploughing cost

X_4 = Organic manure cost

X_5 = fertilizer cost

X_6 = Plant protection cost

X_7 = Labour cost

a_0 and a_i (I = 1, 2, 3, 4, 5 , 6,7) are parameters

ε is a random disturbance term, following normal distribution with zero mean and constant variance.

In data analysis, popular statistical tools like average, standard deviation, range, percentage and ratio etc. are used to facilitate comparison.

1.5.2. Data Source

Primary data have been collected to examine the profitability of paddy and the current problems of paddy cultivation. The detailed explanation of the sample procedure is given in Chapter II, Section 4-of Theoretical framework. Secondary data is collected to supplement primary data wherever necessary from various published and unpublished sources.

1.6. Scope of the Study

In an era of decentralized planning, it becomes imperative to build up economic data and information at the micro level. Absence of data in respect of many socio-economic variables has been a serious handicap in the conception and formulation of plans at the regional level. Data on income, cost of cultivation, cropping pattern etc. from the grass root level can be used for formulating location specific and target group oriented plans for the overall development of the region. The study may help farmers in visualising how improvements in agricultural operations by way of mechanisation, green manuring, soil and fertility improvement can reduce cost of production and generate higher income with resultant and higher surplus from their holdings. The official development wing of the State government may get a further insight into these aspects of rural development which require more attention. Moreover, the rural poverty eradication programme can be better formulated and implemented depending upon the occupational structure of the rural economy.

1.7. Limitations of the Study

This study is based on farm level data generated through sample survey. The main limitation of the study is that farmers do not maintain any basic farm records, as a result of which one has to rely on their memory. Moreover, farmers are usually reluctant in giving correct information on income and cost. The market price of paddy and its alternate crops is unknown to some farmers as they are illiterate and they are using the product for self consumption. The present study is confined to only six development blocks in the Palakkad District which represent the paddy cultivation of the district as a whole. Data regarding second crop of current year lacks perfection because of the drought experienced by the farmers in certain blocks. The study involves a lot of concepts and definitions and hence working definitions have been used wherever required. Despite of all these, every effort has been made to obtain reliable information as far as possible.

1.8. Plan of the Study

The present study is divided into nine chapters including the present introductory chapter which deals with the importance of investigation, review of existing studies related to the problem under investigation, objectives, methodology and data source, scope of the study and limitations.

The second chapter provides a theoretical framework in which the conceptual and methodological issues are examined which also gives details of the methodology used in this study. The review of the change in cropping pattern and the performance of the paddy sector in Kerala along with the causes for the decline of paddy cultivation in the State are attempted in the third chapter. In Chapter 4, a brief description of paddy cultivation in Palakkad District is attempted in terms of area of production and productivity after depicting the socio-economic profile of the study area. The economics of paddy cultivation and of its alternate crops is examined in detail in Chapter 5 in terms of estimated costs and returns. Chapter 6 discusses the causes of shifting and consequences of decline in area under paddy cultivation. Here both economic and non-economic factors are analysed. Chapter 7 is devoted to examine the relationship between farm size and productivity in sample area. This is followed by the presentation of results and the discussion of findings in Chapter 8. Chapter 9 summarises the findings of the study, followed by references.

CHAPTER II

THEORETICAL FRAME WORK

CHAPTER II

THEORETICAL FRAMEWORK

Introduction

The present study is designed to examine the economics of paddy cultivation and declining trend of area under this crop in Palakkad District. In addition, other major problems proposed to be investigated in the study are the change in cropping pattern, relationship between the size of holding and profitability and the resultant problems faced by the paddy farmers and conversion of area to non-agricultural purposes. Some of these problems with reference to Indian agriculture have been studied in detail by some scholars. This chapter is an attempt to review the methodology of these studies grouping them under

(a) Studies on the economics of crop production and
(b) Studies on the relationship between the farm size and productivity.

An attempt is also made to explain the tools of analysis used in the present investigation. The selection of different tools has been made in the light of different methods followed in various studies reviewed.

2.1. Methodological Review of Literature

2.1.1. Studies on the Economics of Crop Production

Two approaches have been used to examine the economics of crop production and they are the Net Returns Approach and the Production Function Approach. A number of studies which examine this problem using both these methods are available at present.

2.1.1.1. Studies using Net Returns Approach

The earliest attempt on the economics of crop production in terms of cost and return analysis in India had been made in the Farm Management Studies (FMS)[1]. Following FMS, the studies made by Pillai and Panikar (1966), Kuttanad Enquiry Commission (1971), the State Planning Board, Kerala (1976) and Radhakrishnan (1981) have also attempted to work out economics of crop production with Net Returns Approach. The cost and returns of paddy cultivation in three paddy producing districts in Kerala, viz, Alappuzha, Trichur and Palghat is examined by Radhakrishnan (1981).

One drawback of the Net Returns Approach in examining the economics of crop production is that this would not help us to understand the contribution to output by individual inputs in the production in which more than one input interact together.

Some scholars are of the opinion that marginal analysis based on Production Function is more useful.

2.1.1.2. Studies using Production Function Approach

The rationality in the allocation of resources shown by farmers in traditional agriculture in under-developed countries was pointed out for the first time by Schultz (1964) on the discussion of allocation efficiency of farmers in traditional agriculture. He remarked that "given the land at the disposal of farmers and the state of their knowledge, they are not underutilising the reproducible capital at their disposal…they are not misallocating their own labour nor other labour that is available to them". The data used in his study were drawn from Hopper's study (1965). Hopper conducted his study among high caste farmers in a North Indian village who undertook agricultural operations such as ploughing, sowing and

[1] FMS were launched by the Directorate of Economics and Statistics, Ministry of Food and Agriculture, in the early period of 1950's and continued in 1960's also. (See for more details Chapter 1. Review of Literature)

harvesting with hired labour. Shultz's study, therefore, does not perhaps reflect the allocation efficiency of peasants who cultivate mostly with family labour. The study conducted by Thakur *et al.* (2001) laid emphasis on the extent of resource-use and endeavors to quantify the technical input-output relationship so as to achieve resource use efficiency for better agricultural growth. The study was carried out in three agro-climatic zones of Himachal Pradesh excluding high hills dry temperature zones. One district from each zone was selected, by employing cluster sampling; a cluster of three villages was selected randomly from each district. The cross-sectional data on various aspects of farming and input-use were collected through personal survey method. Both tabular and functional analysis was carried out to synthesise the results and findings. Cobb-Douglas type of production function was employed on the basis of better results and goodness of fit (χ^2). The technical input-output relationship through production function under different sizes of farm for different hill zones is depicted in their study. According to them, the Marginal Value Product (MVP) and the Factor Cost (FC) ratio varied among different crops in hill regions. Yet there was unanimity in the utilisation and relative importance of the inputs. Farm Yard Manure and fertilizers emerged as the most critical resources for increasing output, which were signalled by higher and positive MVP-FC ratio of these two inputs for all these crops. Seed, human labour and bullock labour, by and large, did not contribute to the additional value output thereby showing that these inputs are surplus and used in excess. Further, it was visualized that MVP-FC ratio, in general was relatively higher on medium farms showing greater scope for improvement in these farms. The study concluded that crop productivities with study area can be increased by higher use of Farm Yard Manure and fertilizers. The study recommends less use of human labour and bullock labour along with the adoption of high yielding varieties of crops.

Different pattern of returns to scale was observed for field crops on small and medium farms on these zones. They find the medium farms better than small farms and this is due to low level of uses of farm yard manure, fertilizers and bullock labour. The use of human labour input did not reveal any significant impact on the production of crops except the labour intensive crop of peas, where it was statistically significant.

Borbora and Mahanta (2001) have examined the inter-disparities in the production with respect to area, fertilizer-use and rainfall as determining factor in the state of Assam using the Cobb-Douglas Production Function. A correlation study among the four variables, viz, area, production, fertilizer and rainfall is done to get an idea about the interrelations among them. The study based on primary data is an attempt to examine the impact of fertilizer and rainfall on agricultural productivity. The study shows that where the area did not play any important role in situation, this fertilizer, rainfall or irrigation facilities have to play important role in increasing agricultural production. If production is increased it is only the effect of either intensification of area or increased rainfall or better irrigation facility. But one limitation of the study is that several other factors such as the use of mechanised farming, migration of labour, total irrigated area have to be incorporated in order to provide a complete picture, other than area, fertilizer and rainfall.

Singh (1975) had examined the allocative efficiency separately for all farms and different size groups in Seoria District of Uttar Pradesh using Cobb-Douglas Production function with land (standard acre), human labour (in-man days), bullock labour (pair days) and fertilizers (in rupees) as explanatory variables. The study shows that marginal value products are higher than respective factor cost, indicating thereby existence of inefficiencies in the present use of inputs on the same farm.

One drawback of the above studies, according to Rudra (1973), is the assumption of the model itself, where every individual farm is inefficient. Rudra points out that "the equality of market price to the marginal value products at the average points directly implies that one section of the farmers are over-allocating the resource concerned and remaining under-allocating it. In other words, every individual farm is by the assumption of the model itself inefficient". While this assertion of Rudra still remains controversial, further evidences for the inefficient allocation of resources have been provided by the set of other studies. Some of the important studies in this group are of Pillai (1967), Dey and Rudra (1973b), Hati and Rudra (1973) and Sampath (1979).

In this study, Pillai (1967) concludes that the resources in paddy cultivation in Kerala are inefficiently used. The data for this study have been drawn from the FMS of 1962-63, 1963-64 and 1964-65. Cobb-Douglas production function with farm size, free human labour, bullock labour and farm-yard manure and fertilizers as independent variables have been fitted to test the resource use efficiency in paddy cultivation. Perhaps, this is the pioneering study dealing with resource use efficiency in the cultivation of paddy in Kerala. The study has been noted due to the fact that the resource-use efficiency has been examined for three years with three paddy crops, viz, Virippu, Mundakan and Punja. But this study has one drawback. It did not attempt to examine the resource-use efficiency in different size categories. The size-wise analysis of resource-use efficiency was quite imperative. This is so, because during the study period Kerala had not implemented land reforms and consequently, there was glaring disparities with size of holdings in the State.

Economic efficiency has two components, viz., allocative efficiency and financial efficiency. The allocative efficiency refers to the proper choice of input combinations where as the technical efficiency denotes proper choice of production function. Hati and Rudra (1973) have examined both these aspects of the economic efficiency. Data have been collected from 149 farms in Hoogly District of West Bengal and Cobb-Douglas production function has been fitted to study the problem. With regard to the technical efficiency, the study indicates that about sixty per cent of the farms produce less than forty per cent of what the most efficient farms among them can produce, given the same input. In the matter of allocative efficiency, both under constrained and unconstrained maximisation were observed. The authors found that the farmers in the sample are not allocating resources optimally. More or less similar view has been held by Sampath (1979) in his study relating to Deoria District in Uttar Pradesh. According to this study, the economic inefficiency of the farms is as high as 36.53 per cent out of which 24.42 per cent is due to technical inefficiency and 12.11 per cent is due to allocative inefficiency.

Dey and Rudra (1973) presented some results based on farm-level data of farm management survey of West Bengal of a test carried out for the hypothesis of allocative efficiency of farmers under the assumption of Cobb-Douglas technology. The authors considered the production function connecting value of output (O) with labour input (L) and material input (M) both for crops taken individually and for crops taken together. They studied empirically the relation between the pairs of variables (M, L and O). They found that there is a strong association between the pairs of variables for all crops and no association for individual crops. The lack of association between the variables for individual crops prompted them to conclude that the hypothesis of allocative efficiency of farmers gets rejected irrespective of any production technology.

The same hypothesis in the same region is examined by Saswati Das and Chattopadhyay (1998) after a period of about 18 years. Dey and Rudra (1973a) designed a test which has the following four fits for all crops as a whole.

$$
\begin{aligned}
H_0 &: \overline{L}_r = \theta_1 \overline{M}_r \\
H_1 &: \overline{L}_r = \theta_1 + \theta_2 \overline{M}_r \\
H_2 &: \overline{L}_r = \theta_2 \overline{M}_r + \theta_2 \overline{M}_r^2 \\
H_3 &: \overline{L}_r = \theta_1 + \theta_2 \overline{M}_r + \theta_2 \overline{M}_r^2
\end{aligned}
$$

where θ_1, θ_2 and θ_3 are constants; $\overline{M}_r$ per acre material inputs and $\overline{L}_r$, per acre labour input in farm r.

To examine the allocative efficiency hypothesis in a different way Dey and Rudra (1973b) considered the proportions in which the inputs are allocated among different crops and suggested some test criteria for individual crops as well. In their study, Saswati Das and Chattopadhyay (1998) examined the allocative efficiency model mainly on the basis of data of all crops. They used comprehensive scheme for studying cost of cultivation (CSSCC) data pertaining to the year 1989-90 for West Bengal only (Dey and Rundra, 1973 a, b).

The study done by Dey and Rudra ruled out the confirmation of the hypothesis of allocative efficiency of Indian farmers under a Cobb-Douglas technology. The study by Saswati Das and Chattopadhyay (1998), by and large, supports this conclusion though they do not agree with the view that no association between labour input, material inputs and outputs exist at the individual crop level. One drawback of their study is that, no conclusion can be drawn from their findings regarding the effects of new agricultural technology as well as institutional reforms in rural West Bengal recently on the production function frontier.

Studies conducted by Janvry and Kumar (1981) made use of Cobb-Douglas type of profit functions in the context of Indian agriculture. This functional form imposes restrictive assumptions on the elasticities (Chand and Kaul, 1986).

The study conducted by Goyal and Ernst Berg used the normalised quadratic profit function to examine the impact of input output changes on the demand for inputs and the supply of output among cultivators of Haryana State (Lau, 1976, 1978). This function form allows negativity of the profit which is an additional advantage. Two variable inputs (human labour days and fertilizer use) and three fixed inputs (irrigation, capital expenditure and land area in hectors) are included in the model. The study concludes that farmers are profit maximisers and for increasing output, technological improvements are of paramount importance and land has very strong influence on paddy supply and input demand. The regression coefficient of the supply equation indicates that factor price effect on output supply was negative and statistically significant at one per cent level. This shows that the output decreases with the increase in normalised price of inputs. The sum of elasticities of fixed factors was 1.01 which indicates that constant returns to scale existed in paddy cultivation.

India is a vast country where the geographical and climatic conditions vary significantly, not only within a state but also within a district. Further, the glaring disparities in the distribution of size of holding, high dependence of farmers on moneylenders for their credit needs etc., are some of the factors which affect the allocative efficiency of the farmers. More over, the imperfections in both factor and product markets also influence the allocative efficiency. The studies reviewed above, give little attention to the aspects of the resource use efficiency of the farmers.

2.1.2. Studies on Farm-Size-Productivity Relationship

Sen (1962), Deepak (1963), Khusro (1964), Rajkrishna (1964), Hanumanth Rao (1966), Rao (1967), Rudra (1968), Saini (1969) and Krishna Bharadwaj (1975) are some of the scholars who have examined this relationship in traditional Indian agriculture. While Sen, Deepak, Khusro, Hanumanth Rao, Rajkrishna and Krishna use aggregate or classified data for the analysis, the remaining others in this category use disaggregate or farm level data.

Most of the scholars who use the aggregate data for analysing this relationship support the inverse relationship between the farm size and productivity.

Khusro (1964) subjected the farm management data to statistical analysis and confirmed the existence of an inverse relationship between farm size and productivity. His findings, however, cannot be accepted because of (i) the aggregation bias, (ii) the weak statistical significance of correlation coefficient and (iii) the limitations of land revenue as an index of soil fertility.

Sen (1962, 1964) expressed doubts about the use of aggregate size class data as published in the farm management studies to prove statistical validity of the observations which he made on 'a priori' reasoning. Rudra (1968) too challenged the statistical validity of the inverse relationship that was revealed to exist on the basis of aggregate. Rudra used in his analysis, farm class averages as against the disaggregated farm level observations. Even if one gets constant productivity relationship on the basis of gross cropped area, the results will still be consistent with inverse relationship between farm size and productivity.

The relationship between the farm size and productivity in the context of new technological development has been examined by Usha Rani (1971), Singh and

Patel (1973) and Chanda (1978). Singh and Patel concluded from their regression analysis that, "in the context of new technology, there is no indication of decrease in output per hectare with an increase in farm size and therefore, the hypothesis of inverse relationships is rejected in the area under study."

According to Rudra (1968) small farmers seem to cultivate their lands more intensively in the sense that they put in more of labour per hectare and more non-labour material inputs per hectare, they seem to arrange for irrigation for a greater proportion of their land. As the new agricultural strategy is highly capital-intensive, even after all the efforts, the small farmer's "output per hectare on his farm may not be larger than on the farms of bigger farmers." Even before the emergence of the economic consequences of abolition of tenancy and operation laws of inheritance, the assumption that the size of holdings and productivity were inversely related came to be questioned by Rudra and Sen (1980). They observed that the negative relation may hold in certain parts of the country at certain times. Even when the inverse relationship holds, it may hold in certain ranges but not in others, and in many cases it is particularly noticeable, only for small size classes.

Dyer (1991) after examining the empirical basis of inverse relation between farm size and productivity in some developing countries, including India, has come to the conclusion that in the static context, the inverse relation is not the product of superior efficiency on the part of small farms nor is due to better quality land on the small farms, but arises from the desperate struggle of poor peasants for survival on below-subsistence plots of land in a relatively backward agricultural redistribution of the land. On the basis of the inverse relation argument, therefore, far from alleviating poverty and creating employment opportunities, this will deepen and perpetuate extreme levels of exploitation and poverty. Further more, in the dynamic context of the development of the forces of production in the shape of Green Revolution Technology, the inverse relationship is likely to disappear. Inverse relationship argument has no longer any rationale in the context of changing production conditions.

After reviewing the entire debate on the issue, Dyer (1997), has concluded that in the dynamic context of the development of both the relation and forces of production, in the shape of new technology, the inverse relationship breaks down and disappears.

Thakur *et al.* (2001) lay emphasis on the extent of resource-use and endeavours to quantify the technical input-output relationship so as to achieve resource-use efficiency for better agricultural growth. A sample of farm house holds comprising 60 small and 40 medium in low hills, 75 small and medium in medium hills and 82 small and medium in high hills were selected for the study. Cobb-Douglas production function was employed.

Different patterns of returns to scale were observed for field crops on small and medium farms in these zones. The medium farms were better than small farms. On medium farms low level of use of farm yard manure, fertilizer and bullock labour were the major limiting factors in the production of all the crops in high hill region. This was depicted by the significant positive values of the elasticity coefficients for different crops. Farm yard manure and fertilizers emerged as the most critical resources for increasing output. It was visualized that MVP-FC ratio, in general were relatively higher on medium farms there by showing greater scope for improvement on these farms.

2.1.3. Studies on Farm-Size and Profitability

An important question in respect of small-sized holdings is about their efficiency. Compared to large-sized farms, small farms are generally found to be inefficient in the sense that they are unremunerative.

Md. Abdul Wadud and Ben White (2002) in their study, 'The determinants of technical inefficiency of farms in Bangladesh' measures farm specific technical inefficiency using farm level cross-sectional survey of data of rice farmers. Technical inefficiency effects are modeled as a function of environmental factors, irrigation infrastructure and farm specific socio-economic factors. The results show the technical inefficiency influenced by the factors measuring environmental degradation and irrigation infrastructure. The literature indicates that a range of socio-economic and demographic factors determine the technical efficiency of farmers. They include land use, credit availability, land tenure and house hold labour's education, techniques of cultivation, share tenancy, farm holding size which influence the efficiency as well.

Sen (1962) was observed that "when family labour employed in agriculture is given an important value in terms of the ruling wage rate, much of Indian agriculture seems unremunerative. He concludes, "by and large, the profitability of agriculture increases with the size of holding, profitability being measured by the surplus of output over costs, including the imputed value of labour.

Saini (1969) did not agree with Sen. Analysing the FM data for Uttar Pradesh and Punjab he found that the marginal value product of labour was not only positive but was also higher than the labour costs. Saini observed the following facts:

i) A good proportion of even the smallest sized farms should get positive profits
ii) Losses are to be found not only in small sized farms but also in bigger land holdings.
iii) Size classes show loss in one year but profit in another year.

A critical review of the debate since it commenced in the early sixties down to the late nineties throws up the following main issues:

i) Most of the studies have used pooled aggregate data. The size class aggregates have been compared to establish the relationship between farm size and productivity. This may conceal the inter play of numerous factors which operate in a real world situation. The group aggregation might generate spurious statistical relationship. Though the later studies did use the farm level data, the aggregation bias persisted in as much as the data for different villages were pooled and studied in terms of averages.

ii) The procedure for testing the relationship using farm-size as a single independent variable has been questioned. Though farm-size is the single most important variable surrogating income, wealth, social status etc. of the sample house holds can't be reduced to a single scale variable.

iii) The assumption of monotonous linear relationship is not realistic. It is quite likely that the said relationship holds true in some ranges of farm-size, while in others it may not exist.

iv) It has been pointed out that most of the studies have established the inverse relationship between farm-size and value productivity per hectare. There is not much evidence to establish whether the relationship also exists between physical yields of individual crops and farm-size. The confirmation of this later relationship is essential to establish higher efficiency on the small farms.

The controversy regarding the inverse relationship between farm-size and land productivity is not one of academic interest, but of fundamental significance from the point of view of economic policy. It is against this background that the present study is undertaken to examine the shifting of paddy cultivation in Palakkad District.

2.2. Methodology and Sample Frame

The present study highlights the existing status of paddy production in Palakkad District, which is one of the rice bowls of Kerala State, with an emphasis on cost and profitability of paddy and its alternate crops. This section deals with the tools of analysis used in the present investigation and measurement of inputs. The remaining section deals with the concepts used in the study, the data sources, research approach and the sample frame.

2.2.1. Tools

Net returns approach has been used to examine the economics of paddy cultivation and its alternate crops. Net income is found after deducting all expenditure incurred-actual as well as imputed- for farm production from the gross value of farm output. This helps in measuring the efficiency of different farms in the same region or in the different regions or of the same farm on different points of time.

The concept of cost developed in various farm management studies are often followed as models for estimation of cost of cultivation of crops. These concepts have been used in a number of studies in Kerala for cost estimation. For estimating cost of production of paddy and its alternate crops in Palakkad District we also follow, the concepts of costs used in the farm management studies with some minor modifications. Four different cost concepts are followed in these studies. They are defined as follows:

Cost A_1 = Hired human labour, owned or hired bullock labour, seed and manures (both farm produced and purchased), irrigation charges, interest on Crop loans, depreciation of implements and other implement charges.

Cost A_2 = Cost A_1 + rent paid on land taken on lease.

Cost B = Cost A_2 + rent on owned land and interest on owned fixed capital (Excluding land).

Cost C = Cost B + the inputted value of family labour.

On the basis of these costs, Net income may be defined as Gross income minus cost C. As there exists no tenancy in the sample farms, rent not taken, (both paid out and imputed one), into account in the estimation of cost. The total cost is divided into two: variable cost and fixed cost. The important items of expenditure considered for variable cost estimation are those for human labour, bullock labour, seed, irrigation, fertilizers, pesticides and transportation. The items of expenditure included under fixed cost are those for interest on working capital, land revenue/tax and depreciation.

Two concepts of income, viz., Gross Income and Net Income have been used to examine the returns from the paddy cultivation in the study area. The Gross Income is defined as the value of paddy and straw, the byproduct of paddy. Likewise the value of the output of alternate crops and its byproducts if any is defined as Gross Income. The difference between the Gross Income and Total cost of production indicates the Net Income. Further, an attempt is also made to work out the benefit-cost ratio of, not only paddy and its alternate crops but also for different size group of these crops. This is worked out by dividing Gross Income with Total Cost of Production.

2.2.2. Measurement of Inputs

Land represents, in general, nature and natural resources that are used in production. Soil is the end product of the parent material resulting from the constituent influence of climate, topography and natural vegetation over a long period of time. In earlier studies this variable has been measured in two ways: (1) ordinary acreage and (2) standard acreage. Agarwal (1956-67), Basak and Chowdhiry (1956-67), Saini (1969), Zacharias (1956-57) and Thomas (1996) in their studies measured the land input in terms of ordinary acreages. This is the easiest and simplest methods of measuring the land input. But the defect of this measurement is that as it ignores the fertility differences among and within farms, this, in most cases, vitiates the result. To overcome this defect, standardisation procedure is generally adopted in production function studies. (Hopper (1965), Khusro (1964) and Rajkrishna (1964)) The standardisation of area which is aimed at to allocate the fertility differences is effected with different methods like Land Revenue Index, Fertility Index etc. Though there are a number of methods available at present to standardise the area, none of them is free from defects.

For the purpose of present investigation, the land area has been measured in ordinary unstandardised acreage. In spite of the defect pointed out above, the reason to take this measurement is that the paddy fields in Eastern and Western Blocks represent more or less homogenous soil structure in its own but heterogeneous in general and the ordinary acreage would not vitiate the result.

Human Labour: Human labour stand next to land in production process in agriculture. This variable can be measured in two ways: either in total number of labours used in production process or in terms of physical units of labour time. While Naik (1965) measured this variable in terms of total number of human labour used in the production, Rajkrishna (1964) and Zacharias (1956-57) expressed this input in physical units of time. And in this study, the second measurement is used since it takes the differences in efficiency between male and female labourers into consideration.

Here, a man day is defined as eight hours of work done by an adult man. The female labour has been converted into man days on the basis that two female labours is equal to one male labour.[2]

Again in the case of labour in agriculture, the use of labour is intermittent. Ploughing, sowing and weeding are all distinct operations distributed over the crop season, and hired labour would be used at these times. No doubt, family labour, and some attached labour would be performing on-farm functions even when they are away from field proper, but this is not the same thing as having a regular labour force for cultivation purposes. Apart from these, in the agricultural sector, valuation of family labour pauses serious conceptual problems. On the one hand, family labour can be shown to be employed even when its marginal productivity is very low, and, on the other, an hour's work done by family labour cannot be equal with that of casual or attached labour because the quantity of work done by family labour would be far better.

Two types of labour are observed in the study area - permanent and casual. What distinguishes the two is that the permanent labour is conferred permanent right

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[2] The wage rate for male labour is just double that of a female labour in the study area

to certain agricultural operations like, harvesting and making hay. They receive more employment though the wage rates are lower than casual workers. On the other hand, temporary or casual labourers are engaged only during peak period of work. Their employment is temporary and they are paid at the market rate. They are not attached to any landlord.

Bullock Labour and Tractor: In the study area, both bullock labour and tractor are used for ploughing and leveling of land at the time of sowing. As in the case of human labour, this variable is also measured in physical units of time, viz., bullock labour day. One bullock labour is defined as 5 hours of work done by a pair of bullocks and a man behind the plough. Animal labour is being used by some farmers instead of machine labour for the preparation of land and is valued on the basis of the local hiring charges. Since adequate and correct data on maintenance and use of the bullocks was very difficult to get, the value of the owned bullock labour is inputted at the rate of hiring charges prevailing in the localities. Likewise owned machine labour is also valued on the basis of the local hiring charges.

Fertilizers and Manures: While Naik (1965) and Parikh (1966) treated chemical fertilizers and manures as separate variables, Rajkrishna (1964), Basak and Chowdhiry (1956-67) used them combined as one variable in their respective studies.

Fertilizer alone is used in majority of the sample farms because of its easy availability and transportation facilities. Indeed, in several farms, either farm yard manures or both fertilizers and manures have been used. In this study, we take both chemical fertilizers and farm yard manures and represent them as one variable and these have been measured in kilograms. When farmyard manure is scarce, green manure is added to keep up the fertility of soil.

Farm-produced seeds have been evaluated at the village prices prevailing at the time of sowing. Value of plant protection chemicals, viz., insecticides and fungicides are calculated at their market prices.

Irrigation: Irrigation is a promotional input for agriculture, which has a production augmenting effect in the study area. The cost of irrigation means the rate at which the farmers utilise water resources for raising crops.

2.3. Research Approach

The research approach adopted in the present study comes under the descriptive design where the researcher describes or presents picture of a phenomena under investigation. The methodology here is quantitative in nature producing descriptive data, i.e. farmers' own experiences observed in the study area. In the study, the statistical survey was done using sampling method to collect data regarding:

i) Distribution of land holdings
ii) Proportion of area under paddy and its alternate crops
iii) Distribution of house holds on various types of farm activity
iv) Cropping pattern and income and expenditure pattern
v) Problems faced by the paddy farmers, and
vi) Employment pattern of the population

The methods used ranges from field-based visualisation to interviewing. The field work and social interaction helped a lot to collect the essential and necessary data more systematically and accurately. This is partly because local people's knowledge about local conditions is often greater than that has been supposed, and partly because it allows the local people to discuss and crosscheck local conditions. Thus direct observation, semi-structured interviews, and questionnaire surveys were carried out by the researcher. Detailed field notes were also prepared during the process.

The data collected for the present study belong to two categories: primary and secondary data.

2.3.1. Primary Data

Primary data has been collected from 302 farmers with an aim to examine the cost and profitability of paddy cultivation in the Palakkad District and also to identify the problems and prospects of paddy cultivators in the study area. For the purpose of collecting primary data, with the help of a structured interview schedule, a field investigation was conducted in the selected blocks during 2003-2004, Mundakan season. The selection of sample households was done after a village survey. A group of effective households, who has been cultivating paddy for the last consecutive three years were chosen at random from the village records after obtaining the preliminary information. The respondents are being interviewed stating the details of the purpose of the study, along with the academic significance and nature. As many of the respondents are not able to fill-in the questionnaire because of inadequate records, the researcher has to spend more time to get the essential details of their farming from asking questions related to agricultural operations. Almost all the respondents are interviewed and a few of them expressed their doubts regarding policy matters.

The interview schedule included questions to be filled up giving the characteristics of each area surveyed regarding environment, cropping pattern, livestock, machines, source of irrigation, source of finance, product price and fertilizer application. In the course of interview, the respondent was expected to express their own ideas, understanding and experience regarding paddy cultivation. During the course of the study, several villages were visited where the researcher has focused group discussions with the agricultural labourers, small peasants and landowners and also with agricultural workers in Palakkad District. Thus participatory research method was extensively used. In every village, discussions are held with several interest groups in the village. These discussions are held mainly with the following groups:

1) Agricultural labourers
2) Labourers working in the off-farm activities
3) Elders of the village, who are not in the work force at present

4) Some big farmers of the village
5) Peasant farmers of the village
6) Separate discussions with women labourers of different categories.

2.4. Methodology adopted

This section deals with the materials, methods and tools of analysis adopted in estimating the economics of paddy cultivation and its alternate crops in Palakkad District. The study was conducted in six selected Development Blocks of the District and the data for the study was generated through a sample survey, involving four Circular Systematic sampling procedures. The sampling units at different stages of sampling were blocks, Panchayats, Padasekhara Nellulpadana Samithies (PNS) and Households.

2.4.1. Sampling Procedure

The study area of Palakkad District comprises five Taluks and thirteen Development Blocks. It has nine towns and fifty five inhabited villages. The census of Panchayaths of 2001 population constituted the sampling frame for the selection of PNS. Out of thirteen blocks, six blocks were selected using circular systematic sampling procedure (Figure 2.1). Blocks were numbered 1 to 13 as the order given in Figure 2.1. One Block was selected at random and then every 2nd unit (Block) was selected one after the other until a sample of six blocks is selected. (Two is the sampling interval which is equal to 13/6). The selected Blocks were Kollengode, Malampuzha, Kozhalmannam, Palakkad, Ottapalam and Pattambi, the first four blocks representing irrigated (Ayacut) area and the last two representing Non-ayacut area where the paddy cultivation is mainly rain fed. From each blocks number of sample households were selected randomly based on the probability proportional to the number of effective farm households belonging to each PNS. Total number of farm house in PNS and the number of sample households selected from each selected block are given in Table 2.1.

Table 2.1

Distribution of Households and Size of Sample belonging to PNS in the Selected Blocks

Block	Total number of households	Sample size
Kollengode	83	34
Malampuzha	159	66
Palakkad	118	49
Kozhalmannam	126	52
Ottapalam	89	37
Pattambi	154	64
Total	729	302

Source: Computed from respective Krishibhavans 2002-03.

Altogether there are 302 households in the sample studied. Data is collected during the Mundakan season in the year 2003-2004. Virippu is raised only by 265 out of 302 house holds.

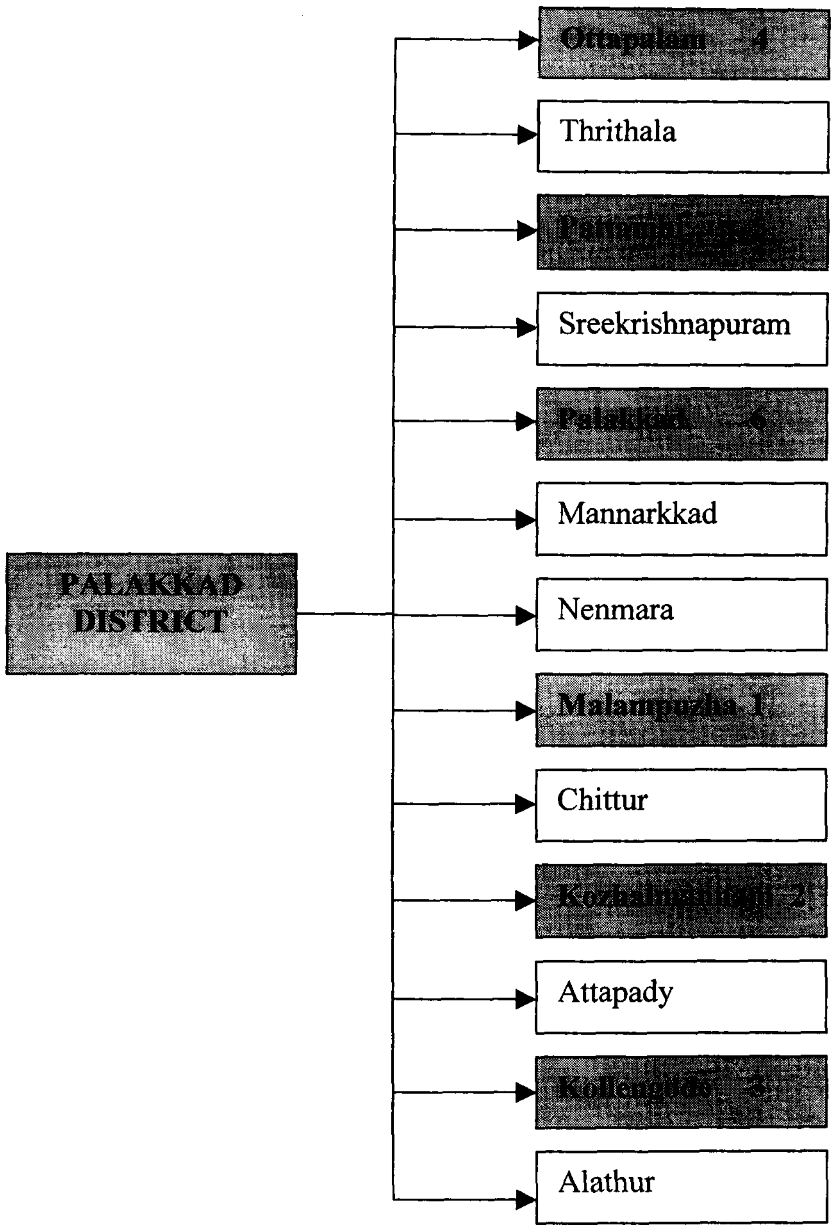


Figure 2.1. Graphical Representation Showing the Selection of Sample Blocks from the District

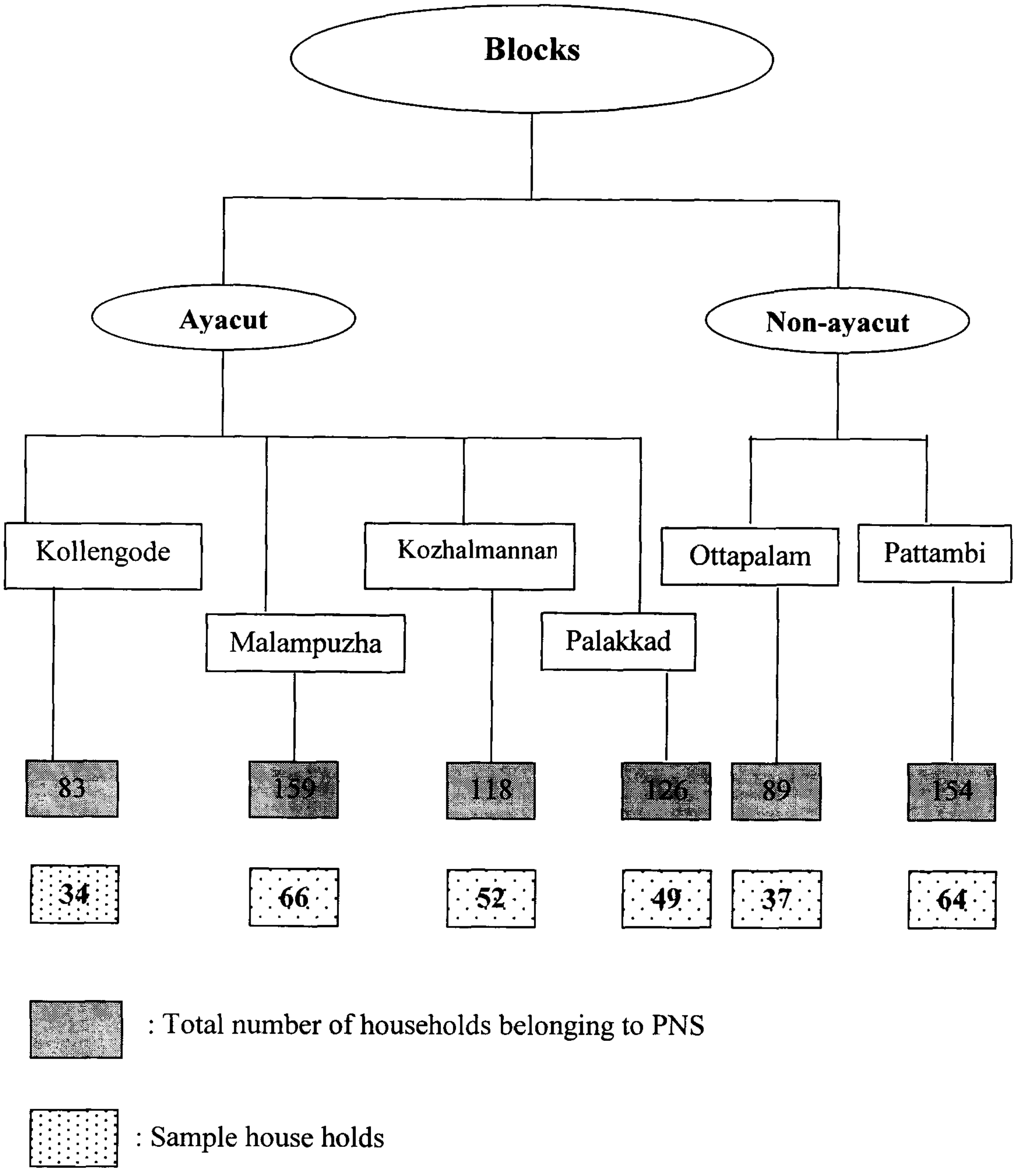


Figure 2.2. Graphical Representation Showing the Selection of Sample Households from the Blocks

CHAPTER III

A REVIEW OF THE PERFORMANCE OF THE AGRICULTURAL SECTOR WITH SPECIAL REFERENCE TO PADDY CROPS

CHAPTER III

A REVIEW OF THE PERFORMANCE OF THE AGRICULTURAL SECTOR WITH SPECIAL REFERENCE TO PADDY CROPS

This chapter in two parts attempts to make an analysis of the problem and prospects of paddy cultivation in Kerala. The introductory part of the chapter deals with the overall performance of the agricultural sector with special reference to paddy cultivation in terms of State Domestic Product (SDP). The performance of paddy crops in the State is analysed in terms of growth rates in area, production and productivity of paddy. Land use pattern, cropping pattern and the changes over time are also highlighted. A brief assessment of critical growth factors- technical and institutional together with policy matters is also attempted. The second part deals with the causes for the decline of paddy cultivation in the State. These are broadly classified as economic and non-economic factors of paddy cultivation.

3.1. A Review of the Performance of Agricultural Sector in Kerala

This section starts with the description of a location and area of agriculture along with the importance of agriculture in the State. Second section deals with the State Domestic Product and the contribution of agricultural sector. Sector-wise growth trends and changes in the relative contributions of primary, secondary and tertiary sectors to the State Domestic Product are examined. Growth rates in the overall agricultural output, area under cultivation and productivity indices are analysed in the third part along with the comparative performance of food crops and non-food crops. The changes in the land utilisation pattern and the changes in the cropping pattern are analysed in the fourth and fifth sections. An assessment of factors contributing to agricultural growth is briefly attempted in the last part of the first section of the chapter.

3.1.1. Paddy Economy of Kerala – An Overview

The State of Kerala was formed on 1st November 1956, consequent on the reorganization of States on linguistic basis. It is a narrow strip of land about 585 km in length located in the southern tip of the Indian peninsula between Arabian Sea on the West and the Western Ghats on the East. The land slopes from East to West. Based on topography, the State may be divided broadly into three regions, viz, low land, mid land and high land. In the low land region bordering the Arabian Sea, the soil in most places is sandy, but the wet land tracts contain clay soil too. Rice and coconut thrive well in this region. The mid land comprising rolling hills and valleys provides a variety of crops. The soil here is mostly laterite. The high land region is almost entirely covered with forests and is best suited for plantation crops like tea, coffee and rubber. The State gets normal rainfall from the South-West monsoon during June-August and from the North -East monsoon during October-November.

Kerala covers an area of 38855 sq. km with a population of 318.39 lakh as per 2001 census. The density of population of the State is thus 819 per cent per sq. km, which is the second highest among the Indian States. The State has a high literacy rate of 90 per cent that is the highest in India. Most of the farm activities are carried out in the land around the houses. The prevalence of homestead farming is thus a special feature of Kerala. Though 62 per cent of the land area is cultivable, only 58 per cent is already brought under cultivation. Of the remaining 4 per cent, about 2 per cent is cultivable waste and the remaining is left fallow. Because of the high density of population, pressure on cultivable land is very high, the supply availability being less than 20 cents per person. The average size of an operational holding according to 1995-96 Agricultural Census was only 0.33 hectares. In fact, nearly 93 per cent of holdings are less than one hectare in extent.

Rice is the staple food of the people of Kerala. It is grown in 30.95 per cent of the net area sown in the State. It provides 105.14 million man days employment to the agricultural labour and contributes 19.23 per cent of the State agricultural income (at 1984-85 prices). Nearly 54 per cent of Kerala population depends on agriculture for their livelihood, as against 70 per cent for the whole of India. The exports of Kerala constitute mainly agricultural products or agro-based goods and the entire export earnings could, therefore, be reckoned on contributions by the agricultural sector. The export earnings of the State grow considerably per annum. The dominant positions held by the plantations and spices in the cropping pattern of Kerala are responsible for the high exports.

3.1.2. State Domestic Product and Share of Agricultural Sector: The Changing Scenario

The State Domestic Product provides the most important and widely accepted single index of overall economic development of a State, notwithstanding its limitations in reflecting the social welfare and distributional aspects. Generally, the assessment of regional disparities and the formation of the policies for the distribution of central assistance to State Government are done on this basis. The structural change, which occurred in Kerala over the last two or three decades, can be observed with the help of this parameter. So a review of the State Domestic Product (SDP) and Net Domestic Product (NDP) is attempted along with the share of agricultural sector.

A review of the sector-wise growth rates of the State's Net Domestic Product for the period 1960-61 to 2003-04 shows that the performance of the primary sector was dismal compared to the performance of the secondary and tertiary sectors (Table 3.1.).

As shown in the table, except for the second halves of 1960's and 1980's, primary sector of the State Economy registered either very low growth rates or negative growth rates. The performance of the agricultural sector was worst during the decades between 1975-76 and 1985-86, the rate growth being just 0.15 per cent. The subsequent period 1985-86 to 2003-04 witnessed a modest revival in the growth of agriculture (13 per cent). Tertiary sector recorded highest rate of growth with 19.7 per cent in 1999-2000 followed by secondary sector with 12.6 per cent and primary sector with 15.0 per cent. Secondary sector recorded the highest rate of growth with 14.8 per cent in 2001-02 followed by tertiary sector worth 10.5 per cent and primary sector ranged between 5.2 and 7.3 per cent. At current prices (2003-04), primary sector's contribution to NSDP was 0.99 per cent during the second half of the 12 years between 1991-92 and 2003-04 where as in the secondary sector this was 13.43 which shows that the growth of the secondary sector is remarkable due to the New Economic Policy.

Table 3.1.

Sector-wise Growth Rate of Net Domestic Product in Kerala

(1960-61 to 2003-04)

Period	Primary	Secondary	Tertiary	Total
	Growth Rate (%)			
At 1960-61 prices				
1960-61 to 1965-66	(+) 0.4	(+) 5.8	(+) 4.4	(+) 2.5
1965-66 to 1970-71	(+) 5.1	(+) 4.3	(+) 5.6	(+) 5.1
At 1970-71 prices				
1970-71 to 1975-76	(+) 1.6	(+) 4.0	(+) 3.3	(+) 2.6
1975-76 to 1980-81	(-) 1.2	(+) 5.6	(+) 4.1	(+) 2.0
At 1980-81 prices				
1980-81 to 1985-86	(+) 0.2	(+) 0.6	(+) 3.2	(+) 1.4
1985-86 to 1990-91	(+) 5.3	(+) 6.4	(+) 5.9	(+) 5.8
At Current Prices (2003-04)				
1991-92 to 1996-97	(+) 1.01	(+) 7.46	(+) .706	(+) 9.18
1996-97 to 2003-04	(+) 0.99	(+) 13.43	(+) 1.29	(+) 15.71

Source: BES (1978), Statistics for Planning 1977
DES, State Income and Related Aggregate of Kerala (Various issues)
SPB (1993, 2001), Economic review 1992, 2003

Here, the following are the important points to note:

(1) Average annual growth rate in NDP during the post formation period of the State is found to be invariably related to the performance of the Primary Sector.

(2) The Secondary sector which was stagnant during the 1980's show increasing trend during 1990's and 2000's.

(3) In the case of the Tertiary sector also, a declining trend in growth rate is found in the successive decades though it recorded a slight increase in 2000's.

(4) The deterioration in performance of the productive sector can be identified as the basic development issue of the Kerala economy during the 1980's (Prakash, 1994)

The major structural change that had occurred in the State economy during the period was the decline in the relative share of the primary sector in the State's NDP and the simultaneous increase in the share of the tertiary sector (Prakash, 1993) within a period of forty-two years. Percentage share of the primary sector had declined from 56.0 to 17.49 per cent, showing a steep decline of (-) 0.92 per cent. Meanwhile, the relative share of the tertiary sector increased from 28.8 per cent to 63.82 per cent and its average annual growth rate is found to be 0.83 per cent (Table 3.2).

Table 3.2.

Sector-wise Distribution of Net Domestic Product in Kerala

Year	Sector-wise Distribution (Per cent)			
	Primary	Secondary	Tertiary	Total
1960-61	56.0	15.2	28.8	100
1970-71	49.4	16.3	34.3	100
1980-81	39.2	24.4	36.4	100
1990-91	36.0	23.9	40.1	100
2000-01	20.39	20.41	59.2	100
2001-02	19.41	18.92	61.67	100
2002-03	17.49	18.69	63.82	100

Source: BES (1978), Statistics for Planning 1977
DES, State Income and Related Aggregate of Kerala (Various issues)
SPB (1993, 2001), Economic review 1992, 2003

The share of the secondary sector made a slow improvement to 16.3 per cent during 1970-71. During 1980-81, the share of the secondary sector was around 24 per cent. Since 1990-91 the share of secondary sector showed a decline and remained static during recent years. The slow pace of growth of State Domestic Product is mainly attributed to the stagnation that persisted on the industrial front. Since 1980-81, a boom has occurred in the construction sub-sector which is mainly due to the Gulf remittances that lifted the share of the secondary sector from 16 per cent to 24 per cent. The share of construction remained at a fairly high rate of 9 per cent for the whole period except some setbacks in recent years (Surendran, 1991). While the decline in the relative share of the primary sector is not a welcome symptom of development and growth, it is important to ensure that there is sufficient increase in the share of the secondary sector to give the economy a sustainable material base.

In spite of the substantial decrease in the share of the primary sector in NDP, agricultural income in the State, which was stagnating around Rs.1340 crores at 1980-81 prices during the first half of eighties has shown steady and continuous recovery from 1986-87 onwards (Government of Kerala, 1993 & Economic Review, 1992, SPB,TVM). During the period of ten years from 1987-88 to 1997-98, agricultural income in Kerala increased from Rs.1366.01 crores to 2259.07 crores (at 1980-81 prices) (Table 3.3). The annual growth rate in the State's agricultural sector in Kerala during the four years from 1998-99 to 2001-02 was around 1.75 per cent.

The growth of agricultural income from 1982-2003 is estimated using the semi-log linear curve. The estimated equation is given by

$$\ln(y) = -158.322 + 0.083\ t.$$

where y is agricultural income and t is the year. The adjusted R^2 computed for this equation is 0.796. The growth rate for the agricultural income is 0.083. The trend in agricultural income is given in Figure 3.1.

Table 3.3.

Growth of Agricultural Income in Kerala

year	Agricultural income in 1980-81 prices (Rs. in crores)	Rate of change over previous year (per cent)	Percentage contribution to state income
1982-83	1286.38	-1.41	33.62
1983-84	1185.76	-7.82	32.20
1984-85	1319.75	11.29	33.86
1985-86	1379.24	4.50	34.13
1986-87	1309.49	-5.05	32.79
1987-88	1366.01	4.32	32.79
1988-89	1568.94	14.86	34.23
1989-90	1547.30	-1.38	31.67
1990-91	1761.35	13.83	33.47
1991-92	1818.36	3.23	33.89
1992-93	1826.06	0.43	31.75
1993-94	1903.54	4.24	29.83
1994-95	2034.36	6.87	30.90
1995-96	2102.19	3.33	30.83
1996-97	2170.51	3.15	29.72
1997-98	2259.07	4.01	29.03
1998-99	6829.33	3.82	22.70
1999-2000	6979.56	2.20	22.04
2000-2001	5448.00	-22.36	16.23
2001-2002	5365.00	-1.52	15.38
2002-2003	5068.00	-5.54	13.72
2003-2004	5165.00	-4.00	13.00

Source: Economic Review (Various issues)

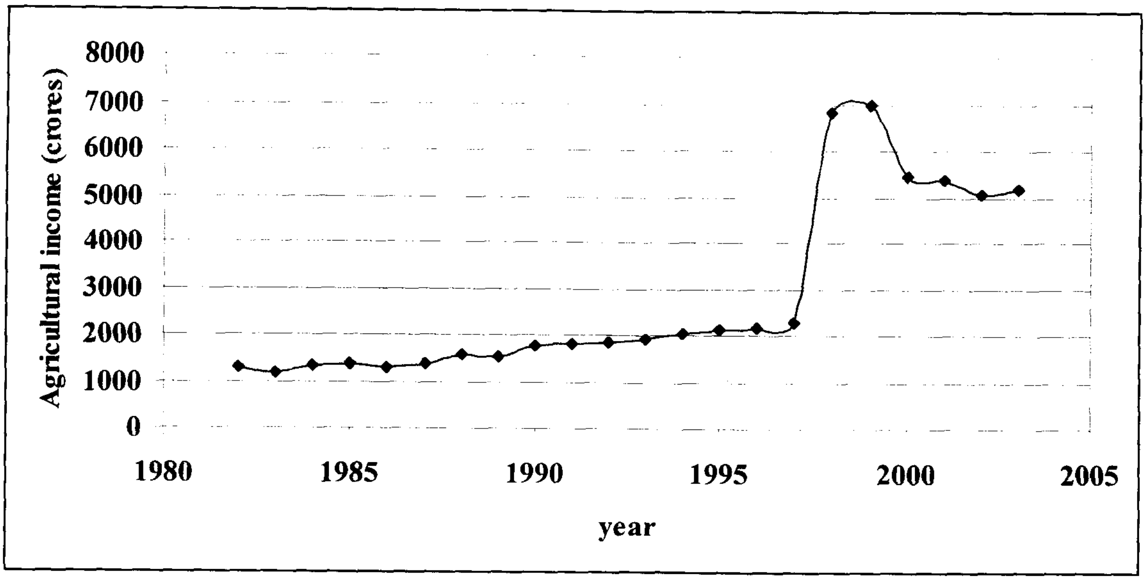


Figure 3.1. Trend in Agricultural Income during 1980 to 2003

3.1.3. Change in the Land Use Pattern[1]

In order to assess the performance of the agricultural sector in Kerala, it is useful to examine the pattern of land utilisation in the State and its changes overtime. Table 3.4 shows the change in the land use pattern that occurred in the State during the past three decades. At any particular time the land use is determined by temperate moisture, topography, soil and physical structure. Land has the characteristic of its fixity in supply and scarcity. Therefore, land use pattern is directly concerned with the problem arising in the process of deciding upon and carrying out into action the optimum use. The land use data is available only for 3885497 hectares of land. There is a 'Data Gap' with regard to the extent of geographical and forest area.

Table 3.4 shows the change in the land use pattern that occurred in the State during the past three decades. Out of the total geographical area of 38.85 lakh hectares, reserve forest accounts for 27.84 per cent. Land put to non-agricultural uses has increased from 6.67 per cent to 10.15 per cent. The increasing trend of using land for non-agricultural uses is clear in the land use pattern.

[1] Land use/utilisation refers to reporting area, which in turn refers to the area maintained by the village revenue agency

Table 3.4.

Land Use Pattern of Kerala 2002-03 (Area Figures in Percentages)

Classification of Land	1975-76	1980-81	1985-86	1990-91	1995-96	2000-01	2002-03	% Change in area between:	
								1997-98 & 1998-99	2001-02 & 2002-03
Total Geographical area	100	100	100	100	100	100	100	-	-
Forest	27.84	27.84	27.84	27.84	27.83	27.83	27.83	-	-
Land put to non-agricultural uses	6.67	6.94	7.17	7.65	8.31	9.8	10.15	4.2	0.25
Barren and uncultivable land	2.02	2.21	2.14	1.50	1.20	0.75	0.76	27.2	0.50
Permanent pastures & other grazing lands	0.51	0.14	0.11	0.05	0.04	0.004	0.007	17.3	12.88
Land under miscellaneous tree crops not included in net area shown	2.17	1.64	1.29	0.89	0.83	0.40	0.34	8.3	19.37
Cultivable waste	2.92	3.32	3.23	2.43	2.12	1.53	1.78	3.6	8.62
Fallow other than current fallow	0.59	0.69	0.72	0.68	0.79	0.87	1.01	13.7	14.13
Current fallow	0.94	1.12	1.11	1.14	1.23	2.0	1.82	16.3	10.69
Net area shown	56.34	56.10	53.81	57.83	57.64	56.78	56.33	0.5	0.10
Area sown more than once	20.38	18.15	17.39	19.90	20.65	20.99	20.12	5.8	2.46
Total cropped area	76.72	74.25	73.77	78.32	78.46	77.77	76.45	1.8	0.73
Cropping intensities (actual)	136.18	132.35	130.84	134.41	135.43	136.96	135.72	1.3	0.72

Source:DES, Kerala.1998, 2003; DES, Statistics for Planning (various issues), SPB, 1993, 2001; Economic Review, 1992, 2002

The composition of the cultivable land has also undergone significant changes. The net area sown has shown a marginal increase from 56.34 per cent to 57.64 per cent in 1999-2000, from where it started declining and in 2002-03 it declined to 56.33 per cent. Fallow land has increased from 1.53 per cent to 2.83 per cent. A more disturbing phenomenon to be noted in this regard is that compared to the first half of the 1990s, land put to non-agricultural use and current fallow have shown relatively higher annual growth rates since 1996-97. Unofficial estimates account 5 lakh hectares of loss in the forests. Construction of roads and railways has also added to the deforestation and conversion of wetlands.

It is useful to recall in this context two studies on Kerala's land use pattern and declining trend of area under paddy cultivation. One is that of the Government itself (1993) and the other by the committee of 'Nelvayal Samrakahana Samithy' (1998).

Table 3.5.

Conversion of Wetlands in Kerala

Pattern of Land Use	Area	
	(in lakh hectares)	Percentage
Area classified as wetland ('Nilam') As per basic tax register)	5.74	100.0
Area under perennial crops	1.37	23.8
Area under non-agricultural uses	0.35	6.1
Area under annual and Seasonal crops	0.49	8.5
Fallow land	0.20	3.5
Area under rice cultivation	3.33	58.1

Source: Conversion of Paddy Land, Kerala Statistical Institute, TVM, 1994

The total wet land ('nilam') in Kerala according to revenue record is 5.74 lakh hectares. A study conducted by Kerala Statistical Institute in 1992-93 shows that only 3.33 lakh hectares remain in wetlands and is used for paddy cultivation

(Kerala Statistical Institute-1994). Nearly 1.37 lakh hectares are now under perennial crops and 0.35 lakh hectares put to non-agricultural uses. These two together forms nearly 30 per cent of the total wetlands in the State; and this entire area has been filled up and hence rendered unsuitable for paddy cultivation. Nearly two thirds of this filing up of wetlands took place during the past two decades. It is found that about 0.69 lakh hectares of wetlands are used either for annual and seasonal crops other than paddy or left fallow. If proper efforts are made it may be possible to reconvert this for paddy cultivation. This was the position in 1992-93 and it is likely that the situation has further deteriorated since. The policies followed by the Governments relating to filling up of wet lands for non-agricultural uses makes the conversion easy. The summary data on wet lands taken out from the study are given in the Table 3.5. Diagrammatic representation is given in Figure 3.2.

The second study relates to the study conducted by 'Nelvayal Samrakshana Samithy' in 1998 reveals the following facts regarding paddy cultivation and land use pattern in the State.

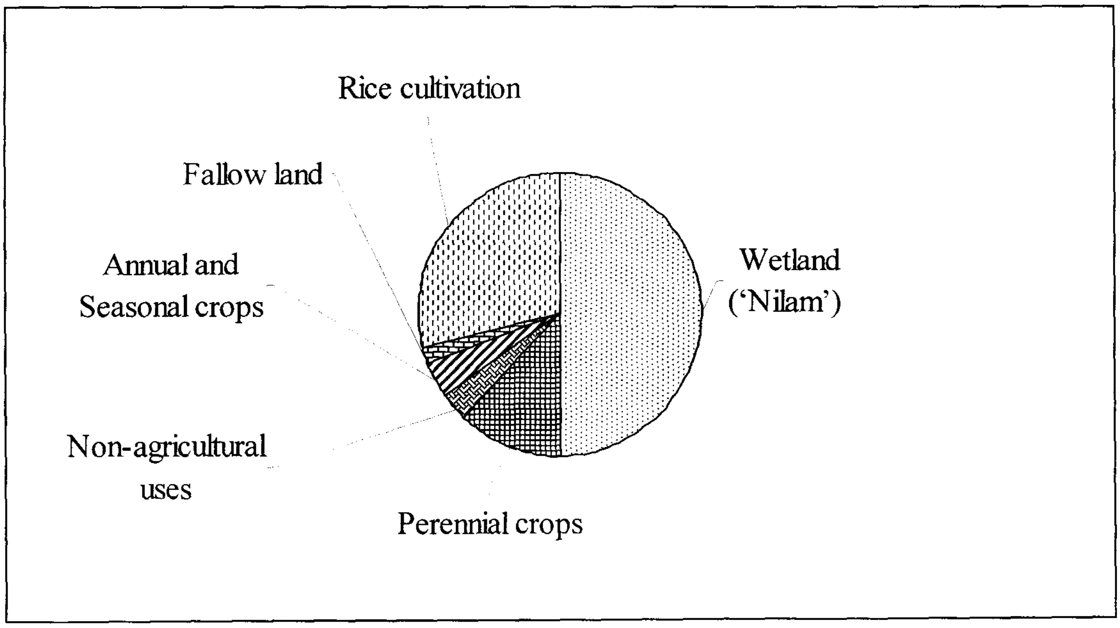


Figure 3.2. Pie Diagram Showing the Land Use Pattern

3.1.4. The Fading Paddy Fields of Kerala

It is a fact that the paddy fields of Kerala are depleting at an alarming rate. Any discussion on agricultural production must therefore highlight this problem first. In fact, we resort to four different methods to measure the area under cultivation and problems of cultivation viz., Official records, Panchayath Development Plans, Sharing of farmers own experience collected from Padasekhara Samithy and Comparing village Survey map of 1960 and satellite map of 1990.

When the State of Kerala was formed in 1955-56, we had 7.59 lakh of hectares of land under paddy cultivation. In fact, we could produce 8.84 tones of paddy and the productivity per hectare was 1164 kg. During the first 10 years after the formation of Kerala State, the area, production and productivity were increasing gradually and it was 8.76 lakh hectares, 13.31 lakh tones and 1520 kg respectively in 1975-76. And it was record maximum in 1974-75. In those days by cultivating 8.81 lakh hectares land we could produce 13.33 lakh tones of rice which was more than half of our total requirements. We were actually making a five per cent growth per annum in agricultural production during this period.

In the second half of 70's greater attention was given to extension of area under paddy cultivation. For e.g. in Kuttanad Taluk itself out of 53603 acres of cultivable land 19500 acres were reclaimed as Kayal land. But by 1980 this trend was reversed. In 1990-91, the paddy cultivating area declined to 5.60 lakh hectares and production went down to 10.90 lakh tones. That reveals the land area under paddy cultivation declined by 3.21 lakh hectares in a span of 15 years and this was worked as that cultivable land was declining at an alarming rate of 21000 hectares per annum or 60 hectares per day. Table 3.6 explains this trend in detail.

Table 3.6.

Area, Production and Productivity of Paddy since the Formation of Kerala State

Year	Area (Lakh ha)	Production (lakh tones)	Productivity (kg/ha)
1955-56	7.59	8.84	1164
1960-61	7.79	10.68	1371
1965-66	8.02	10.00	1243
1970-71	8.75	12.02	1483
1975-76	8.76	13.31	1520
1980-81	8.02	12.72	1587
1985-86	6.78	11.73	1729
1990-91	5.60	10.90	1959
1991-92	5.41	10.60	1958
1992-93	5.38	10.84	2018
1993-94	5.08	10.04	1977
1994-95	5.03	9.78	1939
1995-96	4.90	9.53	1944
1996-97	4.75	9.42	1983

Source: Nelvayal Samrakahana Samithy Report, 1998

The Trends in the Transformation of Paddy fields

If we take 1975 as the base year, with in a period of 10 years (i.e. by 1985)) there was 23 per cent decline in total paddy cultivating area. This was 43 per cent in the year 1995 and 46 per cent in 1997 (Figure 3.3). The way in which this change takes place is worth noting. 13 per cent of land was converted to tree crops, 4.2 per cent was made annual crops, 0.8 per cent was left fallow and 5 per cent was converted to non agricultural purposes. In 1995, this was 18.0, 8, 4 and 13.2 per cent respectively. Later during 1997, this was 18.5, 7.5, 5.4 and 14.6 per cent respectively. Till this time out of total used land 14.6 per cent (1.23 lakh hectare) is converted for non agricultural purposes which can not be retained at any cost.

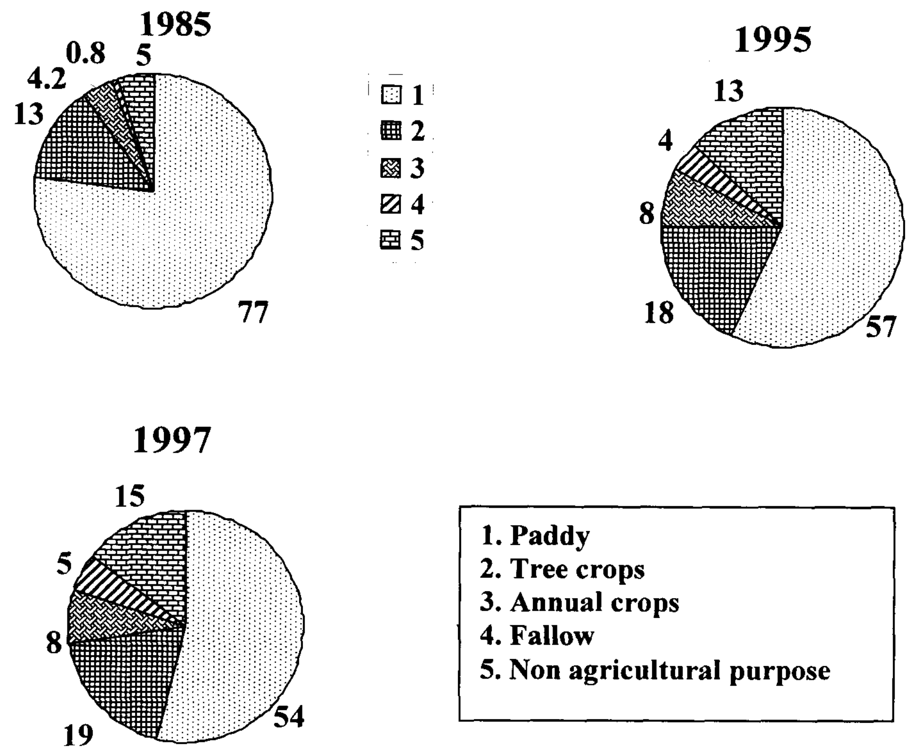


Figure 3.3. Changes in Area of Paddy in 1985, 1995 and 1997

It is also noteworthy that the paddy land being converted to other crops is reducing in size where as the land converted for non agricultural purposes shows an upward trend. Land being converted for other agricultural purposes is 5 per cent (40,000 ha) in 1985, 13 per cent (1,13,000 ha) in 1995 and 14.6 per cent (1,28,000 ha) in 1997.

The converted paddy land which is left fallow went on increasing. It increased from below 1 per cent in 1985 to 5.4 per cent during 1997. If we assume that the fallow land is utilised for non agricultural purposes, in the coming future, approximately 50,000 ha land area would also be converted and it would be a great loss to paddy sector.

Filling, Digging and Leaving Land Fallow

Filling, digging and fallowing are three type of transformation that is generally taking place for our land. In the year 1985, through filling land 185000 hectares (21.2%) paddy cultivating area was lost. Digging had converted 9000 hectares (1%) of land. And fallowing could displace 7000 hectares (0.8%) of land (Table 3.7). Out of the total land filled 35000 hectares (4%) of land was utilized for non agricultural purposes in which 22000 hectares (2.5%) was for residential building construction and for other real estate ventures. By 1995, this filling itself had consumed 8% (70000 hectares) of our total paddy fields and by 1997 it had increased to 8.7% (76000 hectares). The trend of fallowing also increases during this period. At the same time earlier trend of leaving land for other non agricultural purposes (especially plantations) showed a declining trend.

Table 3.7.

The Change in the Area (in ha) of Wet Land through Filling, Digging, Leaving Fallow (1985, 1995, 1997)

Type of change	1985		1995		1997	
	Area	%	Area	%	Area	%
I. Filling						
Tree crops	113000	13.0	156000	18.0	161000	18.5
Annual crops other than Paddy	37000	4.2	70000	8.0	66000	7.5
Non Agricultural uses	35000	4.0	94000	10.7	100000	11.4
II. Digging	9000	0.8	35000	4.0	47000	5.4
III. Fallow	7000	0.8	35000	4.0	47000	5.4
Total	201000	23.0	383000	43.0	40200	46.0

Source: Nelvayal Samrakahana Samithy Report, 1998

In short, the land use pattern during 2002-03 reveals very negative features such as marginal increase in the barren and uncultivable land, cultivable waste, land put to non-agricultural uses, current fallow and fallow other than current fallow. Land under miscellaneous trees alone shows a positive feature (a reduction of 1.83 per cent over the period 1975-76 to 2002-03). The land use pattern also reduces the replacement of mono-cropping systems with predominance for perennial crops by homestead farming system.

The total cropped area recorded a marginal reduction from 76.72 per cent to 76.45 per cent in area (Net Sown Area plus area sown more than once) during 2002-03. The cultivation of paddy is not a relatively profitable affair due to the high cost of cultivation including wage cost. Strengthening of family income through gulf remittances discouraged the cultivation of farms for sustenance and promoted the process of non-cultivation of arable land.

However, the net area sown started a distressing by declining trend in current fallows. The probable reason for this contraction was a decrease in the agricultural activities owing to a host of factors like adverse changes in weather, sectoral shifts in labour force away from agriculture, unremunerative prices for agricultural produce, increasing deterioration of soil in irrigated tracts and a general decrease in the productivity of most of the crops subsequent to Green Revolution. The area sowed more than once increased by more than three-fold over a period of 43 years, witnessing a growth of 2.6 per cent per annum. This was largely attributable to the expansion of irrigation facilities and increased adoption of short duration crops developed during the Green Revolution period. The area sown more than once and consequently the gross cropped area did not extend substantially over the net area sown. This indicates the limited capacity of irrigation to increase cropping intensity apart from that initiated by the monsoons. The gross cropped area being a function of the net area sown and the area sown more than once, therefore, showed a parallel and concurrent change.

It is evident that these resources have been used and misused by a trial and error method and revision of land and water use methods is imperative in the State economy of Kerala so as to materialise the hopes to take care of an increasing population.

3.1.5. Changes in Cropping Pattern

By cropping pattern it is meant the proportion of area under different crops at a point of time. A change in the cropping pattern implies a change in the proportion of area under different crops. In this subject of cropping pattern, the area of land devoted to different crops in terms of the total cropped area is studied.

The crop pattern in the State is quite different from that of other States in India owing to the topography and climatic conditions of Kerala. An analysis of the changes in cropping pattern of the State since its formation in 1956 clearly shows that there has been a persistent shift in favour of garden crops and plantation crops at the expense of food crops. Perennial crops dominate the cultivated area in the State. Over the years, the share of the perennial crops has been gradually increasing. Table 3.10 shows the change in the area under different crops since 1975-76. (Broadly the crops grown in the State are divided into three categories. viz., food crops, garden crops and plantation crops. Food crops include paddy, other cereals and millets, banana and other plantains, tapioca and pulses. Crops like coconut, cashew nut and pepper are treated as garden crops while tea, coffee, cardamom and rubber are regarded as plantation crops).

The share of area under paddy has nearly halved during the past two decades. According to the State Revenue Minister, K.M. Mani (1998) paddy cultivation area dropped by 30 per cent from about 8 lakh hectares in 1980-81 to 5.41 lakh hectares in 1991-92, bringing down production from 13.39 lakh tonnes in 1981 to 10.06 lakh tonnes in 1991. During the period 1990-91 to 2002-03 the proportion of area under paddy, which is the predominant food crop in the State, declined from 5.60 to 4.11 lakh hectares.

Table 3.8.

Area under Important Crops (In Million Hectares)

Name of Crop Cultivated	1975 - 76	1980 - 81	1985 - 86	1990 - 91	1995 - 96	2000 - 01	2002 - 03
Net Cultivated Area	2189	2180	2191	2247	2265	2206	2186
Gross Cropped Area	2981	2885	2867	3020	3067	3021	2970
Paddy	885	802	678	560	471	347	411
Total Food Grains	926	842	712	590	583	359	322
Tapioca	327	245	203	147	114	115	104
Sugar Cane	8	8	8	8	6	3	4
Pepper	108	108	122	169	191	202	208
Areca nut	77	61	59	65	71	87	97
Banana/Plantain	52	49	43	66	74	99	110
Ginger	12	13	16	14	13	12	90
Cashew	109	141	138	116	103	92	89
Vegetables	33	31	27	22	21	193	191
Total Fruit Crops	317	346	323	353	363	413	419
Total Food Crops	1909	1778	1606	1496	1441	1349	1321
Coconut	693	651	705	870	914	926	899
Tea	38	36	35	35	35	37	37
Coffee	42	58	66	75	82	85	83
Rubber	207	238	330	412	449	474	476
Cocoa	-	24	17	12	8	8	9
Fodder Crops	19	13	11	14	16	19	21
Total Non-food Crops	1072	1187	1261	1524	1626	1673	1649

Source: Farm Guide-1994, 2002; DES, Kerala, 1978, 1998
Economic Review (various issues); Statistics for Planning, 1977

The area under most of the crops given in the table except paddy and plantation crops is raised under a multi-tier cropping system in and around the homestead. In most of the homesteads, coconut is the base crop and other crops like pepper, plantain, areca nut, tapioca and tubers are grown as inter crops. Thus, one acre of coconut garden may contain in addition to the coconut trees, 50 cents of tubers, 25 cents of plantain, 15 cents of pepper, 10 cents of ginger and tapioca. This mixed cropping system is destroyed when the land is used for rubber cultivation since no other crops grow under rubber trees. The proportion of area under coconut which is often considered the principal competitor of paddy, increased from 6.93 lakh hectares to 8.99 lakh hectares (Table 3.8).

The area under tapioca, which is a cereal substitute, has also considerably declined, to about one-third. The area under vegetables has gone down to nearly two-thirds. Among the crops that have expanded area cultivated, the most significant is rubber which has more than doubled its area, followed by coconut and pepper which have increased their area by nearly one-third and three-fourth respectively.

Along with paddy, tapioca, the most important food crop in the State, especially amongst economically backward sections too, has lost around one lakh hectares for similar reasons. Production of tapioca has thus not only fallen from 40 lakh tonnes in 1980-81 to 27.98 tonnes in 1990-91, but it has also become a scarce commodity, costing over Rs.2500 per tonne. Area under tapioca, normally cultivated in mid and high lands which are also suitable for rubber plantations, fell from 2.45 lakh hectare in 1980-81 to 1.47 lakh hectares in 1990-91. The only change occurred during 1996-97 against the trends in the earlier years is the improvement of area coverage of tapioca. And during the last three years starting from 1997-98, 1998-99 and 1999-2000, the trend in area under tapioca showed again a decline. The area declined from 1.47 lakh hectares in 1990-91 to 1.09 lakh hectares in 1999-2000. The shift in land cultivation patterns is particularly visible in the form of trade-offs between rice and coconut on the one hand, and between tapioca and rubber on the other. While the area under coconut cultivation went up from 6.51 to 8.70 lakh hectares between 1980-81 and 1990-91 respectively, the corresponding figures for rubber are 2.38 lakh hectares and 4.12 lakh hectares (Table 3.8). Another group of crop that has shown positive growth trends in the area is of banana and other plantains, the area under which has increased by over 60 per cent within the last twelve years. It can be asserted that in recent years a sizeable portion of Kerala's paddy fields are being converted for the cultivation of these two crops. Thus the physical area under paddy has been continuously on the decline during the last three decades (Table 3.9).

Table 3.9.

Change in Area under Paddy Cultivation (Area in lakh hectares)

Year	Autumn		Winter		Summer		Total
	Area in lakh hectares	Share of area (%)	Area in lakh hectares	Share of area (%)	Area in lakh hectares	Share of area (%)	Area in lakh hectares
1960-61	3.96	50.83	3.07	39.41	0.76	9.76	7.79
1965-66	3.98	49.63	3.28	40.90	0.76	9.48	8.02
1970-71	3.96	45.2	3.82	43.7	0.97	11.1	8.75
1975-76	3.97	42.80	3.84	45.20	1.04	12.0	8.85
1980-81	3.49	43.60	3.54	44.20	0.98	12.2	8.02
1985-86	2.8	41.20	3.13	46.20	0.85	12.6	6.78
1990-91	2.36	42.20	2.59	46.20	0.65	11.6	5.6
1995-96	1.87	39.62	2.25	47.67	0.6	12.7	4.71
1999-2000	1.22	34.86	1.70	48.57	0.58	16.57	3.5
2000-2001	1.3	37.34	1.62	46.75	0.55	15.9	3.47
2001-02	1.17	36.15	1.62	50.24	0.44	13.6	3.22
2002-03	1.12	36.20	1.57	50.56	0.41	13.2	3.11

Source: DES, Kerala, 1997 ; SPB, 2001 ; DES, 2003

The disparity in net income per unit area in the case of paddy, vis-à-vis other competing crops, has been widening day by day which makes it all the more difficult to retain the area under this crop. Thus a shift in cultivation patterns from food grains to cash crops is gaining ground in Kerala over the past decade.

To sum up, the emerging pattern of land use and crop pattern in the State shows the following features:

1. Area of wetland has declined considerably. A portion of the shift of wetland has been for non-agricultural activities. A portion of the remaining part has been covered by perennial crops where as one part is still available for reconversion to paddy which is covered by seasonal crops. Thus the overall effect of wetlands is the reduction of area under paddy.
2. Vast areas previously under a multiple crop system are now covered by a mono-crop system, thus reducing plant diversity.
3. The trend in area under the various crops reveals that the urge for replacing seasonal and annual crops by perennial crops is persisting. Seasonal/annual crops, namely rice, sugar cane, ginger, turmeric, banana, tapioca, groundnut and sesamum recorded decline in area. On the other hand perennials such as pepper, arecanut, coconut, coffee, tea and rubber (except cashew nut) added coverage of area.
4. Plantation crops as a category are expanding and the lead crop among them is rubber.
5. Replacement of subsistence crops like rice and pulses by more remunerative cash crop continues.

Thus a tilt in crop pattern unfavourable to paddy can be observed in Kerala since the formation of the State itself. The farm sector is being sought to be made free from "artificial support systems" and the emphasis is upon making agriculture profitable.

3.1.6. Growth Rates in Agricultural Production, Area and Productivity (Food crops and Non-food crops)

Overall performance of the agricultural crop sector in Kerala can be assessed by analysing the changes in output and its two components: area under cultivation and productivity per hectare. Index of agricultural production had been steadily increasing in the State during the sixties and early seventies (Table 3.10). During the period 1960-61 to 1974-75, average annual growth rate in production was 3.13 per cent. In 1974-75, agricultural production index reached the peak level of 159.8. It was followed by a period of negative growth rates or agricultural stagnation. In spite of 8.3 per cent increase in the total cropped area, output declined by 3.8 per cent in 1975-76 compared to the previous year. Thus it can be rightly pointed that "the stagnation began with a decline in productivity in the agricultural sector". Index of agricultural production declined to 121.2 in 1985-86 and remained more or less stagnant at that level in the subsequent years with the exception of 1989-90 when it suddenly rose to 139.8. Index of agricultural production increased to 249.13 in 2001-02 and remained stagnant at that level in the following year and declined to 237.56 in 2003-04. The annual growth rate in agricultural production during the period 1975-76 to 1991-92 is found to be (-) 1.51 per cent (Table 3.10.) and between 1975-76 to 2003-04 is found to be 1.94 per cent.

Index number of cropped area in the State reached its zenith in 1975-76, a year after the indices of production and productivity reached its peak points. Annual growth rate in the cropped area during the period 1960-61 to 1975-76 is estimated to be 2.32 per cent. Between the years 1975-76 and 1985-86, index of area in the State declined at the average annual rate of -1.53 per cent (Thomas, 1996). The situation improved since 1985-86 and during the period 1985-86 to 1991-92, there has been a marginal increase of 0.42 per cent in the cropped area. From 1992-93 onwards the total cropped area declined marginally (Table 3.10).

Agricultural productivity index in Kerala showed continuous increase till the year 1974-75 when it reached the peak level of 121.2 (Table 3.10). Annual compound growth rate in productivity during the period 1960-61 to 1974-75 is estimated to be 1.41 per cent. After 1974-75, index of productivity began to decline and it reached lowest point in 1985-86. During this period, annual growth rate in agricultural productivity is found to be (-) 1.81 per cent. The index of productivity during the year 1960-61 had been slightly higher than that of 1985-86 and therefore it can be observed that the State has lost twenty five years of agricultural growth in terms of productivity by the year 1985-86. Productivity index improved considerably after 1989-90 (Thomas, 1996). The index of productivity during the year 2002-03 increased to 267.90 but in the subsequent year it started declining.

Table 3.10.

Index Number of Production, Area and Productivity of Agricultural Sector in Kerala (1960-61 to 2003-04) (Base: Avg. of Triennium ending 1961-62)*

Year	Production	Area	Productivity
1960-61	100.7	101.1	99.6
1965-66	113.8	109.3	104.1
1970-71	146.0	127.1	114.9
1974-75	159.8	131.8	121.2
1975-76	153.7	142.7	108.2
1980-81	140.8	120.7	116.5
1984-85	155.0	123.8	120.0
1985-86	121.2	122.3	99.1
1989-90	139.8	129.8	107.7
1990-91	121.7	127.5	105.6
1991-92	120.5	125.4	106.3
1992-93	132.67	104.19	114.94
1993-94	138.56	103.73	117.51
1994-95	140.28	104.09	119.91
1995-96	144.29	103.79	120.44
1996-97	147.21	101.78	124.95
1997-98	155.12	104.97	125.56
1998-99	147.63	97.10	135.46
1999-2000	150.55	97.49	137.58
2000-01	NA	100.66	NA
2001-02	249.13	93.96	265.14
2002-03	249.82	93.25	267.90
2003-04	237.56	92.36	257.21
Annual growth rate	3.08	-0.20	3.60

* From 2001-02 onwards Base changed to 1993-94

Source: BES (1976), Basic Statistics on Kerala Economy, 1975.
DES, Statistics for Planning (Various issues).
SPB (1993), Economic Review 1992.

Paddy accounts for nearly 95 per cent of the total food grains produced in Kerala. In spite of wide temporal and spatial variations, the per hectare yield of paddy has shown positive growth trends in this period and annual growth rate is estimated as 1.86 per cent. The production of paddy, which stood at 10.87 lakh tonnes in 1990-91 decreased to 7.04 lakh tonnes by 2001-02, showing a negative annual growth rate of -3.68 per cent. A similar growth pattern is discernible in the performance of tapioca (Table 3.11).

Table 3.11.

Production and Productivity of Major Crops in Kerala (1990-91 to 2001-02)

B. Production (In thousand tonnes)

Year	Rice	Tapioca	Plantain	Coconut (million nuts)	Rubber
1990-91	1086.58	2803.00	491.94	4232	307.52
1994-95	978.07	2578.89	574.26	5336	442.83
1998-99	726.74	2630.16	784.57	5132	559.10
2001-02	703.50	2455.88	769.09	5479	580.35
Growth rate	-3.68	-0.58	4.99	1.76	5.96

C. Productivity (kg per hectare)

Year	Rice	Tapioca	Plantain	Coconut (nuts per hectare)	Rubber
1990-91	1943	19134	7495	4864	800
1994-95	1937	19821	7909	5858	999
1998-99	2061	23222	9630	5817	1190
2001-02	2182	22087	7252	6049	1222
Growth rate	1.86	1.93	0.81	1.34	4.48

Source: DES, 2001, SPB, 2001, 2003

During this period, the annual production of banana and other plantains rose from 4.92 to 7.69 lakh tonnes at the annual rate of 4.99 per cent, their productivity also shows positive growth trends. During this period, the production and productivity of coconut increases at the annual rates of 1.76 and 1.34 per cent respectively and the production of natural rubber in the State has increases at the rate of 5.96 per cent while its productivity shows a relatively lower growth rate of 4.48 per cent (Table 3.11).

3.1.7. Trend in Area, Production and Productivity

In this section, the performance of the rice economy of the State is analysed in terms of growth rates in area, production and productivity of rice.

Rice, the staple food of people of Kerala, is cultivated in all the districts of the State under varied agro-climatic conditions. It is cultivated in three distinct seasons viz., autumn or 'Virippu' (April-May to August-September), winter or 'Mundakan' (September-October to December-January) and summer or 'Punja' (December-January to March-April). There are predominantly single crop paddy lands like Kuttanad and Kole, sizable double crop areas, and where sufficient irrigation facilities exist, all the crops are taken. Rice is grown in 30.95 per cent of the net area sown in the State and provides 105.14 million man days employment to the agricultural labour and contributes 19.23 per cent of the State's agricultural income (at 1984-85 prices). The situation under which rice are grown in Kerala is shown in Table 3.12.

Though as stated above, rice is the staple food of people of Kerala, the State is far from self sufficient in its production and, the share of internal production in total availability has been declining (Prakash, 1994). More than 80 per cent of the food grain requirement of Kerala in 1991 was met through the imports from other parts of India. During the past three decades, the gap between internal production and requirement of rice in the State has been widening. At present more than 75 per cent of the State's rice requirements are met through imports by private traders and through central allotments. An analysis of performance of this crop is, therefore, useful.

Table 3.12.

Area under Paddy Cultivation in Different Situation

Situation	Area in Ha
Upland ("Modan"- rain fed)	8000
Terraced uplands ("Palliyals")	12849
Double crop wetlands (semi dry)	180000
Double crop wetlands (transplanted)	313423
Kuttanad (Punja)	52000
Kole lands (Thrissur and Ponnani)	14800
Pokali	27000
Deep ill grained soils of central Travancore	1500
Onattukara	30000
High altitude areas (wynad and High ranges)	21558
Total	**663130**

Source: Muraleedharan, 1982

The growth rates of area, production and productivity of rice in Kerala have been examined for a period of 43 years from 1960-61 to 2002-2003. The period of the present analysis is divided into period I (1960-61 to 1974-75), period II (1975-76 to 1991-92) and period III (1992-93 to 2002-03).

3.1.7.1. State Level Growth Rates in Area Under Paddy

Paddy occupied more than 96 per cent of area under food grains (in 1981-82) and, therefore it had a major influence on the growth pattern of the food grains. Area under paddy in the State declined from 7.8 lakh hectares in 1960-61 to 5.5 lakh hectares by the year 1990-91 showing an overall decrease of 30.50 per cent (Table 3.13). The area under the crop further declined to 3.1 lakh hectares in 2002-03. The most distressing trend of the change is the drastic decline in the area under rice in absolute terms since 1975-76. The area under paddy declined steeply to 583.39 thousand hectares by 1989-90 and this formed only 19.47 per cent of gross cropped area where as the area under paddy in 1975-76 formed 29.34 per cent. Average annual growth rate during this period is found to be (-) 0.95 per cent. Annual growth rates have shown wide temporal variations. During the sixties, area under paddy in the State had increased considerably. After reaching 8.74 hectares in 1969-70, it remained more or less stagnant for the next five years and attained peak level of 8.81 lakh hectares in 1974-75. Average annual growth rate in area under paddy is estimated as (-) 3.09 per cent. Even though absolute area under paddy began to fall only from the year 1974-75 onwards, percentage share of paddy growing areas to total cropped area in the State had begun to decline from 1960-61 itself (Table 3.13).

Table 3.13.

Area under Cultivation and Proportion to Total Cropped Area in Kerala

Year	Area under paddy (in lakh hectares)	Annual Growth Rate	Percentages to Total Cropped Area
1960-61	778.91	NA	33.16
1965-66	802.33	0.15	31.45
1970-71	874.93	0.10	29.84
1975-76	876.02	(-) 0.62	29.38
1980-81	801.70	1.06	27.79
1985-86	678.28	(-) 7.13	23.66
1990-91	559.49	(-) 4.10	18.39
1995-96	475.15	(-) 6.38	15.49
2000-01	347.45	(-) 0.66	11.49
2001-02	322.36	(-) 7.22	10.77
2002-03	310.52	(-) 3.67	10.25

Source: BES (1967), Fact Book on Agriculture, 1966, DES (1975), Agricultural Statistics in Kerala, 1975, SPB, Economic Review (Various issues)

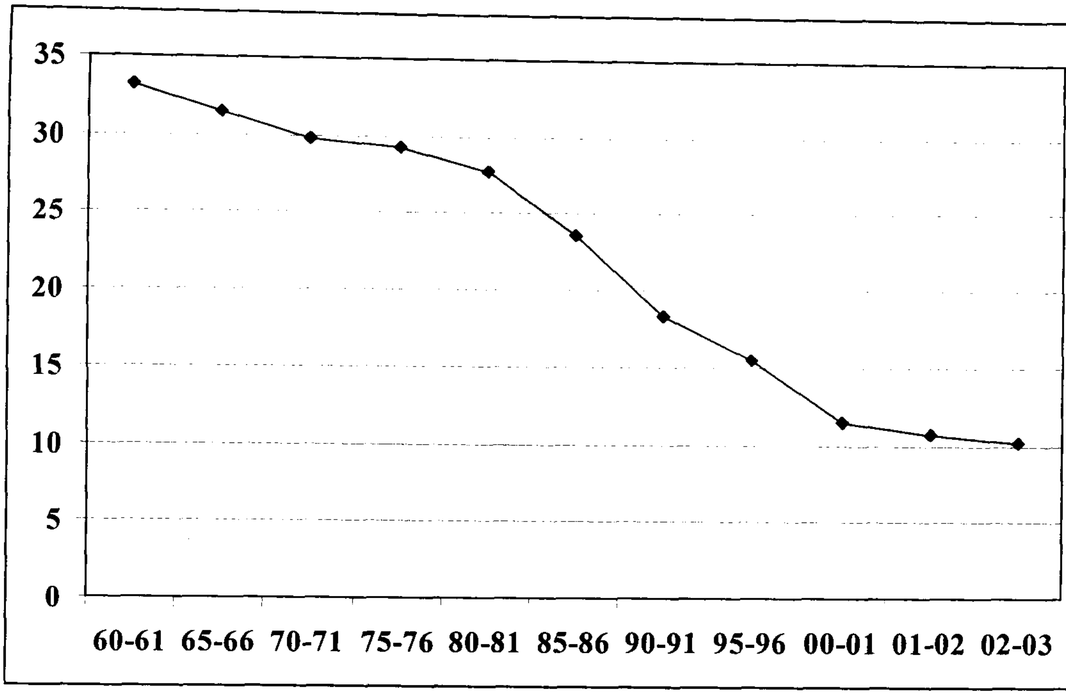


Figure 3.4. Change in Proportion of Area under Paddy to Total Cropped Area

Relative share of area under paddy steadily decreased from 33.16 per cent in 1960-61 to 18.38 per cent by the year 1990-91. During the third period (1991-92 to 2002-03) the gross area under paddy has been declining in both absolute and relative terms. (Table 3.13) The area statistics show that the shift in area from paddy cultivation continued to persist resulting in a loss of around 4 lakh hectares of gross cropped area.

3.1.7.2. Seasonal Variations in Area under Paddy

In Kerala, paddy is cultivated during three seasons in a year. The two major paddy crop seasons in the State, viz. autumn and winter account for more than 80 per cent of the total area under paddy. Summer crop is mainly concentrated in the four districts of Alappuzha, Kottayam, Ernakulam and Thrissur.

At the beginning of the sixties the share of autumn crop was more than half of the total areas under paddy in Kerala while the shares of winter and summer crops were nearly 40 per cent and 10 per cent respectively (Table 3.9). Thereafter the share of the autumn paddy began to diminish gradually. At the same time the share of the area under winter paddy improved. By mid seventies, relative share of area under autumn and winter crops became more or less equal. Percentage share of summer paddy area increased during the first two decades from 1960-61 and thereafter began to decline.

Season-wise data on the performance of paddy during the last five years shows decline in area in all three seasons with relatively less reduction in Mundakan (winter) season (Table 3.9). During Virippu (autumn) and Punja (summer) seasons of 1999-2000, the negative trend has been reversed. The data also reveal that out of around 1.70 lakh hectares of double cropped area, nearly 50000 hectare are remaining fallow during the autumn (Virippu) season. The single cropped lands of Kuttanad and Kole, where only one crop is raised during Punja (summer) season, also offer scope for additional cropping. Among the three seasons, Punja (summer) season records 6.3 per cent reduction in area during 2002-03. During the whole period of 1960-61 to 2002-2003 share of area under Autumn crop declined by 14.70 per cent and the shares of Winter and Summer crops increased by 11.18 per cent and 3.52 per cent respectively (Economic Review, 2002).

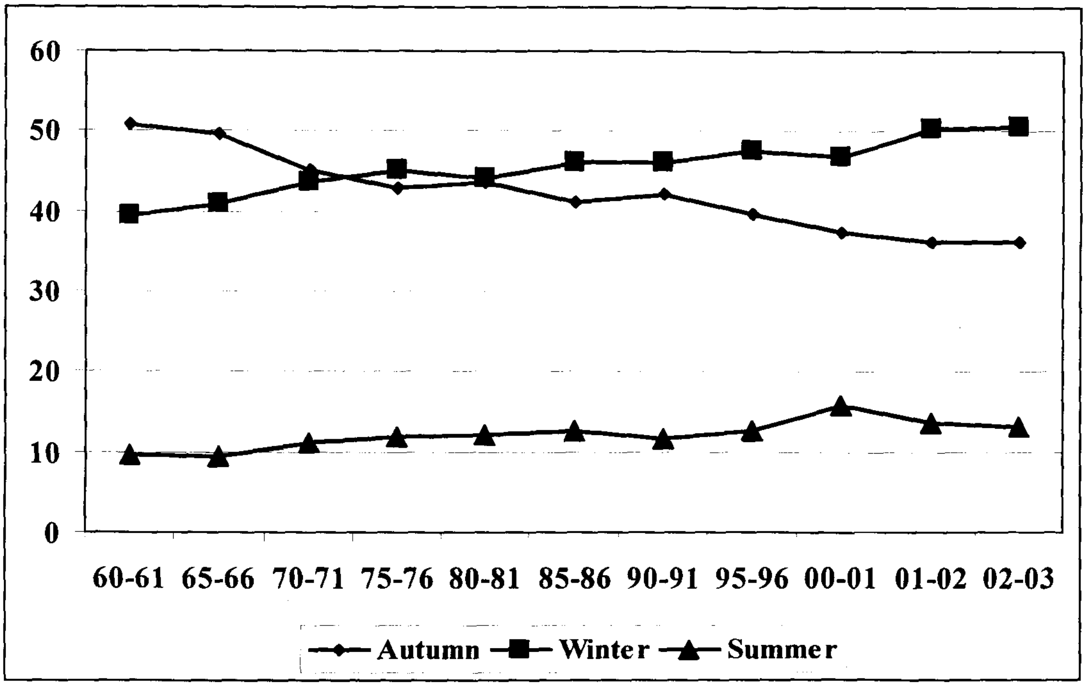


Figure 3.5. Percentage Share of Area under Autumn, Winter, Summer Crops

3.1.7.3. Growth in Area under High Yielding Variety (HYV)

The HYV programme was introduced in 1966 and area under HYV paddy in the State reached its peak level in 1977-78 when 2.93 lakh hectares were brought under its coverage. During the period of 1969-70 to 1977-78 area under HYV paddy increased at the annual rate of 8.33 per cent. Annual average growth in HYV paddy area during the period 1978-79 is found to be (-) 8.04 per cent. From the year 1988-89 onwards, area under HYV paddy has shown a moderate rate of recovery and by the year 1991-92 its proportion to the total paddy growing areas in the State had become 30.72 per cent. From 1991-92 onwards the area under HYV paddy showed remarkable increase of 51.66 per cent over the period 1990-91 to 2002-03. An evaluation study conducted by the State Planning Board has shown that the total area covered under HYV paddy in the State has increased over the years - more so during the Virippu season. The evaluation study has revealed that the level adoption of HYV was more among those whose main occupation was agriculture and least among wage-earners and non-agricultural land holders and also that both the number of persons as well as the percentage of area covered under HYV was relatively more among the large size holdings. This has important implications, as vast majority of our paddy cultivators have small holdings which can not provide a reasonable income or full time employment to an average family. However the fact remains that the average yield of HYV paddy was nearly 42 per cent higher than that of local varieties as reported in the evaluation study (1976). In the year 1991-92, 16.63 lakh hectares is under HYV out of a gross area of 54.13 lakh hectares under paddy. Area under HYV paddy showed improvement in paddy during last three years after a decline over a period from1985-86 to1995-96 (Table 3.14).

Naturally it can be asked to what holds back the spread of HYV in more area? The answer is that the cost of cultivation of HYV paddy is almost 30 per cent higher than cultivation of local varieties and also that the benefit cost ratio (as measured by the ratio of gross value of output to cost of production) was 1.67 for HYV as against 1.49 for local varieties showing only a marginal advantage of HYV over local varieties (Evaluation study 1976). Further, HYV seeds will not lead to the higher production levels in the absence of other important complementary factors like fertilizers, water and management essential for the full expression of the high potential seed. Again it is observed that since HYVs are generally dwarf, per hectare yield of straw is relatively low in its cultivation. Thus in terms of profitability comparative advantage of HYVs is only marginal.

Table 3.14.

Season-wise Percentage Share of Area and Spread of HYV in Kerala (1970-71 to 2002-03)

Year	Season-wise percentage share of Area			Area under HYV(in ha)	Percentage of HYV coverage
	Autumn	Winter	Summer		
1970-71	45.2	43.7	11.1	159.1	18.17
1975-76	44.8	43.7	11.5	230.1	26.27
1980-81	43.6	44.2	12.2	279.7	34.89
1985-86	41.2	46.2	12.6	163.3	24.08
1990-91	42.2	46.2	11.6	162.8	29.10
1995-96	43.34	31.49	25.17	163.88	34.78
2000-01	36.99	39.67	23.33	226.69	65.24
2001-02	35.46	46.24	18.29	222.88	68.89
2002-03	39.22	44.78	16.00	250.80	80.76

Source: DES, Farm guide (Various issues), SPB (1994, 2001), Economic Review 1993, 2001 and 2002.

3.1.7.4. Season-wise Coverage of High Yielding Varieties

Varieties of Paddy during the period 1970-71 to 2002-03 shows that in the beginning of 1970s, total area under HYV seeds had been distributed more or less equally among three seasons-Autumn, Winter and Summer. However, by the end of 1980s, nearly 45 per cent of the HYV area had come under the autumn and winter crops (Table 3.14).

In spite of the sharp decline in the area under paddy, the coverage under HYV varieties remains steady and is increasing from 1999-2000 onwards (Table

3.13). The increase in coverage was all pervasive through the three seasons. The Mundakan (winter) season could retain higher growth rate as well as high proportion in coverage. The overall percentage of HYV coverage during this period was over 60 and is much higher than the national average. The percentage change in area under HYV seeds in all seasons in the State during 1970-71 to 2002-03 comes to 62.59. The share of autumn crop was 49.48 per cent. The shares of winter and summer crops were nearly 42.73 per cent and 7.77 per cent respectively.

3.1.7.5. State Level Growth Rate in Production and Productivity

Per hectare productivity of paddy in Kerala showed a steady and sustained increase over the past four decades. During the period 1960-61 to 2002-03, per hectare productivity of paddy in the State had increased from 1371 kilograms to 2218 kilograms showing an overall increase of 61.77 per cent (Table 3.15). Average annual growth rate in productivity of paddy for the period estimated is as 1.64 per cent.

Table 3.15.

Productivity of Rice in Kerala (1960-61 to 2002-03)-

(Productivity in kg per hectare)

Year	Productivity	Annual Growth Rate
1960-61	1371	NA
1965-66	1243	-14.86
1970-71	1483	5.70
1075-76	1520	-0.46
1980-81	1587	-3.11
1985-86	1729	-0.52
1990-91	1942	0.72
1995-96	2023	4.43
2000-01	2162	-1.86
2001-02	2182	0.92
2002-03	2218	1.64

Source: DES, "Fact Book on Agriculture", 1966, Agricultural Statistics in Kerala, 1975, SPB, Economic Review (Various Issues); Action Plan: 2003-04, TVM

Table 3.15 also shows that productivity of paddy in the State reached the highest level in 2002-03. In 1989-90, the year in which Group Farming Programme in paddy cultivation was introduced in the State, productivity of paddy rose all on a sudden by 11.52 per cent. Thereafter it remained more or less stagnant.

According to a study conducted by the Kerala Agricultural Ministry (1989), crisis in rice production was the result of six constraints:

1) Extensive marginalisation of paddy lands which makes them operationally non-viable. The average size of operational holdings in Kerala according to 1985-86 estimates is 0.36 hectares.
2) Scattered nature of paddy lands possessed by the farmers. Uneconomic and fragmented holdings make all farm operations costly.
3) Absence of full time farmers in 80 per cent of operational holdings. In order to attain high level of production of paddy, we are in need of full time labourers and not the part time labourers.
4) Inadequate coverage of irrigation facilities. Inadequate planning regarding irrigation is a reason for the present paddy crisis.
5) Non-uniformity in agricultural operations including plant protection measures.
6) High cost and non-availability of labour.

In spite of rather continuous increase in productivity, total production of paddy in Kerala has been declining over the last three decades. It was due to the more than proportionate decrease in area under paddy compared to the rate of increase in productivity. During the second period from 1975-76 to 1991-92, rice productivity increased by 28.29 per cent, but the area under paddy declined by 38.21 per cent resulting in a net reduction of the total rice production in the State by 20.36 per cent. Data regarding the production of paddy in Kerala for the period 1960-61 to 2002-03 is given in Table 3.16. The realised per hectare productivity of paddy in Kerala in the year 2002-03 is found to be 2218 kg of paddy. Production of paddy remained more or less stagnant during the first half of seventies and afterwards it began to fall. Annual growth rate in production during the second period (1975-76 to

1991-92) is found to be, -1.54 per cent. The only year which showed positive growth rate in production of paddy is 1989-90 when production increased by 12.66 per cent compared to the previous year. The annual production of paddy during 1999-2000 showed positive growth rate of 6.05 from where it started to decrease. For the first time during the last two decades, the food crop sector is making a positive contribution to the commodity basket of Kerala. It is not worthy that the average productivity of paddy at its current level of 2203 kg per hectare is higher than the national average of 1930 kg per hectare.

Table 3.16.

Rice Production in Kerala (Production in 1000 tonnes)

Year	Production	Growth Rate (Per cent)
1960-61	1067.3	NA
1965-66	997.49	(-) 11.05
1970-71	1292.01	5.35
1975-76	1331.19	(-) 0.14
1980-81	1272.00	(-) 2.13
1985-86	1173.05	(-) 6.60
1990-91	1086.58	(-) 4.79
1995-96	953.03	(-) 2.26
2000-01	751.32	(-) 2.51
2001-02	703.50	(-) 6.36
2002-03	688.85	(-) 2.38

Source: BES (1967), Fact Book on Agriculture 1966
BES (1976), Agricultural Statistics in Kerala 1975
DES (1989), Farm Guide 1988, 2001
SPB, Economic Review (Various Issues)

3.1.8. Season-wise Analysis of Growth Rate in Production and Productivity of Paddy

Per hectare productivity of Paddy in Kerala shows wide inter seasonal variations. Per hectare productivity of winter crop during 1960-61 to 1974-75 remained more or less constant and the annual growth rate in summer crop had been comparatively higher than the autumn crop. During this period per hectare productivity of autumn, winter and summer crops had increased at the annual rates of 1.22 per cent, 0.08 per cent and 1.71 per cent respectively (Table 3.17). During 1975-76 to 1991-92 period productivity of winter crop improved substantially and the average annual growth rate in productivity of autumn crop exceed that of summer crop. Annual growth rates in productivity of the three seasons autumn, winter and summer are estimated as 1.59 per cent, 1.31 per cent and 1.38 per cent respectively. During 1992-2003, productivity per hectare of winter crop showed variations and in 1999-2000 the productivity per hectare in all seasons showed positive growth (Economic Review, 1998, 2000). Poor performances of productivity was shown in winter season during 1996-98 where as in 2001-02 productivity per hectare increased to 2239 kg from 2071 kg per hectare in the previous year.

Table 3.17.

Season-wise Growth Rate in Productivity of Rice

(1960-61 to 2002-03) (kg/ha)

Seasons	1960-61 to 1974-75	1975-76 to 1991-92	1992-93 to 2002-03
Autumn	1.22	1.59	1.43
Winter	0.08	1.31	0.86
Summer	1.71	1.38	1.49

Source: BES (1967, Fact Book on Agriculture 1966.
BES (1975), Agricultural statistics in Kerala. 1975.
SPB, Economic Review (various issues)

It is observed that the potential productivity of paddy crop in Kerala is much higher than what the State has already realized. For, e.g., during the year, 1975-76, Kerala Agricultural University conducted a national demonstration in Trichur District in which 18 paddy farmers had participated and their average per hectare yields for the winter and summer seasons were found to be 5064 kg and 4960 kg of paddy respectively (Agricultural university of Kerala, 1976). The State average yields during the same year for the two crops were 2340 kg and 1835 kg respectively. Again a district-wise competition conducted by the department of agriculture in 1986-87 has shown that per hectare yield ranging from 6657 kg to 9320 kg of paddy are within the reach of paddy farmers in the State (Suseelan, 1988). However, the realised per hectare productivity of paddy in Kerala in the year 1991-92 is found to be 2938 kg which is 55.85 per cent to 68.48 per cent less than the potential yield. The productivity of autumn, winter and summer crops during 2002-03 shows the remarkable growth achieved by Puncha in all three years where as the productivity of Autumn crop declined from 2081 kg to 2074 kg and winter crop productivity started decreasing from 1996-97 onwards and reached to 2190 kg per hectare from 2999 kg showing an over all decrease of 809 kg (Economic Review, 2003).

The total production of paddy in Kerala during the year 2002-03 was 2832.17 million tones out of which the contributions of autumn, winter and summer crops were 2333.32 million tones (33.85 per cent), 3437.92 million tones (49.90 per cent) and 1118.50 million tones (16.23 per cent). The share of autumn crop during the period declined from 46.9 per cent in 1960-61 to 37.9 per cent in 2002-03. Poor performance was shown in the sixties; performance improved over the period 1970 to 1982-83 and thereafter showed a declining tendency till 1986-87. From 80's till 1992-93 the growth rate of production in autumn season is found to be negative. The situation continued in the recent period also (2002-03). During the first period of 1960-61 to 1974-75 rates of growth in production of rice from autumn and winter crops where 1.44 per cent and 2.03 per cent respectively. Summer crop production increased at a high rate of 4.40 per cent. During the second period (1975-76) to 1991-92 autumn, winter and summer crops showed negative growth rates and the linear growth rates are found to be negative.

During the third period (1991-92 to 2002-03) the three season's crop showed poor performance except in the period 2000-01 for Puncha and 1991-92 for winter. During the period 2000-01 to 2002-03, winter season accounts for highest share in production with 50 per cent followed by 34 per cent in autumn and 16 per cent in Punja season. (Table 3.18)

The trend in the total production in the past seems to have steadily increased and reached a static level where it has remained for more than a decade now. The increase in the total production of rice has been mainly due to increase in productivity rather than increase in area under the crop.

Table 3.18.

Seasonal Production of Rice in Kerala (1960-61 to 2002-03)

Year	Production – (in '000 tonnes)		
	Autumn	Winter	Summer
1960-61	500.9 (46.9)	4475 (41.9)	119.6 (11.2)
1965-66	521.4 (52.3)	389.8 (39.1)	85.7 (8.6)
1970-71	538.7 (41.5)	567.2 (43.7)	192.1 (14.8)
1975-76	550.2 (41.4)	598.1 (45.0)	180.7 (13.6)
1980-81	553.3 (43.5)	548.2 (43.1)	169.2 (13.3)
1985-86	462.2 (39.4)	526.7 (44.9)	184.2 (15.7)
1990-91	462.6 (42.6)	480.0 (44.2)	143.4 (13.2)
1995-96	344.2 (36.12)	458.09 (48.06)	150.7 (15.8)
2000-01	260.0 (34.64)	336.42 (44.77)	154.6 (20.57)
2001-02	235.8 (33.52)	362.63 (51.54)	105.0 (14.92)
2002-03	233.3.(21.70)	343.79 (49.90)	111.8 (16.23)

Source: BES (1967) Fact Book on April 1966
BES 1976 Agricultural Statistics in Kerala 1975
SPB 2002

The main factors that contribute to the low productivity of paddy in Kerala can be summed up.

1. Rice is cultivated in Kerala under varying conditions including problem areas like water logged and flooded areas, high altitude areas, coastal line regions etc. These differing agro-ecological conditions pause peculiar

location specific problems standing in the way of increasing productivity of economically feasible levels of investment.

2. The high acidic nature of the rice growing soil of Kerala gives generally a low response to high levels of technology available at present.
3. Even though the rainfall in the State on an annual basis is fairly good its uneven distribution leads to different problems in the paddy fields. For e.g. the first crop of paddy (Virippu) suffers from drought in its early stages and floods in its middle or later stages since the south west monsoon is concentrated towards June-July. Similarly the second crop (Mundakan) is affected by droughts in its later stages.
4. The undulating topography of the land favours soil erosion and silting up of the natural drains and water courses and also toxic proportions of iron and aluminum. Salts are washed into the low-lying paddy fields.
5. The high humidity and warm temperature prevailing throughout the cropping seasons and the system of multiple cropping followed are congenial for multiplication of pests and diseases.
6. Above all the high cost of cultivation and low labour output and constant labour problems make paddy cultivation less remunerative.
7. Rice area covered under irrigation is only 36 per cent of the gross area under the crop. (Pillai, 1994) while much is left to be desired by way of command area development for effective utilisation of the irrigation potential erected.
8. The consumption of fertilizers per unit of cropped area in the State is comparatively less. The recommended dose of fertilizers for HYV and local varieties as per package of practices comes to 90 kg Nitrogen, 45 kg Potash per hectare for HYV and 40 N, 20 P and 20 K per hectare for local varieties respectively. Average quantity of inorganic manures used by cultivators using HYV is 50.6 kg per hectare whereas the same for local varieties is only 23 Kg/ha (1981-82). The consumption of fertilizers (N+P+K) comes to 72.47 kg during 2001 (SPB, 2001). This alarming situation should not be allowed to exist. It has to be examined from all possible angles to find solutions.

To conclude, the agricultural development in Kerala is characterised by two pronounced features that deserve our serious attention. The first is the serious crisis faced by the important food crop paddy, manifested through the steep decline in area. This crisis started setting on since the mid-seventies and still continues to grow. The second and the more disturbing is the tendency among the farmers for shifting the area under food crops especially that of paddy in favour of cash crops. However, during the past four decades per hectare productivity of paddy in the State has considerable increased. Thus the negative effect of decrease in area in total paddy production is partially off set by the increase in productivity. Season-wise analysis shows that in terms of productivity summer crop is better placed compared to autumn and winter crops. However, area under summer paddy in the State constitutes only a small proportion of the total area under paddy.

3.1.9. An Assessment of Factors Contributing to Agricultural Growth

The pattern of agricultural growth in Kerala, as described in the earlier section is characterised by fairly positive growth till the mid seventies and deceleration since then. A probe into the factors that are generally believed to contribute to improvement in agricultural production and productivity is attempted briefly in this section. Since the same analysis is attempted at the micro level separately in the sixth chapter, only a few assessments are attempted here.

The factors that are generally believed to contribute to the growth of agricultural sector are many and some of the most important factors are examined here, grouping them as

1. Physical and Technical factors,
2. Historical factors,
3. Social factors.
4. Economic factors.
5. Technological factors and
6. Policy factors

(For a detailed study of this see Sivanandan, 1983, Chapter 4)

At any given time the crop pattern of a country is given by the history. Whatever may have been the position in Kerala, in the past, there is very clear indication that the farmers are influenced by economic factors now, among which, price and income maximisation, farm size, availability of inputs played the leading role. Many empirical studies have brought out the relation between price movement and crop pattern. A study of inter-crop price parities undertaken by the Ministry of Food and Agriculture shows how the price variations exert an important influence in acreage shifts. It seems that price influence the acreage under the crops in two ways. One is that the variations in the inter-crop price parities led to shift in acreage as between the crops. Another is that the maintenance of a stable level of prices for a crop provides a better incentive to the producer to increase the output, than what a very high level of price does. Fixed procurement price of rice and wheat and other government controls have induced farmers to shift to each crops like sugarcane, coconut etc.

Income maximisation pull has greatly influenced in changing the crop pattern. Rajkrishna (1964) argues that, relative profitability per acre is the main consideration, which influences the crop pattern.

Farm size: There is a relationship between farm size and cropping pattern. The small farmers are first interested in producing good grain for their requirements. They would go in for cash crops, only after they have met their requirements of food grains. Many empirical studies has brought out that small holders devote a small relative acreage to cash crops than large holders. As the economy grows, the small farmers make adjustments in his crop pattern in order to maximize his income. Besides, insurance against risk, availability of inputs, pests, diseases etc. influence the cropping pattern in the State.

There has taken place some changes in the social factors like density of population, customs, traditions, attitude towards material things connected with agriculture and this resulted in the land area changing to take advantage of modern inputs and new knowledge.

Influence of Technology: - Cropping pattern is influenced by the latest and modern technique of production. Since the inception of Green Revolution, cropping pattern has radically been changed. In a sense, high yielding varieties of seeds, irrigation, chemical fertilizers and mechanization has provided a base for multiple cropping.

Agricultural productivity has been subject to wide yearly fluctuations and has never been significantly influenced by the fairly uniform and high rate of growth in the fertilizer consumption. The productivity movements over the years have been independent of the fertilizer consumption.

Irrigation: - Paddy has the lion share of irrigation. Irrigated area under paddy generally gave higher yields. However in a number of districts, yields under irrigated farms were lower than the yields from un-irrigated farms. Impact of irrigation on stabilising summer crops which needs irrigation, was marginal.

Government Policy: - Government policies often affected crop pattern in a very important way. Policies relating to priorities given to various crops, exports, taxes, supply of credit, development of backward regions, all had their own role in determining the nature of crops and the area under them. The Government's special facilities to farming community, like procurement prices, support prices, subsidies contributed to change the cropping pattern. The facilities which the government makes available for the growth of certain crops and for the development of certain regions alter a crop pattern, implied by these policies.

To conclude, it is observed that at the State level, none of the different sources of productivity such as the adoption rate of HYV Seeds, level of fertilizer consumption, extent of irrigation facilities and plant protection measures had any significant positive role, in improving paddy productivity. Even though in individual farms, at the micro level the situation can be different. Experience in recent years has been that, the farmer does accept the logic for a change, whenever he is shown a better cropping pattern. The real difficulty in adopting a better cropping pattern is that, the farmer may not have the requisite capital to invest now or posses the know-how that may be necessary for changing the crops. It is here that the Government may come to help.

Past performances of Kerala agriculture front, shows a mix of commendable achievements and lost opportunities. Although the State has all the natural endowments, in the context of the emerging pattern of trade, the State has to re-orient its farm front by identifying commodities, which have a relative advantage for production in Kerala having a competitive edge over other producing areas and also concentrate their production in the agronomical suitable zones. The macro level support for identifying crops, the varieties suitable, locating the ideal zones for promoting these commodities, technological guidance, major infra structural support like irrigation, marketing etc have to be extended from the State level. It is necessary to take special efforts to put to full capability utilisation of the land resources along with improving the efficiency of water management. In short, it is only through a major paradigm shift in the approach, strategy for agricultural development in Kerala, that the State's agriculture could be carried in more vigour and vitality.

3.2. Causes for the Change in the Cropping Pattern and Decline of Area under Paddy Cultivation in Kerala

The agricultural development in Kerala is characterised by two pronounced features that deserve our attention. The first is the serious crisis faced by the two most important crops of the State, paddy and coconut, particularly since 1975-76, manifested through the steep decline in area under paddy on the one hand, and the steep decline in the productivity of coconut on the other. This crisis started since the mid-seventies and still continues to grow. The second and the more disturbing is the tendency among the farmers for shifting the area under food crops in favour of cash crops/plantation crops.

A number of factors contributed to this phenomenon. Paddy farming in Kerala, which has been ailing for quite some time, appears to be moving towards a point of no return. The high pressure of population combined with a cropping system which is more and more oriented towards perennial cash crops make the State increasingly dependent on neighbouring States for meeting the food requirement of both human and cattle population. However, the fifteen years period from the mid-seventies witnessed large-scale shift in area under the crop, resulting in a loss of around four lakh hectares of gross cropped area. Consequently the production of paddy also suffered a severe set back during the period. Salvaging the paddy economy by arresting the further fall in area under paddy cultivation can be made possible by identifying the causes for the decline of area under paddy. This section summarises the possible factors responsible for the decline of area under paddy in the State which can be divided into two, viz, non-economic and economic causes.

The peculiar background of Kerala agricultural economy is examined in the introductory part after which the causes are analyzed. The dependence of agriculture especially paddy on nature is generally much bigger than in case of other occupations. In Kerala this dependence on rains is rather too much. Rains in Kerala are inadequate, uncertain and irregular. In a few places it rains too much, in other too little. As a result Kerala often gets floods or drought conditions. Strong laden-winds, locust and other features of inclement weather make paddy cultivation an uncertain occupation as a consequence of which one finds large variations in their economic positions.

A substantial number of cultivators in the State are small farmers. This is due to the backward nature of agriculture and rapidly rising population, which is leading to sub-division, and fragmentation of holdings. As a result, farmers cultivate tiny pieces of land with no or little resources. These farmers are not able to make any worthwhile investments in land, nor can they make other necessary arrangements for the required agricultural operations. As a result, cultivation is not carried on as a business; instead it serves merely as a source of subsistence. And naturally, they think of alternative ways of earning income rather than depending on paddy farming, which they may be in the form of substitution of crop.

The size of fixed capital is inadequate. As a result the in-built capacity to expand and to withstand nature's uncertainties continues to be much less than required.

The use of modern inputs like researched seeds, fertilizers, pesticides etc is not wide spread. The green revolution continues to remain confined to a few areas and to a few crops.

Social environment of the sector is far from satisfactory. Owner-cultivators are quite many but most of them are very small farmers with little resources and very little surpluses. The human factor is weak too. It is inhibited in out look by the traditional values. The scientific temper is conspicuous by its absence. In short, the core of paddy cultivation is unprogressive.

One major cause of poor performance in agriculture is the State itself, which offers little incentives to the farmers to put in his best. In fact in certain cases, it is a disincentive ridden system. The unfavorable backdrop is made worse by the inadequacy of various inputs such as water, seeds, fertilizers etc. The availability of these inputs is inadequate in the State as a whole. But the unfortunate part of this is that whatever is available is unevenly distributed among regions and farmers. Institutional arrangements for enabling the farmers to conduct the occupation as a business are also inadequate. And it is more so for small and marginal farmers who need them the most. The State's financing agencies have yet to be oriented fully to the needs of the most important segment of the economy. Even in respect of marketing, villages have to be integrated with the urbanities, both in terms of the transactions of agricultural products that the farmers have and the consumer goods and many inputs that they need.

Faced by the vicious atmosphere of caste and religion, the clutches of moneylender, lack of any organization, particularly of poor farms, an overwhelming number of cultivators are just subsistence farmers. From the point of view of efficient farming, the so-called agriculturist is any thing but an agriculturist. With this background, an attempt is made in this section to summarize the main causes for the change in cropping pattern and decline in area under paddy in the State.

3.2.1. Economic Factors

Economic factors relate to such things as prices, income, size of land holdings, availability of agricultural resources, labour problems etc. One of the major factors that influence the choice of crop is the expected income from land. The prices of agricultural products and of inputs will have a bearing on the type of crops the farmer will grow and the proportion of land he will devote to different crops. Not only the level of prices but also the changes in prices affect decisions as to what to grow and how much of land is utilised. The different prices, i.e., sale price of products, purchase price of inputs and consumer goods determine the real income of a farmer. The crops that give him the largest income will naturally be the ones to be cultivated. Even though pertinent data with regard to the extent of allocation of paddy fields among competing crops such as coconut, vegetables, banana, arecanut and tapioca are not available, "it is the conversion of paddy land to coconut that is often mentioned in the Kerala context". But "the change in area under paddy should be explained by the change in the prices of paddy relative to that of coconut". The rate of increase in coconut prices surpassed paddy prices during the period 1985-86 to 1990-91 and accordingly area under paddy declined and area under coconut crop increased during this period.

The farm harvest prices are more relevant to the farmers, particularly to the small and marginal farmers, who often sell their marketable surplus at the time of harvest. The price rise in coconut had always been faster than that of paddy through out the period and this relative advantage of price rise must have to some extent, influenced the conversion of some paddy farms to coconut gardens. Another noteworthy feature is the lower rate of increase in the price of rice compared to that of other crops which have influenced the conversion of some paddy farms to other crops. Among all the crops, the rate of increase in the price of paddy was the lowest.

The fluctuations in the price of agricultural products create a state of insecurity among farmers. In order to spread the risk, they diversify crops preferring those that are expected to give a steady income. From experience they have found that in the long run coconut is more reliable and useful crop responding favourably to manuring and irrigation. Income from coconut gardens could be augmented by raising various other crops like banana, tubers, pepper etc. as inter crops. The farmers therefore prefer coconut cultivation with inter cropping to all other crops. This pattern is said to be providing a reasonable level of income from land and at the same time minimises risk due to crop failures and price fluctuations.

Compared to paddy, the risk due to fluctuation in yield was also low for tree crops. In the converted paddy lands banana and tapioca were cultivated initially and since their yield rates were higher, they bring higher income than paddy farming. From the point of view of the farmers, the emerging crop pattern with predominance of cash crops has reduced risks and improved standards of living.

In short, the acreage allocation decisions are better influenced by the current and expected rate of profits in which costs are equally important as farm prices of products. For e.g., the comparative advantage of coconut in terms of profitability over paddy may induce paddy farmers to shift their crop pattern in favour of coconut.

Not only the farm prices but the availability of inputs and their price also influenced the cropping pattern in favour of coconut or other tree crops. A major factor discouraging investments in paddy is the increased cost of production arising out of augmenting labour and other input costs

3.2.1.1. Labour Problems

In the traditional system of agriculture in which land remained in the hands of a few house holds, each cultivator family had one or two attached labour households, which provided male and female labour for agricultural operations. In addition to providing labour for routine operations, they arranged additional labourers to meet the peak demand at times of sowing and harvesting. This system had worked efficiently and was advantageous to both cultivator and the labourer. With the fragmentation of holdings, the system broke down and the cultivator had to go in search of casual labourer for each farm operation. Getting suitable farm labourers became a problem to small holders especially those engaged in paddy cultivation.

The transition of the economy from agriculture to non-agriculture, growth of urban centres in the neighbourhood, and growth of facilities for quick transport induced movement of labour from the village to outside areas in search of work. Thus the availability of farm labourers for timely farm operations declined. After 80's the State witnessed a spurt in non-agricultural activities like construction, transport and trade in and around the State. The higher wages existing in the non-agricultural sectors and the performance of the workers to work in sectors other than farming shifted a sizeable proportion of the rural labour away from agriculture. The supply of labour for agriculture especially for paddy cultivation fell drastically in consequence.

Increased educational facilities extended the period of schooling and delayed the entry of younger generation to the work force. The new entrants who are better educated than their elders prefer white-collar or non-manual jobs, as this reduced the availability of farm labour even further.

The programs like decentralisation introduced in 90's raised the income of the labourers. The government introduced different schemes of financial aid to self-employed, cattle farms, Sthree-Sakthi, Kudumbasree etc., which enabled the educated labourers to meet their needs without engaging in agriculture. Thus the new entrants prefer non-agricultural activities to agricultural work, which in turn reduced the number of agricultural labourers. Thus the successful implementation of the various poverty alleviation programs envisaged by the Government such as IRDP, TRYSEM, JRY, DWCRA have created large amount of employment opportunities to the people outside the farm sector. Again, the fast growing service sector along with the hectic construction works going on in the different parts of the State also caused a reduction in the number of farm labourers.

Aversion of new generation from agricultural labour households to paddy cultivation reduced the availability of farm labourers. Since the social status of agricultural labourers is comparatively less, the new entrants to labour market from rural households prefer more colorful jobs even at lower wages. The educated unemployed youth from agricultural labour families prefer to remain jobless till they get a permanent job elsewhere other than agriculture. Elder generation of agricultural labourers also encourage the younger ones to take up other jobs which need less physical strain and effort. Low wages compared to construction workers, head-load workers and other skilled labourers in rural areas induced more and more farm labourers to quit agriculture and adopt alternative jobs

3.2.1.2. Inter regional Marriages

The supply of farm labourers is reduced due to inter regional marriages. Whenever a female agricultural labourer is married outside the region she will not be available for farm works. Most of the young brides coming to the area from outside either lack the skill needed or are unwilling to work as labourers. This is supported by their male partners

3.2.1.3. Nature of Work and Work Conditions

Compared to many other jobs paddy farm works are more laborious and tiresome. Often farm workers are exposed to scorching heat or incessant rain for many hours a day. Again in paddy fields labourers are usually under the strict supervision of farmers. All the more, since paddy farming is seasonal, for the major part of the year workers have to remain idle and they have no job security. It is natural that they will leave paddy fields for the sake of permanent jobs with better service conditions.

3.2.1.4. High Cost of cultivation

A major factor discouraging investment in paddy is the increased cost of cultivation arising out of augmenting labour and other input costs. Compared to neighbouring States the labour cost of cultivation is higher in Kerala. As the price of land, cost of materials and cost of wages are higher; the initial cost of investment is also higher in Kerala. The State Planning Board is of the view that because of inadequate production and the need to import most of the essential and other consumption items of the people, the wages and prices are higher in Kerala. The decline in the profitability of cultivators, arising out of steep increase in cultivation cost is cited as the major factor that led to the steady decline of paddy cultivation. The steep increase in the wages of agricultural workers and other categories of workers also discouraged the hiring of labourers for agriculture and other activities. The study by Bardhan (1973) have noted that the real wages have gone up faster in Kerala compared to even to that of Punjab.

There are some evidences from other studies to support the view that strong labour movements and urbanisation of workers have succeeded in pushing up money wages and this perhaps offer some explanation for the unprofitability of cultivation which is reported to have a high rate of labour absorption. Thus the rising labour costs coupled with the unmanageability of labour have prompted rice cultivators to convert paddy land to grow other crops whose economics are more favourable and labour requirements are smaller. Thus the labor shortage taken together with cost may be considered as a crucial factor for the change in the cropping pattern unfavourable to paddy cultivation. Increasing wages for the agricultural workers seem to be the greatest problem faced by paddy farming.

An important constituent of the cost of production of paddy other than the labour cost is the cost of manures, which includes both the chemical fertilizers and the farmyard manures. In July 1991, the administered prices of nitrogenous fertilizers were increased by 30 per cent with the new fertilizer policy of the Union Government. Prices of paddy seeds, insecticides, and pesticides had also shown 20 to 30 per cent increase. Thus the costs of inputs like fertilizers are beyond the affordable capacity of the farmers. When the fertilizer price is higher and the output price is relatively lower, the farmers may try to shift from one crop to another within his resource constraint. In short, the impact of this hike in fertilizer prices on paddy farmers, especially small and marginal farmers are considerably high. The increased price of chemical fertilizers resulted in a reduction of fertilizer consumption, which in turn affected the agricultural production. The index numbers of parity between prices received and paid by farmers reveal that the index of prices received was lower than the prices paid except for few years. Displacement of paddy by coconut, at least in single crop wetlands has taken place after sixties owing to the generally unfavourable price for paddy. A similarity between the trend in area under tapioca and change in price of tapioca and also the relative prices of tapioca and paddy can be noted. If we consider the area with respect to tapioca and paddy, it would indicate that the areas under tapioca came down when the relative price was unfavorable to paddy (i.e. when rice was cheap). Naturally, these areas would go to other competing crops like coconut, rubber etc. Panikar has argued in a study that the decline in the area under paddy cultivation since 1974-75 has been due to the fall in the price of paddy and the rise in the cost of cultivation, particularly due to the disproportionate increase in the wage rate of labour. In another study on the conceptual issues involved in the cost of cultivation estimates in Kerala, it has been pointed of by George (1982) that the decline in the profitability of paddy cultivation is mainly the result of the relatively higher rate of increase in wages of labour, compared to that of output price.

The most unfortunate thing is that the institutional reformers, who are essential for releasing the best out of the irrigation projects, are neglected in the State. The high cost of irrigation projects is attributed to the topographical features peculiar to Kerala and non adoption of scientific management practices. In addition to the labour costs, manure costs and costs on seeds and seedlings, paddy farmers have to bear some other costs such as plant protection costs, land tax, irrigation cess, repair and maintenance charges etc due to which cost of cultivation of paddy increased substantially.

The size of operational holding is another critical factor, which determines the choice of crop. A small farm produces little and the farmer generally gives first priority to the production of food grains for self consumption. In a big farm, where large scale production is feasible, there is a tendency to devote a large proportion of land to commercial crops for market. The small and marginal farmers are economically at less advantageous position in the sense that the benefits of modern technology and agricultural subsidy programm of the Government are mostly reaped by the larger farmers.

3.2.1.5. Technological Factors

Paddy cultivation witnessed technological changes during the mid-sixties by way of HYV seeds and chemical fertilizers and pesticides. The application of these modern varieties increased the yield considerably. At the same time increased use of fertilizers and pesticides affected the micro-organisms in the paddy field and reduced the original fertility of the soil. As a result the high yields of paddy could not be sustained after 1970's. Moreover paddy cultivation became more costly and less profitable. The cultivators therefore chose to cultivate those crops that yielded higher cash income in the long run.

3.2.1.6. Dependence on Non-institutional Sources of Credit

In order to meet their capital requirements, majority of the paddy farmers are depending on the external sources like commercial banks, co-operative banks, friends and relatives, moneylenders and traders. Even with huge expansion of rural branches the financial institutions could not serve all the regions. There is also the concentration of credit on the upper and better-off segment of farmers while the poorer and larger segment at the lower levels of the ladder are on the marginal receiver. Naturally, the better depend on the moneylenders who exploit the farmers by charging exorbitantly high rate of interest. This on the one hand increase the cost of cultivation and on the other reduces the net income from the agricultural sector from paddy.

3.2.2. Non-economic Factors

It relate to factors such as social, political, climatic, urbanization, real estate investment, migration to gulf countries, State intervention, demand for land for non-agricultural purposes, high rate of crop failures, decline in the number of full time and dedicated paddy farmers.

3.2.2.1. Demand for Land for Non-agricultural Purposes

Apart from the cost price squeeze mentioned above, there is other, though related factors, which account for falling area under paddy in recent years. One of them is the rising land price on account of rising demand for house sites and another is raising urbanisation. Since land prices have become unrelated to the return from crops, paddy land appears to be the first target of demand for land for non-agricultural uses. Thus conversion of paddy fields for non-agricultural purposes such as construction of houses, factories, shops, education and health institution etc resulted in the decline in area under paddy. After the crash of share market, investors in Kerala, particularly NRIs, have turned to real estate investment and as a result of it land prices are shooting up. In order to take advantage of the rising demand for land, paddy field owners are converting their lands to saleable plots by filling it with soil. It is found that out of the estimated eleven lakh houses built in the State during the last decade, more than half are built in filled up paddy fields. Decline in area under paddy in Kerala is accompanied by an increase in fallow lands. The percentage of current fallow to the total geographical area in the State had increased from 0.62 per cent in 1970-71 to 16.3 per cent by the year 1998-99. Since profitability of paddy crop comes down, majority of the people are cultivating paddy for their own use and the rest of the land is left fallow. In short, conversion of paddy lands for housing purposes and for cultivation of commercial plantation crops has been a major reason for the decline in cultivated area.

3.2.2.2. Fall in the Number of Men Cultivators

The decline in the total number of cultivators is due to the steep fall in the number of men cultivators. This may be partially due to the fact that a large number of Keralites have gone to gulf countries in search of employment and substantial number of them may be small cultivators with a meager size of holding who might have sold out these small plots of land. The result of 1991 census reveals a shift in the working population from the agricultural sector to the non-agricultural sector.

Thus falling employment days, erosion of real wages due to inflation, mounting misery of wage labour and unprofitability of paddy cultivation suggest a very bleak future for paddy production, the cultivators and farm labour in the State.

3.2.2.3. Political Factors/State Intervention

Land reforms: In Kerala context, land reform has been a major institutional change, which should have encouraged farmers to produce more as they need not share the surplus, generated. But after the introduction of land reforms, big land lords who possessed hundreds of hectares of paddy fields, had to surrender their excess lands which were later distributed among landless labourers and small peasants. Many of the agricultural labourers have recently purchased small plots of paddy lands or have taken land on lease for paddy cultivation. Thus a new category of farmers is formed as this made the availability of hired labourers more difficult.

Land acquisition: During the seventies the Government acquired private land for railway track and canal construction purposes, displacing a large number of households mostly belonging to rural labour. The compensation amount paid by the Government was used to purchase new lands for resettlement of the displaced households. This led to a rapid increase in the price of dry land, which in turn changed the cropping pattern. The paddy lands were converted to dry land in anticipation of a hike in price of land due to increasing demand. This reduced the area of paddy cultivation and ultimately cropping pattern of the State.

Deforestation: Destruction of forests and cutting down of wood as a part of deforestation policy of the Government reduced source of green manure and fodder for cattle. The farmers had to depend more on external sources for which they have to pay more. As a result of this, cost of cultivation went up. Increase in the cost of cultivation is said to be one of the reasons for shifting paddy farms to other crops.

Public Distribution System (PDS): The Public Distribution System in the State had played a key role in keeping paddy prices low by influencing the supply side of domestic rice market and thereby reduced the profitability of the crop.

Government Policies: Government policies affect crop-pattern in a very important way. Policies relating to priorities given to various crops, exports, taxes, supply of credit, development of backward regions etc. determine the nature of crops and the area under them. The sharp decline in area under paddy is also the result of the one among the many policies of the Government to combat the problem of food deficit in the country. In spite of the Government orders preventing conversion of paddy fields, the farmers are continuing the process somehow or the other.

3.2.2.4. Lack of Supporting Services

Rice cultivation is seasonal. Therefore ploughing, transplanting etc. has to be done during the cultivation season itself. The small holders who form majority of cultivators are not maintaining animals for farm operations because of high cost. They can not afford to own farm machinery on individual basis also. Non-availability of sprayers and skilled workers for operations like spraying at times of need is another serious problem confronted by the paddy farmers.

3.2.2.5. Lack of On-farm Development

Lack of on-farm development for effective water control in the field is another serious gap in rice production.

3.2.2.6. Lack of Agency

There is also no effective agency to procure the marketable surplus at reasonable price.

3.2.2.7. Lack of Extension Services

Extension services provided by the Government are not satisfactory to meet the requirement of the farmers. Poor transformation network restrict the interaction among the farmers and the extension workers. The farmers in the remote areas are the most disadvantaged in terms of getting the inputs. Farmers do not get information about new innovation and market price of different crops. Profitable paddy production calls for more intensive extension work to disseminate low cost technology.

3.2.2.8. High Rate of Crop Failures

Recurrence of crop failures is yet another problem for the paddy cultivators. Crop failures due to floods, droughts, incidence of pests and plant diseases are experienced by paddy cultivators, which made the paddy cultivation unprofitable compared to plantation crops. As a result they opt for a cropping pattern with less risk and more profit.

3.2.2.9. Decline in the Number of Full-time and Dedicated Paddy Farmers

At present, for the majority of the farmers, paddy cultivation is merely a subsidiary occupation to supplement their main source of income. They lack genuine interest in paddy farming. In most cases, Government servants are engaged in the paddy cultivation along with fulltime farmers. For them it is a part-time job and it is one of the reasons why the paddy fields are left fallow or they opt for a single crop even though it is possible to raise a second crop in their fields.

Conclusion

The paddy farmers are now in a dilemma as to whether to continue in the business of paddy cultivation or leave it. The high cost of cultivation coupled with comparatively low yield rate, low price of paddy and high probability of risk create a situation which forces the small and marginal farmers to leave this occupation. At the same time, they are not inclined to leave it, partly due to the land utilisation order which prevents leaving lands fallow and partly due to the fact that this is their only means of livelihood. The attachment of ancestral property prompts them to cultivate the land and gradually convert part of it for other purposes.

CHAPTER IV

SOCIO-ECONOMIC PROFILE OF PALAKKAD DISTRICT

Chapter IV

SOCIO-ECONOMIC PROFILE OF PALAKKAD DISTRICT

District planning, as an instrument of decentralised development planning with so much of socio-economic diversity, is desirable in a State like Kerala. By facilitating the diffusion of development through the realisation of local development potential and people's participation, district planning may help in investigating regional imbalances and social tensions. For this, it is necessary to estimate the development potential of the dominant agriculture sector of Kerala economy. It is a fact that, agriculture is the predominant sectors from which majority of the population draws its sustenance. As such it need be attended with top priority and hence agriculture constitutes the major component of a district plan.

Agricultural is very much dependant on the climatic and geographical conditions such as temperature, rainfall, soil etc. Besides these natural factors, economic factors such as population structure, availability of land, livestock position, and investment in fixed assets like implements and machinery etc., influence the efficiency in farming and bring about desirable changes in the farm economy. Since the present study is pertains to different blocks of Palakkad District, it is appropriate that background informations, socio-economic and related aspects of the district in general and the selected blocks in particular are examined. The first part of the chapter deals with general profile of Palakkad District, the second part deals with agricultural situations in Palakkad, third part deals with economics of paddy cultivation in Palakkad District and fourth part deals with socio-economic profile of the sample blocks.

DISTRICT PROFILE

Total area	: 4480 Sq. kms
Total Number of Blocks	: 13
Panchayaths	: 90
Latitude	: Between 10°20' & 11°14'
Longitude	: Between 76°02' & 76°54'
Population	: 2382235
Male	: 1155822
Female	: 1226413
Density of population	: 532 / Sq. km
Literacy Percentage	: 81.27
Total Workers	: 786381
Cultivators	: 97289
Agriculture Labours	: 348299
Industrial workers	: 21904
Other workers	: 318871
Land Utilisation Pattern	
Total Geographical area	: 4,38,980 ha
Forest	: 1,36,257 ha
Non-Agricultural use	: 33,038 ha
Uncultivable land	: 9,393 ha
Miscellaneous tree crops	: 6,928 ha
Cultivable waste	: 21,796 ha
Fallow other than current fallow	: 5,089 ha
Current fallow	: 7,942 ha
Net area sown	: 2,14,456 ha
Area sown more than once	: 1,33,061 ha
Total cropped area	: 3,51,517 ha
Major crops	: Paddy, Coconut, Rubber, Groundnut, Cotton, Tapioca

4.1. A brief Profile of Palakkad District

4.1.1. Origin of the Name Palakkad

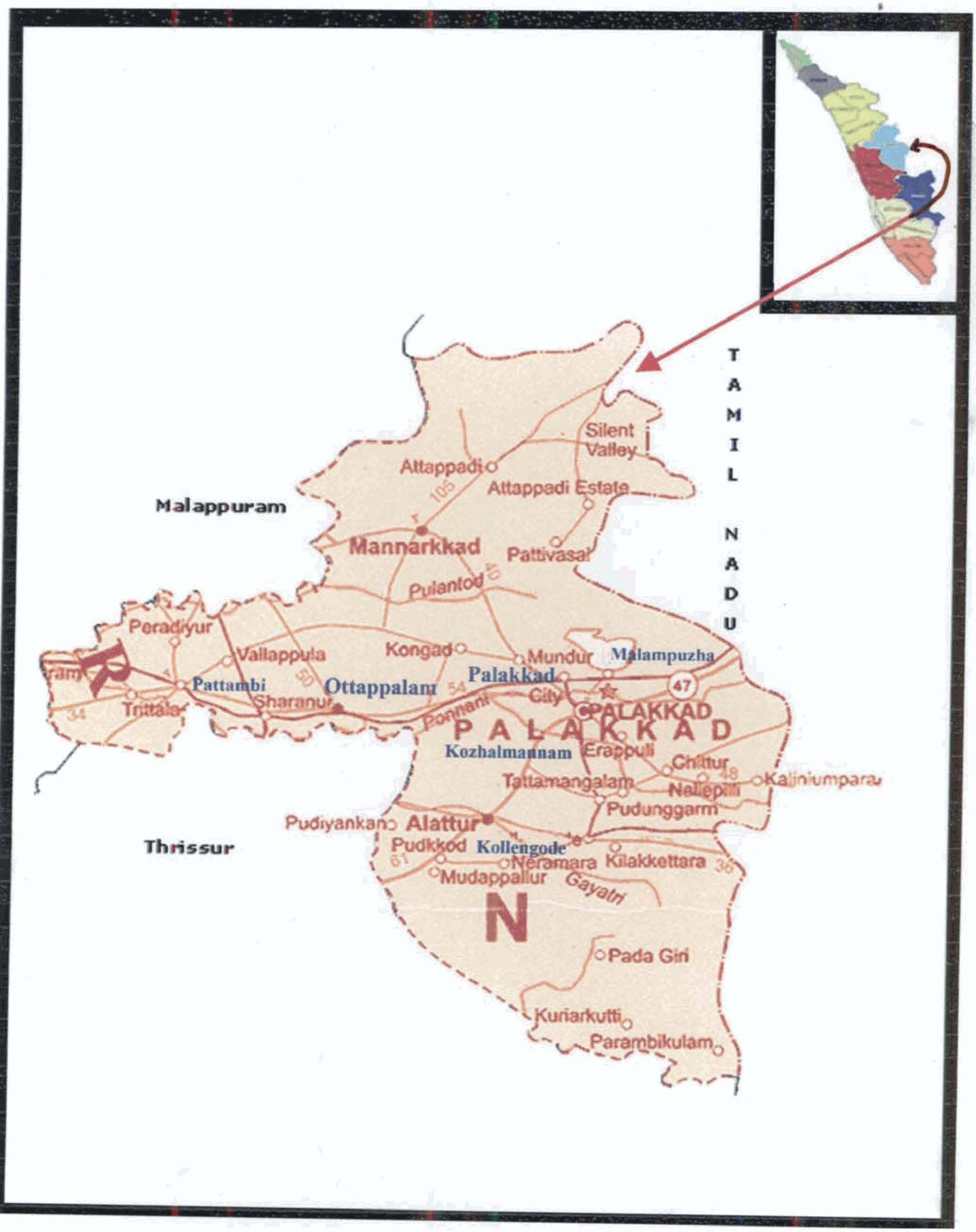
Different versions are given to the origin of the name Palakkad. It is said that the name derived from the traditional Tamil classifications of land on the basis of soil formations and physical features. Places which were for the most part desert regions hardly fit for raising food crops and were in many places barren and rocky were called the 'Pala or Palai'. The pre-assumption of a section of scholars is that the name Palakkad originated from the physiographic term 'Pala or Palai' that denotes the barren and rocky regions combined with the word 'Kadu' or forest, meaning there by the land covered by rocky regions and forests.

Considering the fertile plains of the district and other physical features of the place, it seems that Palakkad can never come under the traditional classification of 'Pala' region.

A more sensible argument is that the whole of Palakkad and its suburbs were once covered by thick forests of Pala (*Alsteria scholaris*) trees; hence the word Palakkad. In the East India Company's correspondence, the place is called by the name 'Palghatcherry identified with the modern Palakkad town with its Mysorean fort. In the East India Company's records and in the references made by Buchanan and others mention is made of a Jainese Temple. Probably 'Palakkad' might be spelt to denote the 'ghat' or place where the language 'Palai' was spoken. Any how no authentic record is forth coming to say clearly the derivation of the name Palakkad.

4.1.2. Location, General Boundaries

Palakkad District is located between north latitude 10"20' and 11"14' and east longitude 76"02' and 76"54'. The district is bounded by Malappuram and Nilgiri districts on the North, Coimbtatore District on the east, Trichur District on the South and Malappuram and Trichur Districts on the west.



TAMIL NADU
Malappuram
Thrissur
Silent Valley
Attappadi
Attappadi Estate
Mannarkkad
Pattivasal
Pulantod
Peradiyur
Vallappula
Kongad
Mundur
Malampuzha
Pattambi
Ottappalam
Palakkad
City
Sharanur
Trittala
Ponnani
PALAKKAD
P A L A K K A D
Kozhalmannam
Erappuli
Chittur
Tattamangalam
Nallepilli
Kalliniumparai
Pudunggarm
Pudiyankan
Alattur
Pudkkod
Kollengode
Neramara
Kilakkettara
Mudappallur
Gayatri
N
R
Pada Giri
Kuriarkutti
Parambikulam

4.1.3. Area and Population

With an area of 4480 sq. km, this district ranks fourth in the State in regard to area (Table 4.1). This works out to 11.53 per cent of the total area of the State. The district Palghat has been renamed as Palakkad. Taluk-wise area (Table.4.1) and population (Table.4.2) are given below.

Table 4.1.

Distribution of Area by Taluks

Taluks (1)	Total Area in sq.km. (2)	Rural (3)	Urban (4)
Ottapalam	844.8	798.3	47.5
Mannarghat	1,099.6	1,092.0	7.6
Palakkad	720.3	689.7	30.6
Chittur	1,155.1	1,124.5	30.6
Alathur	569.0	569.0	Nil

Source: District Census, 1991

The total population of the district according to the census of the year 2001 is 2617072. The growth rate of population in the district is 9.86 where as it is lower in the State i.e., 9.42. Density of population per sq. km in this district is 584[1]. Another feature in the distribution of population according to sex is that the percentage of females is higher than that of the males. The number of females per thousand males is 1068. Total male members are 1265794 where as the number of female is 13 51278 (106.75%). The district has achieved 100% literacy in 1991, calculated on the basis of population above the age of 6 years (Literary rate 84% as on 2001).

[1] The density of population has increased from 311 persons per. Sq. Km. in 1961 to 532 persons in 1991, and to 584 persons in 2001

Table 4.2.

Distribution of Population by Taluks

Taluk (1)	Rural (2)	Urban (3)	Population (Total)
Palakkad District	1,471,263	214,079	1,685,342
Mannarghat	171,999	12,500	184,579
Ottapalam	464,755	57,272	522,027
Palakkad	266.181	102,820	369,001
Alathur	295,762	Nil	295,762
Chittur	272,566	41,407	313,973

Source: District Census, 1991

4.1.4. Administrative Subdivisions

The District Head quarters located at Palakkad is about 160 km away from Kochi and 370 km from Thiruvananthapuram, the State Capital. For the purpose of administration the district is divided into two Revenue Divisions- Ottapalam and Palakkad and five taluks, viz. Alathur, Chittur, Palakkad, Ottapalam and Mannarghat. There are 163 villages in the district. Palakkad Municipality is among the oldest municipalities of the State and has completed 130 years. Other Muncipal towns are Ottapalam, Shornur and Chittur-Thathamangalam. The district has 90 Panchayaths and is divided into community Development Blocks for the effective implementation of various developmental activities (Table 4.3).

Table 4.3.

Block, Panchayath and Village Relations-Palakkad District

C.D. Block Name	Panchayath (Nos)	Revenue Villages (Nos)	Census Villages (Nos)
1. Ottapalam	5	8	35
2. Chittur	6	20	18
3. Pattambi	10	11	59
4. SreeKrishnapuram	7	13	63
5. Kollengode	5	8	10
6. Trithala	7	9	76
7. Alathur	9	17	29
8. Malampuzha	8	13	26
9. Nenmara	6	10	16
10. Kozhalmannam	7	14	35
11. Mannarkkad	9	20	35
12. Palakkad	8	11	34
13. Attapadi	-	7	7

Source: Panchayath Level Statistics (Palakkad District-2002-2003)

4.1.5. Topography

Being one of the interior districts of the State, Palakkad is unique in many respects. The continuity of majestic Western Ghats, which stretches over 1000 km, is broken at Palakkad, known as Palakkad gap with a width of 32 km. On either side of the gap are the giant Nilgiris and Anamalais. The climate of the district is greatly influenced by this gap as it enables the north east winds to blow spreading its wings right up to the coast through out the breadth of the Ghat.

Topographically, the district can be divided into two regions, the low land comprising the midland and the highland formed by the hilly portion. The soil is laterate in the hill and mid regions. Midland is thick with Coconut, Arecanut, Cashew, Pepper, Rubber and Paddy cultivation. Since the district gets the benefit of south west and north-east winds, rainfall is heavy in both the seasons and consequently Palakkad District has extensive paddy fields and completely known as the granary of Kerala. The eastern region of the district has high mountains, extensive ravines and dense forests. In the Southern part, there are number of orange estates. To the west of this region are the plains broken here and there by some isolated hills and drained mainly by Bharathapuzha and its tributaries. There is extensive paddy cultivation in this tract. The mountains of all the Taluks in this district range from 914 metre to 2132.7 metre forming the Western Ghat. It forms a formidable fortress on the eastern side of the district. There are several hills scattered here and there in the river plains also. There is no low land region in this district.

4.1.6. Rivers, Canals and Waterways

The river system of this district has much to do with its development. The main rivers that flow through the district are the Bharathapuzha, the Bhavani and the Siruvani. The important tributaries of Bharathapuzha are Gayatri puzha, Kannadi puzha, Korayar and Thuthapuzha. Bhavani River and Siruvani River also passes through Palakkad.

4.1.7. Irrigation Projects

The first requisite to increase the productivity of the soil is sufficient supply of water. The verdure nature of the district gives a false impression that it has enough water to irrigate her vast paddy fields. But the real state of affairs is far from satisfactory. The rains very often fail at the required time and the crops suffer. It is of vital importance to agricultural security that there should be reasonable distribution of rainfall. It is therefore necessary to have irrigation projects for harmonizing water and distributing it.

Irrigation projects in the district were launched only after attainment of independence, though some investigation work on the Malampuzha project was initiated as early as 1914. The reservoir has a capacity of 22.65 million litres with a water spread area of 22, 0149 sq. km to serve an Ayacut of 20,675 hectares. The project is intended to irrigate about 3440 hectares in Palakkad District. The water is being supplied through 2 main canals.

Gayathri project consists of two schemes 1. Meenkara Dam (Gayathri stage I) and (2) Chulliar Dam (Gayathri stage-11) across the Meenkara and Chulliar rivers, two tributaries of Gayathri which in turn joins Bharathapuzha near Ottapalam. There are two main canals in the Meenkara dam which irrigates 1012 hectares and 2023 hectares respectively. Chulliar dam is the fifth major project completed in Palakkad District. Nearly 33512 hectares of land in this district have been brought under major irrigation schemes.

Chitturpuzha Irrigation Project

The existing system is functioning with four Ayacuts constructed across Chittur river at Moolathara, Kunnankattupathy, Thembaramadakku and Nurnee and diverting the flow of water from the river to the irrigation Canals and there by irrigating the present Ayacut of 8205 hectares. For the first crop, water will be available for entire 8205 hectares but for the second crop hardly 6075 hectares of lands will receive irrigation facilities. This is mainly due to the unequal release of water by the Tamilnadu authorities. As per the agreement executed by Kerala government with Tamilnadu government, Kerala will get an additional quantity of 2500 m cft of water if the storage capacity in the PAP system exceed 16500 m cft and this will be sufficient to meet the demand for the extension of 3035 hectares of Ayacut proposed in the second stage of the project. This project is a multi purpose one. 62,000 k.w of power can also be generated in addition to providing irrigation facilities for 25,503,218 hectares. The canal system of the scheme is expected to benefit an area of 5463261 hectares. The Attappady irrigation project is also taken up in 1971 and an area of 4322 hectares can be irrigated by this system.

4.1.8. Minor Irrigation and Lift Irrigation Works

A number of minor irrigation works have been taken up in the district. They are estimated to irrigate an area of 19605 hectares. The lands which cannot be irrigated by gravity flow are brought under cultivation by lifting water by electric pumps or diesel pumps from the river or lakes or ponds. They benefit an area of 2282.429 hectares. It may be mentioned here that in Palakkad in some places, the superfluous water to thrown off by basket suspended between 4 ropes and drawn by two men is a method of raising water practiced in different parts of India.

4.1.9. Area under Irrigation

Table 4.4 shows the source of water supply and the area irrigated in the district of Palakkad and Kerala State. Table 4.5 shows the gross area irrigated under different crops. The main source of irrigation in Palakkad District is provided by Government followed by private wells.

Table 4.4.

Sources of Water Supply and Area Irrigated in Palakkad and Kerala during 2001-02.

Sources	%	Area irrigated			
		Palakkad		Kerala	
		In hectares	%	In hectares	%
1. Govt. Canal	45.174	43830	58.48	95270	25.26
2. Pvt. Canal	29.3	1293	1.73	4413	1.17
3. Govt.Tanks.	5.9	116	0.15	1962	0.52
4. Pvt. Tanks	8.9	4265	5.69	47983	12.72
5. Govt. wells	Nil	Nil	Nil	223	60
6. Pvt. wells	17.0	14630	19.52	86074	22.8
7. Minor Lift Irrigation	7.3	550	0.73	7581	2.0
8. Other Sources	8.3	11030	14.72	133656	35.44
9. Total Area	19.9	74952		377162	

Source: DES Palakkad, 2003-04

Table 4.5.

(Gross) Irrigated Area under Different Crops during 2001-02 and 2002-03

Crop	Area Irrigated in hectares	
	2001-02	2002-03
Paddy	60384	56482
Coconut	19185	19402
Arecanut	2388	2586
Banana	4713	4379
Sugar cane	1610	1989
Vegetables	1284	1245

Source: DES Palakkad, 2003-04

The area irrigated under paddy shows a decline between two periods where as the irrigated area under coconut, areacanut and sugar cane showed a marginal increase in 2002-03 over the previous year. The data on irrigated area under different crops reveals the declining trend of area under paddy than other crops.

4.1.10. Climate

The climate of this district is slightly different from the rest of the State, as it is influenced by the presence of Palakkad gap. The district has a tropical climate, with an oppressive hot season and fairly assured seasonal rainfall. The hot season from March to May is followed by the South West monsoon from June to September. October and November form the post-monsoon or retreating monsoon season. The period from December to February is the North East Monsoon season and the rest of the period is generally dry. The meteorological observatory records that March and April are the hottest months with the mean daily maximum temperature at 37.1° C (98.8° F) and the mean daily minimum at 24.6° C (76.3° F). The peculiar feature in this district particularly the region facing the Palakkad gap, is the hot wind which rushes from the burning plains of the neighbouring Coimbatore District of Tamilnadu, starts blowing during the month of December. These contribute to higher evaporation rates during November to February months, which coincides with the Mundakan cropping period. Based on IMA indices generally, June, July and August are months of excessive moisture, September and November are moderately deficit and October some what deficit. The period from December to May is classified as very deficit.

Palakkad District receives an average annual rainfall of 2391 mm. About 7 per cent of the rainfall is concentrated during South West monsoon period from June to September and only 18 per cent is received during North East monsoon from October to December. There is irregularity and fluctuation with rainfall over the years (Appendix 1).

The actual rainfall received by the district during 2002-03 comes to 1750 mm against the State level of 2515 mm, i.e. the district got 765 mm less rainfall than the State average. Average rainfall in Kerala and Palakkad District for the period 2002-03 is given in Table 4.6.

Table 4.6.

Average Rain Fall in Kerala and Palakkad (during the year 2004)

Month	Kerala	Palakkad
January	2.7	1.0
February	8.1	2.6
March	38.5	28.8
April	113.6	80.9
May	622.2	389.4
June	665.3	590.4
July	378.4	331.9
August	406.1	401.7
September	196.8	95.1
October	326.5	217.5

Source: DES Palakkad, 2002-03

Table 4.7.

Block-wise Area Affected by Drought during 2003-04

Block/ Municipality/ District	Estimated area in hectares			Total Wet Land (Area in ha)
	Crop damage due to drought			
	Fully damaged	Partially damaged	Total	
Alathur	2063.48	1379.19	3442.67	10500.70
Kozhalmannam	4456.75	2011.74	6448.49	9330.60
Chittur	628.88	125.51	754.38	8497.71
Kollengode	905.22	302.83	1208.06	5619.83
Nenmara	1785.00	329.87	2114.87	7139.43
Palakkad	1682.57	903.98	2586.54	6793.79
Malampuzha	1961.83	661.11	2622.94	10837.68
Mannarkad	49.07	160.36	209.43	7745.56
Attappady	1.82	8.17	9.99	471.41
Ottapalam	90.43	401.17	491.60	4696.53
Pattambi	102.77	442.24	545.02	6441.11
Sreekrishnapuram	205.45	382.79	588.24	5241.49
Trithala	12.15	255.47	267.61	5437.91
Muncipalities	168.66	226.34	395.00	3799.31
District Total	14114.09	7590.76	21704.85	925560.07

Source: DES Palakkad, 2003-04

The severity of drought is experienced by the district in the last year 2003-04 as a result of which seeds died, there was no Khariff out turn, and drinking water became scarce as the water table goes down (Reported in the Mathrubhumi Aug. 28, 2004). The estimated loss of agriculture crop during 2003-04 drought is Rs.200 crores, (Central Government Drought Relief Agency-Report in the Mathrubhumi 28th Aug 2004).

The crop loss due to drought during the period 2003-04 is more in eastern Palakkad compared to rainfed areas of Western Blocks of the district. Alathur, Kozhalmannam, Malampuzha, Palakkad and Kollengode Blocks are seriously affected by the drought and this loss in crop indirectly affected the agricultural economy of the district (Table 4.7).

Thus, based on the availability of water, the district agricultural area is divided into two, viz, Ayacut area and Non-ayacut area. Ayacut area is defined as those areas in which agriculture operations are carried on by the irrigational projects. Non-ayacut areas are mainly rain-fed and not depending on irrigation.

4.1.11. Soil

The Soil of the district is divided into three classes such as (1) Laterite (2) Alluvial and (3) Black. The soil condition varies from place to place. All the blocks in the district come under the category of laterite soils. It is formed by weathering mainly acidic rocks, under alternate wet and dry tropical conditions and this is found in the major portions of Mannarkkad, Ottapalam, Palakkad, Alathur and Chittur taluks. The soil is soft near water table and this material is used for making bricks for building purposes. This soil is porus and has poor retentive capacity and fertility. It may be noted that almost in every block, in the middle tract of the district, there are all types of soils varying from alluvial to clay and laterite to sandy loams.

On the eastern parts of the district especially the major portions of Chittur, Kozhalmannam and Kollengode blocks are covered with black cotton soil. The black soil is deficient in organic matter which is found in the eastern sector of Chittur taluk and a small region of Palakkad taluk. The principal crops of this area are rice, sugar cane, cotton groundnut and millets.

Forest soil occur on the portion of Mannarkkad taluk, the eastern region of Ottapalam taluk and a narrow strip of land along the Western boundaries of Palakkad and Alathur taluks and along the Southern boundary of Chittur taluk. The soil is composed of organic matter derived from forest growth. It is rich in nitrogen but extremely poor in base due to leaching.

4.1.12. Land Use Pattern

Land use refers to reporting the area, which in turn, refers to the area maintained by the village agency. Palakkad's share in land area has been 11.53 per cent of all - Kerala where as its share in population in 2001 is 9.86 per cent of all Kerala which is equal to 2.61 million. The land use pattern in Palakkad District is given in Table 4.8 for two periods (1991-92 and 2002-2003).

Table 4.8.

Land Use Pattern (1991-92 and 2002-03) (Area in ha)

Use	Area		% of total Reported Area in the State	
	1991-92	2002-03	1991-92	2002-03
Total geographical area	438,980	438980	11.3	11.3
Total cropped area	343372	438980	11.4	10.8
Forests	136257	136257	12.59	12.59
Barren & Uncultivable land	9487	3393	17.21	11.4
Land put to non agriculture uses	32865	53019	10.9	13.4
Permanent pasture & other grazing land	91	8	5.11	3.0
Land under miscellaneous Tree crops	7037	1451	20.5	11.1
Cultivable waste	22798	20123	24.5	29
Fallow other than current fallow	5190	10110	19.4	25.8
Current Fallow	8026	13280	18.2	18.7
Net area sown	217229	201339	9.7	9.19
Area sown more than once	126143	120693	16.3	15.4

Source: Farm Guide - Various issues.

Out of the total cropped area of 343372 hectares, the net area sown is only 217229 hectares (Table 4.8)*. The Table 4.9 reveals that the total area reduced to a great extent by (-) 0.67 per cent whereas the net area sown has reduced only by (-) 0.06 per cent. A noticeable feature is the increase in the fallow land both in terms of current fallow and other than current fallow. This increase is caused by uncertainty of rain, labour, shortage, flood, inadequate supply of inputs etc. The land utilisation order has also played a major role in converting the land to fallow.

Land put to non-agriculture uses went up by 2.5 per cent during 1991-92 to 2002-03. This shows the diversion of agriculture land for other purpose like construction of buildings and making of bricks and mining sand. The percentage of land put to non-agriculture uses is likely to increase further on account of the growth of industry and population

The land area under tree crops and groves has declined in the district. In the early period, the country side of the district used to be turned into grazing ground after the harvesting of paddy with the result that even if a cultivator was enterprising he could not do so, if the fields all around were open to grazing. Table 4.9 shows the paucity of land meant for pasture and other grazing ground, thanks to the Land Reclamation Schemes.

Table 4.9.

Permanent Pastures and Other Grazing Land

Year	Area (Lakh ha)		Ratio of total reported area (Per cent)
	Kerala	Palakkad	
1999-2000	1	253	3.95
2000-01	1	16.4	6.09
2001-02	2	233	.086
2002-03	8	263	0.03

Source: Calculated from the data from farm guide (Various issues)

* The total area is according to Village Papers do not agree with the figures under rural area derived from the area figures supplied by the Surveyor General of India

Thus the land use is determined by a variety of factors, viz., physical, economic and institutional. Wet lands have been undergoing rapid conversion during the last few years which have negative impact on the economy.

4.1.13. Land Use and Land Utilisation

Land use is the surface utilisation of all developed and vacant land on a specific point, at a given time and space. Land utilisation, on the other hand, is the use made of land by man, as surveyed and mapped in a series of recognised categories. But in the present study, both terms are used interchangeably. Land utilisation is determined by various principles such as principle of maximisation, principle of first choice and principles of Diminishing Marginal Productivity 'as given in Appendix 2.

In the field of land use pattern, however, there are only few studies in Kerala. Most of them are biased either to the agrarian sector or to the cropping changes. An attempt is made here to examine briefly the cropping pattern and land utilisation in Palakkad District of Kerala State.

4.1.14. Work force

Work force in Palakkad District is male dominated. Male workers are 69 per cent of total workers in 2001. Similarly the decadal growth rate of population in Palakkad is higher and equal to State growth rate (9.42 %). It is also having a decadal growth rate higher than the state average for rural areas (> 10.05 %) and urban decadal growth rate has shown a declining trend. This may be due to the fact that Mannarghat Municipality of Palakkad District has been declassified as panchayath during 1991-2001. The Table 4.10 shows that according to 2001 census there is predominance of rural workers and male workers.

Data relating to population in Palakkad District shows the predominance of agricultural sector which sustains about 12.19 per cent of agricultural labourers as against 5.1 per cent in the State. The number of cultivators is also more in Palakkad District (3.28 per cent) than that of the State (2.33). All these factors magnify the significance of Palakkad District and the contribution of Agricultural sector to the State economy. In spite of all these, there is a fall in the number of cultivators from 97289 (according to 1991 Census) to 85788 (2001 Census) and a subsequent increase in the number of agricultural labourers (from 3482299 in 1991 to 318990 in 2001) which draws a distinct picture of the occupational pattern. This phenomenon is due to the change in the crop pattern from seasonal (food crops) to annual crops (perennial crops) and of late to horticulture (Appendix 3).

Table. 4.10.

Percentage of Total Workers, Main Workers, Marginal Workers and Non-Workers to Total Population by Residence and Sex, State and District (1991-2001)

State/ District	Total/ Rural/ Urban	Category	Percentage to total population							
			Total workers		Main workers		Marginal workers		Non-workers	
			1991	2001	1991	2001	1991	2001	1991	2001
Kerala	Total	Population	31.4	32.3	28.5	25.9	2.9	6.4	48.6	67.7
		Male	47.6	50.4	44.8	41.9	2.8	8.5	52.4	49.6
		Female	15.9	15.3	12.8	10.8	3.1	4.5	84.1	84.7
	Rural	Population	32.1	32.6	28.8	25.5	3.3	7.1	67.9	67.9
		Male	47.9	50.2	44.9	41.0	3.0	9.2	52.1	49.8
		Female	16.9	15.9	13.4	10.8	3.5	5.1	83.1	84.1
	Urban	Population	29.6	31.6	27.6	27.1	2.0	4.5	70.4	68.4
		Male	46.8	50.8	44.6	44.5	2.2	6.3	53.2	49.2
		Female	13.0	13.5	11.3	10.6	1.7	2.9	87.0	86.5
Palakkad	Total	Population	35.5	36.2	33.0	29.4	2.5	6.8	64.5	63.8
		Male	48.6	52.2	46.6	44.6	2.0	7.6	51.4	47.8
		Female	23.1	21.1	20.2	15.1	2.9	6.0	76.9	78.9
	Rural	Population	36.2	36.5	33.5	29.4	2.7	7.1	63.8	63.5
		Male	48.7	52.2	46.5	44.2	2.2	8.0	51.3	47.8
		Female	24.4	21.8	21.3	15.4	3.1	6.4	75.	78.2
	Urban	Population	31.8	34.0	30.4	29.6	1.4	4.4	68.2	66.0
		Male	48.2	52.4	46.9	47.2	1.3	5.2	51.8	47.6
		Female	16.2	16.5	14.7	12.8	1.5	3.7	83.8	83.5

Source: District Agricultural Department, PKD, 2001 Census

4.1.15. Occupational Composition

Occupational composition or distribution of work force by industry originally implies the distribution of work force among the different sectors of the economy viz., Primary, Secondary and Territory sectors. The share of the primary sector declined from Rs. 147881 to 124798 (lakh) between 1999-2000 and 2001-02. The share of the secondary sector increased from Rs. 83201 to 97716 during the same period and the performance of the territory sector was also progressive during the period. It increased from Rs. 2322679 to 271737. This shows that the secondary and territory sectors contributed major share of the employment opportunities to the people other than agriculture and allied activities. The traditional farm labourers are loosing their employment due to change in the crop pattern from seasonal (food crops) crops to annual crops, annual crops to perennial crops and then to horticulture. The number of female non-workers in rural area has increased from 75.6 to 78.2 (1991 census to 2001 census) showing the decline of primary sector. This is true in the case of State also.

4.2. Agricultural Situation in Palakkad

4.2.1. Land Holding Pattern

There is excessive fragmentation and subdivision of holdings due to the extreme pressure of population on land. The growth of population followed by increased demand for agricultural land resulted in the reduction of holding size. The average size of a holding in the district is 0.39 hectares during 1995-96 which was 0.56 in 1980-81. The total number of the holdings, according to the recent statistics available on distribution of land holdings in Palakkad is 484996, constituting a total area of 188565 hectares. This is presented in Table 4.11.

Table 4.11.

Distribution of Land Holdings in Palakkad - 2002-03 (Number and Area of Operational Holdings[2])

Number/Area	1980-81	1985-86	1990-91	1995-96	2000-01
Number	313828	387559	431631	484996	387559
Area (Ha)	177507	180028	179756	188565	178584
Average size of holding	0.56	0.46	0.42	0.39	0.46

Source: Agricultural census, DES, - Statistics for Planning 2001, DES.

Two important features are noted in the size of holding. One is holdings tend to be very small and second one is individual holdings tend to become broken up into a number of separate plots, situated at different places[3].

4.2.2. Cropping Pattern in Palakkad Agriculture

Cropping pattern stands for the proportional distribution of the cultivated land area among the crops. It is intimately identified with the three principal seasons in Kerala, namely Autumn, Winter and Summer[4]. The gross area in Palakkad comes to 106548 ha, of which 51.3 per cent is contributed by Virippu and 48.7 per cent by Mundakan. Puncha cultivation is very meager.

The cropping pattern in Palakkad is overwhelmingly food crops oriented. Between 1960-61 and 2002-03, there has taken place a marginal change of 4 per cent approximately. During the eighties, food crops acreage was merely 90 per cent of gross cropped area (GCA). The District has not done well in the production of non-food crops, though the pace in that direction definitely gathered momentum

[2] An operational holding is one which includes all lands (ie. cultivated, fallow and even the land which is not under cultivation) used wholly or partially for agricultural production operated as a single technical unit by a single household or a number of house holds operating jointly

[3] Agricultural holding implies the total area of land which is held for cultivation as a single unit by an individual, joint family or more than one farmer on a joint basis. Such land may be owned, taken on lease or partly owned and partly rented

[4] Note: Autumn-(Kanni or Virippu) June to Oct, Winter (Kumbam or Mundakan) Nov to Feb , Summer or Punja – March to May

during the nineties. There has been a decrease in the area under food crops and increase in the area under non-food crops. This is clear from the Table 4.12. The acreage under banana and other plantations has undergone remarkable changes in between 1975-76 and 2002-03, the area increased from 4070 ha to 14517 ha.

With reference to the Table 4.12, it is noted that the acreage under food crops fell by 47774 hectares during 1975-76 to 2002-03 and that under non-food crops rose by about 48002 ha. The acreage devoted to coconut rose by 36213 ha and that of plantain and banana, taken together rose by 10447 ha during the same period. The area under paddy crop taken separately shows a trend of decrease from 185182 ha in seventies to 115910 hectares in 2003.

Table 4.12.

Area under Major Crops (Area in '000 ha)

Year	Paddy	Total Food Crops	Tapioca	Coconut	Banana & Other plantain	Non food Crops
1975-76	1851.82	252492	7965	16994	4070	69312
1980-81	1836.34	27060	12644	22954	3742	66277
1985-86	1608.55	241698	11960	26349	3983	76743
1990-91	1456.87	233260	9924	38153	6756	105797
1995-96	1356.30	236598	8965	48336	7822	120522
2000-01	1187.01	203077	6646	46393	10701	107795
2001-02	1159.04	206484	5649	50568	13085	114230
2002-03	1159.10	204718	4960	53207	14517	117314

Source: Economic Review; SPB (Various issues)

An analysis of the area under different crops is attempted for the period 2002-03 (Table 4.13). The net cultivated area of the district is 218000 hectares, i.e.

49 per cent of the total geographical area. The total paddy cropped area comes to 120809 hectares. Palakkad is the only district in the State where cotton and groundnut are cultivated. Area under fibre cotton cultivation is 14551 hectares and groundnut 10031 hectares. Coconut and other oil seeds occupy a prominent position among the crops covering 56356 hectares and it is one of the major sources of income to the cultivators. Paddy, cereals and millets are cultivated in 141630 hectares and it is the major agriculture activity of the district. The area under rice cultivation in the district is 36 per cent of the total area in the State. Fibre, drugs etc., cultivated in vast areas of the district covering 11744 hectares which is about 65 per cent of the corresponding area of the State. The climate in the district is suitable for the cultivation of the horticultural crops such as mango, jackfruit, papaya etc., and the area under cultivation of fresh fruit is 23908 hectares. Plantation crops such as rubber, tea and coffee are planted in a big way in midland and highland regions. The area under plantation crops is 29181 hectares in which rubber occupies more than 70 per cent. More and more areas are brought under plantation crops. Major cultivation of cotton in the State is concentrated in Palakkad District which occupies an area of 11693 hectares.

Table 4.13 shows the cropping pattern and production of principal crops in the district for the year 2002-03. The agricultural scenario of the district shows the predominance of paddy as the principal crop with wide fluctuations in the acreage. Mangoes, banana and plantains are the important fresh fruits cultivated in the district. Arecanut and sesamon are the other cash crops of this district. Cashewnut is mostly cultivated in Ottapalam and Mannarghat taluks. Coffee is grown in the Nelliyampathy hills of Chittur taluk and parts of Alathur taluk. Tea plantations are located in Nelliampathy hills and Sholayar. Nelliampathy is famous for oranges. Rubber is also grown in Mannarghat, Ottapalam and parts of Alathur taluk. The other crops in this district are pepper grown in Mannarkkad block, jowar and ragi in Chittur block, chillies, pulses, sweet potato, tapioca and coconut in Trithala, Pattambi and Ottapalam blocks.

Table 4.13.

Cropping Pattern and Production of Major Crops in Palakkad District (2002-03)

Crops	Area (in ha)	% to TCA*	Production (Tonnes)
Paddy	115910	36	243926.
Pulses	541	0.17	408
Other cereals	14.94	0.46	1161
Total cereals	121263	37.6	3516
Ground nut	2422	0.75	1801
Tapioca	4960	1.54	105002
Banana & Other plantains	14517	4.51	126869
Pepper	5482	1.70	778
Mango	8742	2.7	46783
Coconut	53207	16.5	363
Arecanut	4936	1.5	(M. Nuts)
Sweet potato	180	0.06	5706
Rubber	29064	9.02	34334
Papaya	1326	0.41	8791
Tamarind	6967	2.16	8596

* TCA (Total cropped area) is 322032 ha

Source: DES, Palakkad, 2002-03

At present the cropping pattern is dominated by non-food crops and food crops other than paddy. Some high-value crops such as rubber and non plantain crops like tapioca and banana are gaining area at the cost of area under paddy.

To sum up, the following factors are identified as responsible influences behind the cropping pattern in Palakkad District. The existing cropping pattern in the district is a continuation of the past. The weather conditions and rainfall are the two prime determinants in the earlier period. Since Palakkad District is prone to drought,.the cropping is different in view of the insecurity and instability elements.

The farmers in drought prone areas stick to survival maximum and seek to ensure themselves against the natural vagaries by sowing some combination of paddy, plantain, tapioca and grains. Intercropping is practiced to eliminate the risk of paddy crop failure. In some regions of the district paddy is grown with plantain or vegetables. Areas within the reach of the urban and industrial centres have different cropping patterns from areas that are interior and isolated.

In several parts of the district, the farmers are content with merely growing a single paddy or rabbi crop, even under favourable soil and climate conditions for more intensive farming. The cultivation of potato, tapioca, vegetables and grains fits well with this system.

The farmers prefer the subsidiary crops which are very responsive to the intensity of manual work and fertilizer application and are less dependent on the favours of nature. There is plenty of scope for the development of fodder crops, pasture and animal husbandry in the different regions of the district.

4.2.3. Livestock Population

Palakkad District's live stock statistics shows that cattle population has declined from 363338 in 1996 to 272981 in 2001-02. Similar is the case of sheep, buffaloes, goats and other livestock which is revealed by the Table 4.14.

Table 4.14.

Livestock Population (Palakkad) 1996 and 2001-02

Year	Cattle	Buffaloes	Sheep	Goats	Other Livestock	Total Livestock
1996	363338	35693	490	162488	3107	565115
2001-02	272981	13500	412	141516	1964	430373

Source: SPB, 2001.

The animal husbandry is a leading sub-sector of the primary sector of the district and it plays a significant part in the rural economy. Animal husbandry provides gainful, economically profitable farm self-employment particularly to women and growing children in rural families. Organic manure compost is productivity-augmenting product of animal husbandry. It is combined with the chemical fertilizers in proper proportions and applied in agriculture.

Recent trend of animal husbandry shows that farm mechanisation and increased consumption of chemical fertilizers have resulted in a fall in the shares of livestock and working cattle.

The availability of straw for cattle combined with the demand for organic manure motivated the farming community to own cattle. With the shift in the cropping pattern, the area under paddy has come down leading to drastic reduction in the availability of straw for feeding cattle. The internal supplies of straw available from rice fields has shrinken from around 60 per cent to nearly 30 per cent, consequent on the sharp and continuous decline in area under paddy during the last two decades. As a consequence of the reduction in the paddy area, the farming community is compelled to reduce the number of cattle. Kerala farmer being rational switched over to cows so that the limited straw could be used more economically.

4.2.4. Fertilizer Use

Fertilizer is an important input in crop production especially rice. The total N, P and K (N+P+K) consumption per gross cropped area has increased many folds after the advent of green revolution. The time of application of fertilizer often makes a considerable difference in its utilisation by the crop. Plants absorb large quantities of Nitrogen, Phosphoric acid and Potash during the early stages of growth. Therefore, the fertilizers should be applied to most crops at or before sowing time. Fertilizers need not be applied to annual crops in the better stages of their growth. The phosphatic fertilizers should be applied a little before or at the time of planting the crop, as phosphorus is not leeched out of the soil. Potash is applied at the time of planting and to a limited extent as a top-dressing at later stage of crop growth. The response to fertilizers varies with the nature of the soil, the crop grown and on factors like whether it is rain-fed or irrigated. In order to secure maximum response to fertilizers the crop should be irrigated immediately following their application and at suitable intervals thereafter, because the response of the crop under irrigated, condition is usually uncertain. The maximum profit from the use of fertilizers depends on such factors as nature of the soil, kinds of crop grown, climate, price of fertilizers, the market price of the produce etc. One important point found is the use of fertilizers subject to the law of Diminishing Return to scale. This means that the rate of increase in crop yield decreases after a certain point is reached and consequently the value of the additional yield becomes less than the cost of fertilizers.

Table 4.15.

Consumption of Plant Nutrients in Kerala and Palakkad during 1992-93 to 2002-03

Year	Kerala				Palakkad			
	N	P	K	Total	N	P	K	Total
92-93	85987	46324	73022	205333	12690	5521	8247	26458
93-94	76965	33122	65110	175197	13255	4225	5778	23258
94-95	80182	39939	78205	198326	11823	4553	7153	23529
95-96	87231	43143	73523	203897	13991	5008	6515	25514
96-97	86385	41438	59752	187575	12783	4208	5109	22100
97-98	86960	45226	87297	219483	13251	5129	8849	27229
98-99	86042	42528	52917	181487	15282	5850	4870	26002
99-00	87061	43975	80326	211362	14999	5104	8228	28331
00-01	73756	37600	61849	173205	NA	NA	NA	NA
01-02	76417	37237	63471	177125	NA	NA	NA	NA
02-03	86659	40212	70786	204657	11232	3818	5171	21021

Source: Economic Review, Various issues, There has been a steady increase in the use of chemical fertilizers till 1999-2000; thereafter it shows a declining trend (Table 4.15).

4.2.5. Agricultural Implements

Increased use of modern mechanised implements in agriculture is believed to contribute to growth in productivity. But the mechanisation level in Palakkad is not satisfactory. Traditionally, draught animals have been used in the district to field operations, transport and agro processing. Almost ninety per cent of small and marginal farmers who have limited land holdings and resources rely on draught animals and human power for farm operations. The increased cropping intensity requires higher energy and thus, use of tractors has increased as a result, use of draught animals has declined.

Now a days tractors and tillers are becoming common and are extensively used for ploughing. With tractors many of the improved implements are also used by the farmer. The main drawback is that enough tractors are not available to the farmers at the time of preparation of land. Non availability of improved tools and equipments, lack of trained service mechanics and operators, especially for medium and large machineries (e.g., Power-drawn Transplanter, Reaper, Thresher etc.) lack of locally adapted machines are the major constraints for adoption.

The increasing utilisation of plant protecting chemicals especially after the introduction of HYVs resulted in an increase of plant protection equipments and engines.

4.3. Economics of Paddy Cultivation in Palakkad District

The 'rice bowl of Kerala' continues to have a 'slow growth rate, poor quality of life and low per capita income' even after 48 years of development since the formation of the State in 1956. Palakkad had the lowest growth rate of 4.70 per cent against the State average of 4.72 per cent during 2001-02 (October. 25 Indian Express – Survey on "Regional Development strategy for Palakkad - 2021", Department of Regional Planning and Architecture, New Delhi). An analysis of the agriculture sector reveals that the district is well ahead of other districts. Though, there is a decrease in the area under agriculture, productivity has increased resulting in higher agriculture production. This section analyses the performance of Paddy in Palakkad District by studying the trends in area, production and productivity of paddy.

4.3.1. Mode of Cultivation of Paddy

The rising of two crops viz. Virippu and Mundakan of paddy is the general rule. The third crop called Punja is also raised in some areas of the district. There are other systems like "Koottumundakan", "Karinkora" which are raised in the district. Rice, the staple food of the people is mainly grown under a special system of cultivation called "Koottumundakan". The system has advantage in that the cost of cultivation is less and it is ideal for soils which are not amenable for till agricultural operations during second crop planting season.

The agricultural operations connected with these crops are explained briefly. Bullocks were used for ploughing the land in the early period. Non-availability of bullocks at the times of ploughing induced the big land owners to use tractors, local terms for ploughing are "Kannupoottal" and Uzhukal. Recently almost all farmers use tractors and tillers for land preparation.

Before preparing the land for the first crop, trimming and repair of bunds are usual practices. This is done with manual labour with the implement called spade. Before raising the second crop the land preparation in the form of plastering the bunds and strengthening of bunds requires more male labour and thus land preparation becomes highly labour intensive and so highly expensive. Local names are 'Varambumadal' and 'varambidal'.

Drainage of water is not a problem to the cultivators. During heavy rains the water drains out through the canals which are meant for irrigation. In areas where paddy is entirely grown as rainfed crop, no systems of canals are there for drainage.

The water simply overflows the fields and reaches the lowest field from where it runs to bottom of the valley where there will be natural water flow out let called "Thodu".

Sowing is done by paid labourers who are experts in sowing seeds. Virippu (autumn) paddy is normally a broadcast crop as this is sown expecting the rain. Dibbling behind the countryploughs was also in vogue earlier. The local names of this operation are 'Nuri' and 'Vithidal'. The sowing operation is locally called as 'Vithakkukka', 'Vithakkal' and 'Vitha'. The transplanting operation is known as 'Parichunadeel'. In some areas for virippu cultivation, transplantation is also resorted. Assured irrigation is the criteria for the choice of transplantation. For Mundakan the usual practice is transplanting. Seedlings are raised separately and within a fortnight of harvesting of the first crop. Seedlings are planted for the second crop in the field. Water will be available during the planting time in plenty. For puncha, the usual practice is broadcasting the sprouted seeds. In all the three seasons, transplanted crop always yields higher than the broadcasted crop.

Weeding is usually done by manual labour. In recent years, some chemical weedicides are coming into vogue. But they have not yet attained any popularity among the agriculturists. Paddy crop is weeded twice. Reaping is done with sickles. The whole plant is cut leaving 5 to 8 cm at the base. It is locally called "Koithu".

Threshing is usually done by beating the small bundles of reaped paddy plants on hard stones, wooden benches or even on the cemented floor of the yard ("Kalam"). The using of machines for threshing has not gained much acceptance due to various reasons. The threshing operations are locally called as "Thallu" or "Methikkal".

The threshed produce is put into wind and the heavier paddy is separated from lighter ones, straw particles, unfilled grains etc. It is locally called as 'Kattathidal'. Paddy is dried well and stored in wooden bin called 'Pathayam' usually the seeds alone require storing. The produce finds a ready market as soon as harvesting and drying are over.

4.3.2. Trends in Area, Production and Productivity of Paddy in Palakkad District

An analysis of area, production and productivity of paddy in Palakkad District is attempted by comparing it with other major paddy producing districts of the State, viz., Alappuzha, Ernakulam and Trichur for a period of twenty five years.

Table 4.16.

Area under Paddy in ha (1973-74 to 2002-03)

Year		Alappuzha	Ernakulam	Trichur	Palakkad	Total of 4 Districts	State Total
1973-74	Area	92039	86568	109914	183181	471702	874675
	%	**10.52**	**9.9**	**12.57**	**20.94**	**53.93**	**100**
1978-79	Area	75501	100165	115787	174413	465866	799238
	%	**9.45**	**12.53**	**14.49**	**21.82**	**58.29**	**100**
1983-84	Area	79050	86732	103391	168034	437207	740086
	%	**10.68**	**11.72**	**13.97**	**22.70**	**59.08**	**100**
1988-89	Area	64404	71266	78862	142293	356825	577557
	%	**11.15**	**12.34**	**13.65**	**24.64**	**61.78**	**100**
1993-94	Area	51427	65790	66354	139769	323340	507832
	%	**10.13**	**12.96**	**13.07**	**27.52**	**63.67**	**100**
1998-99	Area	41681	64529	64190	90287	260687	352631
	%	**11.8**	**18.3**	**18.2**	**25.6**	**73.9**	**100**
2002-03	Area	29635	32072	37274	115910	214891	310521
	%	**9.54**	**10.33**	**12.00**	**37.33**	**69.20**	**100**

Source: DES, Palakkad 2002-03

A study conducted by the District Agricultural Statistics Department shows that during the period 1973-74 total area under paddy cultivation in the State was 874675 hectares; (Three Seasons together) out of which 183181 hectares was in Palakkad District, i.e. 20.94 per cent (Table 4.16).

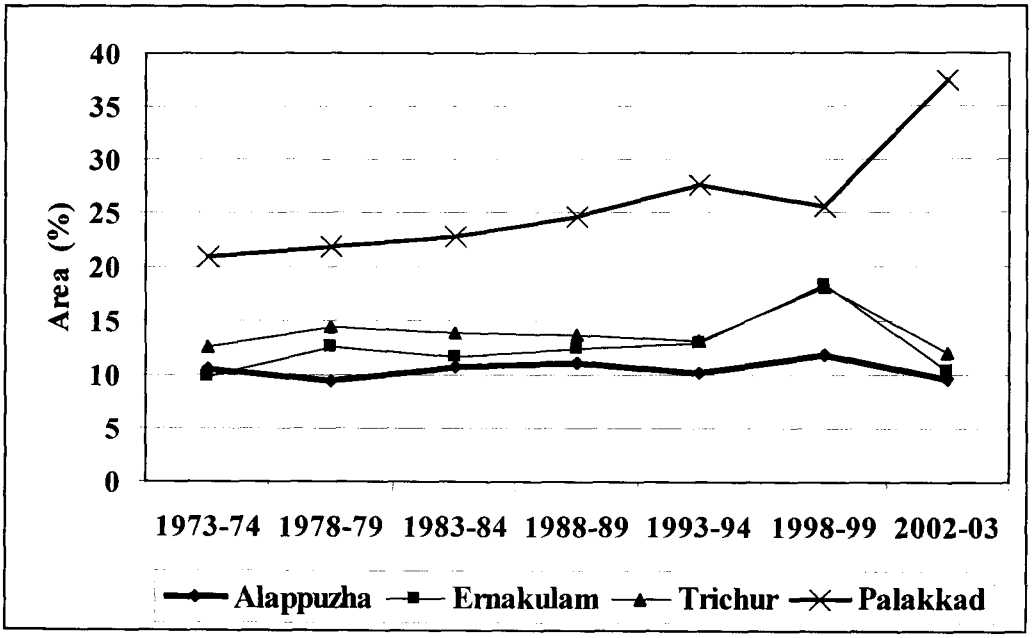


Figure 4.1. Percentage Share of Area under Paddy in the Major Paddy Producing Districts in Kerala

The area under paddy showed wide variations over the years from 1973-74 to 2002-03. The area under paddy in Palakkad District showed a gradual decline from 185182 hectares in 1975-76 to 107467 in 1999-2000 and from 2000 onwards it showed a positive change. Another notable feature is the sharp decline in area under paddy in the two districts, Trichur and Alappuzha, where as the decline is marginal in Palakkad. The percentage change in area under paddy in Palakkad District is 5.96 during 1999-03, whereas this change is negative in other three districts, viz., Alappuzha, Trichur and Ernakulam. The analysis of area under paddy in the four rice producing districts of Alappuzha, Ernakulam, Palakkad and Trichur shows the significance of Palakkad District in the share of area under paddy in the State.

The share of area under three crops in the four paddy producing districts of Palakkad, Alappuzha, Ernakulam and Thrissur reveals the dominance of Palakkad District over other three, though its share of summer crop is low both in absolute and percentage terms (Table 4.17).

In Palakkad District, the area under summer crop has gone up mainly because of the cultivation of long duration crop for second crop. The crop being harvested in January and February may be considered as summer crop. The farmers prefer long duration crop for winter season and the harvesting is done in January and February. This is mainly because of the limited scope for the third crop. However, the area under paddy during three crops of four districts has come down to half between 1973-74 and 2002-03.

Table 4.17.

Season-wise Comparison of the Share of Area in Four Major Paddy Producing Districts

Year	Season	Area (in hectares)					
		Palakkad	Alappuzha	Ernakulam	Thrissur	Total 4 districts	State
1973-74	Autumn	101497	26542	37261	35028	200328	392765
	Winter	79753	23431	39092	60620	20289	380980
	Summer	1931	42066	10215	14266	68478	100930
	Total	183181	92039	86568	109914	471702	874675
2002-03	Autumn	57583	3721	12016	9740	83060	112438
	Winter	53203	17149	13448	19836	103636	157004
	Summer	5124	8765	6608	7698	28195	41079
	Total	115910	29635	32072	37274	214891	310521

Source: DES, Palakkad 2002-03

Changes in area under paddy and percentage share to States total area under paddy is shown in Table 4.18.

Table 4.18.

Area (in '000 ha) under Paddy and Percentage Share to State Total (1990-91 to 2002-03)

Year	Area under paddy	States Total	District share to State (%)
1990-91	145.68	559.45	26.04
1991-92	147.06	541.33	27.17
1992-93	146.09	537.61	27.18
1993-94	139.76	507.83	27.52
1994-95	140.06	503.29	27.83
1995-96	135.63	471.15	28.79
1996-97	128.35	430.83	29.79
1997-98	120.80	387.12	31.21
1998-99	107.46	352.63	30.41
1999-2000	109.70	349.77	31.36
2000-01	118.70	347.45	34.16
2001-02	115.90	322.36	35.95
2002-03	115.91	310.52	37.32

Source: DES – SPB, Various issues

The area under paddy showed a declining trend at an increasing rate from mid nineties and reached to 1.09 lakh hectares in 1999-2000 from where it showed a positive change. The area under paddy increased to 1.18 lakh hectares in 2000-01. But it slightly decreased to 1.15 lakh hectares in 2002-03. The compound growth rate of area under paddy in Palakkad District was –2.58 during 1990-91 to 2002-03. In both the case (Palakkad and State) the area under paddy shows a negative trend.

Magnitude of the slope coefficient indicates that compared to State the rate of decrease in area in Palakkad District is lower (Table 19).

Table 4.19.

Results of Trend Equation for Area during 1990-91 to 2002-03

District/State	Slope coefficient	t-value	R^2
Palakkad	-0.026	6.65**	0.801
Kerala	-0.054	17.608**	0.963

** Significant at 5 % level

Source: Computed from data from various issues of Economic Review and SPB

Table 4.20.

Comparison of the Share of Production for Three Crops in Four Major Paddy Producing Districts

Year	Season	Production (Metric Tonnes)					
		Palakkad	Alappuzha	Ernakulam	Thrissur	Total 4 districts	State
1973-74	Autumn	216121	37300	47171	46054	346646	605595
	Winter	122420	21662	48884	63211	256177	507755
	Summer	2807	71321	11724	17258	103110	143719
	Total	341348	130283	107779	126523	705933	1257069
2002-03	Autumn	117326	9467	23859	20021	170673	233217
	Winter	112229	53102	25091	44167	234589	343792
	Summer	14371	28992	11936	23084	78383	111850
	Total	243926	91561	60886	87272	483645	688859
Growth rate		-0.98	-1.02	-1.50	-1.07	-1.09	-1.56

Source: DES, Palakkad 2002-03

Out of the total production of paddy in the State, the four districts of Alappuzha, Thrissur, Ernakulam and Palakkad accounted for more than 70 per cent. Among these four, Palakkad alone contributed about 35.41% compared to the other districts (Table 4.20). The table reveals the contribution of the four major paddy cultivating districts to the State production and especially that of Palakkad District. The district is the largest contributor of paddy. The four districts taken together contributed 70.2 per cent of the total paddy production in the State during the period 2002-03. Out of the total production of paddy in the State, one third is contributed by Palakkad District alone and it is aptly called the granary of Kerala State.

The seasonal performance of paddy in terms of production in Palakkad District shows a different picture from that of other three districts of the State viz. Alappuzha, Thrissur and Ernakulam.

In 1973-74, the overall production of the State, three seasons taken together comes to 1257069 million tones, out of which Palakkad District alone contributed 341348 million tones (27.15 %). Alappuzha, Ernakulam and Thrissur together contributed 364585 million tones. In terms of percentage of the State production, these work out as 27.15, 10.36, 8.57 and 10.06 per cent respectively. Out of the total district production, the percentage contribution of autumn, winter and summer crops were 35.69, 24.11 and 1.95 respectively. The share of summer crop in Palakkad District is low, 2807 million tones (1.95 %) when compared to other districts of the State.

During 2002-03, it was 13.21, 8.83, 11.96 and 35.41 per cent which shows the remarkable contribution of Palakkad District to State production. The percentage production of the four paddy producing districts of the State (season-wise reveals that winter season accounts for more in production in the four districts than summer. Winter season in the two districts of Alappuzha and Thrissur accounts for highest share. In Palakkad District, autumn season accounts for highest share in production with 48.10 per cent where as it was 46 per cent in winter and only 5.89 per cent in summer.

The Table 4.21 shows the production under paddy in the four major paddy producing districts along with State average in different crop seasons for the period from 1990-91 to 2002-03.

Table 4.21.

Season-wise Production of Paddy (1990-91 to 2002-03)

Year	Season	Alappuzha	Ernakulam	Trichur	Palakkad	State
1990-91	Autumn	51556	43311	41746	170696	461992
	Winter	37539	41841	60606	152559	480665
	Summer	42568	17537	26935	1652	142898
1991-92	Autumn	21725	38502	32115	179871	401610
	Winter	57879	43871	59758	162459	507525
	Summer	36485	27111	29850	2408	151215
1992-93	Autumn	37286	39934	37750	176783	435794
	Winter	38209	46152	53576	155489	476748
	Summer	47683	27841	28052	3374	172336
1993-94	Autumn	33161	38534	33513	165990	398357
	Winter	40757	40521	52005	149121	461156
	Summer	36952	22291	24108	1836	144425
1994-95	Autumn	10402	37334	30370	141969	327375
	Winter	55924	40245	58686	163260	499877
	Summer	32914	23469	25004	8539	147813
1995-96	Autumn	25489	37779	31756	138686	344238
	Winter	59776	42573	53313	130735	458058
	Summer	35792	21599	25629	10984	150730
1996-97	Autumn	26302	36600	28821	144709	332643
	Winter	37873	37832	55397	132556	414338
	Summer	21017	18950	20748	1680	124380
1997-98	Autumn	29459	27997	20967	123628	285328
	Winter	18831	29534	44255	123149	342353
	Summer	46838	16703	17769	15717	136929
1998-99	Autumn	17570	28778	17623	98955	235849
	Winter	16098	36613	42334	123214	346022
	Summer	58013	19138	14233	15619	144872

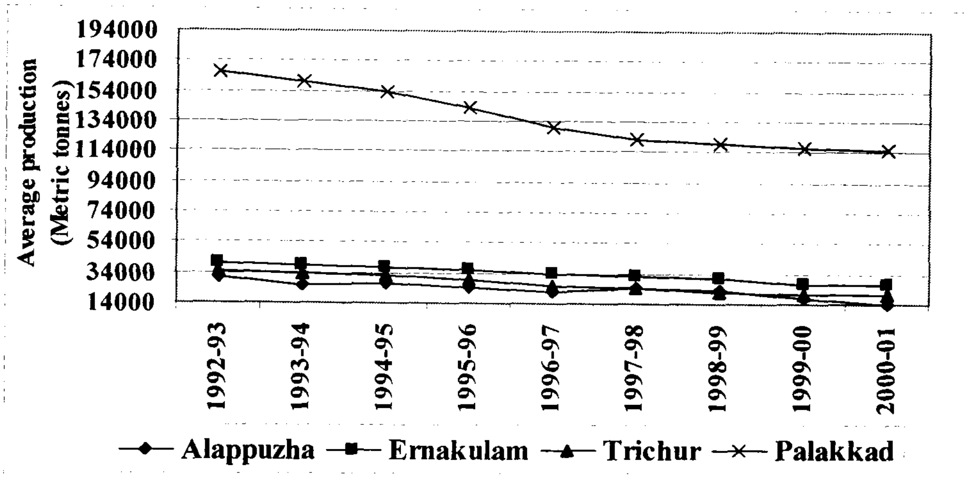
Table 4.21 Continued

Year	Season	Alappuzha	Ernakulam	Trichur	Palakkad	State
1999-00	Autumn	24776	31401	21488	106137	252876
	Winter	27593	33858	51132	123292	373259
	Summer	39718	17067	19589	21482	144551
2000-01	Autumn	16354	26770	21416	125076	260306
	Winter	31207	26596	45021	112598	336416
	Summer	55953	11941	15668	24496	154606
2001-02	Autumn	2390	22370	19830	129463	235838
	Winter	47741	26456	48590	119346	362634
	Summer	22668	10867	15861	20493	105032
2002-03	Autumn	9467	23589	20021	117326	233217
	Winter	53102	25091	44167	112229	343792
	Summer	28992	11936	23084	14371	111850

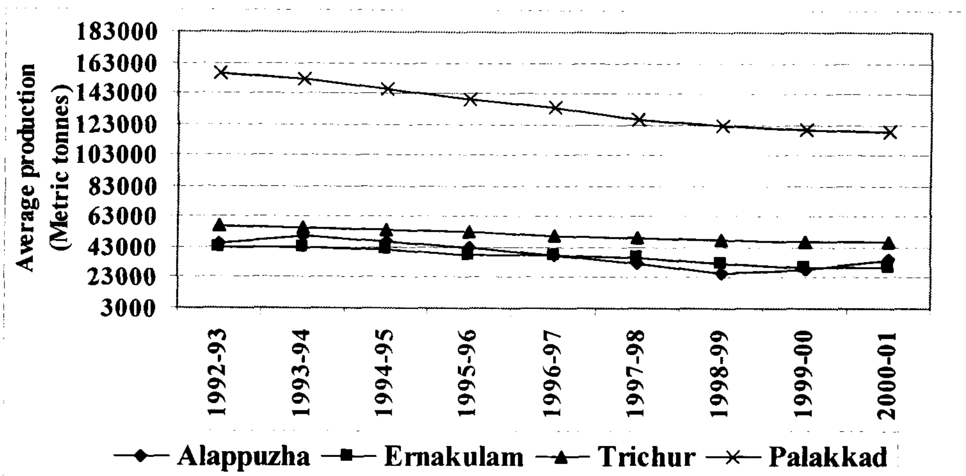
Source: DES, Palakkad 2002-03

Season-wise trends in production under Paddy in the major paddy producing districts in Kerala and also for the State was worked out by fitting semi logarithmic equation taking production as the dependent variable and year as independent variable. Results of the fitted equation for the same are given in Table 4.22. Production during the years 1960-61 to 2002-03 was utilised for estimating the trend.

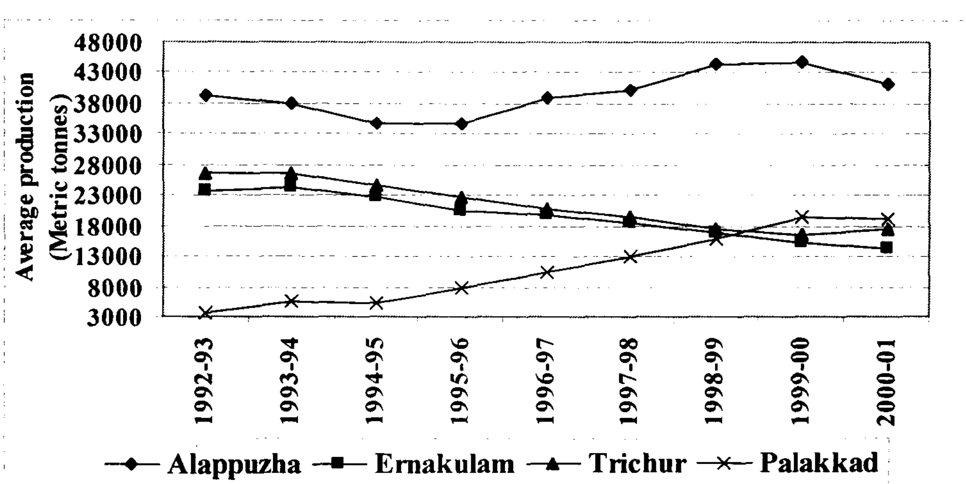
Trends in production using moving average are given in Figure 4.2. For all other cases except summer season of Palakkad District shows a negative trend. Production of paddy in summer season of Palakkad District shows an increasing trend from 1960-61 to 2002-03. Compared to other three districts summer production is low during the starting of 1990 then its production increased and it become higher than Thrissur and Ernakulam after 1998-99.



Autumn



Winter



Summer

Figure 4.2. Trends in Production of Paddy using Moving Average

The data in the Table 4.22 reveals that the production of paddy crop in Palakkad District during 1990-91 was 3.25 lakh tones. It reached to 3.35 lakh tones in 1992-93, from where it started to decline until 1999-2000. During 2000-02, there was a positive growth rate of production, but again this started to decline from 2002-03 onwards.

Table 4.22.

Production (in '000tonnes) under Paddy and Percentage Share to States Total Production under Paddy (1990-91 to 2002-03)

Year	Production (in '000tonnes)	States Total	District share to State (%)
1990-91	324.91	1086.58	29.90
1991-92	344.74	1060.35	32.51
1992-93	335.64	1084.88	30.93
1993-94	316.94	1003.91	31.56
1994-95	313.76	975.07	32.18
1995-96	280.41	953.03	29.42
1996-97	294.06	871.36	33.74
1997-98	262.49	764.61	34.32
1998-99	237.78	726.74	32.72
1999-2000	250.91	770.69	32.55
2000-01	262.17	751.32	34.89
2001-02	269.30	703.50	38.25
2002-03	243.92	688.85	35.41

Source: Various issues of Economic Review. DES, Palakkad

The compound growth rate of production of paddy was -2.85 per cent during 2002-03. The percentage share of the district in the State total declined to 35.41 per cent in the same period which was 38.25 per cent in 2001-02. Average rate of growth of production was -0.47 per cent during 1991-97 and this rate of decline increased to -10.42 per cent during 1997-2003. The percentage share of the production of paddy to States total increased and it was 38.25 in 2001-02 which declined slightly during 2002-03. The percentage share of production declined to 35.41 per cent in 2002-03. In both the case, (Palakkad and State) production of paddy shows a negative trend. Magnitude of the slope coefficient indicates that compared to State, the rate of decrease in production is lower in Palakkad District (Table 4.23).

Table 4.23.

Results of Trend Equation for Production during 1990-91 to 2002-03

District/State	Slope coefficient	t-value	R^2
Palakkad	-0.0289	6.49**	0.793
Kerala	-0.043	12.286**	0.932

** Significant at 5 % level

An analysis of productivity of the paddy in the four paddy producing districts of the State during the period 1985-88 to 1992-93 shows wide fluctuations (Table 4.24). During the period ending 2002-03 only Palakkad District showed a positive change in productivity over a period of 1999-03. The productivity in Palakkad District during 2002-03 was 2104 kg/ha which is lower than that of State's productivity of rice (2218 kg/ha).

Table 4.24.

Productivity (kg/ha) of Paddy in Kerala

District	Average of Triennium ending			Average. Annual Growth Rate
	1987-88	1992-93	2002-03	
Alappuzha	1920 (111.95)	2186 (110.80)	11797 (113.31)	2.77
Thrissur	1584 (6236)	1762 (89.31)	8212 (78.88)	2.25
Palakkad	1875 (109.33)	2290 (116.07)	10621 (102.02)	4.43
Ernakulam	1602 (93.41)	1678 (85.05)	11078 (106.41)	0.95
State Total	1715 (100)	1973 (100)	10411 (100)	3.01

Note: Percentages to State averages are given in brackets
Source: DES, Palakkad 2002-03

The Table 4.24 reveals that during nineties the productivity level of the paddy in the district is higher than the State average. The four traditional paddy growing districts accounts for about two third of the area under the crop in Kerala. In spite of this, the productivity of paddy in the State has not increased. This is due to the trend of either conversion of paddy lands for non agricultural purposes or leaving the land fallow.

Table 4.25.

Productivity (kg/ha) of Paddy in Palakkad District

Year	Productivity
1990-91	2230
1991-92	2344
1992-93	2297
1993-94	2268
1994-95	2240
1995-96	2067
1996-97	2291
1997-98	2173
1998-99	2213
1999-2000	2287
2000-01	2209
2001-02	2323
2002-03	2104

Source: Economic Review-DES (Various issues)

The productivity of paddy in Palakkad District showed variations in the 1990's which showed a decline in absolute terms from 1991-92 onwards (Table 4.25). There was a positive annual increase in productivity in 1996-97 and increased to 2287 kg/ha during 1999-2000. Later, the productivity level showed a declining trend reaching 2104 kg/ha of rice in 2002-03 which is lower than that of States productivity of rice (2218 kg/ha). The rate of decline in productivity increased to

2.58 per cent during 1997-2003. The trend line fitted for productivity is not significant statistically.

Thus it was not the slackness in productivity, but the reduction in the area under cultivation that appears to be the principal reason for the steep reduction in the production of paddy in the Palakkad District.

Table 4.26.

Area under Important Crops in Palakkad District (in '000ha)

Year	Paddy	Banana	Plantain	Tapioca	Coconut
91-92	145680	3070	3854	10257	37090
92-93	147060	3399	4075	10075	39514
93-94	146090	2970	4021	10346	43703
94-95	139760	3275	3866	9472	45503
95-96	140060	4413	3409	8965	48336
96-97	135630	4448	4165	7553	46037
97-98	128350	4115	4538	7272	48929
98-99	120800	4612	4966	6815	45439
99-00	107460	5279	4268	6373	45857
00-01	109700	5931	4770	6646	46393
01-02	118700	7414	5671	5649	50568
02-03	115900	8155	6362	4960	53207
Growth rate	-21.19	15.06	5.92	-4.69	3.95

Source: DES, Palakkad, 2002-03

In contrast to the declining trend on area, production and productivity of paddy, pepper, ginger, plantain and banana, tamarind, coconut, tea, coffee, rubber and cotton have registered substantial increase in these area except sugar cane and tapioca both in absolute and relative terms. The increasing trend in the production was due to the increase in the area under these crops at the cost of paddy land. The

Table 26 shows the area under important crops and percentage change in the area under other crops than paddy in Palakkad District over the last 12 years.

It is estimated that out of 92556.07 ha of wet land in the district, 52209.66 ha are under winter paddy and 15769.24 ha are left fallow during 2003-04. This shows the significant problem of declining trend of area under paddy in the district because of two reasons. 1) That of leaving the wet land fallow in order to use it for future non-agricultural purposes and 2) the conversion of paddy land to the cultivation of other crops which yield comparatively better income and less labour intensive.

4.4. Socio-economic Profile of Sample Blocks

As per the reorganisation of wards under the new Panchayat Raj system, the District Panchayat has twenty five divisions. The thirteen Block Panchayaths together have140 wards. Ninety panchayath and 4 Municipalities together have1308 wards. Of the five taluks in the district, six Development Blocks are selected. Four Development Blocks from Ayacut region and two blocks from non-ayacut region are selected, in order to study the development potential and problems of paddy cultivation. The physical factors like topography, soils, climate, crops, cropping pattern and economic factors like incentives enjoyed by the paddy cultivation that come under different schemes of Central and State Government and infra structure availability and support services needed to support production are different in different Blocks. These factors can influence the land use, cropping pattern, water and power resources which ultimately determine the occupational structure of the economy. So an analysis of these factors is attempted in this section in order to study the extent and magnitude of conversion in sample area.

4.4.1. Land Utilisation Pattern in Selected Blocks

Land use pattern in selected blocks is given in Table 4.27. Number of wet land (2000-01 census) is highest in Kozhalmannam block (34215). Wet lands holding in the Eastern Blocks of the district constitute 51.25 per cent of the total wet land which comes to 18.75 per cent of the total area (both wet and dry) of the district. Only 15.05 per cent of wet land holdings come under Ottapalam and Pattambi blocks which account for only 5.50 per cent of the total area in the district. (Table 4.27)

Table 4.27.

Details of Geographical Area during 2000-2001 (in hectare)

Name of block	No of holding			Area of block as in the village records (in hectare)*		
	Wet land	Dry land	Total	Wet land	Dry land	Total
Kollengode	12615	26068	38683	5575.7	9825.2	15400.9
Malampuzha	26562	40193	66755	10837.7	17959.8	28797.5
Palakkad	22882	39777	62659	6793.8	13314.1	20107.9
Kozhalmannam	34215	43956	78171	9330.6	10473.6	19804.2
Ottapalam	15896	26518	42414	4696.5	11852.6	16549.1
Pattambi	24137	35133	59270	6441.1	16019.4	22460.5

Source: DES- 2000- 2001. Panchayat level Statistics Palakkad District.

* Includes forest area as per village records.

Table 4.28.

Workers and Work Participation Rate 1991-2001

Block	Main Workers			Marginal workers			Total workers			Work participation rate		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Kollengode	29915	15989	45904	1035	1730	2765	30950	17719	48669	52.61	29.02	40.60
	29871	*13151*	*43022*	*7526*	*2472*	*9998*	*37397*	*15623*	*53020*	*61.47*	*24.77*	*42.79*
Malampuzha	50205	24436	74641	1157	2148	3305	51362	26584	77946	51.87	26.25	38.92
	55250	*22783*	*78033*	*6558*	*6901*	*13459*	*61808*	*29684*	*91492*	*56.05*	*26.14*	*40.88*
Palakkad	39220	18607	57827	1690	2726	4416	40910	21333	62243	48.53	23.76	35.76
	42664	*15303*	*57967*	*7824*	*66675*	*74499*	*50488*	*81978*	*132466*	*58.34*	*19.10*	*51.00*
Kozhalmannam	35879	22896	58775	1811	3236	5047	37690	26132	63822	49.64	32.37	40.74
	32036	*23050*	*55086*	*12375*	*346*	*12721*	*44411*	*26511*	*70922*	*55.24*	*24.39*	*37.51*
Ottapalam	25293	11168	36461	1645	2336	3981	26938	13504	40442	46.07	20.67	32.67
	27354	*9335*	*36689*	*4830*	*3678*	*8508*	*32184*	*13013*	*45197*	*49.00*	*17.00*	*32.00*
Pattambi	42406	11024	53430	3349	3198	6547	45755	14222	59977	41.13	11.74	25.70
	44189	*4196*	*48385*	*12255*	*10015*	*22270*	*56444*	*14211*	*70655*	*58.20*	*41.79*	*49.61*
District total	538134	248229	786363	23344	35434	58778	561478	283663	845141	48.50	23.13	35.48
	565198	*203851*	*769049*	*96165*	*81313*	*177478*	*661363*	*285164*	*946527*	*52.00*	*21.00*	*36.00*
Kerala	5770543	2530544	8301087	622500	222500	845000	6799104	2347431	9146535	46.65	18.00	32.18
	6479350	*1757391*	*8236741*	*1311172*	*743345*	*2054517*	*7790522*	*2500736*	*10291258*	*50.00*	*15.00*	*32.00*

Note: Values in italics corresponds to the year 2001

Source: Population Census 1991, 2001

4.4.2. Occupational Structure

The structure of labour force has undergone considerable changes during the last few years. This change in the work structure has several implications on the agricultural front, as for eg: large scale shifting of labour from the primary sector to other sectors affects agricultural operations, which leads to unprofitability of paddy cultivation. The workers and work participation rate for the sample blocks are given in Table 4.28.

Between 1991 and 2001, the total work force in Palakkad District increased by 119.98 per cent, from 8, 45,141 to 9, 46, 527. Out of a total of 3, 18,990, i.e. 33.70 per cent are agricultural labourers as against the State average of 25 per cent. The proportion of agricultural labourers is high in Kozhalmannam block and lowest in Pattambi. Between 1991 and 2001, the work participation rate in Palakkad District declined by 9 per cent. There has been an increase in male work participation rate from 48.58 per cent to 52 per cent. The work participation rate in Kollengode and Kozhalmannam is high and that of Pattambi block is low. There is a substantial decline of cultivators in the selected blocks in between 1991 and 2001.

4.4.3. Wage Rate Differentials

Harvesting wage varies between 7:1 and 10:1. Table 4.29 shows the variation in the current wages paid to agricultural labourers.

The average daily wage rate in the sample blocks are given in Table 4.29, which reveals disparity, both in money terms and real terms. The average male wage rate during 1993-94 in Palakkad increased from Rs.45-75 to Rs.150-175 in 2003-04 and female wages from Rs.25-35 to Rs.75-85. There is a five fold increase in the wage rate of agricultural labourers.

Table 4.29.

Sex-wise Average Current Wage - 2003-04

Blocks	Male	Female
Kollengode	100 - 125	55 - 60
Malampuzha	100 - 110	55 - 65
Palakkad	100 - 110	60 - 70
Kozhalmannam	100 - 120	50 - 60
Ottapalam	125 - 150	60 - 80
Pattambi	150 - 170	75 - 85

4.4.4. Availability of Machineries

The increased use of modern mechanised implements is the practice of the sample blocks, due to scarcity of labour. But mechanisation in agriculture is not found to be catching in all the blocks under study. Appendix 4 gives a clear picture of the development in the use of farm machineries in different blocks selected for the study. The number of tractors increased suitably over the period. Oil engines and electric pumps have been popularised and wide spread. The number of electric pumps has increased. Nearly 35 per cent of the registered tractors and tillers in the State are in this district. Considering the non-availability of local labourers for timely farm operations and the upward trend in wage rates, farm machanisation has become an integral part of farming in the district. The recently developed machineries such as paddy harvester, winnower etc are used extensively in the Eastern blocks for harvesting paddy.

Subsidy assistance for tractors and other machineries, like threshers and sprayers are provided to the farmer groups/Samithies. Samithies under the group farming programme for paddy and other projects implemented through the Agriculture Department. Kerala Agro Industries Corporation and Regional Agro Industries Corporation are supplying farm equipments under Government sponsored programmes. Besides many private dealers and repair units are functioning in various parts of the district.

The credit flow under the farm machanisation had increased by 11.6 per cent during the year 2002-03, which came down to 4.7 per cent during the year 2001-02. (Potential linked credit plan, Palakkad District 2004-05, NABARD). One reason attributed to this is that paddy development agency had started functioning more efficiently from last year onwards and has distributed tractors and power tillers to Padasekhara Samithies with 90 per cent subsidy.

4.4.5. Water Bodies in Selected Blocks

The District is blessed with good surface water resources treated by a number of major and medium irrigation projects. The potentials for minor irrigations in the district includes, surface water irrigation and the ground water exploitation by construction of irrigation structures. Out of the net irrigated area of 98,503 ha, 70,993 ha (i.e. 72 %) is irrigated by canals. The source-wise data in selected blocks are given in Appendix 5.

Among the sample blocks, Ottapalam and Pattambi were adversely affected by lack of sufficient water bodies. The position of surface water resources available for irrigation in Eastern blocks is better when compared to western blocks. The stage of ground water development is quite low in the District and hence in sample blocks too. As against the utilisiable recharge of 75,070 ha m, the net draft for irrigation as on 31st March 2001, stood at 14,044 ha m, leaving a balance of 61,033 ha m. The net ground water available for further irrigation development is 418.10 ha m. The low level of ground water exploitation in the sample blocks is on account of the extensive cropped area being irrigated by canals and lift irrigation schemes. Data on stage of ground water development and balance potential available are given in Table 4.30.

Table 4.30.

Estimation of Ground Water(GW) Availability

Block	Total annual GW Re-charge	Natural discharge during non-monsoon season	Net amount of GW available	Existing GW for drift irrigation	Allocation for next 25 years domestic and industrial use	Net GW available for future irrigation development	Stage of development	Category
Kollengode	84.71	8.47	76.24	16.81	11.67	47.76	32.23	Safe
Malampuzha	74.15	7.41	66.74	28.83	49.12	14.48	74.8	Safe
Palakkad	113.46	11.35	102.12	11.46	29.68	69.97	36.45	Safe
Kozhalmannam	116.78	11.68	105.1	10.51	56.58	38.02	60.71	Safe
Ottapalam	33.84	3.38	30.46	8.47	6.94	15.05	44.57	Safe
Pattambi	39.3	3.93	35.73	9.67	12.78	12.92	54.05	Safe
Palakkad District	823.88	73.55	750.7	140.44	191.81	418.1	40	Safe

Source: PLCP, Trivandrum, 2003-04

All blocks fall under "safe" category, offering grand potential for further ground water development. Credit flows for Minor Irrigation has declined sharply from Rs.581.56 lakh to Rs.483.12 lakh during the year 2001-02 and the achievement for the year was only 53 per cent of the target fixed for the year. As on March 31st 2003 NABARD has sanctioned Rs.964.96 lakh for completing 62 Minor Irrigation Projects, like construction of canals, check dams etc, under Rural Infra structure Development Fund (RIDF).

Though the district is having good net work of surface water irrigation system, some pocket of the district experience scarcity of irrigation water. Ottapalam and Pattambi are such blocks, which are suffering from lack of canal water.

4.4.6. Soil Type and Fertility Status

The important soil types are three. 1) laterites covering Western and North Western parts, 2) red soil and 3) black soil which cover the Eastern parts. Out of the nine Taluks, Ottapalam located in the Western side, falls entirely in mid lands. 20 per cent of Palakkad block is under high lands. Laterite soil is seen in Ottapalam, Malampuzha and Palakkad Taluks. Alkaline soil is found in Kollengode Taluk. Acidic soil is seen in Ottapalam and Palakkad blocks. The undulating terrains in the mid land and high lands ((Ottapalam, Palakkad and Malampuzha) coupled with high rainfall conditions make the fertile top soil vulnerable to erosion. The critical area affected by soil erosion in the district was earlier estimated at 1,41,360 ha. Under the National Watershed Development in Rain fed areas, four watershed areas were sanctioned, out of which two were in Ottapalam and Pattambi blocks.

The Soil Testing Centre at Pattambi is having a mobile soil testing unit and a stationery unit. The soil type fertility status and the average soil test data, of selected blocks, as obtained from the soil testing stations, are given in the Table 4.31.

The soils are free of salts. In terms of soil fertility, Kollengode, Kozhalmannam and Pattambi are low in organic matter; where as other blocks are of medium status. The region is relatively better in available P and K status (medium to high) (Table 4.31). The average yield of Paddy in the sample blocks in the past four years is given in Table 4.32, which reveals the difference in fertility status of soil in different blocks.

Table 4.31.

The Average Soil Test Data of Sample Blocks – Palakkad District

Block	pH	TSSDSm^{-1}	OC (%)	Av. P kg ha^{-1}	Av. K kg ha^{-1}
Kollengode	6.85 (medium)	0.1 (low)	0.49 (low)	53.03 (high)	264.90 (medium)
Malampuzha	5.20 (low)	0.1 (low)	0.71 (medium)	19.12 (medium)	270.0 (medium)
Palakkad	5.20 (low)	0.1 (low)	0.71 (medium)	19.12 (medium)	270.0 (medium)
Kozhalmannam	5.61 (medium)	0.1 (low)	0.41 (low)	57.91 (high)	237.18 (medium)
Ottapalam	3.8 (low)	0.1 (low)	0.60 (medium)	10.0 (medium)	250.1 (medium)
Pattambi	5.0 (low)	0.1 (low)	0.59 (low)	9.09 (low)	240.8 (medium)

Note: Soil fertility classes are given in parenthesis.

Source: Soil testing Lab, Pattambi 2003-04.

4.4.7. Size of Holding

The Agriculture census data on pattern of holding indicates dominance of small and marginal holdings. Out of 3,87,559 individual operational holdings in the district 3,36,709 (i.e. 87 per cent) are holdings of less than one hectare and 30214 members are between one and below two hectares.

The number and area of operational holdings in Palakkad Districts, reveals the uneconomic size of holdings, especially in the Western blocks compared to Eastern blocks. Operational holdings in Kerala during 1990-91 and 1995-96 shows the average size of holdings in 1995-96 comes to 33 hectares as against 157 in 1990-91). Number of operational holdings has come to 62.98 lakh from 105.29 lakh in 1990-91. The marginal decrease in the size of holdings is more in Pattambi (Appendix 6).

Table 4.32.

Production of Paddy and Average Yield (kg/ha)

Year	Number/Production	Kollengode	Malampuzha	Palakkad	Kozhalmannam	Ottapalam	Pattambi	Palakkad District
1996-97	crop cutting experiment	25	41	23	35	30	47	496
	Production (kg)	303.29	374.93	154.31	345.5	227.15	302.22	4186.965
	Average production (kg)	12.13	9.14	6.71	9.87	7.57	6.43	8.44
1997-98	crop cutting experiment	25	41	19	36	10	48	496
	Production (kg)	210.81	349.07	142.76	363.15	67.19	366.68	4171.32
	Average production (kg)	8.43	8.51	7.51	10.09	6.72	7.64	8.41
2002-03	crop cutting experiment	32	56	40	48	40	64	650
	Production (kg)	330.43	421.38	311.67	416.15	319.645	406.01	5174.55
	Average production (kg)	10.33	7.52	7.79	8.67	7.99	6.34	7.96
2003-04	crop cutting experiment	32	56	40	48	40	64	656
	Production (kg)	350.43	438.21	333.735	497.3	256.22	480.54	5422.395
	Average production (kg)	10.95	7.83	8.34	10.36	6.41	7.51	8.27

Source: DES Palakkad, 2003-04

4.4.8. Availability of Infrastructure and Support Services

The main infrastructural facilities needed to support production are credit for seasonal agricultural operations, the availability of seeds and other inputs, extent of irrigation, remunerative and assured prices, marketing facilities and a strong credit delivery system.

There are five state seed farms and four horticultural farms in the district to provide quality seeds and planting materials to the farmers. Four are located in Eastern Palakkad, which comes under the Palakkad Nelkrishi Vikasana agency. Out of the two fertilizer quality control laboratories in the State, one is at Pattambi. The state government has set up a paddy development agency at Palakkad. Out of the 33 State Seed Farms (paddy) in Kerala, Palakkad District owns five. Four are located in the Eastern Palakkad Nelkrishivikasana agency (Palakkad, Kollengode and Kozhalmannam).

Table 4.33.

Number of Rice Mills in the Study Area

Block	No. of Rice Mills
Kollengode	5
Malampuzha	3
Palakkad	2
Kozhalmannam	2
Ottapalam	2
Pattambi	1

Source: DES, Palakkad 2003-04

An industrial co-operative society (PADDYCo), at Elappully in Malampuzha, has been procuring paddy at remunerative price from the farmers and converting it into rice, in their modern rice mill, and it is marketed by the society itself. The traditional rice mills in the Eastern district have been a support for the farmers of that region (Table 4.33). The absence of rice mills in Ottapalam and Pattambi blocks enhance the problems/constraints of farmers and they do not get advantage of better price for their produce.

Table 4.34.

Number of Co-operative Societies and RRB's in the Study Area

Block	Co-operative Societies	RRB
Kollengode	6	1
Malampuzha	7	-
Palakkad	10	-
Kozhalmannam	8	1
Ottapalam	6	2
Pattambi	5	2

Source: PLCP, Trivandrum, 2003-04

The credit delivery system in the district comprises mainly 242 branches of commercial Banks, five primary co-operative Agricultural and Rural Development Banks (PCARDBS), 89 Service Co-operative Banks and other financial institutions. Table 4.34 gives the number of co-operative societies and RRB's in the study area. Interest subsidy from Government of Kerala is provided to the farmers @ 5 % in the form of production incentive. Block-wise (sample blocks) distribution of machineries owned and operated by PNS are furnished in the Appendix 4.

4.4.9. Agricultural Development Programme in Palakkad District

Despite the speedy transformation of the district, from its traditional agricultural base to a fast growing industrial metro polis, the main vocation of a large share of the population is still agriculture. This is a main feature, since there is a view that agriculture occupation fail to yield the desired results.

In December 2002, the U N General Assembly approved a draft solution, which declared 2004 as the International Year of Rice, which reflects the importance of Paddy in global concerns regarding food security, poverty alleviation, preserving cultural heritage and sustainable development. The fundamental objectives of the International Year of Rice, is to promote and provide guidance for efficient and sustainable increase in rice production.

Since this study attempts to analyse the problems and prospects of paddy cultivation in Palakkad district, in a micro level, it is imperative to go through some of the development programmes in brief recently introduced in this district.

a. Rashtra Swayam Vikas Yojana (R S V Y)

Planning Commission has selected Palakkad District for implementation of RSVY for overall development of the District. Programme and policies, which will remove barriers to growth, accelerate the development process, and improve the quality of life of the poor people, are to be formulated. It is proposed to provide about Rs.45 crores at the rate of 15 crores per year for a period of three years. Suitable incentive in the form of additional funding will be available for the better performance.

The main objective of the scheme is to redress the problems of low agricultural productivity and unemployment and to fill critical gaps in physical and social Infrastructure. For this the obstacles constraining growth of the district as well as the strength of the district in terms of natural resources and existing institutional support are to be identified. The local needs which would make a dent on the poverty of the district in a time bound manner are to be served. Peoples participation and the involvements of Panchayat Raj institutions, Non-Government organizations and self Groups at every stage including plan information, implementation and monitoring are to be ensured. Innovative programmes and alternative ways of implementing schemes to ensure transparency, efficient delivery and accountability are of paramount importance.

The action plan for Palakkad District would include schemes like draught proofing (which includes soil conservation, aforestation, social forestry, waste land development and minor irrigation), agriculture, horticulture, infrastructure, social sector and livelihood support.

It is proposed to provide an assistance of Rs.3500 per hectare, as financial assistance to padasekharam, who successfully laying out the demonstration of popularising new technology.

The Padasekharams successfully cultivating paddy and possessing a minimum area of 20 hectares continuously will be selected by Agricultural Officers of concerned Krishibhavans. The Padasekharams so selected will be approved by the Assistant Director of Agriculture.

b. Command Area Development Authority (CADA)

The area which can be irrigated by an irrigation project is called its command area. Development of command area envisages developing this command area by creating a proper water distribution and usage net work and management facilities for optimum utilisation of available water. CADA has been formed for the comprehension and systematic development of the area in which the benefited areas of the irrigation projects are situated. It is undertaking activities for bridging the gap between potential created and potential utilised, so as to maximise the crop production and increase the utilisation of created potential. The project-wise expenditure incurred (Including establishment expenses) for CAD activities in Eastern block upto March 2002 is given in Table 4.35.

At the outset, 10 completed irrigation projects were included under the CAD Programme. During 1992-93, four more completed irrigation projects were also included under CAD Programme. Later two new projects namely Kanjirapuzha and Pazhasi were also included. So totally at present there are sixteen projects included under CADA. Kerala having a total Ayacut of 203003.2 ha, out of which 62103.5 ha is in Palakkad District. The cultivable command area benefited by the projects in Palakkd District is furnished in Appendix 7.

Table 4.35.

The Project-wise Expenditure Incurred (Including Establishment Expenses) for CAD Activities in Eastern Blocks

Name of Project	Cumulative expenditure from 1985-86 to 2000-01	Achievement during 2001-02	Cumulative achievement from 1985-86 to 2001-02
1. Malampuzha (Palakkad)	1976.500	15.609	1992.109
2. Gayathri (Malampuzha)	552.560	0.031	552.591
3. Mangalam (Alathur)	353.330	0.295	353.625
4. Chitturpuzha (Chittur)	85.700	NA	85.700
5. Kanjirapuzha (Palakkad)	6.210	NA	6.210
6. Pothundy	513.420	2.624	516.044

Source: DES, Trichur and Palakkad, 2003-04

c. Integrated Nutrient Management (INM)

INM is a scheme which envisages the establishment of model INM Farmers (@ Rs.5,000 per plot), giving due emphasis to the integrated and optimum use of organic and chemical fertilizers to demonstrate the sustained improvement of soil productivity due to the adoption of INM approach. There is also provision for strict quality control measures in pesticides / fertilizers by taking samples and sending the same to laboratories for testing. Krishibhavan-wise soil maps (59 Nos @ Rs. 2100/-) will be prepared by the soil testing laboratories. . Fifty per cent assistance is given to the Samithies / farmers organizations for adoption of new suitable equipments and machineries from other States / countries, by importing.

Grass Root Level Support system envisages from field visits by the technical officers of the field by the group contact visit system at specific locations and farm and field visit-system based on a pre-fixed schedule. Funds are provided for strengthening the Agricultural Information Samithies established at selected Krishibhavans of Blocks.

Production bonus of Rs.350 per ha is given to farmers. Subsidies are given for adoption of HYV cultivation, green manure, seed distribution, construction of seed godown, bio-fertilizer distribution adopting bio control measures and conducting training programmes and organising Integrated Pest Management Demonstration Plots. The scheme also envisages production of good quality paddy seeds under registered seed growers programme through Padasekhara Samithies. The quality seeds will be procured by the Kerala State Seed Development Authority.

d. Group Farming

Group Farming is a massive technology transfer programme in which thrust is given to bring the farmers together and take up paddy cultivation by adopting scientific methods of cultivation. The rationale of group farming is joint management of available resources with a group of farmers for overcoming the handicaps of small scale individual farming and thereby achieving economies of scale. However, past experience with the group farming programme suggests that neither input subsidies nor infra structure support per se can bring about substantial change in area and production. Strengthening of Group Farming Samithies with the required facilities and gradually raising them to the level of self supporting institutions, is perhaps one way to avoid the problems involved in the paddy cultivation.

The Samithi's activities proved to be successful and soon this attracted the attention of farmers of the area and the membership of the Samithi increased to cover more farmers spread over 75 hectares of paddy fields. Presently the Samithi has 102 members with the land holdings ranging from 30 cents to 10 acres. This was later on adopted by the Department of Agriculture, Kerala as a model to be extended throughout the State.

e. Padasekhara Nellulpadana Samithi (P N S)

The main objective is to revitalise the Group Farming activities of PNS. Assistance (@ Rs. 1000 per ha X 20000 ha), will be provided for adoption of machanisation for land preparation, use HYV of seeds, community nursery, community weed control, joint plant protection operation, following uniform cropping pattern etc through Padasekharams.

f. Group Action for Locally Adopted and Sustainable Agriculture (GALASA)

GALASA has been implemented by the District Panchayath in 40 Panchayaths. Under this scheme, Group Farming is done in the case of paddy with the use of bio-fertilizers and improved seeds. The technical guidance is given by the scientists of the Agricultural Universities. This novel programme aimed at reviving paddy cultivation in Palakkad District through effective application of technologies and by minimising the cost of cultivation. Group effort is considered as the most critical input in the entire programme. An amount of Rs.1,000/ per acre was given to those farmers who cultivated and applied green manure and the same amount was collected back after the harvest of the crop – 'in the form of revolving fund' – applicable to all blocks.

g. Kisan Credit Card Scheme (KCCS)

KCCS is revolving cash credit limit for farmers to meet their short term agricultural and working requirement of allied activities and non-farm sector requirements. The card is valid for 3 years, subject to an annual review. As per Government direction all eligible farmers are to come under KCC Scheme by 31st March 2004.

i. Warabandhi

Warabandhi was essentially an intervention, by the Government in the minimum interference of the affairs of farmers, to entire equitable water distribution to the large number of cultivators in an outlet command. The Warabandhi now lays emphasis not only on equity in distribution and efficient management of water on the farm but also on the cropping pattern, crop water requirement and soil condition. The entire system from main canal to field channel has to be included under Warabandhi of CADA for the efficient utilization of the created potential. It is introduced in all completed projects and hence confined to Eastern blocks only.

Table 4.36.

Infrastructure and Incentives-Block-wise

Items	KLD	MLA	PKD	CLM	OTP	PTB
1. State seed Farm	√	√	√	√	Nil	Nil
2.Paddy Co (Procurement)	Nil	√	Nil	Nil	Nil	Nil
3. GALASA (general)	√	√	√	√	√	√
4. CADA (**	√	√	√	√	Nil	Nil
5. Warabandhi (**)	√	√	√	√	Nil	Nil
6. SHGs Subsidy	√	√	√	√	√	Nil
7. Production Bonus	√	√	√	√	√	√
8. RSVY	√	√	√	√	√	√
9. Free electricity	√	√	√	√	√	√
10. Kerosene Permit	Now withdrawn					
11. Soil Fertility	Low	Medium	Medium	Low	Low	Low
12. Mechanisation	Medium	Medium	Medium	Medium	Low	Low

KLD – Kollengode; MLA – Malampuzha; PLD – Palakkad; CLM – Kozhalmannam; OTP – Ottapalam; PTB – Pattambi
Source: DES, Palakkad, 2003-04; PLCP, Trivandrum, 2003-04

Infrastructure of the sample blocks and the incentives provided to paddy farmers are summarised in Table 4.36. It shows that Western blocks are denied by most of the facilities provided by the Central and State Government.

4.4.10. Socio-Economic Profile of the Sample Households

The general socio-economic characteristics of the sample households are described in this section.

(i) General Economic and Social Conditions

Knowledge of the socio-economic characteristics of the sample farm households would be useful for understanding the implications of the analysis and generalizations there from. In this section an attempt is made to present the salient features of the social and economic conditions namely family size, age, religion, literacy, occupation, ownership holding, cropping pattern, income, source of irrigation, subsidy received etc. of the sample respondents.

a. Family Size

Table 4.37.

Average Number of Family Members in the Sample House Holds

Block	Frequency based on family member			Mean no. of family member	Minimum of family member	Maximum of family member
	1-3	4-6	>6			
Kollengode	21	13		2.76	1	5
Malampuzha	22	30	14	4.50	1	10
Palakkad	42	6	1	2.02	1	8
Kozhalmannam	27	23	2	3.42	1	8
Ottapalam	21	14	2	3.22	1	8
Pattambi	15	34	15	4.89	1	8
Total	148	120	34	3.64	1	10

The respondent farmers were classified on their family size and their distribution in the different blocks and the average number and range of family members are given in Table 4.37.

The average number of the family members in the sample households was four. The maximum number of members in the family was ten. All are nuclear households. Joint family system has totally disappeared from the study area.

b. Age

The age composition of paddy farmers given in Table 4.38 reveals that majority of the farmers belongs to higher age group i.e. between 40 and 60. 29.1 per cent of the sample farmers are 60 or more years old and only 9.9 per cent of them fall in the age group of 40 and less than 40. And in all blocks except Ottapalam only less than 10 per cent belong to smaller age group. In Ottapalam block, 21.6 per cent of the respondents belong to smaller age group.

Table 4. 38.

Age Class Distribution of the Head of the Household in the Sample Blocks

Block	Age group						Total
	≤ 40		Between 40 and 60		>60		
	No	%	No	%	No	%	
Kollengode	2	5.9	26	76.5	6	17.6	34
Malampuzha	7	10.6	39	59.1	20	30.3	66
Palakkad	-	-	42	85.7	7	14.3	49
Kozhalmannam	6	11.5	33	63.5	13	25.0	52
Ottapalam	8	21.6	19	51.4	10	27.0	37
Pattambi	7	10.9	25	39.1	32	50.0	64
Total	30	9.9	184	60.9	88	29.1	302

c. Religion

Distribution of respondents based on religion in different blocks is given in Table 4.39. Table shows that most of the respondents belong to the Hindu religion.

Table 4.39.

Distribution of Sample Households (Religion-wise)

Block	Hindu		Christian		Muslim		Total
	No	%	No	%	No	%	
Kollengode	32	94.1	1	2.9	1	2.9	34
Malampuzha	63	95.5	1	1.5	2	3.0	66
Palakkad	46	93.9	1	2.0	2	4.1	49
Kozhalmannam	48	92.3	2	3.8	2	3.8	52
Ottapalam	37	100.0	-	-	-	-	37
Pattambi	60	93.8	-	-	4	6.3	64
Total	286	94.7	5	1.7	11	3.6	302

d. Caste

45.71 per cent of the sample households belong to general category. Only 1.3 per cent of the farm households belong to SC (Table 4.40). In Palakkad block, about 80 per cent of the respondents belong to OBC category

Table 4.40.

Caste-wise Distribution of the Sample Households

Block	General		SC		OBC		Total
	No	%	No	%	No	%	
Kollengode	13	38.2	-	-	21	61.8	34
Malampuzha	25	37.9	2	3.0	39	59.1	66
Palakkad	8	16.3	2	4.1	39	79.6	49
Kozhalmannam	22	42.3	-	-	30	57.7	52
Ottapalam	23	62.2	-	-	14	37.8	37
Pattambi	47	73.4	-	-	17	26.6	64
Total	138	45.7	4	1.3	160	53.0	302

e. Education

Classification of heads of households according to their educational status is given in Table 4.41.

Table 4.41.

Education-wise Distribution of Respondents in Different Blocks

Block	Primary		Secondary		High School		Degree		Total
	No	%	No	%	No	%	No	%	
Kollengode	-	-	-	-	33	97.1	1	2.9	34
Malampuzha	11	16.7	3	4.5	36	54.5	16	24.2	66
Palakkad	-	-	-	-	42	85.7	7	14.3	49
Kozhalmannam	10	19.2	3	5.8	37	71.2	2	3.8	52
Ottapalam	4	10.8	2	5.4	29	78.4	2	5.4	37
Pattambi	7	10.9	8	12.5	37	57.8	12	18.8	64
Total	32	10.6	16	5.3	214	70.9	40	13.2	302

Analysis showed that none of the farmer was illiterate which would be attributed to the high literacy rate of sample blocks. Out of the total respondents 70.8 per cent had high school education but only 13.2 per cent had acquired higher education.

Persons having education above SSLC was highest among the Class IV category of farm households (32.4%). Classification according to education level of family is represented in Table 4.42. The education level of the family was estimated using the socio-economic status scale of Trivedi (1963).

Table 4.42.

Education-wise Distribution of the Respondents in Different Farm Size Classes

Size class	Primary		Secondary		High School		Degree		Total
	No	%	No	%	No	%	No	%	
Class I	10	18.52	5	9.26	37	68.52	2	3.70	54
Class II	8	7.62	6	5.71	86	81.90	5	4.76	105
Class III	7	9.33	4	5.33	53	70.67	11	14.67	75
Class IV	7	10.29	1	1.47	38	55.88	22	32.35	68
Total	32	10.6	16	5.30	214	70.86	40	13.25	302

Education-wise distribution of the respondents in different size class is graphically given in Fig. 4.5. It shows that percentage of respondents having degree increases from class I to class IV. In Class II, about 82 % of the respondents are having high school education.

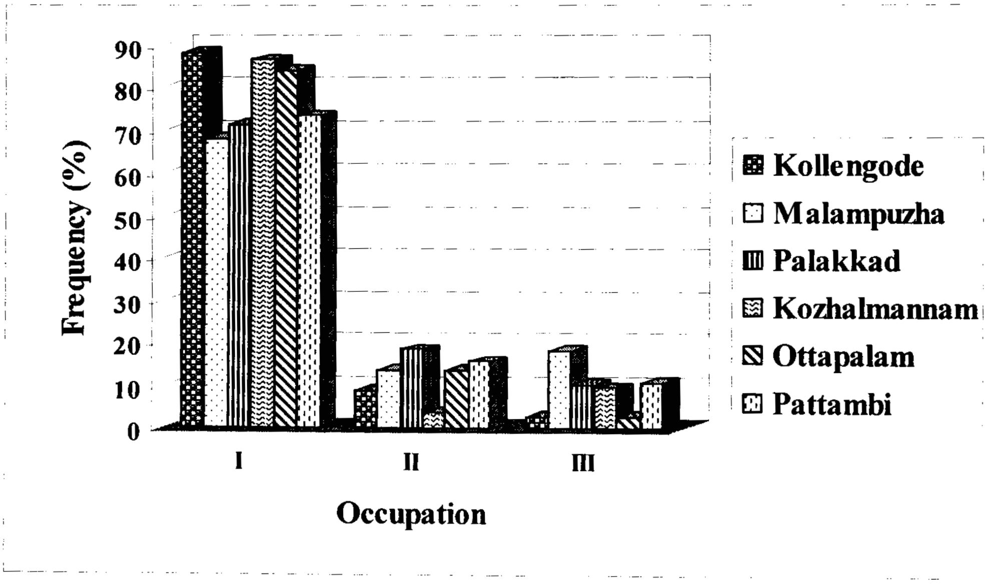
f. Occupation

Distribution of heads of households, according to their occupation is shown in Table 4.43. Out of the total respondents 77.2 per cent had agriculture as their only occupation. This shows the significance of the agricultural sector in the study area as a source of income and employment.

Table 4.43.

Occupational Status of the Respondents in the Sample Blocks

Blocks	Agriculture as only occupation		Agriculture as main occupation		Agriculture as subsidiary occupation		Total
	No	%	No	%	No	%	
Kollengode	30	88.2	3	8.8	1	2.9	34
Malampuzha	45	68.2	9	13.6	12	18.2	66
Palakkad	35	71.4	9	18.4	5	10.2	49
Kozhalmannam	45	86.5	2	3.8	5	9.6	52
Ottapalam	31	83.8	5	13.5	1	2.7	37
Pattambi	47	73.4	10	15.6	7	10.9	64
Total	233	77.2	38	12.6	31	10.3	302



I - Agriculture as only occupation, II - Agriculture as main occupation, III - Agriculture as subsidiary occupation

Figure 4.3. Percentage of Respondents in Different Blocks According to their Occupation Status

Table 4.44 reveals that 86.7 per cent of the medium farmers (class III) solely depend on agriculture. Only 10.3 per cent of the respondents are taking agriculture as subsidiary occupation.

Table 4.44.

Occupational Status and Size of Holding

Size of holding (ha)	Agriculture as only occupation		Agriculture as main occupation		Agriculture as subsidiary occupation		Total
	No	%	No	%	No	%	No
≤ 0.25	43	79.6	9	16.7	2	3.7	54
0.25-0.5	79	75.2	15	14.3	11	10.5	105
0.5-1.0	65	86.7	5	6.7	5	6.7	75
> 1.0	46	67.6	9	13.2	13	19.1	68
Total	233	77.2	38	12.6	31	10.3	302

g. Ownership Holding

The total land held by the sample farmers was appointed on the basis of size of holding and is presented in Table 4.45. The smallest size, class I, held only 17.9 % of land area followed by 22.5 per cent in the next higher class II., 24.8 per cent in the third higher class III and 54.8 per cent in the class IV.

Table 4.45.

Distribution of Size of Holding in Ayacut and Non-ayacut Area

Ayacut/ Non-ayacut	Size of holding (ha)								Total		Average size of holding
	≤ 0.25		0.25-0.5		0.5-1.0		>1.0				
	No	%	No	%	No	%	No	%	No	%	
Ayacut	37	12.3	80	26.5	44	14.6	40	13.2	201	66.6	0.913
Non-ayacut	17	5.6	25	8.3	31	10.3	28	9.3	101	33.4	1.115
Total	54	17.9	105	34.8	75	24.8	68	22.5	302	100	0.981

Table 4. 46.

Distribution of Size of Holding in Different Sample Blocks

Block	Size of paddy lands									
	Class I		Class II		Class III		Class IV		Total	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Kollengode	3	0.12	18	0.35	8	0.80	5	2.44	34	0.75
Malampuzha	14	0.17	16	0.36	17	0.73	19	1.51	66	0.75
Palakkad	11	0.18	16	0.38	11	0.79	11	5.79	49	1.64
Kozhalmannam	9	0.14	30	0.35	8	0.83	5	2.00	52	0.54
Ayacut	**37**	**0.16**	**80**	**0.36**	**44**	**0.78**	**40**	**2.87**	**201**	**0.91**
Ottapalam	8	0.20	11	0.37	11	0.88	7	3.85	37	1.14
Pattambi	9	0.16	14	0.40	20	0.85	21	2.21	64	1.10
Non-ayacut	**17**	**0.18**	**25**	**0.39**	**31**	**0.86**	**28**	**2.62**	**101**	**1.12**
All farms	54	0.17	105	0.37	75	0.81	68	2.76	302	0.98

Average size of holding was 0.981 hectares for the sample. The average size of holding, was higher in Palakkad block (1.641) and lower in Kozhalmannam (0.545 ha) (Table 4.46).

Table 4.47.

Average Size of Holding in Ayacut and Non-ayacut Area among Different Category of Farmers

Category of farmers	Average size of holding		
	Ayacut	Non-ayacut	Total
Agriculture as only occupation	0.695	1.163	0.852
Agriculture as main occupation	0.636	0.527	0.593
Agriculture as subsidiary occupation	2.658	1.751	2.424
Total	0.913	1.115	0.981

Table 4.47 shows that the average size of holding in non-ayacut area is higher than Ayacut area. Average size of holding of those who considered agriculture as only occupation is higher in non-ayacut area (1.163) than Ayacut area (0.695). Average size of holding who considered agriculture as only subsidiary is higher in Ayacut area (2.658) than non-ayacut area (1.751).

h. Cropping Pattern

The cropping pattern indicated the economic significance of different crops in the study area. The area under important crops was directly obtained by asking the respondents. The cultivation is carried out in the form of mixed crops in the converted wet land (Table 4.48). The mixed crop pattern has helped in spreading the risk of crop failure and price fluctuation (Appendix 8). Area of land converted and non converted in the sample studied is given in Table 4.49.

Table 4.48.

Area under Paddy and Cropping Pattern in the Converted Wet Land

Area (Ha)	Kollengode	Malampuzha	Palakkad	Kozhalmannam	Ottapalam	Pattambi
Virippu	350.49	2010.70	822.41	31.51	46.52	338.36
Mundakan	0.00	777.60	0.00	0.50	3.00	176.00
Puncha	0.00	0.00	0.00	0.00	0.00	18.06
V+M	5660.75	7237.54	5502.81	8742.67	4053.06	4332.56
M+P	0.00	0.00	0.00	0.00	2.13	12.00
V+M+P	0.00	1.28	80.00	20.00	5.25	9.50
V+Groundnut	0.01	0.00	0.00	0.00	0.00	0.00
V+Vegetables	3.76	0.00	0.00	0.00	0.00	0.00
Vayal Nikathi+ cashew	62.62	153.05	57.50	25.75	18.50	24.38
Vayal Nikathi+Mixed crop	46.37	225.13	214.00	26.87	91.85	68.01
Vayal Nikathi+Coconut	23.40	32.95	61.88	29.50	48.51	48.11
Vayal Nikathi+Tapioca	0.00	1.13	0.00	22.25	1.26	8.75
Vayal Nikathi+Sugarcane	0.00	1.75	0.00	0.00	0.00	0.00
Vayal Nikathi+Plantain	0.00	3.63	14.75	0.00	30.01	30.88
Vayal Nikathi+Arecanut	0.00	1.00	8.80	0.00	5.25	6.25
Vayal Nikathi+Rubber	0.00	2.00	4.00	5.00	4.50	10.25
Vayal Nikathi+Mixed trees	0.00	1.89	3.75	0.00	0.00	0.00
Vayal Nikathi+Tharissu	14.00	0.00	0.00	0.00	0.00	1.50
Total	**146.39**	**422.53**	**364.68**	**109.37**	**199.88**	**198.13**

Source: DES, Palakkad 2003-04

Table 4.49.

Area of Land Converted and Non-converted (in ha)

Block	Land used for agriculture					Non agriculture	Fallow
	Paddy	Coconut	Plantain	Tapioca	Mixed crop		
Kollangode	18.33	-	0.16	0.20	6.67	-	-
Malampuzha	40.54	-	-	-	3.69	1.06	4.10
Palakkad	49.96	-	-	-	0.81	1.07	29.47
Kozhalmannam	20.55	1.81	0.16	0.20	5.61	-	-
Ottapalam	31.13	0.02	0.80	2.43	7.86	-	-
Pattambi	53.01	2.42	3.23	-	5.94	0.80	3.64
Total	213.52	4.25	4.19	2.63	19.41	2.93	37.21

Table 4.49 shows that major part of the conversion is taken place for mixed cropping. About 37.21 ha of area is kept fallow and 2.93 ha of area is now used for non agricultural purposes.

i. Income

The income distribution of the sample farm household (block-wise), is presented in Table 4.50. It would be observed from the table that 36.8 % of the farm households belong to the income group of 5000 – 20000, whereas only 2 % belong to higher income range (> 100000). Among the selected blocks, the number of households, having income more than one lakh comes to three in Palakkad block, none in Kozhalmannam and Ottapalam. Size-wise distribution of the sample households according to income, shows that 30.9 % of farm households, who belongs to the income range 20,000 – 50,000, were large farmers. Also 26.5 % of the large farmers had income in between 50,000 and 1, 00,000 (Table 4.51).

Table 4.50.

Income Distribution in the Different Sample Blocks

Block	Income group										Total
	<5000		5000 - 20000		20000 - 50000		50000 - 100000		>100000		
	No	%	No	%	No	%	No	%	No	%	
Kollengode	6	17.6	16	47.1	8	23.5	3	8.8	1	2.9	34
Malampuzha	28	42.4	17	25.8	11	16.7	9	13.6	1	1.5	66
Palakkad	6	12.2	26	53.1	13	26.5	1	2.0	3	6.1	49
Kozhalmannam	21	40.4	16	30.8	11	21.2	4	7.7	-	-	52
Ottapalam	18	48.6	13	35.1	2	5.4	4	10.8	-	-	37
Pattambi	12	18.8	23	35.9	17	26.6	11	17.2	1	1.6	64
Total	91	30.1	111	36.8	62	20.5	32	10.6	6	2.0	302

Distribution of farm households according to annual income, in Ayacut and non-ayacut areas is presented in Table 4.52 and 4.53. Five persons represents higher income group having an income more than Rs.1,00,000 in Ayacut area, whereas it is only one in non-ayacut area. Income status and size of holding of the respondents shows, that respondents belong to the lower income group comes to 30.8 %, having an income of less than Rs.5000. Majority of the farm households, belongs to the middle income group, having an income of Rs.5,000 – Rs.10,00,000. Marginal and small farmers constitute a substantial part of the sample households deriving their income from agriculture (Table 4.51). This is found true in the case of non-ayacut and Ayacut area.

Table 4.54 reveals that there is a declining trend to depend agriculture as the only source of income and employment. The survey shows that farm households accept agriculture as subsidiary occupation, as they feel that they can not survive, depending mainly on agriculture. In order to survive or exist, the farm households carry on agriculture as a subsidiary occupation. The farm households are taking agriculture as subsidiary occupation and they get more income than those farm households taking agriculture as main occupation. This throws light on the fact that, genuine interest in paddy cultivation is getting reduced and they turn away from agriculture. In spite of the fact that 77 per cent of farm households depend on agriculture as only occupation, only 1.7 per cent receive an income more than one lakh Rupees; where as, in the case of those farm families, accepting agriculture as subsidiary occupation, it was 12.5 per cent, who get more than one lakh Rupees as income.

Table 4.51.

Income Status and Size of Holding (General)

Size of holding (ha)	Income group										Total
	<5000		5000 - 20000		20000 - 50000		50000 - 100000		>100000		
	No	%	No	%	No	%	No	%	No	%	
≤ 0.25	28	30.8	20	18.0	3	4.8	3	9.4	-	-	54
0.25-0.5	39	42.9	39	35.1	18	29.0	7	21.9	2	33.3	105
0.5-1.0	13	14.3	35	31.5	20	32.3	4	12.5	3	50.0	75
> 1.0	11	12.1	17	15.3	21	33.9	18	56.3	1	16.7	68
Total	91	100	111	100	62	100	32	100	6	100	302

Table 4.52.

Income Status and Size of Holding (Ayacut Farms)

Size of holding (ha)	Income group										Total
	<5000		5000 - 20000		20000 - 50000		50000 - 100000		>100000		
	No	%	No	%	No	%	No	%	No	%	
≤ 0.25	18	29.5	13	17.3	3	7.0	3	17.6	-	-	37
0.25-0.5	29	47.5	34	45.3	14	32.6	2	11.8	1	20.0	80
0.5-1.0	8	13.1	20	26.7	11	25.6	2	11.8	3	60.0	44
> 1.0	6	9.8	8	10.7	15	34.9	10	58.8	1	20.0	40
Total	61	100	75	100	43	100	17	100	5	100	201

Table 4.53.

Income Status and Size of Holding (Non-ayacut Farms)

Size of holding (ha)	Income group										Total
	<5000		5000 - 20000		20000 - 50000		50000 - 100000		>100000		
	No	%	No	%	No	%	No	%	No	%	
≤ 0.25	10	33.3	7	19.4	-	-	-	-	-	-	17
0.25-0.5	10	33.3	5	13.9	4	21.1	5	33.3	1	100	25
0.5-1.0	5	16.7	15	41.7	9	47.4	2	13.3	-	-	31
> 1.0	5	16.7	9	25.0	6	31.6	8	53.3	-	-	28
Total	30	100	36	100	19	100	15	100	1	100	101

Table 4.54.

Income Status and Occupation (General)

Occupation	Income group										Total
	<5000		5000 - 20000		20000 - 50000		50000 - 100000		>100000		
	No	%	No	%	No	%	No	%	No	%	
Agriculture as only occupation	78	33.5	83	35.6	49	21.0	19	8.2	4	1.7	233
Agriculture as main occupation	8	21.1	17	44.7	4	10.5	9	23.7	-	-	38
Agriculture as subsidiary occupation	5	16.13	11	35.48	9	29.03	4	12.9	2	6.45	31
Total	91	30.1	111	36.8	62	20.5	32	10.6	6	2.0	302

Table 4.47 shows that, average size of holding in the first category of farmers taking agriculture as the main occupation was 0.852 and it was 2.4 to those who take agriculture as subsidiary occupation. This shows that small size of holding is the real problem, faced by the paddy farmers, both in Ayacut and non-ayacut areas. This

may be considered as an important factor, responsible for increasing cost of cultivation of paddy.

j. Source of Irrigation

The source-wise data of irrigation in the sample blocks is given in Table 4.55, which shows the inadequacy of private source of water for irrigating agricultural land. 171 farm households had public source of irrigation whereas only 26 farm households depend on private sources for irrigation. The disparity in irrigation is made clearer when Ayacut and non-ayacut area and its source of irrigation are taken separately. Non-ayacut area depends on private sources of irrigation and that too within constraints. Ayacut areas get advantage of irrigation projects (major and minor) and Command Area Development Agency (Figure 4.4).

Table 4.55.

Source of Irrigation in Different Blocks

Block	Public		Private		Both		None		Total
	No	%	No	%	No	%	No	%	
Kollengode	31	91.2	-	-	3	8.8	-	-	34
Malampuzha	37	56.1	4	6.1	19	28.8	6	9.1	66
Palakkad	48	98.0	-	-	1	2.0	-	-	49
Kozhalmannam	32	61.5	-	-	4	7.7	16	30.8	52
Ayacut	**148**	**73.6**	**4**	**2.0**	**27**	**13.4**	**22**	**10.9**	**34**
Ottapalam	11	29.7	2	5.4	12	32.4	12	32.4	37
Pattambi	12	18.8	20	31.3	10	15.6	22	34.4	64
Non-ayacut	**23**	**22.8**	**22**	**21.8**	**22**	**21.8**	**34**	**33.7**	**66**
Total	171	56.6	26	8.6	49	16.2	56	18.5	302

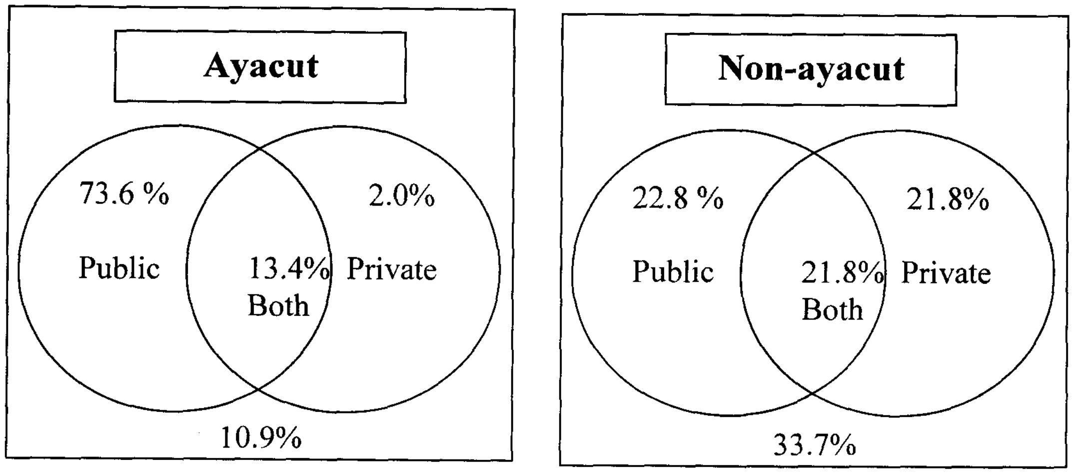


Figure 4.4. Venn Diagram Showing the Source of Irrigation in Ayacut and Non-ayacut Farms

Ground water in the sample blocks is mainly developed by means of dug wells and bore wells. There is good demand for bore wells in non-ayacut areas of Ottapalam and Pattambi Taluks. Though the study area is having, a good net work of surface water irrigation system. Some pockets of the area, experience scarcity of irrigation water, especially in summer season.

h. Subsidy

Average subsidy per hectare received by farm households, is presented in Table 4.56. The incentives in the form of bonus and subsidy, given to paddy farmers vary in different blocks.

Table 4.56.

Average Subsidy per Hectare Received per Hectare

Block	Average subsidy
Kollengode	2944.14
Malampuzha	1899.57
Palakkad	1014.76
Kozhalmannam	4062.67
Ayacut	**2420.17**
Ottapalam	1543.10
Pattambi	1127.045
Non-ayacut	**1279.46**
Total	2038.68

The paddy farmers of the Eastern blocks enjoy more benefit, since each and every farm household is carrying on farm operations through Padasekhara Nellulpadana Samithies. The functions of these PNS are not efficient in Western blocks of the study area and this is reflected in the farm operations and finally cost of cultivation of paddy.

CHAPTER V

COST OF CULTIVATION AND ECONOMICS OF PADDY CULTIVATION IN PALAKKAD DISTRICT

CHAPTER V

COST OF CULTIVATION AND ECONOMICS OF PADDY CULTIVATION IN PALAKKAD DISTRICT

In this chapter an attempt has been made to work out the cost and income from paddy cultivation and its alternate crops in the study area. The chapter is divided into three sections. Section one deals with the cost analysis. Section two shows the economics of paddy cultivation. The relative profitability of paddy compared to alternate crops cultivated in the converted wet land is examined in section three.

5.1. Cost Analysis

Concepts of cost used in the study have been discussed in Chapter 2. The cost per hectare is divided into two parts, namely, variable and fixed for the purpose of analysis. The variable cost is more sensitive to changes in the agricultural sector in technology, input and output prices etc. The fixed cost is not based on the size of operational unit while the variable cost depends on the size of unit. It is the variable cost which mostly enters into the decision making process regarding the allocation of resources.

5.1.1. Variable Cost

The major items coming under variable cost are human labour, machine/bullock labour[1], seed, irrigation, lime[2], manures, fertilizers, pesticides, transportation and interest on working capital. The average quantity of major inputs such as human labour, machine labour, seed, fertilizers and manures are given in Table 5.1. The variable cost per hectare is worked out using these physical quantities

[1] Application of bullock labour for land preparation is negligible in the study area.
[2] Lime is used only by a few selected farmers and so it is not included in the cost element

of inputs by multiplying their respective prices. The average cost per hectare of major inputs and total variable cost for different blocks and for Ayacut and Non-ayacut separately are given in Table 5.2.

Table 5.1.

Average per Hectare Quantum of Input

Block	Seed (Kg)	Ploughing (Hrs)	Manure (Kg)	Fertilizer (Kg)	Pesticides (Kg)	Labour (Man Days)
Kollengode	106.83	6.50	261.86	103.69	0.72	54.15
Malampuzha	103.69	10.88	160.77	132.73	1.21	145.36
Palakkad	72.45	2.70	110.19	145.42	1.31	65.52
Kozhalmannam	97.49	8.35	245.24	124.37	0.92	61.43
Ayacut	**94.65**	**7.50**	**184.25**	**129.49**	**1.09**	**90.22**
Ottapalam	116.95	12.70	137.22	142.82	1.65	67.94
Pattambi	136.35	13.34	185.91	144.17	1.75	91.91
Non-ayacut	**129.47**	**13.11**	**168.65**	**143.69**	**1.27**	**83.41**
All farms	107.24	9.16	179.70	133.63	1.72	88.24

Table 5.2.

Average Variable Cost per Hectare: Block-wise (in Rupees)

Block	Items						
	Seed	Ploughing	Manure	Fertilizer	Pesticides	Labour	Total
Kollengode	1388.8 (8.02)	1949.9 (11.26)	4713.5 (27.23)	1866.4 (10.78)	625.1 (3.61)	6768.3 (39.10)	17311.9 (100)
Malampuzha	1348.0 (4.63)	3262.7 (11.21)	2893.9 (9.94)	2389.1 (8.21)	1044.2 (3.59)	18169.5 (62.42)	29107.2 (100)
Palakkad	941.9 (6.01)	809.3 (5.16)	1983.5 (12.65)	2617.6 (16.70)	1134.5 (7.24)	8190.4 (52.24)	15677.1 (100)
Kozhalmannam	1267.4 (6.71)	2505.1 (13.26)	4414.4 (23.36)	2238.7 (11.85)	793.3 (4.20)	7678.6 (40.63)	18897.4 (100)
Ayacut	**1230.4** **(5.76)**	**2248.9** **(10.54)**	**3316.5** **(15.54)**	**2330.8** **(10.92)**	**941.2** **(4.41)**	**11278.0** **(52.83)**	**21345.7** **(100)**
Ottapalam	1286.4 (8.6)	3683.2 (14.7)	2470.0 (9.9)	2570.7 (14.8)	1428.1 (5.1)	8492.0 (47.0)	19930.4 (100)
Pattambi	1499.8 (6.45)	3868.2 (18.48)	3346.3 (12.39)	2595.0 (12.90)	1516.2 (7.17)	11488.6 (42.61)	24314.1 (100)
Non-ayacut	**1424.2** **(6.26)**	**3802.6** **(16.71)**	**3035.7** **(13.34)**	**2586.4** **(11.36)**	**1485.0** **(6.52)**	**10426.5** **(45.81)**	**22760.4** **(100)**
All Farms	1286.9 (6.17)	2701.8 (15.91)	3234.6 (13.76)	2405.3 (10.67)	1099.7 (6.24)	11029.7 (47.25)	21758.1 (100)

Note: Values in the brackets are the percentages to total variable cost within a block

5.1.1.1. Cost on Human Labour

The largest single item of cost in the cultivation of paddy was found to be human labour. The expenses on sowing, transplanting, weeding, spraying of insecticides, harvesting, threshing, winnowing and drying are included under the cost of human labour. The expenditure on weeding, transplantation, harvesting and threshing constitutes the major portion of expenditure on human labour. Human labour was found to be predominantly wage labour and in cases where family labour was used, their wages were imputed at the rates prevailing in the village during the relevant periods.

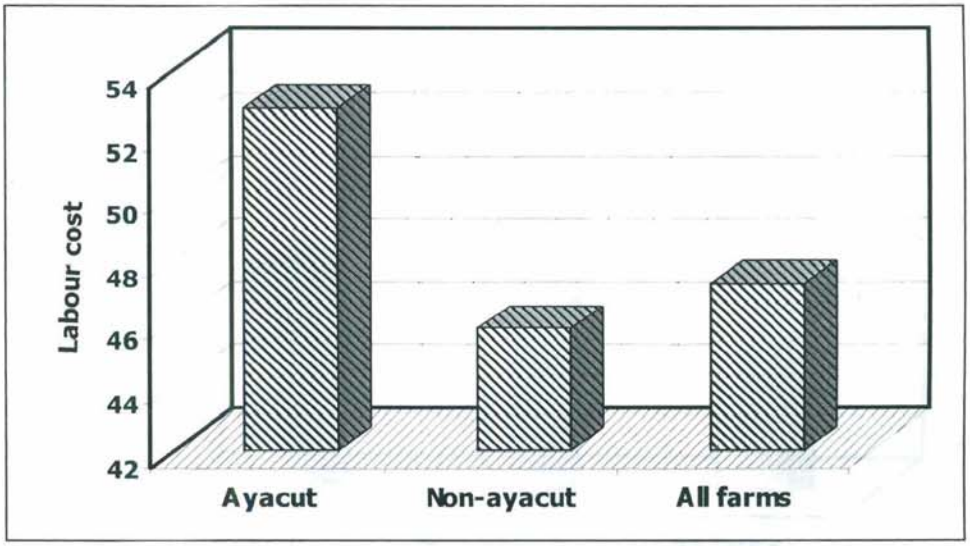


Figure 5.1. Percentage of Labour Cost to Total Variable Cost in Ayacut and Non-ayacut Farms

The cultivators in the sample farms have mostly used hired labour. The use of family labour is on the decline. Apart from wages, the labourers used to get customary payments in the form of cloths, food materials etc., from the cultivators[3]. The average man days required for farm operations in the Ayacut farms came to 90.22 where as it was 83.41 in Non-ayacut farms (Table 5.1.).

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[3] The wage paid by the cultivators ranges from Rs. 100-120 for a male labour and Rs. 50-60 for a female labour in the ayacut area. In the Non-ayacut area, the wage rate ranges from Rs. 150-175 for a male labourer and Rs. 75-90 for a female labourer.

The average expenditure on human labour amounted to Rs. 11278.00 for Ayacut as against Rs. 10426.50 for Non-ayacut farms. The percentage cost on human labour to total variable cost of Ayacut farms was 52.83 as against 45.81 in Non-ayacut farms (Table 5.2).

5.1.1.2. Machine Labour

Machine labour is engaged mainly for soil preparation which can be carried out either by using animal labour or tiller/ tractor. The method of ploughing was mechanical in both systems of farming. Traditional methods of ploughing did not exist in the areas under consideration during the period.

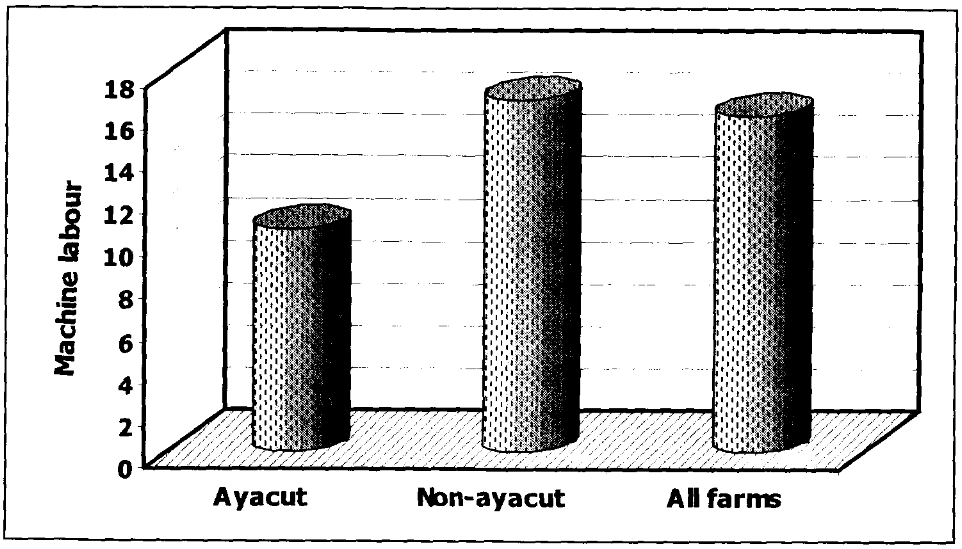

Figure 5.2. Percentage of Machine Labour to Total Variable Cost in Ayacut and Non-ayacut Farms

Next to labour, tractor/tiller ploughing constitutes the lion share of the total cost of cultivation. The cost on ploughing includes the hiring charges paid for tractor/tiller which comes about the range of Rs. 200-300 per hour. Machinery was found to be hired by the respondents either from PNS or from private individuals. On an average, Ayacut farms used 7.50 hours per hectare for ploughing as against 13.11 hours by Non-ayacut farms. The cost incurred on this item came to about Rs. 2248.9 per hectare for Ayacut farms while it was Rs. 3802.6 for Non-ayacut farms (Table 5.2). In terms of percentage, the cost of machine labour was 10.54 and 16.71

for Ayacut and Non-ayacut farms respectively. The expenditure on this item is higher in Non-ayacut farms due to the lack of functioning efficiency of PNS.

5.1.1.3. Seed/Seedlings

Generally, the cultivators in the study area themselves prepared the seed just after harvesting and stocked it for cultivation in the next season. Except a few, all paddy farmers had their own seeds for cultivation. There was no uniformity with regard to seed material used. While in some farms in the study area, seeds were broadcasted and in the other farms transplanting was adopted. In some cases where seedlings were used, they were purchased and not raised by the farmer concerned. Hence the cost of seed materials was found to vary considerably among the different farms. As a whole, in the sample farms in Ayacut area, 35 varieties are cultivated during Virippu and Mundakan. Of these Kanchana, Kunjukunju, ASD 16, Aiswarya, Kanakam, Uma, Pavizham, Swarnaprapha, Sulochana, Matta Ponni and Ponmani occupy the maximum area. In the Non-ayacut area many farmers are cultivating traditional varieties like Aryan, Chenkayama etc. It is generally an accepted standard that one hectare of land requires 125 kg of seeds for sowing and 75 kg for transplanting. In our sample farms, 129.47 kg of seeds were used in Non-ayacut and 94.65 kg seeds used in Ayacut. The prices of seeds of the Ayacut farms and Non-ayacut farms in the study area were Rs. 11 and Rs. 13 respectively. Both own and purchased seed are valued at market price. For Ayacut farms this item costs about Rs. 1230.4 and for Non-ayacut Rs. 1424.2 (Table 5.2).

5.1.1.4. Irrigation

Three fourth of the selected cultivators depend mainly on canal for irrigation. However, a few cultivators in the sample farms have used other sources of irrigation like wells, tanks, etc. The canal irrigation is cheaper compared to other types of irrigation. The cost for irrigation was found to be negligible in Ayacut farms since they are utilizing the canal sources whereas in Non-ayacut farms the cost of irrigation is slightly higher because they have to depend on private source of irrigation.

The per hectare cost of this item in Ayacut farms amounts to Rs. 62 which accounts for 0.29 % of total variable cost. The expenses on this item incurred by Non-ayacut farms are estimated to be Rs. 500 or 2.19 % of the total variable cost.

5.1.1.5. Manures and Fertilizers

In paddy cultivation scientific application of fertilizers and manures is an important aspect. The expenditure on these items constitutes the second largest item of cost. In general in the study area, the cultivators, irrespective of the varieties cultivated, apply more chemical fertilizers. The fertilizers are applied as per soil fertility map[4]. The paddy farmers in Ayacut farms cultivate 'daincha[5]'during the fallow season to reduce their dependence on organic manures from outside. The purchase and broadcasting of green manure seeds were arranged by the PNS which helps to reduce the cost of manure in Ayacut farms. But this facility is not widely accepted in the Non-ayacut sample farms. As a result they incur more cost towards this item. The farmers face a real shortage of organic manures/farm yard manures. Green manure, cow dung etc. are not available in most cases. For the estimation of costs, the organic manures and chemical fertilizers are valued at their respective market price. While as much as 57.35% of the farmers in the sample areas have used organic manure (Table 5.3) and 42.65 % of them have applied chemical fertilizers on their farms. On an average, Ayacut farms used 129.49 kilograms and Non-ayacut farms 143.69 kilograms of fertilizers (Table 5.1). The cost on this account amounts to Rs. 2330.8 for Ayacut farms as against Rs. 2586.4 for Non-ayacut farms[6] (Table 5.3).

[4] In July 1991, the administered prices of nitrogenous fertilizers were increased by 30% in accordance with the new Fertilizer Policy of the Union Government. The increase in the prices of phosphatic and pottasic fertilizers were in the tune of 250% from August 1992.The impact of these steep hike in fertilizer prices on paddy farmers, especially small and marginal farmers is indeed great which lead to a substantial increase in the cost of paddy farming in the study area also.

[5] Daincha is raised as a pure green manure crop in the summer rice fallow to serve as a source of green manure. Green manures obtained by engaging wage labour were evaluated on the basis of wage cost.

[6] The average per unit cost of N+P+K worked out to Rs. 18 for both ayacut and Non-ayacut farms

Table 5.3.

Block-wise Cost of Manures and Fertilizers (in Rs/ha)

Blocks	Organic manure		Fertilizer		Total cost
	Value	%	Value	%	
Kollengode	4713.464	71.63	1866.404	28.37	6579.869
Malampuzha	2893.855	54.78	2389.054	45.22	5282.909
Palakkad	1983.529	43.11	2617.563	56.89	4601.092
Kozhalmannam	4414.382	66.35	2238.681	33.65	6653.062
Ayacut	**3316.501**	**58.73**	**2330.836**	**41.27**	**5647.337**
Ottapalam	2469.972	49.00	2570.691	51.00	5040.662
Pattambi	3346.286	56.32	2595.021	43.68	5941.308
Non-ayacut	**3035.694**	**54.00**	**2586.398**	**46.00**	**5622.092**
Total	3234.642	57.35	2405.336	42.65	5639.978

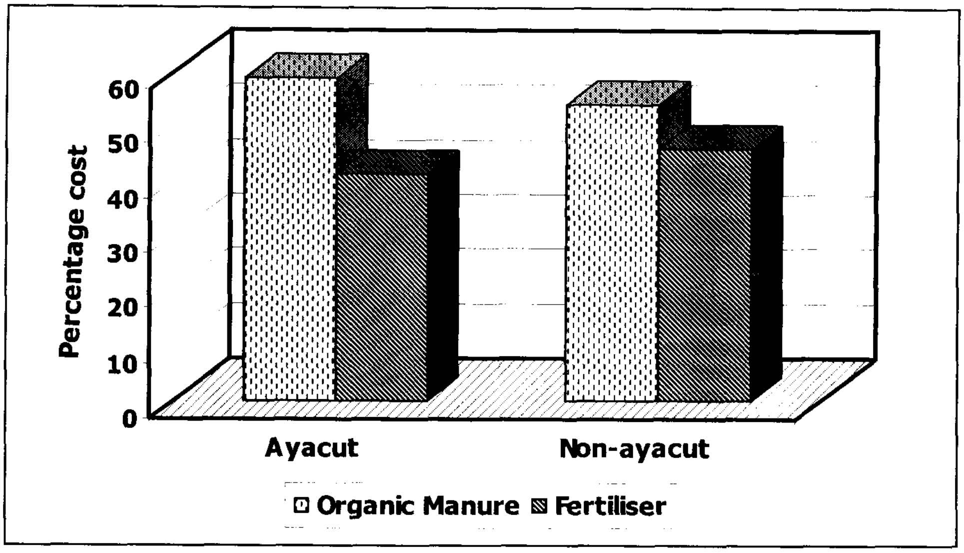

Figure 5.3. Percentage Cost of Organic Manure and Fertilizer to Total Manure Cost in Ayacut and Non-ayacut areas

The average quantity of organic manure applied in Ayacut and Non-ayacut farms comes to 184.25 kg and 168.65 kg respectively which accounts Rs. 3316.5 in Ayacut and Rs. 3035.7 in Non-ayacut. Likewise the average quantity of fertilizers used in Ayacut farms comes to 129.49 kg whereas it was 143.69 kg in Non-ayacut farms. The cost on this accounts to Rs. 2330.8 and 2586.4 in Ayacut and Non-ayacut farms respectively. On an average, the sample farms have spent Rs. 5639.97 towards manures and fertilizers altogether.

5.1.1.6. Plant Protection

Expenses on plant protection are another component of total material cost. Partly because of frequent occurrence of pests and partly due to soaring prices of pesticides, the cost on plant protection measures appears to have been increasing in the sample farms. Certain differences may be noticed on plant protection measures of Ayacut and Non-ayacut farms. The uniformity in sowing and use of seeds with same duration reduced the attack of pests and diseases in the Ayacut farms. Consequently, the cost on plant protection was very low (Rs.941.20), compared to that of Non-ayacut farms, which stood at Rs. 1485.00 per hectare (Table 5.2). The cost on this item accounts for less than 10 % of the total average cost, which amounts to Rs.1099.70. A higher cost is incurred on these items, due to the frequent occurrence of pests.

5.1.1.7. Transportation Cost and Interest on Working Capital.

The transportation cost, which is incurred mainly to carry inputs like manures and seeds, is not a very significant item, to all the farmers of the sample. Some farmers incur a reasonable amount on transportation, while others do not. The interior parts of the study area expended more for the transportation of organic manure to paddy fields.

The interest on working capital does not enter into the cost calculation of paddy cultivation in the study area, since it forms a negligible part.

5.1.1.8. Total Variable Cost

Item-wise average variable costs per hectare are given in Table 5.2. The average variable cost per hectare for all farmers is Rs. 21758.10. The average total variable cost per hectare works out to Rs.21345.70 for Ayacut farms and Rs.22760.40 for Non-ayacut farms, the latter being 6.2 % higher than the former. The excess cost incurred in the cultivation of Non-ayacut in the sample is contributed, in varying proportions, by items such as machine labour, fertilizers, pesticides and seed / seedlings. Of these the cost on machine labour and fertilizers are significantly higher in Non-ayacut farms. Conversely, on certain items such as labour and manures the Ayacut farms spend more amounts. The high cost on machine labour, fertilizers and plant protection measures is due to the low soil fertility and lower functioning efficiency of PNS in Non-ayacut farms. The low cost of machine labour in Ayacut sample farms is attributed to the effective functioning of PNS. The average quantum of manure in Ayacut farm is found to be higher than Non-ayacut farms due to the wide availability of green plant manures (daincha) (Table 5.1.). The Non-ayacut farms use more fertilizers to compensate the low dosage of green manures in their farms.

5.1.2. Fixed Costs

Items normally included under the category of fixed costs are, land revenue/ tax, rent and depreciation on farm buildings, machinery, equipments and implements. A few paddy farmers have reported renting in of land for paddy cultivation and the average rent per hectare was Rs.19760.00.Out of a total area of 296.15 hectares spread over the 302 sample farms randomly selected in the six blocks under study, only a very small area of 2.5 hectares was rented like this. This cost has also been taken into account for working out the cost of cultivation in those respective farms.

The basic land revenue charged from the cultivators amount to Rs.98.80 per hectare. There were no farm buildings mainly or exclusively used for agriculture purposes, in the sample. Few of the farmers owned machinery. Hence in the item fixed cost, land revenue and rent of land are included.

5.1.3. Total Cost of Cultivation per Hectare

Table 5.4 presents the detailed information on the average cost of cultivation which comprises both variable and fixed costs.

Table 5.4.

Average Cost of Cultivation per Hectare in Ayacut and Non-ayacut Farms (in Rupees)

Blocks	Variable cost	Fixed cost	Total cost
Kollengode	17311.9	1086.2	18398.10
Malampuzha	29107.2	1634.8	30742.00
Palakkad	15677.1	967.1	16644.20
Kozhalmannam	18897.4	1042.8	19940.20
Ayacut	**21345.7**	**1233.5**	**22579.20**
Ottapalam	19930.4	1428.4	21358.80
Pattambi	24314.1	2665.7	26979.80
Non-ayacut	**22760.4**	**2227.2**	**24987.60**
All farms	21758.1	1523.2	23281.30

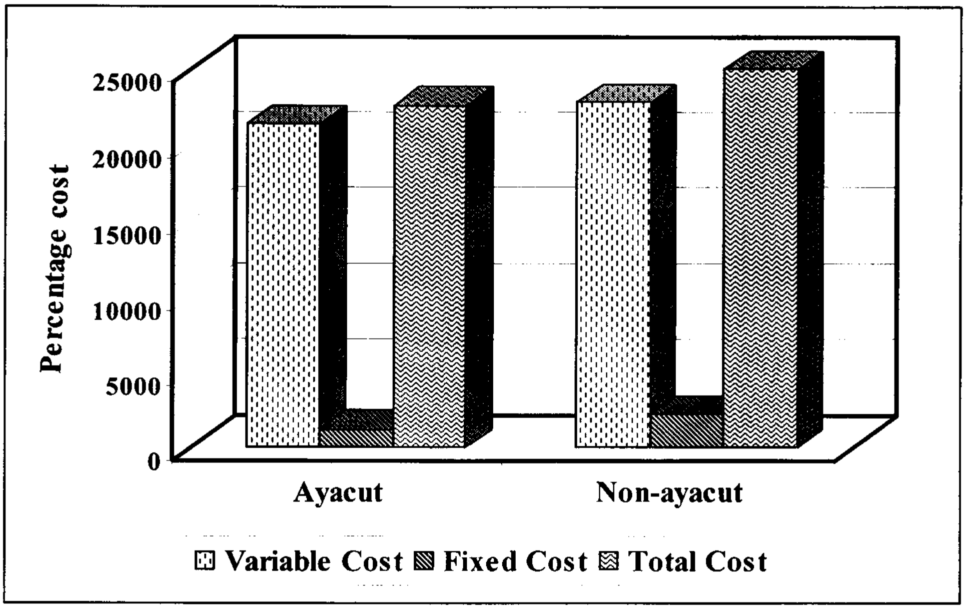

Figure 5.4. Variable Cost, Fixed Cost and Total Cost in Ayacut and Non-ayacut Farms

The table reveals a high degree of variation in total cost of paddy cultivation among the blocks and also between Ayacut and Non-ayacut farms. The cost of cultivation on Non-ayacut farms is higher than that of Ayacut farms, the cost being Rs. 22579.2 for Non-ayacut farms and Rs. 24987.6 for Ayacut farms respectively. On an average, Non-ayacut farms incurred 10.67 per cent more cost than the Ayacut farms.

5.1.4. Relation Between Total Cost and the Cost of Individual Items

Multiple regression equations were fitted with total cost as dependent variable and Labour cost, Cost of organic manure, Cost for Plant protect, Machine labour, Cost of inorganic fertilizer and seed cost as independent variables. Stepwise regression method was used for estimation. The results of fitted equations in Ayacut and Non-ayacut farms are given in Table 5.5 and stepwise adjusted R^2 computed while adding each variable in the model are given in Table 5.6. In the stepwise method only those variable which significantly affect the total cost are come into the model.

Table 5.5.

Regression Equation Fitted for Ayacut and Non-ayacut Farms

Farms	Equation fitted
Ayacut farms	Y = 1428.63 + 0.995 X_1 + 1.068 X2 + 1.249 X3 + 1.356X4 + 0.926 X5
Non-ayacut farms	Y = -649.463 + 1.122 X_1 + 1.167 X2 + 1.254 X3 + 1.440X4 + 1.18 X5

Y = Total cost; X_1 = Labour cost; X_2 = Cost of organic manure; X_3 = Cost for Plant protection; X_4 = Machine labour; X_1 = Cost of inorganic fertilizer;

Table 5.6.

Stepwise Adjusted R^2 Computed while Adding Variable in Each Step

Farms	Model	Adjusted R^2	Deviation in Adjusted R^2
Ayacut Farms	Labour cost	0.815	
	Labour cost, Cost of organic manure	0.906	0.091
	Labour cost, Cost of organic manure, Cost for Plant protection	0.945	0.039
	Labour cost, Cost of organic manure, Cost for Plant protection, Machine labour	0.964	0.019
	Labour cost, Cost of organic manure, Cost for Plant protection, Machine labour, Cost of inorganic fertilizer	0.971	0.007
Non-ayacut Farms	Labour cost	0.803	
	Labour cost, Cost for Plant protection	0.909	0.106
	Labour cost, Cost for Plant protection, Cost of organic manure	0.933	0.024
	Labour cost, Cost for Plant protection, Cost of organic manure, Machine labour	0.96	0.027
	Labour cost, Cost for Plant protection, Cost of organic manure, Machine labour, Cost of inorganic fertilizer	0.968	0.008

A table 5.6 show that Labour cost is the most significant variable which comes first in the model in the Ayacut and Non-ayacut farms. In both farms it explains greater than 80 per cent variation in the total cost. Next comes cost of organic manure and third comes the cost of plant protection in Ayacut farms. But in Non-ayacut farms Plant protection cost comes second and cost of organic manure comes third. In both the farms fourth and fifth comes machine labour and cost of inorganic manure. In both cases, all these five factors explains about 97 per cent of the variation in total cost.

5.2. Economics of Paddy Cultivation

The data presented thus far in this Chapter provide with information on cost of production of paddy in sample farms. To assess the economics of paddy cultivation, costs have to be related to the returns. Both gross income and net income are estimated. The Gross income is defined as the value of both paddy and straw. The Net income is the gross income minus cost of cultivation.

5.2.1. Gross and Net Income per Hectare

Table 5.7 gives the details of Per Hectare Yield, Value of Paddy and Straw and Gross Income and Net Income (Block- wise).

The table gives the yield of paddy obtained by farmers excluding the wages paid in kind for harvesting. Among the farms, those in the Non-ayacut areas (47.14 Quintal) were found to show a much higher yield per hectare than those in the Ayacut farms (41.93 Quintal). The highest yield was recorded at Pattambi (50.39 Quintal) and the lowest at Kollengode (34.13 Quintal).

The value of gross output from a hectare of paddy cultivated is given in the Table 5.7. For calculating this value, paddy and straw have been evaluated at the prices which prevailed in the villages in the post-harvest period.

Table 5.7.

Per Hectare Yield, Value of Paddy and Straw and Gross Income and Net income (Block-wise)

Blocks	Yield (Quintal)	Value of Paddy (Rs.)	Value of Straw (Rs.)	Gross Income (Rs.)	Average Total cost = Average Variable cost + Average Fixed cost (Rs.)	Net income (Rs.)
Kollengode	34.13	22182.5	2772.6	24955.1	18398.10	6557.0
Malampuzha	42.31	27503.5	6081.7	33585.2	30742.00	2843.2
Palakkad	48.24	31357.1	4370.1	35727.2	16644.20	19083.0
Kozhalmannam	35.76	23240.9	3205.6	26446.5	19940.20	6506.3
Ayacut	**41.93**	**27256.3**	**4426.1**	**31682.4**	**22579.20**	**9103.2**
Ottapalam	41.24	26803.0	3817.0	30620.0	21358.80	9261.2
Pattambi	50.39	32750.8	4710.4	37461.2	26979.80	10481.4
Non- ayacut	**47.14**	**30642.7**	**4393.8**	**35036.5**	**24987.60**	**10048.9**
All Farms	42.76	27791.0	4416.6	32207.6	23281.30	8926.3

For the Ayacut farms the gross value of output of paddy was Rs.27256.30, the highest was in Palakkad (Rs. 31357.1), followed by Malampuzha (Rs. 27503.5). The value of output of paddy was lowest in Kollengode (Rs.22182.5). For Non-ayacut farms value of output of paddy was Rs.30642.7, the highest income was obtained at Pattambi (Rs.32750.80), followed by Ottapalam (Rs.26803.00). The return in Non-ayacut farm was 12.42 per cent more than that of Ayacut.

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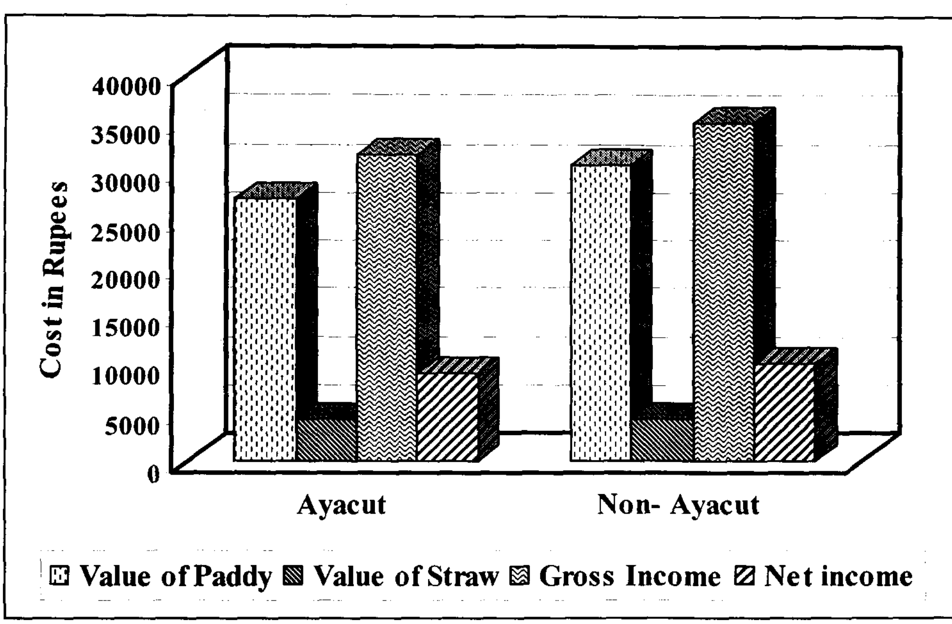

Figure 5.5. Value of Paddy and Straw, Gross Income and Net income in Ayacut and Non- ayacut Farms

The straw is used as cattle food and manure. There is a good deal of heterogeneity in reporting the quantities of straw produced. Hence straw is evaluated on the basis of prices which prevailed in the villages in terms of the physical units reported immediately after the harvest. The variations in the income from straw are on account of the differences in price and recovery. For Ayacut farms, income from straw was highest in Malampuzha (Rs. 6081.7), while in Palakkad it was Rs.4370.1 and in Kozhalmannam and Kollengode it was Rs. 3205.6 and Rs. 2772.6 respectively. The revenue for Non-ayacut farm stood at Rs.4393.80, highest in Pattambi (Rs.4710.40), followed by Ottapalam (Rs.3817.00). The average per hectare income from straw for all farms was Rs.4416.60. Thus the gross income per hectare works out to Rs. 31682.4 for Ayacut and Rs. 35036.5 for Non-ayacut. This means that the gross income from Non-ayacut farm is about 10.59 per cent higher than that of gross income from Ayacut farms. The highest gross income in Ayacut farms was in Palakkad (Rs.35727.2) followed by Malampuzha (Rs.33585.2). The lowest gross income was in Kollengode (Rs.24955.1) followed by Kozhalmannam (Rs.26446.5). For Non-ayacut farms, the gross income was the highest at Pattambi (Rs.37461.2), followed by Ottapalam (Rs.30620.0).

Table 5.7 provides data on estimated net income per hectare from Ayacut and Non-ayacut farms under study. In terms of net income, there is a margin of profit enjoyed by Non-ayacut farms over Ayacut farms. It amounts to Rs.9103.2 for Ayacut farms as against Rs. 10048.9 for Non-ayacut.

5.2.2. Cost – Benefit Analysis

In order to pursue an economic activity, one has to compare costs and its returns. Cost-benefit ratio gives the return per rupee invested on cultivation. The cost-benefit ratios for Ayacut and Non-ayacut farms are presented in Table 5.8. Both for Ayacut and Non-ayacut, the cost-benefit ratios are more than one in all blocks.

Table 5.8.

Cost-Benefit Ratio (Block-wise)

Block	Benefit - Cost ratio
Kollengode	1.36
Malampuzha	1.09
Palakkad	2.15
Kozhalmannam	1.33
Ayacut	**1.37**
Ottapalam	1.43
Pattambi	1.39
Non-ayacut	**1.40**
All farms	1.38

5.2.3. Cost of Production of Paddy per Quintal

An attempt is made here to work out the cost of production per quintal of paddy. This is a crude measure of the efficiency of cultivation. The cost of production of paddy per quintal in the Ayacut and Non-ayacut farms are given in Table 5.9.

Cost of production of paddy per quintal is worked out by deducting the value of straw from total cost of cultivation. Total cost of production of paddy per quintal in different blocks shows that it was lower for the Non-ayacut compared to Ayacut in all the areas. But the lowest cost of production per quintal was recorded in Palakkad at Rs. 254.4. This was due to the use of high yielding seeds used in Ayacut farms.

Table 5.9.

Cost of Production per Quintal of Grain (Size-wise and Block-wise) (in Rs/ha)

Blocks	Holding size in ha				All farms
	Class 1 (0-0.25)	Class II (0.25-0.50)	Class III (0.50-1.0)	Class IV (Above 1ha)	
Kollengode	762.5	459.9	419.8	414.5	457.9
Malampuzha	477.3	618.8	614.9	612.7	582.8
Palakkad	255.7	286.0	251.2	188.4	254.4
Kozhalmannam	398.1	503.1	451.4	452.7	468.0
Ayacut	**377.2**	**472.0**	**452.0**	**457.5**	**443.3**
Ottapalam	428.0	467.0	394.5	422.5	425.4
Pattambi	611.3	314.7	546.0	375.1	442.0
Non-ayacut	**545.9**	**356.5**	**478.9**	**381.1**	**436.8**
All Farms	430.0	440.6	462.1	429.6	441.2

5.3. Relative Profitability of Paddy Compared to Alternate Crops

Farm level acreage allocation decisions can be better explained by comparing the profitability of different competing crops in which changes in costs are equally important as the changes in the farm prices of products. In this section in order to explain the conversion of paddy fields for the cultivation of alternate crops, profitability of paddy crop is compared with the profitability of four of its competing crops namely coconut, tapioca, banana and mixed crops.

5.3.1. Relative Profit and Profitability of Paddy and Coconut crops

Total area under paddy constitutes 28.4 % of the total agricultural area in the sample blocks and total area of coconut constitutes 3.72 % of the total area in the sample blocks.

Table 5.10.

Cost of Cultivation, Income and Percentage of Labour Cost of Coconut, Plantain, Tapioca and Mixed Crops (Block-wise)
(In Rs. /ha)

Block	Item	Coconut	Plantain	Tapioca	Mixed
Kollengode	Labour cost (LC)	-	62500.00	36250.00	28612.43
	Total cost (TC)	-	132187.50	55750.00	112647.30
	% of LC to TC	-	47.28	65.02	25.40
	Value of the product	-	262500.00	92000.00	161575.10
Malampuzha	Labour cost	-	-	-	29562.53
	Total cost	-	-	-	100143.50
	% of LC to TC	-	-	-	29.52
	Value of the product	-	-	-	148254.20
Palakkad	Labour cost	-	-	-	29503.40
	Total cost	-	-	-	100143.50
	% of LC to TC	-	-		29.46
	Value of the product	-	-	-	147264.30
Kozhalmannam	Labour cost	4590.20	62500.00	36250.00	30043.61
	Total cost	15560.00	132187.50	55750.00	87639.55
	% of LC to TC	29.50	47.28	65.02	34.28
	Value of the product	26701.85	262500.00	92000.00	134933.40
Ottapalam	Labour cost	5670.19	37500.00	5866.77	11198.35
	Total cost	17500.60	71455.96	22502.57	24217.27
	% of LC to TC	32.40	52.48	26.07	46.24
	Value of the product	26701.85	159791.50	38753.09	47162.79
Pattambi	Labour cost	6953.74	3500.00	-	4641.43
	Total cost	18873.80	64287.04	-	15190.22
	% of LC to TC	36.84	5.44	-	30.56
	Value of the product	26701.85	76566.36	-	22629.18
All farms	Labour cost	5738.04	41500.00	26122.26	22260.29
	Total cost	17311.47	100029.50	44667.52	73330.21
	% of LC to TC	33.15	41.49	58.48	30.36
	Value of the product	26701.85	190339.50	74251.03	110303.20

Table 5.11.

Per Hectare Profits (in Rs) and Profitability of Paddy, Coconut Plantain, Tapioca, and Mixed crops (Block-wise)

Block	Item	Paddy	Coconut	Plantain	Tapioca	Mixed
Kollengode	Profit	3784.3	0	130312.5	36250.0	48927.72
	Profitability	20.57	-	98.6	65.02	43.43
	% difference in profit from paddy	-	-	**3343.503**	**857.905**	**1192.915**
Malampuzha	Profit	-3238.6	0	0	0	48110.78
	Profitability	-10.53	-	-	-	48.04
	% difference in profit from paddy	-	-	-	-	**1585.5**
Palakkad	Profit	14712.8	0	0	0	47120.8
	Profitability	88.40	-	-	-	47.05
	% difference in profit from paddy	-	-	-	-	**220.271**
Kozhalmannam	Profit	3300.7	11141.9	130312.5	36250.0	47293.84
	Profitability	16.55	71.6	98.6	65.02	53.96
	% difference in profit from paddy	-	**237.56**	**3848.03**	**998.252**	**1332.84**
Ottapalam	Profit	5444.1	9201.3	88335.5	16250.52	22945.52
	Profitability	25.49	52.6	123.6	72.22	94.75
	% difference in profit from paddy	-	**69.01**	**1522.59**	**198.50**	**321.47**
Pattambi	Profit	5770.9	7828.1	12279.3	0	7438.96
	Profitability	21.39	41.5	19.1	-	48.97
	% difference in profit from paddy	-	**35.647**	**112.78**	-	**28.9047**
All farms	Profit	4509.7	9390.4	90310.0	29583.5	36973.0
	Profitability	19.37	54.2	90.3	66.2	50.4
	% difference in profit from paddy	-	**108.23**	**1902.57**	**556.00**	**719.85**

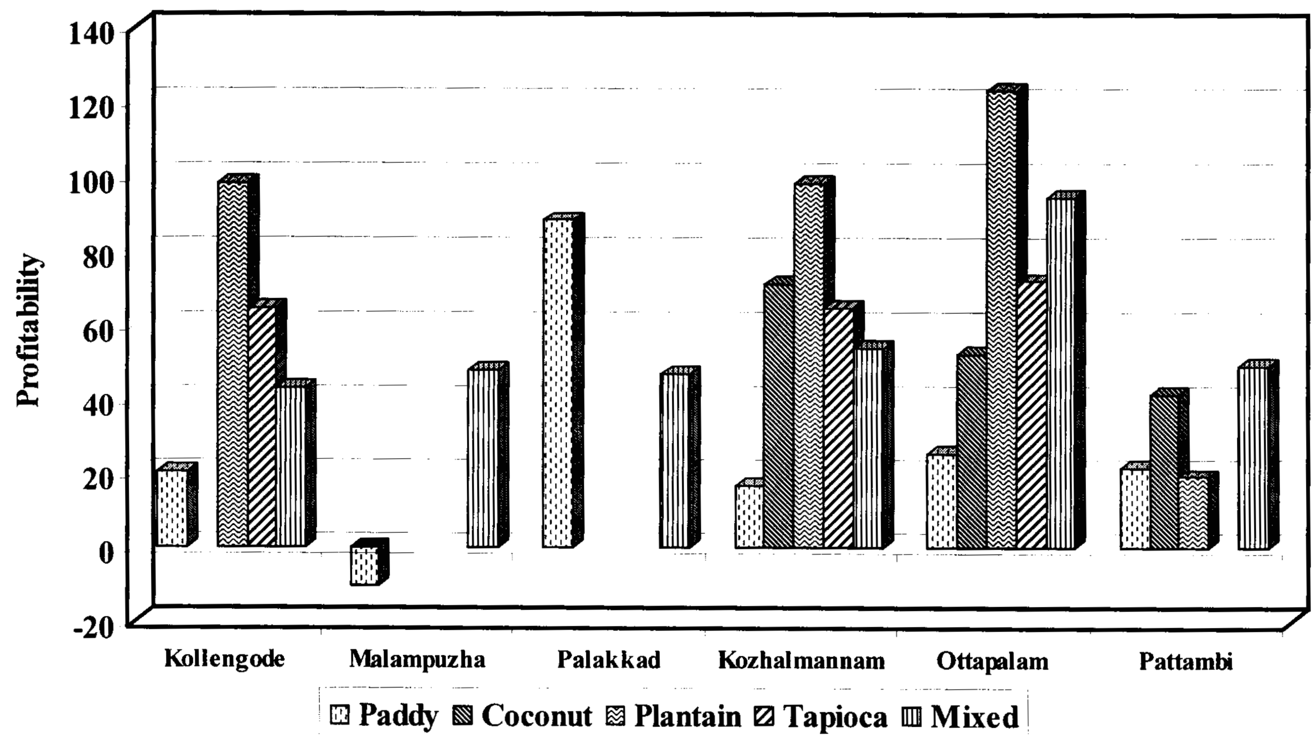

Figure 5.6. Profitability of Paddy, Coconut Plantain, Tapioca, and Mixed crops (Block-wise)

The average total cost of cultivation of coconut in the area under study comes to Rs. 17311.47 (Table 5.10). Since labour is the major input used in the production of paddy and coconut, percentage of labour cost to total cost is taken into consideration for our analysis. Labour cost constitutes 33.15 % of total cost involved in the coconut cultivation. Average annual labour cost in coconut cultivation was Rs. 5738.04 per hectare. The labour cost of coconut cultivation is found to be higher in Pattambi Block.

Since the net yield and price of coconut are insignificant in different Blocks, the value of output is same in all blocks as Rs.26701.85 (Table 5.10).

On an average, per hectare profit from coconut garden was Rs. 9390.4 which is 108.23 % higher than that of paddy fields. Similarly profitability of coconut crop on an average is found to be 54.2 per cent higher that that of paddy crop (19.37 %). While paddy farmers in the sample received only Rs. 19.37 as profit for every hundred rupees they had spent on cost, coconut farmers were able to get Rs. 54.20 for equal amount of cost. Thus both in terms of absolute per hectare profit and per hectare profitability, coconut farming is found to be more attractive than paddy cultivation (Table 5.11).

5.3.2. Per Hectare Profit and Profitability of Tapioca Compared to Paddy

Tapioca occupied 0.03 per cent (48.71 hectares) of the total cropped area in the study area.

The total cost of cultivation of tapioca comes to Rs. 44667.52. Labour cost which is the major cost item alone constitutes 58.48 per cent of the total cost involved in tapioca cultivation. Average cost of labour is estimated to be Rs. 26122.26.

Average per hectare income from tapioca was found to be Rs. 74251.03.and it was found to be higher in Ayacut farms.

Average annual profit of tapioca per hectare was Rs. 29583.5, which is 556 per cent higher than that of paddy crops. Profitability is also found to be higher than paddy in tapioca cultivation (66.23 %). While tapioca farmers on an average earned Rs. 66.23 as profits for every hundred rupees they had spent as cultivation costs, paddy farmers on an average received only Rs.19.37 as profit on equal amount of cost. Thus the present analysis shows that both in terms of per hectare profit and profitability, tapioca is better placed than paddy.

5.3.3. Per Hectare Profit and Profitability of Plantain Compared to Paddy

Area under plantain including banana constitute 0.14 per cent (201.84 hectares) of the total cropped area in the sample blocks.

The total cost of cultivation of plantain comes to Rs. 100029.50. Cost on labour is estimated to Rs. 41500.00, which is 41.49 per cent of the total cost of cultivation.

Per hectare income from plantain cultivation on an average was Rs. 190339.50. It is found to be lower in Pattambi block due to constraints in irrigation facilities.

Compared to paddy crop, plantain cultivation is found to be more profitable in all blocks. During the period of the present analysis, the average annual per hectare profit, from plantain and paddy crops are found to be Rs. 90310.0 and Rs. 4509.7 respectively. Thus on an average per hectare profit of plantain crop was nearly 1902.57 per cent higher than that of paddy. On an average, while plantain cultivation obtained annual profit of Rs. 90.28, for every hundred rupees they had spent as cultivation cost, profit earnings of paddy farmers for an equal amount of cost was only Rs.19.37

5.3.4. Per Hectare Profit and Profitability of Mixed crops Compared to Paddy

Mixed crops occupied 21.18 per cent (29930.53 hectares) of the total cropped area.

The total cost of cultivating mixed crops in sample farms was found to be Rs. 73330.21. Labour cost alone accounts for Rs. 22260.29, which is 30.36 per cent of the total cost.

On an average, the income from mixed crops per hectare was estimated to be Rs. 110303.20 and it is higher in Ayacut farms.

The average profit of mixed crop in sample farm works out to Rs. 36973.0 which is 50.42 per cent higher than paddy crop. Compared to paddy crop, mixed crop is found to be 719.85 per cent more profitable. On an average, while paddy farmers obtained Rs. 19.37 for each hundred rupees they spent for cost of cultivation, profit earnings of mixed crop for an equal amount of cost was Rs. 50.42.

To sum up, comparative analysis regarding the per hectare profit and profitability of paddy crop and four of its alternate crops namely Coconut, Tapioca, Plantain and Mixed crops invariably shows that paddy cultivation is relatively less remunerative for the farmers in the study area. Among the five crops profitability was found to be the highest for Plantain and lowest for paddy. While paddy farmers on an average got Rs. 19.37 only for every hundred rupees they had spent as cost of cultivation, their counterparts engaged in the cultivation of Coconut, Banana/Plantain, Tapioca and Mixed crops were able to get Rs. 54.24, Rs. 90.28, Rs. 66.23 and Rs. 50.42 respectively for an equal amount of cost during the survey period for paddy (Table 5.11)

The analysis made so far reveals the fact that economic rationality holds good in the case of paddy farmers in the study area and they always try to maximise profit from their land holdings. The extent of per hectare profit and profitability differences that exist between paddy and its alternate crops naturally induce paddy farmers to shift their land from the cultivation of paddy to more profit yielding crops. Farmers are found to maintain diversity of crops and the total income from mixed crops is found to be greater. However, the extent of conversion of paddy fields to alternate crops is often restricted by a number of constraints such as topography and texture of soil, initial investment required for conversion, gestation period of crops, and availability of inputs especially quality seeds etc. Whatever be the constraints, it is found in the study area that a large number of paddy farmers have converted considerable portion of land area once used for cultivation of paddy for the cultivation of vegetables, banana and tapioca. Wet land is being converted as coconut gardens with intercropping. Thus one of the prime causes for the conversion of paddy fields for the cultivation of alternate crops in the study area is comparative advantage of alternate crops over paddy in terms of profits and profitability.

CHAPTER VI

CAUSES AND CONSEQUENCES OF SHIFTING FROM PADDY

CHAPTER-VI

CAUSES AND CONSEQUENCES OF SHIFTING FROM PADDY

The causes and consequences of the shifting paddy cultivation resulting in the changes in crop pattern are so complex that it is difficult, if not impossible to classify and isolate individual factors. This chapter examines the reasons for a decline in area under paddy cultivation due to shifting from paddy to other crops and leaving the wet land fallow. Both economic and non economic factors of paddy cultivation or conversion of paddy land to non agricultural purposes are analysed. The second part is an attempt to find out the consequences of such shifting and fallowing.

6.1 CAUSES

Both economic and non-economic factors have played their role in reducing the area under paddy cultivation.

6.1.1 Economic Causes

Economic causes responsible for the decline in area under paddy as a result of shifting from paddy to other crops include price factors, labour problems, marketing problems and problems related to inputs.

6.1.1.1. Price Factors

During the short term period, the extent of area under any crop depends largely on the profitability of that crop while the long term area allocation is very much influenced by the expected profitability of competing crops. And this is also true in the case of paddy farmers of the sample size in the study area, (Palakkad District). In most of the paddy fields in the study area, two or more crops can be raised in a year. Even if paddy farmers are fairly sure of incurring losses during any particular season, they expect to get profits in other seasons. The cultivators may not give up paddy cultivation totally. Instead, they will restrict their farming only to the potential profit yielding seasons. On the other hand, if paddy farming is not profitable for all seasons, they will opt to keep their land as fallow for the time being. When prices and wages turn out to be unfavorable, the farmers may keep their land fallow for the current year. Thus a decline in area under paddy in the study area is accompanied by an increase in the area kept fallow.

When the prices of substitute crops of paddy turn out to be favourable or terms of trade becomes unfavourable to paddy, shifting of paddy cultivation takes place, followed by a decline in the area under paddy. This in turn influences agricultural prices. Thus one of the major factors that influence the choice of crops is the expected income from land. This depends on agricultural prices which influence the decisions of the farmers with regard to allocation of land and other resources among various crops. The relative prices of different crops have influenced the paddy farmers in the shifting of paddy to other crops. Table 6.1 gives an idea of the trend in farm prices of paddy and tapioca, banana and coconut in the sample farms during the period 1975 to 2004.

Table 6.1.

Price Change of Some Important Agricultural Products,

(1975-76 to 2003-04)

Variety	1975-76	1985-86	1995-96	2003-04	Price change
Paddy (Rs/Quintal)	182	241	547	650	2.57
Tapioca (Rs/kg)	0.40	0.89	2.50	6.25	14.63
Pulses (Rs/kg)	2.66	6.61	22.00	30.00	10.28
Coconut (Rs/100)	67	147	331.00	525	6.84
Rubber (Rs/Quintal)	994	1661	4874	7500	6.55
Banana Rs/kg	45	84.6	100-17	139.46	2.10

Source: Economic Review, 1975, 1995, Agriculture Hand book 1995, 1998.

When the price of paddy had grown up three times over the period from 1975 to 2004, other agricultural products had registered 4 to11 times increase instead. The price of vegetables and fruit crops also showed a steady increase. Of all the crops the rate of increase in the prices of paddy was the lowest. This disparity in the price of paddy made paddy cultivation unattractive and uneconomic. The relative advantage of price rise in crops other than paddy influenced the conversion of some paddy farms to coconut gardens, or to cultivate fruit crops and vegetables. This could reduce the insecurity among farmers caused by the fluctuation in the price of agricultural products. In order to spread the risk, the farmers diversified crops, preferring those crops that are expected to give a steady income. From experience, the farm households in the study area have found that in the long run tree crops are more reliable and useful responding favourably to manuring and irrigation. This is true in the case of Plantain and Vegetables. Paddy lands are being used to cultivate various other crops like Plantain, Arecanut, Vegetables and Coconut or even kept fallow. Many farmers prefer intercropping which provides a reasonable level of income from land and at the same time minimise the risk of crop failures and price fluctuations.

When compared to the increase in the prices of agricultural products, agricultural wages showed a higher rate of increase during the last two decades. The average daily wage of male agricultural labour has risen gradually from Rs. 45-75 in 1993-94 to Rs. 120-170 in 2003-04 registering an annual growth rate of 131 % between 1993-94 and 2003-04. As against this the daily wages of skilled workers in the construction sector increased annually by 140 per cent and 210 per cent respectively. The wages of carpenter and painter and plumber were always higher than that of agricultural labourers (Table 6.2.).

One important feature of the movements of wages is its faster rate of growth in non agricultural sector during the last 5 years or more. It is reported by the paddy farmers that the increase in the wages of agricultural labour in the sample farms is attributed to the impact of foreign remittances. The flow of foreign money generated new construction activities and land reclamation measures in the study area. This is particularly true in the case of Non-ayacut farms. Strong labour movements and urbanisation of workers have succeeded in pushing up money wages .This is found to be another cause for the unprofitability of paddy cultivation which is reported to have high degree of labour absorption. Due to higher wages of agricultural labours, the intensity of labour use in paddy cultivation has declined.

Table 6.2.

Wages of Rural Labour in Sample Farms (in Rupees per Day)

	1993-94	1996-97	2003-04
Agricultural labour	45-75	82-95	120-175
Carpenter	60-90	137-145	175-185
Painter	40-60	100-120	150-160

Cost of cultivation of paddy per hectare is attempted here so as to identify the cause of declining trend of area under paddy or shifting of paddy in Palakkad district.

Table 6.3.

Cost of Cultivation (In Rupees) of Paddy per hectare - Palakkad District

Seasons	1980-81	1984-85	1985-90	1996-97	2003-04
Virippu	2773	4377	6284	8596	23281.3
Mundakan	83268	4780	6700	10130	NA
Punja	3256	5422	7619	10936	NA

Source: Survey Report, 1998, 2003-04

The Table 6.3 shows the cost of cultivation of paddy in one hectare as given by the State Government (survey report-1998 and 2003). The cost of cultivation, according to the Report has gone up to 200 per cent over the past years.

Table 6.4.

Cost of Cultivation (Rs./Acre)of Paddy in Palakkad District, 1998.

Items	Farmers	Agricultural labours	Experts
A. Agricultural operations including wage			
1. Land preparation	1500	1100	1250
2. Seedlings	1100	750	800
3.Weeding, Inter planting	800	600	650
4. Fertilizer, Plant protection operations	400	200	300
5. Harvesting expense excluding wage	500	300	300
6. Other expenses	300	150	300
Total (A)	4600	3100	3600
B. Inputs			
1. seeds	400	300	250
2. Manure & fertilizer	1600	1200	1400
3. Plant protection materials	400	250	300
Total (B)	2400	1750	1950
(A)+(B)	7000	4850	5550
C. Interest (6 months 14%)	480	340	389
(A)+(B)+ (C)	7490	5190	5939
Total yield excluding wage ('Pathambu')			
1. Quintal	16	25	18
2. Straw Price	15	20	18
3. Straw income	1500	2000	1800
Total yield (Income after deducting straw)	5590	3190	4139

Source: Nelvayal Samrakshana Samithi Report, 1998

The study conducted by the expert committee (Nelvayal Samrakshana Samithi, 1998) on paddy cultivation came to the conclusion that the imputation of family labour in the total cost of production causes the difference in the average cost of labour estimated by farmers and agricultural labourers. The method of evaluation adopted by farmers, agricultural labourers and study group highlighted different views regarding cost of cultivation of paddy. The average cost of cultivation of agricultural crops according to these three different sections of people was Rs. 7700, 5100 and 6100 respectively (Table 6.4) out of which a substantial part is constituted by labour cost and the remaining other inputs. The imputation of family labour to total cost makes a wide difference in the cost calculation done by farmers and agricultural labourers. Thus 30 to 35 per cent of the labour cost does not enter into the total cost of production done by agricultural labourers.

Wages used to be paid in kind in olden days and perhaps even today. This practice still exists in some interior areas of the district. The average wages at present is Rs.175-180 for male agricultural worker and Rs.75-80 for a female agricultural worker (Table 6.5). Harvesting wages are continued to be paid in kind at the rate of 6:1 i.e. for every six paras of paddy harvested one Para of paddy paid as wage. In money terms it ranges between Rs.130 to 150.

Table 6.5.

Wage Rate of Agricultural Labourers and other Workers (Palakkad 1998)

Type of Labour	1997-98		2003-04	
	Male	Female	Male	Female
Agricultural Labour	70-80	35-40	175-180	75-80
Construction worker	100-125	60-70	200	100-120
Government farm labourer	120	120	170	170
Labourers in Trade	30-35	15-20	50-60	40-50

Source: Survey report, 1998

Since paddy crop is highly labour intensive and that a lion's share of the labour days needed in its cultivation is required during the peak sowing and harvesting seasons, even small farmers depend heavily on hired human labour. Within a period of ten years from 1993-94 to 2002-03, average daily wages of paddy field male labourers had increased from Rs.60 to 180 and that of female labourers from Rs.30 to 80. However, from the discussions we had with various groups, it emerged that the wage rates prevailing in the localities are different from the rates quoted above. There is a practice of discriminatory payments to women. Women workers are paid much less than men workers in all agricultural operations where money wages are paid. Wage rates for women are half or even less than half of the wage rate for men. Harvest wage is the highest of all the types of wages paid for agricultural operations. Payment for harvesting a crop is on a share basis, i.e, a share of the crop. The incidence of permanent labour was high as 53.13% of females and 50 per cent of males (Nambiar, 2000). The incidence is on the decline due to (1) the aversion to the manual work like agricultural operations among the young generation and (2) low employment days in agricultural workers migrate to other areas for better and more employment opportunities.

Employment days in agriculture were 200-220 in earlier period and it reduced to 60-65 days. The prime reason is the shrinking of area under paddy, as paddy cultivation has become less remunerative and uneconomic in view of the rising cost of cultivation mainly on labour account, even if cultivated; some of the operations like weeding are not done in order to cut employment of labour. Thus either conversion of land use to cultivate other crops or leaving the land uncultivated is becoming common especially in rain fed and gulf affected areas. Thus the shifting from paddy cultivation and decline in the area under paddy cultivation has been due to the fall in the price of paddy and the rise in the cost of cultivation.

Labour being one of the principal inputs in paddy cultivation it is natural that farmers shift to crops requiring a lower labour input. In the case of tree crops like coconut and rubber, labour requirement is high only during the initial stages. Once the crops start yielding, labour is required only for maintenance and harvest. The labour requirement is low, (though higher than tree crops) in case of plantain and tapioca also.

More male labourers are required in the crop production of tree crops and seasonal crops than female labourers. When we compare paddy on one side and other crops on another we find a big difference in gender balance, paddy assuring a very high ratio to female labourers. The trend in the comparative prices of agricultural products and wages had the effect of shifting of paddy to crops requiring lower labour input.

Along with wage, the cost of other inputs has also increased. Cost of seed, chemical fertilizers, pesticides and bullock labour/machine labour have also increased over the period (KAU, 1981a, b).

When the cost of production per quintal of paddy is considered for the two periods viz 1979-80 and 2003-04, variation was seen in yield of paddy and cost of paddy per quintal.

A study conducted by Nelvayal Samrakahana Smithy shows the cost of cultivation of paddy and the yield of paddy. The present study also worked out the cost and income of paddy and substitute crops for the period 2003-2004. All the studies point out the fact that paddy cultivation is becoming unprofitable and uneconomic only in comparative terms. And in absolute term profitability is reducing only because of the increase in the price of inputs like labour and fertilizer.

An investigation on cost of cultivation of paddy undertaken by the KAU during the year 1978 -79 reveals that cost of cultivation per hectare was Rs.1847.61 for HYVs and Rs. 1724.51 for traditional varieties (KAU, 1981a). In the case of HYVs manures and manuring was the most important item in terms of cost. It accounted for 36.01% of the total cost. In the case of traditional varieties manures and manuring accounted for only 27.76% of the total cost. The study also revealed that the use of chemical fertilizers was lower than that of manures in the study area.

But now this trend has reversed. The application of organic manure shows a decline compared to the previous periods. The ultimate result was that there was a remarkable increase in the cost of cultivation.

It is seen that the contribution towards cost of cultivation of paddy over the years is maximum through wage increase, followed by increase in cost of manure and fertilizers.

An important constituent of the cultivation cost of paddy other than the labour cost is the cost of manures which includes both chemical fertilizers and the organic manure. In July 1991, the administered prices of Nitrogenous fertilizers were increased by 30% with the new fertilizer policy of the Union Government. The impact of this hike in fertilizer prices on paddy farmers, especially small and marginal farmers is considerably high.

6.1.1.2. Population Growth and Change in Family Structure

The breakup of the joint family system and partitioning of the old Tharavadu and Illam properties has resulted in fragmentation of holdings and rise in the demand for new dwelling units. Each household of four to five members requires an independent house of their own with a small homestead around it. In order to construct new houses and also to raise the required amount of money for construction, wet land is utilised. The paddy land is converted for construction of house and this reduces the area under paddy. The new generation, especially the educated, is after jobs outside agriculture and give only secondary importance to cultivation the least to paddy cultivation. They prefer to construct dwelling units alongside motorable roads and lanes. Homestead will occupy crops other than paddy. This is another cause of shifting of cultivation from paddy to other crops and thus decline in area under paddy.

6.1.1.3. Labour Problems

In the traditional system of agriculture in which land remained in the hands of few households, each cultivator family had one or two attached labour households, which provide male and female labour for agricultural operations. In addition to providing labour for routine operations, they arranged additional labour to meet the peak demand at times of sowing and harvesting. This was the system in the district which worked efficiently and was advantageous to both the cultivator and labour. Each farm family had permanent, attached and casual labourers. There was no standardisation of daily work and even free labour was customary. At the harvesting season they could, reach home late in the night only. Though the wages are paid in kind for harvesting, for other operations the wage was what the cultivator gave. For harvesting the prevalent rate was 12:1 unit during 1998 and it has gone up to 6:1 and 7:1 during 2003-04 (survey). In real terms the labour cost had gone up. The cordial relationship between the cultivator and labour began to reduce and disappear. The role of family labour in agricultural operations in the study area was extremely low. Cost of cultivation of paddy in traditional agriculture was low mainly due to the contribution of family labour. Till recently, family labourers had their own role in reducing the cost of labour and thus cost of cultivation. With the fragmentation of holdings and change in social structure the system broke down and the cultivator had to go in search of casual labourers for each farm operation. Getting suitable farm hands in time for the farm operations became a problem especially to small and medium holders of paddy cultivation which required constant attention. More than this, labour productivity decreased considerably.

After the 90's the area witnessed a spurt on non agricultural activities like construction, transport and trade, in and around the study area. The higher wages existing in the non-agricultural sectors and the preference of the workers to work in sectors other than farming shifted a section of agricultural labour away from agriculture.

The supply of labour for agriculture especially for paddy cultivation fell drastically. This labour movement and urbanization of workers have resulted in pushing up money wages and this offers the explanation for reduction of the unprofitability of paddy cultivation in the study area.

Less scarcity of labour is felt in the study area when compared to other districts, especially with that of Trichur. There is temporary migration of labour from the study area to neighbourhood regions in the harvesting season. Compared to other districts of Kerala, there was availability of labour due to which wage rates were lower. But recently the situation has changed. The flow of Gulf money to study area caused to increase the wages of agricultural labourers and this is visible in Pattambi Block of the study area.

The increased demand for agricultural labour during peak seasons in farm operations result in increased wage rate. This is also because the peak time labour requirement is a simultaneous demand from all the cultivators and this will increase the gravity of the problem. In such a circumstance, the cultivators may be more interested to ensure quick and ready availability of labour even at the expense of paying relatively high wages besides providing refreshments. This was another factor why different wages exist in different blocks of the same region .Wages showed an upward trend generally and wage difference is significant when we take the existing wage rates in Pattambi and Kozhalmannam, extreme West and East Blocks of the study area.

The most important problems related to labourers reported by the respondents were:

- The labourers do not keep their promise to turn up for work on the appointed date and the cultivators have to suspend operations on account of the non-availability of workers.
- The labourers do not complete the work on a continuous basis. They leave the work in the middle and go and work with other cultivators as they do not like to displease

other cultivators who also call them for work. In order to bring them back, the cultivators had to offer better wages.

- The availability of labour for most of the manual work in the study area is on the decline as there is aversion for such works, particularly among the youngsters. As the employment availability is seasonal and wages low (wage low when compared to the wage of counterparts in other districts) labours move on to other occupations also.
- Wide variations in wage rates existed between permanent and causal labour. Even within the area, significant variation is observable for the same operation for the same sex, casual labour earning higher than the permanent labour.
- In the construction sector wages are higher. That is why labourers shift from agricultural sector to construction sector.

6.1.1.4. Changing Size and Structure of Work Force

Structure of labour force has undergone considerable changes in the study area. Between 1991 and 2001 the total work force increased by 11.98 % as against an in crease of 9.86 % in the total population.

Workforce and work participation rate[1] in the study area is given in Table (4.28). Work participation rate declined by 9 per cent in study area.

The decline in the total number of cultivators was due to the steep fall in the number of male cultivators. This may be partially due to the fact that a large number of cultivators have gone outside the study area in search of employment and substantial number of them may be small cultivators with a small size of holding, who might have sold out these small holdings. The small part of land thus sold may not be cultivated, but utilised for construction purpose or for cultivating tree crops.

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[1] The proportion of actual workers to total work force is defined as the work participation rate

Increased educational facilities delayed the entry of younger generation to the work force. The educated youth prefer white collar job than manual labour. The spread of education has made rural labour aware of their rights and privileges and understand the position by comparing their equals in other employments. These make farmers prefer to engage in other activities where labour requirement is less.

6.1.1.5. Modernisation and Commercialisation of Agriculture

Paddy cultivation witnessed technological changes during the mid sixties by way of high yielding variety seeds and chemical fertilizers and pesticides. This modernisation package (New strategy) increased the yield by two to three times. Even in traditional varieties, application of chemical fertilizers and pesticides increased the yield considerably.

In the traditional or subsistence farming system, all the cultivators in a locality carried out planting and harvesting operations simultaneously, thus reducing the incidence of pest attacks. But in the modernised farming, there was no uniformity in the timing of planting and harvesting with the result that the pests could complete their life cycle in different farms where the paddy crop was at different stages of growth. This resulted in the application of higher doses of pesticides. Increased use of fertilizers and pesticides and non-availability of organic manure affected the micro-organisms in the field and reduced the texture and quality of the soil. Once the farmers apply the chemical fertilizers, they are forced to apply high doses of chemical fertilizers in the subsequent years so as to sustain the soil fertility. The farmers could not apply the required proportions of NPK because of high price of fertilizers which in turn reduced the average yield of paddy in the district. As a result of the rapid increase in the cost of cultivation due to the increase in fertilizer price and wage rate, many of the farmers in the district switched back to traditional varieties of paddy. Their yields however, remained more or less the same or reduced. The ultimate effect is that paddy cultivation became unprofitable.

In the subsistence system of farming each and every farm household carries on agriculture mainly for home consumption. Formerly one who cultivates paddy was considered as a real farmer. Later the concept of farming gave place to production for the market. The purpose of cultivation changed from production for household consumption to market. The cultivators therefore choose to cultivate those crops that yielded higher cash income in the long run. This resulted in the shifting from paddy to other crops which are more profitable (Table 5.10). The concept of land has been changed from "means of production to means of trade."

6.1.1.6. Low Productivity of Virippu and Mundakan Paddy

Paddy is the most important crop in the sample farms. Low productivity of Virippu and Mundakan (first and second crop) was the problem indicated by farmers. The average yield of paddy is hardly 2.5 tons/ha. Use of local varieties, which have low productivity, adoption of "Koottumundakan system" (Mixed variety ratoon) of cultivation which has low productivity per unit area and time, poor fertility status of the soil, imbalanced fertilizer use, inefficient and unscientific pest and disease management practices, water stress situations in low lands and uplands during critical periods, weed menace etc. are some of the factors identified. The poor economic condition and small holding size are the major problems in small productive systems. This prevents the farmers from the capital intensive technologies for achieving higher production, like quality seeds of HYV, chemical fertilizers and plant protection measures..

6.1.1.7. Low Cropping Intensity

Paddy covers a substantial portion of the total cultivated area, leaving much area fallow in summer months. This considerably lowers the net out put per unit area. Lack of irrigation facilities during summer months is the limitation under small production systems. Developed technology for utilising moisture is not adopted due to poor awareness, lack of technical know-how and poor economic status of the small production system of farmers. Since the farmers are poor and due to non-judicious use of fertilizers, the resource utilisation is becoming ineffective .Since urea is the cheapest fertilizer and as the farmers are not aware of the role of nutrients in crop production majority of the farmers apply urea alone to the rice crop .The ultimate result is reduction in yield due to various pest diseases. Non-ayacut farms practice inter cropping .The farmers cultivate plantain and vegetables together with paddy. After crop cutting the remains are left in the soil which in turn become manure for the Mundakan crop. Thus application of organic manure is considerably reduced.

6.1.1.8. Marketing Problems

It has been realised from the present survey that the cultivators face the problem of marketing of the produce they got from agricultural land. Mere increase in production could be of little avail so long as the excess production failed to materialise in the form of extra income for the producer. The main channel of paddy-rice marketing is the rice mill owners, who buy paddy, mill it, and sell the rice in the market (Table 4.33). The Eastern Blocks of the study area have more rice mills whereas few rice mills exist in the Western Blocks. Wide variations are observed in paddy prices in the study area. The prevailing price during the survey period had been Rs.8.50 kg in Eastern Blocks and Rs.6.25 in Western Blocks. Within the same region (as for e.g. in Eastern Block) prices vary. In order to repay their debts and due to the lack of storage facilities a substantial number of paddy farmers sell a major part of their produce just after the harvest. It is also found that direct procurement of paddy was insufficient or absent and hence failed to give the desired result. Only 24% of the sample farmers had been beneficiaries of the system (Personal Interview). The primary functions of the agricultural market, viz, adding time, place and form utilities to products are more important for agriculture where production is seasonal, localised and needs processing before it can be consumed. Unfortunately the agricultural market in the study area failed to incorporate these functions. Procurement centers are few and many farmers were not even aware of the location of the nearest one. They have to pay the transportation cost to the procurement centre, where they very often reject the paddy on one account or the other. The Food Corporation of India (FCI) is not even processing what is coming to the market. The procurement price for paddy offered by the FCI is between Rs 2500-3000 for one"vandi" or seventy Paras of Paddy (Approximately 500 kg).

Market prices crash due to bulk arrivals of paddy in the market from neighbouring States of Andhra Pradesh and Karnataka at lower cost. The availability of paddy at reduced price naturally arrests the hike in the price of paddy of that particular area which in turn affects the farmers' expectations adversely.

Quality is an essential element in the market. The paddy cultivators face the problem of storing paddy before marketing which in turn affect the quality of the product. Many farmers sell the produce at the village level itself and not in the regulated markets. The number of farmers with a positive gap between prevailing prices and actually received prices and also the expected prices and actually received prices does not exceed 30% of the total number of households studied. A majority of the farmers sell their produce either at less than the expected or prevailing price. Thus the present marketing structure has several inadequacies and these are the basic causes of distress on the price front. The presence of middlemen also creates imperfections in the market.

6.1.1.9. Irrigation

The dependence of agriculture especially paddy on nature is the general rule in every districts of the State. But the paddy cultivation in the study area is more specific because of its drought-prone proximity[2]. Though Palakkad District is blessed with ample irrigation projects; this potential rice belt has not achieved the expected productivity. The Western Blocks of the study area are rain fed or they come under Non-ayacut area. Farms that are far from the supply outlets of canals generally receive less water as compared to those near the outlets. Therefore, irregularity and inadequacy in irrigation water supply are the serious problems faced by canal irrigated farms.

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[2] See for detail Fourth chapter Profile of the study area

The cultivation of Ayacut area depends on tube well irrigation. The only problem which the farmers face with private sources of irrigation is the shortage of electricity. Kerosene permit already supplied to farmers in 1990's are withdrawn.

The Survey reveals that total cost of production in rain fed farms varies due to the cost of irrigation. It is higher on the canal irrigated farms. The profitability of the crop varies according to the benefit from irrigation. There are disparities in income benefits from tube well and canal irrigation. As a whole the income position of the cultivators in study area is influenced by the source of irrigation. The paddy farmers in Ayacut and Non-ayacut area are treated differently and naturally the rate of conversion in Non-ayacut area is higher than in Ayacut area. The embankment constructed across the paddy fields of Chalavara and Ananganadi Panchayat of Ottapalam Development Block for irrigation project hindered the natural water flows and destroyed many paddy fields. Soil conservation in this area is also badly affected.

The art of growing crops under irrigated conditions is very different and difficult than that grown under rain fed conditions. The paddy farmers in the Eastern blocks face some problems related to water management.

The subject of water management has received more attention in irrigated agriculture (Eastern Block). Irrigation water resources developed at heavy costs are not properly and economically utilised. The projects are not yielding the desired results as far as water utilisation is concerned. Irrigation project is still looked upon merely as a means of providing water for irrigating crops.

Systematic rainfall registration has not been done available in all Development Blocks and this means rainfall information is available for at least one station in a Taluk. This situation has to be improved. Moreover, uptodate data regarding the amount of rainfall in different months in a particular region is difficult to get.

The problem of recharging of ground water is adding to the problems of shifting of paddy cultivation to substitute crops. The ground water is over extracted, as is the phenomena seen recently in Kerala generally and particularly in Palakkad district, increases the cost and finally became highly uneconomical or undesirable.

Ground water is not properly utilised but mismanaged. Economical use of irrigation water, by adopting suitable methods is lacking. Difficulties are encountered in using water during the autumn season (Khariff), especially in black soils when it is intended to raise the crops. The difficulty is mainly because water becomes available, late in the season by which the optimum sowing period is usually over. Taken sown late sowing period, the yields are not attractive enough to invest on the growing of such crops under irrigation. The need for the supply of irrigation water, especially in the period of low or no rainfall, in the beginning of the Khariff season, goes unsatisfied, resulting in the non-utilisation of rain as well as irrigation water during the remaining period of the season. This lead to either leaving the paddy field fallow or convert the land for other purposes.

Information about canal opening and closure does not reach the farmers in time and as a result considerable losses occur. The water let out schedule is not planned, according to the needs of the crops and in consultation with the farmers.

Large quantity of water is lost during transmission mainly due to poor maintenance of the canal systems. The per cent efficiency of the projects vary from 40 per cent to 63 per cent only (Transmission loss is12.5 per cent and the efficiency is 87.5 per cent according to a study conducted by Johnkutty *et. al* (2004)). Lack of unity among farmers and also absence of a well planned crop-calendar results in much wastage of water and reduces the water use efficiency. Non-uniformity of cropping systems and untimely release of water hinder the crop growth.

In Non-ayacut area, there is considerable variation in the total rainfall as well as its distribution. Artificial water sources like rivers and tanks are to be exploited to the fullest extent. The cultivators of the Non-ayacut blocks raise only one crop leaving the paddy land fallow for second season or they lease the paddy land to cultivate other crops, especially plantain, tapioca and vegetables. Thus the decline in area under paddy cultivation or shifting from paddy to other crops is the result.

Soil organic matter gets depleted rapidly and it is difficult to build up and maintain soil organic matter at the required level. While acidity is the problem in rainfall areas, salinity and alkalinity assume importance in low rainfall areas. In some areas, stickiness of soil resulting in low permeability becomes a bottleneck. Productivity of soil is going down due to the leaching down of plant nutrients (Table 4.31).

6.1.1.10. Infrastructure

Adequate and appropriate infrastructure facilities are indispensable to the development of agricultural sector. But the paddy cultivators in the study area have to spend more in terms of infrastructure. As for e.g. it is found in the sample area that the number of co-operative societies extending financial assistance to the farmers are insufficient and they are less in Western blocks when compared to the Eastern blocks (Table 4.34).

There is growing inconsistency between the agrarian structures and the supportive institutions. The agrarian structure is tilting progressively towards small holdings, while the supportive institutions of extension, credit, input supplies and product marketing are geared to serve the medium and large farmers. There are only 44 credit societies in the sample area. The procedure of obtaining credit from the financial institutions is time consuming, needs a lot of paper work, and also the terms and conditions including meeting collateral requirements are not convenient for the poor farmer. The landlessness is restricting the farmers. In effect, a credit rationing takes place and as a result the farmers with little collateral are deprived of credit.

Public investment in creating agricultural infrastructure is declining and biased due to reasons relating to domestic policy. Expenditure on health, education, transport and communications in the rural areas is inadequate.

Poor transportation networks restricted the interaction among the farmers and the extension workers. The farmers in the remote areas are the most disadvantaged in terms of getting the inputs distributed by Government through Krishibhavans .Farmers do not get information about market price of different crops. Moreover, it was only the small number of large farmers who were able to acquire in advance whatever facilities are accorded to the rural areas.

6.1.1.11. System of Giving Paddy Lands on Lease

In order to avoid the problems and risks involved in paddy cultivation many of the paddy land owners in the study area give out their land on lease for cultivation. Usually paddy land is given for single crop and rent is collected in advance. The land is given out on lease for cultivation of plantain, tapioca or vegetables. Per acre rent amounts to Rs.8000 in the study area. Nearly 2.5% of the sample farmers in the study area are cultivating in paddy fields taken on lease. The proportion of leased holdings to cultivate crops other than paddy is comparatively higher in Western Blocks. This trend reduces the area under paddy cultivation and encourages shifting of paddy to other crops.

6.1.1.12. Economic Policies

The public distribution system of food grains, free education up to higher secondary level, exemption of the lowest consumers from electricity tariff, IRDP assistance, housing subsidy, special assistance to backward and socially deprived classes, job reservation for Scheduled caste and scheduled tribes and backward communities in the Government – all these enhance the real earnings of the workers . This contributes to their high retention prices and thus cost.

6.1.2. Uneconomic Causes

Uneconomic causes include climatic, social, religious, psychological and political factors.

6.1.2.1. System of Converting Paddy Fields for Other Non-agricultural Purposes

Conversion of paddy fields for other non-agricultural purposes such as construction of shops and institutions also result in a decline in area under paddy. In order to take advantage of the rising need for land, paddy farmers are converting their lands to saleable plots by filling it with soil (Table 4.41).

Improvement in communication facilities, easy accessibility etc on both sides of the roads in entire village has also made people think of starting industries. Conversion of neighbourhood pockets of paddy fields sometimes creates problems of impeded drainage and at the same time difficulty in loss of connectivity in irrigation activity. This makes a compulsion on such farmers to convert their paddy lands. Among the reasons mentioned by the farmers of the sample (converters), 90% reported that they have converted the marginal land lying in the boarder area in which irrigation constraints, shading of trees, soil erosion, low soil fertility make these paddy land uneconomic for cultivation. So they found better to convert the wet land wholly or partly for construction purposes.

Traditionally, Palakkad District is an agro-based economy. The development of the district was slow because of its agrarian base. But in the last few years, several industries have come up and the district has undergone radical changes. Expansion of built up area was witnessed and occupational structure among the population has also changed (Table 4.10) which has ultimately caused land use change and transformation of the district.

Initially when industrialisation took place, there was shortage of open land for construction (Table 4.41). The demand for land has led to increase in the land value and owners of land started to get more money instantly, which they were not getting in agricultural sector. In anticipation, more and more, people started to offer their land for construction resulting in phenomenal transformation of land from agricultural uses to vacant land. Later, this demand has not subsided resulting in increase of vacant land which is used for urban development nor is it useful for agricultural sector.

Shifting from paddy cultivation to tree crops and seasonal crops like plantain and tapioca is due to two reasons. Rich farmers are protecting their lands from encroachment by planting trees and they are waiting for increase in land value. Secondly, it is remunerative and less labour dependent and these factors helped in increase of area under tree crops. It is also favoured because it needs less care and protection. This land transformation from agriculture to non-agriculture is the outcome of the urban land market which has many dimensions but the most important and relevant is land value. Demand and supply factors in land market interact in ways that determines land value which in turn, have important bearing on the way in which land is used. There was clear shift from low value agricultural land to high value urban land use especially along the main roads. From the angle of the entrepreneurs paddy lands, adjoining roads and good accessibility due to proximity to already established townships, are very cheap compared to dry lands in remote areas. Availability of water in the paddy field at low depths makes such lands more attractive. It is also fact that the existing Kerala Land Utilisation Act is not strictly enforced by the various Government due to lack of co-ordination among different departments of Government like , Tourism, Industry, Revenue and Agriculture.

6.1.2.2. Farmers' Reluctance to Take Second Crop

In spite of the possibility of taking two crops, the farmers are showing reluctance to take the second crop due to the uncertainty in rainfall, non-availability of required number of hired labourers and comparatively less profitability of paddy crop compared to crops like Plantain and Banana. Out of the total, 35 sample households use their lands only for single crop. They either keep their lands fallow during the second crop season or lease it to persons to cultivate other seasonal crops.

6.1.2.3. Aversion of Younger Generation to Paddy Cultivation

An important factor that adversely affects the prospects of paddy cultivation in the study area is the growing aversion of younger generation to paddy farming. The age composition of sample households shows that a substantial number of them belong to higher age group (Table 6.6).

Table 6.6.

Distribution of Sample Paddy Farmers According to Age

Age group	No. of farmers (%)		Cumulative Distribution (greater than)	
			No	Percentage
≤ 34	3	1.0	302	100.0
35-39	15	5.0	299	99.0
40-44	13	4.3	284	94.0
45-49	30	9.9	271	89.7
50-54	67	22.2	241	79.8
55-59	47	15.6	174	57.6
60-64	62	20.5	127	42.1
65-69	27	8.9	65	21.5
70-74	29	9.6	38	12.6
75-79	6	2.0	9	3.0
80-84	3	1.0	3	1.0

According to the sample survey conducted in different blocks of the study area 42.1 per cent of the sample farmers are more than 60 or more years old and 79.8 per cent of the farmers fall in the age group of 50 and above. None of the sample farmers are below 30 years and only 20.2 per cent of them are below 50 years. Average age of paddy farmers in the study area is estimated as 55.9.

6.1.2.4. Decline in the Number of Dedicated and Full Time Paddy Farmers

The paddy farmers in the study area continue to cultivate paddy only because of personal attachment to ancestral property. The fulltime farmers above 60 years old stick to paddy farming where as their educated and employed children find no time and they lack genuine interest in paddy farming. All over the study area large number of business men, government servants, employees in private establishment are engaged in paddy cultivation with fulltime farmers, only 12.6 per cent of the sample farmers in the study area are full time farmers whose main occupation is agriculture (Table 4.43). For 10 per cent of farmers engaged in paddy cultivation, it is only a part time job. It is one of the reasons why many of the paddy farmers in the study area opt for a single crop or keep the paddy land fallow or give out their land on lease to cultivate other crops.

Economic policies are generally directed, and analysed to attain the objective of economical growth and stability at the macro level. But, these reforms did not prove to be beneficial to the poor. As for e.g. market intervention by government with an objective of protecting the interests of the consumers based on maximum social advantage affect the paddy farmers adversely. As and when prices of paddy goes up, government controls the price by importing rice from neighbouring states and this brings down the price of paddy. The paddy cultivation in the study area is thus deprived of any economic benefit followed by economic policies.

6.1.2.5. High Rate of Crop Failures

The farm house holds in the sample blocks experienced heavy draught during the survey period. Almost all farmers have experienced more than 50 per cent loss in yields due to either draughts or other reasons. Out of 422 crop failures reported by the 302 sample farmers, 302 cases (71.6 %) were caused by draught. Other causes of crop failures were the incidence of pests and plant diseases (23.2 %) and floods or break up of bunds etc. (4.7 %). It was reported that crop failures due to draught was more in Eastern blocks of the study area. Therefore farmers choose that combination, where there is a greater possibility of recovering the loss incurred for any crop failure by the production of next alternative crops and the paddy farmers are left with possibility of earning more from their land. This caused the growth of plantain, tapioca, and vegetables in the paddy fields.

The study area has experienced drought and natural hazards since it is the most drought prone district in the State. During the past 3 years almost all farmers had experienced loss in yields due to drought, floods, incidence of pests and plant diseases.

Table 6.7.

Percentage of Crop Lost due to Natural Hazards in Sample Farms (2001-01 to 2003-04)

Causes	Kollengode	Malampuzha	Palakkad	Kozhalmannam	Ottapalam	Pattambi
Drought	80	60	80	80	20	20
Heavy or unexpected rainfall during harvest	20	20	30	10	20	30
Plant diseases	25	10	15	20	30	20

Source: DES, Palakkad 2004-05

It was reported by the farm households of Eastern blocks that they lost 80 per cent of their crop due to drought during the survey period whereas it was only 20 per cent in the Western blocks. But the farm households in the western blocks experienced greater loss in yields due to plant disease and pest attack compared to that of farm households in Eastern blocks.

During 1999-2000, Central Government started National Agricultural Insurance Programme. The objective of this programme was to provide financial assistance to those farmers, who lost their crops due to natural hazards. It was also aimed at introducing new technologies and farming practices among farmers and to make agriculture as a source of permanent income. During 2003-2004, paddy land to the extent of 43,000 hectares was victimised due to draught and out of Rs. 300 crores crop loss, the loss of paddy alone comes to Rs 210 crores. But due to technical objection, not even a single rupee was sanctioned to paddy farmers. This is due to unscientific criterion relating to crop loss (7th October, 2004, Thursday Manorama - Sanjay Chandrasekhar).

As far as producers are concerned, a healthy competition would only help to develop a market in the long run and benefit farmers. Any attempt to fix a minimum price for the sake of quality will go against the spirit of competition and harm the interest of the farmers.

6.1.2.6. Low Income Status of the Farm Women Folk

In the villages, though population-wise the females dominate the males, their share in the income generated is meager. This is mainly because they are confined to the domestic works of the family, which do not give them any monetary benefits. The men folks are the decision makers of the family. The women are unaware of the various enterprises which can fetch them reasonable income.

6.1.2.7. State Intervention -Effect of Land Reforms

During the last few decades the pattern of paddy land ownership has undergone drastic changes in the study area. After the introduction of land reform measures, big landlords who possessed hundreds of hectares of paddy fields had to surrender their excess lands which were later distributed among tenants. These new land owners cultivated land intensively in the initial stages but later it was found that they fall in debt due to unscientific cultivation practices. Many of the agricultural labourers have recently purchased small plots of paddy lands or have taken land on lease for paddy cultivation. These new categories of farmers are not available as hired labourers.

Table 6.8

Problems Faced by the Paddy Farmers in the Study Area

Constraints	Ayacut	Non-ayacut
Un economic size and lack of mechanisation	2	1
Lack of workshop and lack of trained labours	3	1
Non availability of labour	3	1
High wage rate	2	1
Aversion of young generation	1	1
Low price of produce (both straw and rice)	1	1
Lack of co-operation among females as indicated by PNS functioning	2	1
Drought and lack of Irrigation facilities	3	1
Lack of adequate marketing facilities	2	1
Lack of adequate processing facilities	3	1
Non availability of manures and fertilizers	3	2
Problems resulting from non-enforcement of KLU Act	2	2
Non availability of enough quality seeds in time	2	3
Lack of individual farmers or plot insurance	1	1
Lack of proper incentives for production or non scientific nature of the so called production bonus	1	1

1. Less severe, 2. Severe, 3. Very severe

Another trend seen in the study area, especially in the Eastern blocks, is carrying agricultural or farm operations collectively through Padasekhara Samithies without surrendering their property rights but collectively cultivating the land. By doing so the small paddy farmers are benefited by reducing the cost of cultivation of paddy. This type of Group Farming, in a way is similar to co-operative farming existed before. Once again the ownership of land undergoes changes. These Padasekhara Samithies are functioning effectively in Eastern Blocks and the member farmers are benefited. But in Western Blocks not all farmers are members of such samithies and so naturally they could not avail the benefits of Group Farming.

The problems faced by the paddy farmers in the study area are ranked and given in Table 6.8. The main constraints faced by paddy farmers in the study area is the high cost of cultivation due to increasing wage rate and high price of inputs. But profitability of paddy is low when compared to the profit and profitability of its alternate crops. So farmers think of leaving the paddy fields fallow or convert it for other non-agricultural purposes. Government policies and measures are playing their own rule in the shifting of paddy. Besides these, lack of infrastructure, capital investment and natural hazards add to the problem of shifting from paddy to other more remunerative crops like plantain and tapioca.

6.2. CONSEQUENCES OF SHIFTING

The shift in cultivation patterns from food grains to cash crops is gaining ground in the study area. Such a shift in the cultivation profile has been a recent feature. It requires a big push to launch it towards sustained development. So it is necessary to analyse the impact and consequences of shifting of paddy cultivation in the study area which is attempted in this section. Economic and Social impacts are studied and presented here.

6.2.1. Economic Impact

The shifting of paddy cultivation leads to a decline in the production of food grains. If the entire paddy fields are converted for other uses, its people habituated to a staple food of rice for centuries will be in the plight of waiting for wagons of rice from Punjab, Andhra Pradesh or Karnataka for their livelihood. Any disruption in the transportation or a general strike can result in starvation. Added to it, if cash crops like rubber, or seasonal crops like plantain and tapioca are cultivated instead of paddy the situation becomes all the more hopeless. A food system entirely based on imports will be doomed to definite disaster. No boost in grain production can be anticipated as the area under food grain cultivation especially that of paddy has been declining very fast. Paddy farmers take special care to select crops with better yields and tend them carefully to obtain better yields. The overall result is an increase in agricultural production with major shifts in composition of farm food items to commercial items.

6.2.1.1. Increase in Income

In the subsistence system of farming, paddy cultivation was done mainly for getting good rice and also for getting straw to feed cattle which were part of farming. But that situation has changed. Paddy farmers invest more in their wet land by converting it to the cultivation of other crops than paddy in the expectation of getting better prices. This change in crop pattern with predominance of cash crops has reduced risks and provided steady flow of income in the case of tree cops. This is because the risk due to fluctuation in yield is low for tree crops. In the converted paddy lands, seasonal crops like plantain are grown and that yield is higher. The higher income received from other than paddy farming has thus improved standards of living.

The other and more important aspect of shifting of paddy cultivation is that the land's market values went up not equally but lower than the dry land. So the paddy farmers started converting the wet land for non-agricultural purposes in the hope of getting better income rather than cultivating paddy

6.2.1.2. Change in Employment and Income of Rural Poor

During the period when paddy was the main crop almost all the rural labour was engaged in agriculture, though many of them were underemployed. Due to the break up of the joint family system, farm land got fragmented, family member reduced and it reduced the availability of family labour for farm activities. As a result of development in social status and educational status, labour became more mobile spatially and sect orally. This shift is associated with the change in crop pattern. The demand for agricultural male labour is reported to have increased due to increase in area under commercial or seasonal crops. In addition to the influence of higher wages in the non agricultural sector, the decline in the supply of labour to traditional agricultural operations increased the wage rate for agricultural labour. As a result of better wages, their life styles have also undergone changes. However, these changes can not be explained solely in terms of the change in the shifting of paddy cultivation

6.2.1.3. Loss of Traditional Skills and Practices

With the decline in area under food-crops, especially of paddy, farmers have lost many traditional skills and talent of paddy cultivation. The traditional system of farming was complex and diverse and rural livelihood methods depended on traditional skills. The farmers adopted techniques using local resources to suit local needs. These methods ensured maximum utilisation yields. Farm house holds used to own necessary farm equipments and machineries.

But these skills have vanished and modernisation transformed cultivation practices making them more dependent on external sources. Seeds, agricultural implements and fertilizers are purchased from outside making local skills and traditions irrelevant. Rural artisans, who were engaged in making and repairing farm implements and tools have shifted to construction sector. Knowledge of traditional medicines and treatments has also been lost as a result of modernisation of agriculture. When land is being converted to non-agriculture uses, the medicinal plants grown in paddy wet land disappeared. Young generation do not have the traditional skills of making farm implements, at the same time they are not experts in dealing with modern farm equipments like transplanter, thresher etc This lead to the problem of farm mechanisation, especially in the remote pocket areas of the sample blocks

In the present system of agriculture farmers use improved or high yielding varieties of purchased seeds and seedlings. The introduction of new varieties and breeds has almost entirely displaced traditional varieties and breeds. As for paddy seeds only some elderly farmers know the names of local varieties which were commonly used by the paddy farmers. These local varieties are still preferred because of its resistance to pests and diseases and suitability to specific local conditions in the village.

The present generation of agricultural labourers has little knowledge of the traditional varieties of paddy, the traditional method of cultivation, the soil texture and quality. They just do, what they are asked to do, by their employees. However some of the labourers are familiar with the modern method of cultivation.

Moreover, agricultural labourers, unlike the old generation were unable to attend to all activities of farm operations. But as a result of the change in the crop pattern and land use pattern, labour became more specialised, especially in particular farm activities. Thus unemployment on one side and non-availability of labour on the other side, exist in the study area, which is due to this specialisation of agricultural labour, which in turn is the result of change in cropping pattern

One important aspect of the above phenomena of labour is the application of machinery. Since Palakkad is the rice bowl of Kerala and there exists acute shortage of farm labourers, the majority of the labour union leaders were aware of the need for farm machanisation. It is clear from the study that labour cost of cultivation has come down even though it remains as the major item of the cost of cultivation of paddy.

6.2.1.4. Women Labour

In the traditional system of farming, all agricultural house hold members, who is able to work, used to do some kind of work in the paddy fields .They together carry on agricultural activities without force or not strictly according to the wage they get. They like it as their sole responsibility to finish the work within time and they were not bound by time alone. The wage rates for women were less than those of men, and during off-season they spend their time, collecting wood and fodder, to meet both ends.

But now conditions changed. The demand for female labour has come down considerably. It is male workers who attend to agricultural operations in the converted lands. This shifting of paddy cultivation to plantain or tapioca lowered the employment opportunities of women. Some of the female labourers have shifted to non-agricultural activities like construction work. A small part of agricultural female labourers remain at home looking after house hold works. This has resulted in the reduction of whatever small savings female agricultural labourers had, while they are engaged in farm operations. As a result of emergence of nuclear families, the number of female labourers has diminished and they prefer jobs other than agricultural work.

6.2.1.5. Live Stock

One of the major impact of the change in crop pattern, or shifting of paddy cultivation, in the study area is the decrease in the live stock. The decrease in the area under paddy cultivation, conversion of grazing lands for raising tree crops, fruit trees and reduction of the area under pastures near ponds, have made rearing of cattle costly. The replacement of animal power by machine has made the rearing of draught animals redundant. Rearing of milk cows which was very common in most farming house holds, has come down owing to the increase in maintenance cost.

Ash, cow dung and green manure were the common manure applied by almost all house holds, without investing too much. This has given place to, consumption of organic manure, the quality of which is not as high as home made cow dung. This increases the cost of fertilizer, which constitute one important item in the cost of cultivation of paddy.

6.2.2. Social and Cultural Impact

Shifting paddy cultivation is followed by social and cultural changes.

6.2.2.1. Cultivator – Labour Relationship

The feudal relationship between cultivator and labourer, which was un-economic in nature, has lost its relevance with the decline in the importance of paddy cultivation. The labour himself carries on agricultural activities in his land taken on lease from his employer. This has enhanced labourer's self confidence. The cordial relation ship between, the land lord and tenant has given way to equality of relationship between the two. The high status in society enjoyed by the land owners has reduced. Agriculture as a prestigious occupation has changed to agriculture as a source of income. People are occupying land to satisfy the desire for land. The social changes, especially among the former land-owner communities, led to the fragmentation of land holdings, making paddy cultivation uneconomic and unprofitable. Several new land owners were forced to seek additional sources of income outside agriculture. As a result, their investments in paddy cultivation get reduced. As labour and input cost went up, leaving their land fallow became a preferred option for a large number of them. At one time, the gulf boom pushed up land prices so high that selling paddy land for real estate development became a favoured option. Thus the Land Reforms Act has been a major cause and the shifting of paddy cultivation is found to be an important consequence of it.

6.2.2.2. Young Generation's Negative Attitude Towards Agriculture

The older generations – both paddy cultivators and labourers- were very much attached to land. Among the village community, land was power and it was a force that could not be destroyed. Therefore the land owners enjoyed a high status in the society. The situation has now changed. The younger generation has no idea of, how vital land and cultivation were to their ancestors. Agriculture, especially paddy cultivation, is not being considered a prestigious occupation. The shifting of paddy cultivation and the change in crop pattern, gave a new order of the society, to farm households. The traditional way of living, gave way to modern systems of mechanisation. Younger generations do not follow the traditional practice of taking food given by the land owner. In all aspects, they differ from the old generations. In the changed scenario, the skills of labourers have reduced. Seeds, agricultural implements, fertilizers, power etc. are purchased from outside agriculture. Thus local traditions and skills becoming irrelevant. Rural artisans who were engaged in making and repairing farm implements and tools have shifted to the secondary and tertiary sectors. Farm equipments like "muram", "Bamboo baskets" etc. disappeared from farm families.

6.2.3. Environmental Impacts

Serious and severe ecological deterioration is triggered indirectly by the process of paddy-field conversion. Filling of low lying paddy fields for construction purposes and conversion to other crops have severe ecological consequences, as they will disrupt natural drainage and destroy the water conserving properties of midland hills. Thus rich nutrients and minerals, brought by the down flowing streams are denied to the crops. Due to the influence of various factors, the cropping pattern and consequently the land use pattern had undergone substantial changes (Table 4.48).

It can be seen that, (a) the proportion of area used for non-agricultural uses as well as cultivated area is showing an increasing trend and (b) the proportion of area under tree crops, increased at the cost of seasonal and animal crops. This is due to the decline in the area under paddy.

Paddy land, which has been converted from agricultural uses to non-agricultural uses, can not be brought back for cultivation of paddy. Areas shifted to cultivate annual as well as seasonal crops (like banana, plantain and tapioca etc.) and left fallow, which works out to more than 68 hectares, can be brought back to paddy cultivation, if there is a will and favourable condition. Unfortunately, this is not taking place, in the study area. The poor farmer out of necessity is forced to convert it to some other profitable crops. The yield from this reclaimed land is more than the yield from paddy or at least equally valuable. So the total agriculture produce has increased.

During the study period, there was significant interchange of land among various land use classes. These changes are because of the development of city or town, resulting in increased demand for land for residential, commercial and industrial purposes. The demand for land along with the land value of that particular area ultimately influenced the pace and direction of land use change. Much of the outward growth of towns has come at the expense of areas once used for agriculture. The shift from paddy cultivation to sub urban and urban uses often involved a wasteful use of land. Tiny plots of converted land remained idle for many years before houses are built on them. Likewise, lands attached to rural households waiting for future subdivision or conversion also lie idle and if farmed, less efficiently utilised. This very often led to unprofitability of paddy cultivation.

Conclusion

The causes and consequences of shifting of paddy cultivation followed by a decline in the area under paddy crop are so complex and inter related that it is difficult to classify and isolate individual factors. All sectors of the economy have been affected by this type of transformation. Decline in the number of persons engaged in farm-related activities, shift of employment opportunities from women to men, migration of rural labour in search of work, withering away of traditional and local institutions, commercialisation of agriculture etc are all features of this transformation.

CHAPTER VII

FARM SIZE AND PRODUCTIVITY

CHAPTER VII

FARM SIZE AND PRODUCTIVITY

The advantages of large and small farms have been debated for at least a century in academic as well as non- academic circles. Size of farm is a vital element in determining the income of the farmer and also the efficiency of a farm unity. In this context, the analysis of the primary data collected from the study area is presented to examine the statistical validity of the relationship between farm size and productivity[1]

7.1.Variable Cost – Size-wise

The analysis of variable cost has not taken size of farm into consideration. It does not therefore tell us the variations in the cost, if any in the farms of different size groups. Thus an attempt is made here to look into the variable cost, according to farm size, the size group being, 0 to 0.25 ha (class I), 0.25 to 0.50 ha (class II), 0.50 to 1 ha (class III) and 1 ha and above (class IV). The size-wise relationship between farm size and inputs used is explained in the Tables 7.1, 7.2 and 7.3. These tables give the average quantum of inputs per hectare used by Ayacut and Non-ayacut farms, according to the size.

Table 7.1.

Average Quantum of Input in All Farms (Size-wise)

Inputs	Class I	Class II	Class III	Class IV	All farms
Seed	151.26	111.95	89.42	84.43	107.24
Ploughing	11.39	8.34	9.17	8.62	9.16
Organic	253.92	247.43	103.92	98.62	179.70
Inorganic	205.30	134.44	108.49	103.15	133.63
Protection	2.17	1.18	1.06	0.92	1.27
Labour	115.56	85.16	84.28	75.12	88.24

[1] Different studies relating to Farm size and productivity is given in Chapter II

Table 7.2.

Average Quantum of Input in Ayacut Farms (Size-wise)

Inputs	Class I	Class II	Class III	Class IV	All farms
Seed	122.48	100.02	86.36	67.36	94.65
Ploughing	10.09	7.01	6.56	7.23	7.50
Organic	242.78	240.31	112.08	96.17	184.25
Inorganic	192.84	132.01	105.79	93.52	129.49
Protection	2.00	0.92	0.87	0.85	1.09
Labour	104.18	86.10	94.57	81.06	90.22

Table 7.3.

Average Quantum of Input in Non –ayacut (Size-wise)

Inputs	Class I	Class II	Class III	Class IV	All farms
Seed	214.22	140.14	90.85	116.44	129.47
Ploughing	14.37	14.15	13.10	11.28	13.11
Organic	280.96	280.13	91.82	103.41	168.65
Inorganic	235.55	145.57	112.51	121.91	143.69
Protection	2.59	2.39	1.33	1.06	1.72
Labour	143.21	80.87	69.04	63.56	83.41

The Table 7.1 reveals that in all farms, the average quantum of labour inputs used is 88.24 man days. It was highest in class I and lowest in class IV. In Ayacut farms, the average quantum of labour used is found to be the highest (104.18) in class I and lowest in (81.06) in class IV compared to the average quantum of labour used in all farms (90.22). In class II and class III, the average quantum of labour used varies around the all farms average. In Non-ayacut farms, class I and class II used, higher quantum of human labour than class III and class IV. This shows that in Ayacut and Non-ayacut farms, as farm size increases, the quantum of labour input decreases. This may be due to the intensive use of labour saving machine in these farms. It is contended that most farmers having small farms- both Ayacut and Non-ayacut – cannot afford to spare capital out of their own savings to buy machines. The average quantum of input such as, seed machine labour, manures, fertilizers and plant protections used in all farms shows, an inverse relationship between size of farms and inputs used. This inverse relationship is seen in both Ayacut and Non-ayacut farms. This explains the intensive application of inputs by small size farms.

The cultivation expenses incurred by different size groups of the sample farms in general are given in Table 7.4. An inverse relationship between farm size and the cost of inputs used is found to exist in the study area. Both Ayacut and Non-ayacut farms exhibit the same trend. (Table 7.5 and Table 7.6). The analysis reveals that large size farms are more economical in working and conducive to greater efficiency than small farms. It is because large farms enjoy economies of production, management, finance and marketing.

Table 7.4.

Size-wise Variable Cost per Hectare in General

Inputs	Class I	Class II	Class III	Class IV	All farms
Seed	1815.1	1343.4	1073.0	1013.2	1286.9
Ploughing	3358.9	2461.1	2704.5	2543.6	2701.8
Organic	4570.5	4453.8	1870.6	1775.2	3234.6
Inorganic	3695.3	2419.9	1952.9	1856.7	2405.3
Protection	1879.7	1024.1	913.6	798.7	1099.7
Labour	14445.2	10645.3	10535.5	9389.9	11029.7
Total	29764.8	22347.5	19050.0	17377.2	21758.1

Table 7.5.

Size-wise Variable Cost per Hectare in Ayacut Farms

Inputs	Class I	Class II	Class III	Class IV	All farms
Seed	1592.2	1300.2	1122.7	875.7	1230.4
Ploughing	3025.6	2102.8	1967.0	2170.4	2248.9
Organic	4370.1	4325.5	2017.4	1731.0	3316.5
Inorganic	3471.1	2376.2	1904.2	1683.3	2330.8
Protection	1733.2	796.6	752.9	737.1	941.2
Labour	13022.0	10762.2	11820.7	10131.9	11278.0
Total	27214.1	21663.6	19584.9	17329.4	21345.7

Table 7.6.

Size-wise Variable Cost per Hectare in Non-ayacut Farms

Inputs	Class I	Class II	Class III	Class IV	All farms
Seed	2356.4	1541.5	999.3	1280.8	1424.2
Ploughing	4168.3	4104.7	3797.9	3270.2	3802.6
Organic	5057.3	5042.4	1652.8	1861.3	3035.7
Inorganic	4239.9	2620.3	2025.1	2194.4	2586.4
Protection	2235.6	2067.7	1152.0	918.7	1485.0
Labour	17901.6	10109.2	8629.8	7944.8	10426.5
Total	35959.1	25485.8	18256.9	17470.2	22760.4

The cultivation expenses incurred by different size groups of Ayacut and Non-ayacut farms in the sample are given in Tables 7.5 and 7.6 respectively. In Ayacut farms per hectare cost vary among size groups and the difference in different size groups is noteworthy. As between class I and class II, the difference amounts to Rs.5550.50 while it is Rs.2255.50, in the remaining classes, viz; class III and class IV. If we compare the cost of class I and class II with that of class III and class IV, it may be seen that , the farm size coming under class I and II spend a higher amount per hectare than the size of farms coming under class III and IV, the difference in cost being Rs.11963.40. The cost per hectare in Non-ayacut farms displays the same trend i.e. as farm size increases average cost per hectare comes down. The difference between class I and class II in Non-ayacut farms comes to Rs.10473.30, where as it is only Rs.786.70 as between class III and class IV. Thus in the Non-ayacut farms, per hectare cost variation among different size groups is more significant. The per hectare cost difference of class I in Ayacut and Non-ayacut farms comes to Rs.8745.00, whereas it is only Rs.140.80 as between class IV of Ayacut and Non-ayacut farms. Taking all farms together, the cost per hectare of Non-ayacut farms (Rs.22760.40) are found to be higher than Ayacut farms (Rs.21345.70).

Among major items of cost, the expenditure on human labour figures prominent in all size groups, both in Ayacut and Non-ayacut farms. It is seen that Ayacut farms used more human labour than those in Non-ayacut farms (Tables 7.5 and 7.6). Ayacut farms of class III have used more human labour than class III of Non-ayacut farms and in Ayacut farm itself class I and class III have used more human labour than class II and class IV. The Non-ayacut farms show that class I and class II have used more human labour than class III and class IV, the difference between class I and II being Rs.7792.40, whereas it comes to Rs.2259.8 in the case of Ayacut farms. Though Ayacut farms spend more on human labour per hectare, the difference between class I and class II is greater in Non-ayacut farms.

One inference is that small size farms in both Ayacut and Non-ayacut have relied heavily on human labour for their farm activities than on machine labour. This is due to uneconomic size of holding and high cost of machine labour. The analysis also reveals the fact that, large size farms are more economical in working and conducive to greater efficiency than small farms. It is because large farms enjoy economies of production, management, finance and marketing, which can reduce cost, at the same time increase efficiency. An inverse relationship is found to exist between farm size and labour cost. i.e. class I and class II farms have used more human labour than that of class III and class IV.

Another feature, which is noticed, is the heavy expenditure on plant protection measures incurred by Non-ayacut farms in general and class I and class II in particular compared to that of class I and class II in Ayacut farms, the difference being Rs.502.4 and Rs.1271.1 respectively. This again shows the reliance of class I and class II on plant nutrients.

The farms in general used more hybrid seeds, which necessitated the use of pesticides, insecticides and weedicides on a large scale. Thus in the case of pesticide use, the expenditure on all farms varied from Rs.798.70 (class IV) to Rs.1879.40 (class 1) the difference being Rs. 1080.70. In the absence of proper training the farmers in Non-ayacut farms could not able to reduce the use of pesticides and so there is no significant difference between Ayacut and Non-ayacut farms in this regard. The difference is only Rs. 543.8. Since the interest on working capital forms only a small fraction of the average variable cost, size-wise cost is not done.

7.2. Fixed Cost

Table 7.7 sets out information regarding fixed cost per hectare by farm size for Ayacut and Non-ayacut farms. Two significant points emerge from this table. One is that, per hectare fixed costs in different size categories of Non-ayacut farms are higher, compared to corresponding costs in different size groups in Ayacut farms. This is because of high concentration of farm assets in Non-ayacut farms, especially for irrigation and partly because of high rate of leasing in land. Secondly fixed cost per hectare tends to decrease from smaller size group as we move to large size groups. As for instance, the fixed costs for all farms were seen to range between Rs.1872.9 and Rs. 1001.8, in the size group of class I and class IV .and between Rs.1299.7 and Rs. 918.5 in the size group of class I and class IV for Ayacut farms the corresponding figures in Non-ayacut farms are Rs.3265.2 and Rs. 1163.9.

Table 7.7.

Average Fixed Cost in Ayacut and Non- ayacut Farms (size-wise)

Size of farm	Ayacut	Non-ayacut	General
Class I	1299.7	3265.2	1872.9
Class II	1229.8	3045.8	1554.8
Class III	1459.0	1942.9	1653.9
Class IV	918.5	1163.9	1001.8
All farms	1233.5	2227.2	1523.2

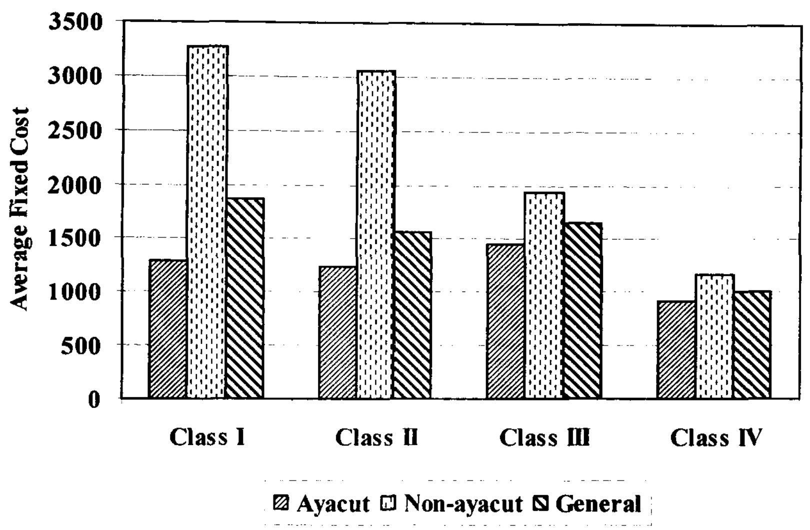

Figure 7.1. Average Fixed Cost (Rs.) in Ayacut and Non-ayacut Farms

7.3. Total Cost of Production per Hectare

Table 7.8.

Total Cost of Production in Ayacut and Non -ayacut Farms (Size-wise)

Size of farm	Ayacut	Non-ayacut	Difference between Ayacut and Non-ayacut (%)	General
Class I	28513.8	39224.3	37.56	31637.7
Class II	22893.4	28531.6	24.63	23902.3
Class III	21043.9	20199.8	-4.01	20703.9
Class IV	18247.9	18634.1	2.12	18379.0
All farms	22579.2	24987.6	10.67	23281.3

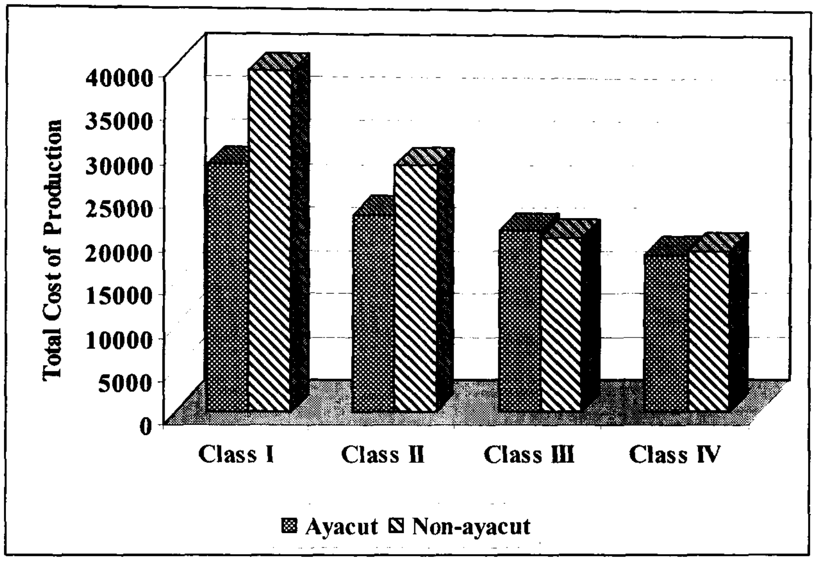

Figure 7.2. Total Cost of Production (Rs) in Ayacut and Non-ayacut Farms

It is significant to note that in the lower two classes the total cost of production in Non-ayacut farms are found to be higher than that of Ayacut. Class I shows a 37.6 per cent increase where as the percentage increase in Class II was 25 per cent. The cost of production of different size groups of Non-ayacut and Ayacut shows difference. Class III and Class IV shows that the difference in the cost of cultivation in Ayacut and Non-ayacut farms are less than 5 per cent. The cost of cultivation of Class III in Ayacut farms (Rs. 21043.9) is slightly greater than Non-ayacut farms (Rs. 20199.8).

7.4. Cost of Production of Paddy per Quintal

The size-wise analysis of cost of production of paddy per quintal is worked out to get a clear picture about the efficiency of different size groups in Ayacut and Non-ayacut farms. The cost of production per quintal of paddy in the different size groups of Ayacut and Non-ayacut are given in Table 7.9.

Table 7.9.

Cost of Production of Paddy per Quintal in Different Size Classes of Ayacut and Non- ayacut Farms (In Rs)

Size of farm	Ayacut	Non-ayacut	General
Class I	54.08	59.72	55.72
Class II	39.99	68.57	45.10
Class III	38.68	34.70	37.08
Class IV	33.55	37.70	34.96
All farms	40.95	47.14	42.76

Above table gives that in general there is a trend of decreasing production per quintal from class I to Class IV. In the case of Ayacut farms also the higher production per quintal was observed in Class I and lowest in the Class IV. But in the case of Non-ayacut farms highest production per quintal was observed in Class II (68.57 quintal) and lowest in Class III (34.70 quintal).

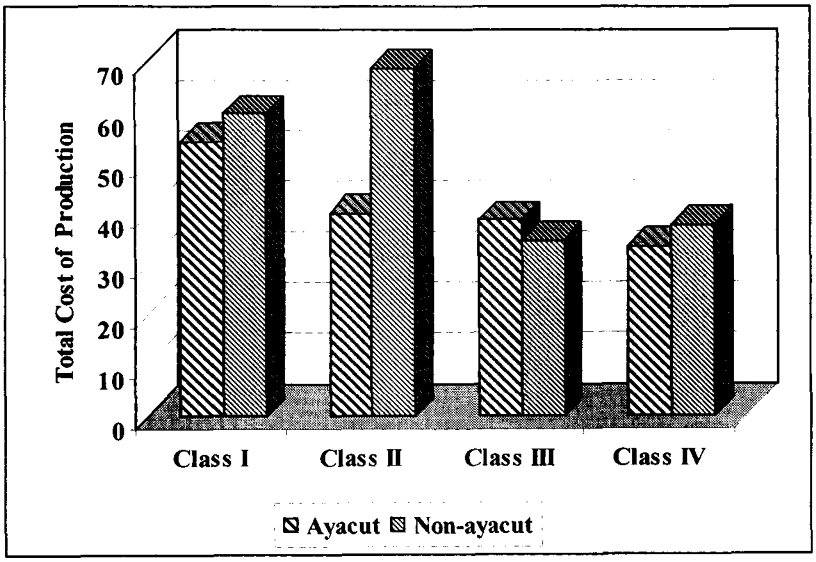

Figure 7.3. Total Cost of Production (Rs) per Quintal in Ayacut and Non-ayacut Farms

7.5. Income analysis

The size-wise analysis of yield of paddy, gross income and net income is given in the Table 7.10.

Table 7.10.

Yield from paddy, Gross Income and Net Income (Ayacut and Non-ayacut)

	Size class	Yield/ha	Byproduct/ha	Gross income	Net income
Ayacut	Class I	35150.1	8113.3	43263.4	14749.6
	Class II	25993.1	4020.3	30013.4	7120.0
	Class III	25141.9	3561.4	28703.3	7659.4
	Class IV	21808.5	2898.1	24706.5	6458.6
	Total	**26617.6**	**4426.1**	**31043.7**	**8464.4**
Non ayacut	Class I	38815.6	6622.8	45438.4	6214.1
	Class II	44569.7	4085.3	48655.0	20123.4
	Class III	22553.1	3583.5	26136.7	5936.9
	Class IV	24506.8	4263.9	28770.7	10136.6
	Total	**30642.7**	**4393.8**	**35036.4**	**10048.9**
All farms	Class I	36219.2	7678.6	43897.8	12260.1
	Class II	29317.3	4031.9	33349.3	9446.9
	Class III	24099.2	3570.3	27669.5	6965.6
	Class IV	22724.0	3361.5	26085.4	7706.5
	Total	**27791.0**	**4416.6**	**32207.6**	**8926.3**

Considerable difference in yield rates is observed as between different size groups of Ayacut and Non-ayacut farms. Data on income per hectare from Ayacut and Non-ayacut farms of different size groups reveals more important and interesting results on the comparative advantages. If all the farms taken together, the net income decreases from class I to Class IV. The same trend was observed in the case of Ayacut farms. But in the case of Non-ayacut farms the higher net income was observed in the case of Class II and lowest was observed in the case of Class III.

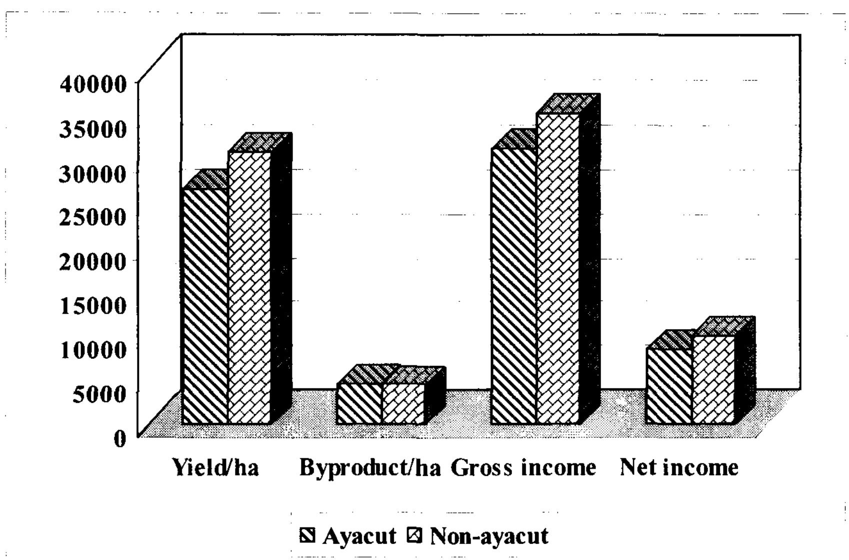

Figure 7.4. Yield from Paddy, Gross Income and Net Income in Ayacut and Non-ayacut Farms

7.6. Benefit - Cost Analysis

Size-wise benefit-cost ratios show the returns per rupee on cultivation. Both for Ayacut and Non-ayacut farms, benefit-cost ratios are more than one in all the size groups. In the class I and Class III the ratio is higher in Ayacut farms (1.52 and 1.36 respectively) than Non-ayacut farms. But in Class II and Class IV the ratio is higher in Non-ayacut farms. But cost benefit ratio is more or less same in both Ayacut and Non-ayacut farms if all the classes taken together.

Table 7.11.

Benefit-Cost Ratio (size-wise)

Size of farm	Ayacut	Non-ayacut	General
Class I	1.52	1.16	1.39
Class II	1.31	1.71	1.40
Class III	1.36	1.29	1.34
Class IV	1.35	1.54	1.42
All farms	1.37	1.40	1.38

Thus the relationship between farm size and productivity worked out for Ayacut and Non-ayacut farms separately in the study area supports the hypothesis of inverse relationship between the farm size and productivity except for Pattambi .There the relationship is found to be significant at 5per cent level of significance.

There are certain unique features related to farm size and productivity in Non-ayacut sample farms. After having a detailed analysis about the farm size and productivity it was found that in all sample farms except Pattambi, there is a close inverse relationship between farms size and productivity. This relationship is tested with regression analysis. Ayacut sample farms in totality support a statistically significant inverse relationship between farm size and output per hectare. In the case of Non-ayacut sample farms the inverse relationship between farm size and productivity is found to existing and it is significant only at 5per cent level. This is especially true in the case of sample farms in Pattambi Block. There we find larger farms are more productive than smaller farms. Exploring the reasons for this kind of relationship, it was found that cultivation of paddy in leased lands is seen more in these sample farms. So the farmers have to invest more in paddy land so as to compensate the rent that has to be paid by them to the landlord. When cultivation is done jointly by owner and labour, the labour could enjoy more benefits by sharing the expense as well as produce with the owner. This makes possible to carry on large scale farming by following co-operative principle, which ultimately leads to increase in productivity. Another reason for higher productivity in large sized paddy farms was found to be the existence of Agricultural Research Station at Pattambi. The extension services introduced by Krishi Vigyan Kendra helped farmers to increase productivity. Utilisation of fallow land for cultivation has contributed to the increased productivity.

These results are tested with the help of scatter diagram. The scatter diagram shows no correlation between units and productivity. The units are not all correlated with productivity. The points is found to be clustering instead of spreading to form a linear curve.

The regression model used in this analysis takes the form $Y = aX^b$ where Y is the yield per acre and X is the farm size.

Table 7.12.

The Results of Regression Equation $Y = aX^b$ Taking a = 1

Block	Slope Coefficients	Std. Error	t - Value	R Square
Kollengode	-7.850	1.262	6.220**	.580
Malampuzha	-6.055	.970	6.245**	.375
Palakkad	-4.191	1.004	4.176**	.266
Kozhalmannam	-6.653	.676	9.846**	.673
Ottapalam	-5.618	1.347	4.169**	.392
Pattambi	-3.754	1.445	2.597*	.119

** Significant at 1% level
* Significant at 5% level

By examining the t-values in the above table it was observed that except in Pattambi all the regression coefficient was found to be highly significant. In the case of

Pattambi regression coefficient was significant at 5 per cent level. All the regression coefficients are negative, indicating that as the field size increases yield per ha decreases. R^2 value is very small in the case of Pattambi, which indicate that the influence of farm size on the productivity is very low.

The regression model used in this analysis takes the form $Y = ab^X$ where Y is the yield per acre and X is the farm size.

Table 7.13

The Results of Regression Equation $Y = ab^x$ Taking a = 1

Block	Slope Coefficients	Std. Error	t - Value	R Square
Pattambi	4.241	0.666	6.366**	0.448

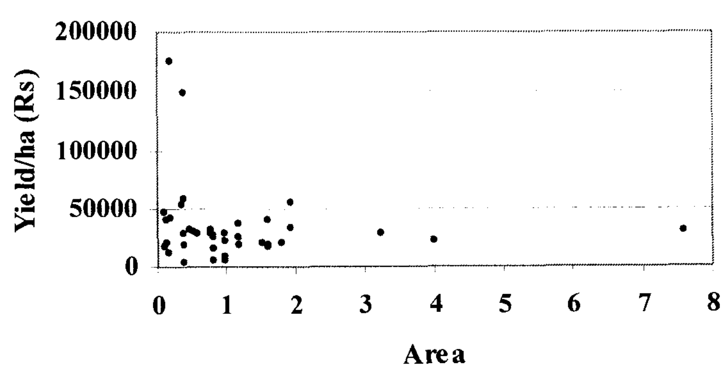

Fig.7.5. Scatter plot for Pattambi

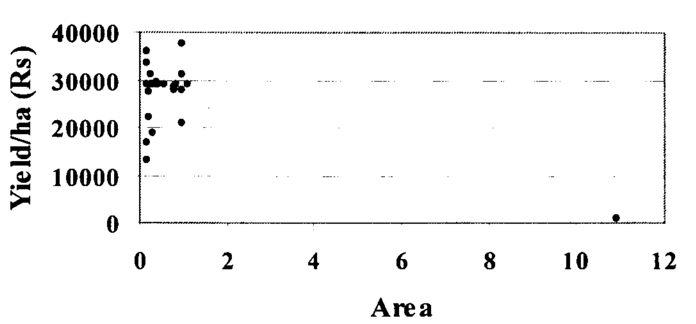

Fig. 7.6. Scatter plot for Ottapalam

Pattambi and Ottapalam units are highly scattered and in the case of Pattambi certain units are showing an inverse relationship. But as a whole there is no linear correlation between farm size and productivity. Inverse relationship always favouring the division of farm units into small size because small size farms are much more productive than large size farms. Over and above this with the increase in population this division of farms and conversion of farms are acceptable due to various reasons. Here the problem of landless agricultural labours can be solved through the division of large quantity of fallow land. The smaller units are much more productive than larger units. This is desirable from the point of view of increasing State Domestic Product (SDP). Another supporting factor is that division and conversion of land will provide a good living for small farmers.

Cobb Douglas production functions were fitted with area of land, cost of seedling, ploughing, labour, organic fertilizer, inorganic fertilizer and plant protection as input variables. The parameters (elasticities) were estimated using method of least squares. Elasticities and the related statistics were given in Table 7.14. Significance of the estimates of the parameters was tested by using t-test.

Table 7.14.

Elasticities of Input Variables of the Production Function Fitted for Ayacut and Non-ayacut farms

Inputs	Ayacut			Non-ayacut		
	Elasticity (B)	SE (B)	t-value	Elasticity (B)	SE (B)	t-value
Farm size	-0.05	0.04	1.466	0.09	0.07	1.389
Seedling cost	0.58	0.07	8.241**	0.49	0.12	3.929**
Ploughing cost	-0.06	0.05	1.362	0.06	0.04	1.704
Organic manure cost	-0.02	0.03	0.712	-0.02	0.03	0.639
Fertilizer cost	0.04	0.01	3.106**	-0.14	0.09	1.509
Plant protection cost	0.06	0.01	6.135**	0.08	0.03	2.564*
Labour cost	0.17	0.05	3.600**	0.56	0.11	5.310**

** Significant at 1% level
* Significant at 5% level

Production functions were fitted for Ayacut and Non-ayacut farms. The elastisities estimated for the input variables, standard error of the elastisities and their t-values are given in the Table (7.14). Significance of t-value indicates that only the elastisities of those input variables are found to be significant. In both the ayacut and Non-ayacut, elasticities of labour cost and seedling cost is highly significant. Plant protection is also having significant role in the case of ayacut farms whereas in Non ayacut area it is significant only at 5 per cent level. Fertiliser cost is significant only in the ayacut farms. Farms size, ploughing cost and organic manure cost has no significant effect on yield of paddy in both the farms.

CHAPTER VIII

MAIN FINDINGS AND SUGGESTIONS

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MAIN FINDINGS AND SUGGESTIONS

In order to identify the current problems and prospects of paddy cultivation in Palakkad District, an investigation of a participatory nature was conducted during the months of March, April, May and June in 2003-04. Its major findings are given in this chapter. The data collected in the survey were analysed and the results interpreted. During discussions with the local people, the researcher came to know that different farm house holds had different perspectives on problems of paddy cultivation and what caused a shift in the farming system. The first part of this chapter discusses the major findings of the survey and a few policy suggestions that emerge from the study to solve some of the problems faced by the paddy farmers are made in the second section of the chapter.

Palakkad District is a land locked district situated in the central region of Kerala. The district economy is predominantly agrarian and has the largest share in terms of the gross cropped area and the area under irrigation in Kerala. However, the district is undergoing a change. Agriculture in the district has certain unique features in the production system and practices. This is due to the particular physiological features of the land and variations in the local environments. The unique features of the agriculture found in the study area are:

1. Paddy cultivation is conducted in areas of diverse conditions, viz., Ayacut and Non-ayacut farms, the deep clayey 'Poonthalpadams' in the Eastern Palakkad and laterite and alluvium soils with rain fed agriculture in Western Palakkad.
2. The homestead system of cultivation with mixed cropping of perennial and annual crops.

3. Utilisation of wet land resource for the cultivation of alternate crops, especially plantain (including banana), tapioca, and vegetables. Multiple cropping is the rule in most of the areas. In certain isolated parts of the study area, farming systems based on banana arecanut, coconut and pepper exist as main crop. Fruit trees form an integral component of the homesteads.

4. Depending on the nature of ownership of paddy fields, paddy farmers in the study area can be grouped into two categories. viz; (a) Farmers who cultivate in their own lands and (b) Farmers who cultivate exclusively in leased holdings

The survey shows that 90 percent of sample farmers in the study area cultivate in their own fields. The proportion of land cultivated by them amounts to 98 % of the paddy lands and the average size of holdings is found to be 0.97 hectares. The remaining 10 percent of sample farmers are cultivating in lands taken on lease and area cultivated by them amounts to 2.31 % of the total paddy fields in the project area. Average size of paddy lands cultivated by these two categories of farmers taken together is estimated to be 0.98 hectares. Taking Ayacut and Non-ayacut farms separately, average size of paddy lands is estimated to be 0.91 and 1.12 hectares respectively.

Block-wise distribution of sample farmers according to the size of cultivated paddy fields is given in Table 4.46.

Proportion of class I (small) paddy farmers are found to be less than those of Class III and Class IV in the study area. Nearly 25 % of the sample farmers are medium farmers who cultivate 0.81 ha of land. The proportion of large farmers who cultivate 1 ha or more of land is found to be 23 %.

Palakkad District is one of the lowest urbanised Districts in Kerala and it has the highest Scheduled Caste and Scheduled Tribes population in the State[1]. Paddy is the major crop covering half of the total cropped area. But being a labour intensive and comparatively less remunerative crop, paddy is giving way to plantain, coconut, tapioca and rubber. Double cropped paddy fields are being widely converted for planting coconut. Decline in area is the result of keeping paddy land fallow or converting it for other agricultural and non agricultural purposes. Increased pressures on land push up land prices which in turn induces paddy farmers to sell their plots. The prices of agricultural products and of inputs will have a bearing on the type of crops and the acreage allocative decisions are influenced by the current and the expected rates of profits.

Not only the farm prices but also the availability of inputs and their prices influence the farmers to convert their paddy fields for other uses.

Labour Requirement and Wages

Maintenance of outer bunds, clearing and leveling of paddy field for sowing, transplanting, weeding, manuring, spraying pesticides, reaping, threshing and winnowing are the major agricultural operations involved in paddy farming. Out of these operations, land preparation, ploughing and spraying of pesticides are done exclusively by male labourers. Irrigation supervising is also done by male labourers. Organic manuring and fertilizer application which were done by male labourer are found to be done by female labourers also. Female labourers are used for weeding and transplanting. In harvesting, nowadays, both male and female labourers are employed. But male labourers are employed mainly to bring reaped paddy to threshing grounds. Threshing (beating) straw was exclusively done by female labourer. Nowadays, it is mainly done by machine labour due to non availability of female labourers. Male labourers are also assisting the female labourers in threshing. It is found that almost all

[1] Scheduled caste =51595, Scheduled tribe = 2812

farmers depend on machine labour for ploughing. The traditional system of ploughing making use of draught animals is rare. Even though threshing machines have been recently introduced in the study area, it has not become popular among the paddy farmers. However, for transplanting, harvesting and winnowing machine labour is applied to a small extent. This is made possible through group farming. Machinery was found to be hired by almost all the respondents, as a few of them owned the machine. Group farming system ensures timely operation by effective utilization of farm machineries. The scope for bank credit for purchase of machinery is very less. Subsidy assistance for tractors and other machineries like threshers are provided to farmer groups or Samithies under the group farming programme for paddy through the Agricultural Department. Paddy Development Agency started functioning more efficiently and has distributed tractors and power tillers to 'Padasekhara Samithies' with 90% subsidy. The analysis shows that group farming Samithies are functioning more effectively in Ayacut farms rather than in Non-ayacut farms.

Paddy farmers in Non-ayacut farms carry on farming operations individually retaining the membership in the PNS. This causes the cost of cultivation to increase. On the other side the group farming along with a scientific approach in paddy cultivation reduces the cost of cultivation and increases the income of the farmers. This is true especially in the case of sample farms in the Kollengode Block. Paddy farmers in this block get a yield of 20 "Meni"[2] (vernacular Unit) per hectare which is due to the successful motivation given by PNS (Table 4.47).

The mechanisation level in the sample farms is not satisfactory. The cost of hiring tractor is found to be low under group farming than individual farming. It ranges from Rs. 280 to Rs. 300 per acre.

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[2] Meni; The ratio of yield in terms of seed

Non-availability of improved tools and equipments, lack of proper facilities for hiring machines and equipments, lack of trained service mechanics and operators especially for thresher, reaper etc. are found to be the major constraints for adoption.

Varieties of Seeds and Manures Used

All the sample farmers in the study area are at present using HYV seeds in their fields. The most popular varieties of seeds are Kunju-Kunju, Aiswarya, Kanakam, Kanjana, Athira, Uma and Jyothi. Variety Uma is mostly preferred for Mundakan. It is also found that 80 per cent of the sample farmers had purchased seeds either from private individuals or from State Seed Farms (SSF). The research institute at Pattambi is innovating new seeds and assures the quality seeds to the farmers. The respondent farmers were asked to list all varieties of their locality and their advantages as well as the disadvantages. The response results indicated that traditional tall indica varieties (Chenkazhama and vellakazhama) are perceived superior to HYVs (Appendix 9).

Since seed production at farmers' level is not done scientifically, the quality of yield is not maintained and the yield gets affected.

Group farming approach in paddy cultivation reduced the cost of cultivation and increased the income of farmers. This is true especially in Kollengode sample blocks. Paddy farmers in these sample farms got 20 Meni (vernacular unit) per hectare because of group farming.

In rain fed low land, 'Koottumundakan' system of paddy cultivation is followed where water is available for two crops. A photo sensitive paddy variety is mixed with photo insensitive paddy variety and sown together. Both direct sowing and transplanting are practiced. The photo insensitive variety is harvested by September – October and the stubbles are retained in the field. The photo sensitive variety comes to harvest by February. This system saves the cost of planting/seeding and other cultural operations.

The first crop is raised as dry seeded crop well in advance of the monsoon. The summer showers obtained during April – May period facilitate the preparation of land and soil. Medium duration varieties are used for this type of crop.

In the rain fed upland, a single crop of paddy is raised which may be followed by vegetables/pulses crops. Medium or long duration variety of paddy is used in this system depending on water availability. Paddy is grown as a transplanted crop using a dry seeded nursery and it is depending on South West monsoon, which normally commence from 1st week of June. Short or medium duration varieties are preferred for this crop eg. Jyothi, Kanchana, Pavizham, Uma and Aiswarya.

The paddy fields after the harvest of second crop remain fallow in all the cases due to water scarcity. It is also found in the survey that 11.6 per cent of sample farms remain fallow after single crop harvest depending upon water availability. Some farmers leave their paddy fields fallow or lease paddy fields to cultivate alternate crops such as vegetable crops like ash gourd, pumpkin, cucumber, cowpea and perennial crop like plantain/banana. Multiple cropping is found to exist in both Non-ayacut and Ayacut sample farms where a number of perennial and seasonal crops are grown together for optimum utilisation of resources and maximising income (Table 4.49).

In Ayacut sample farms, HYV coverage is better. Ten or more varieties are cultivated during Virippu and Mundakan. During Virippu about the 90 per cent of the area is covered by short and medium duration HYVs. During Mundakan the coverage of short and medium duration HYVs is comparatively less (60% of the area). The variety cafeteria used by the farmers in the sample Blocks during the survey period is given in Appendix 9. Among the long duration varieties, vellakazhama is having the highest preference followed by Sulochana & Kanchana.

Cultivation of Nentran banana is found to be an important activity in the project area. Insufficient application of organic manures, imbalance in use of chemical fertilizers and loss due to pests and diseases are the problems identified. Paddy land is used to raise crops other than paddy, the most important among other crops being plantain/ banana (Table 4.49). This is seen in both Ayacut and Non-ayacut farms.

The analysis shows that the study area is heavily depending upon chemical fertilizers in order to maintain productivity. Present study shows that while the entire sample of paddy farmers is using chemical fertilizers only 87.1 % of them use organic manure. In the study area, 133.63 kg of chemical fertilizers are used per hectare of paddy land, to raise a single crop. The analysis shows that per hectare application of chemical fertilizers is highest in Non-ayacut. On an average per hectare use of chemical fertilizers in the villages of Eastern block is 129.49 kg. In general the adoption of the soil test based fertilizer recommendation is very poor due to several reasons.

Irrigation

Since the district is having three major irrigation project i.e., Malampuzha, Chitturpuzha and Kanjirapuzha, canal irrigation system dominates in the sample farms. It is also found that the study area accounts for the largest area under irrigation among various districts in the State (Appendix 7). The potential for the minor irrigation in the district includes surface water irrigation and the ground water exploitation by construction of irrigation structures. Since the study area has got a net work of rivers and streams, the position of surface water resources available for irrigation is very good. Apart from the land irrigation system, there are 40 lift irrigation installations, providing irrigation facilities to cash crops and paddy fields in the valley and elevated places. But each stage of ground water development is found to be low in the study area (Table 4.30). The low level of ground water exploitation is on account of the extensive cropped area being irrigated by canals and lift irrigation schemes. It is observed from the analysis that all the sample farms have good potential for ground water development. Besides major and minor irrigation projects, the paddy farmers in the sample farms depend on private sources of irrigation, viz. wells, tanks, ponds etc. (Appendix 10). The paddy farmers depend mainly on private source of irrigation. Ponds constitute the significant source of irrigation. It is found that sample farms in Non-ayacut area solely depend on private source of irrigation. Therefore the average variable cost of irrigation is found to be higher in Non-ayacut farms. This is due to high cost on electricity and delay in energisation of pump sets by Kerala State Electricity Board (KSEB). 62103.5 hectare of land is found to be under CADA which is an additional benefit enjoyed by the paddy farmers of Ayacut area (Appendix 7) In spite of all these, water scarcity was the main problem faced by farmers. This is especially true in the case of Non-ayacut sample farms.

The major problems in irrigation management found in the sample farms are:

1. Under the individual farming system, common water resources are poorly maintained while under the group farming system effective irrigation is found to be possible. There was centralized and uniform water supply to each field.
2. Competitive deepening of wells increases both private and social costs of water and yet there is great unwillingness on the part of farmers to try out cooperative ownership and operation of wells especially in Non-ayacut farms.
3. Ground water table is seen to be lowering in the study area. Under conditions of lowering water tables, the smaller farmers are put to increasing disadvantages in securing access to ground water.
4. Poor preparatory investigation, delay in completion due to inadequate funding and lack of any pressure for economic use of time and resources have become endemic features of public sector irrigation projects.
5. A large area suffers from the problem of water logging which necessitates huge amount of money for reclamation purpose.

A significant problem found in the analysis is the low reliability of irrigation projects for timely supply of water.

Over all economics of paddy cultivation in the study area shows a high degree of variations in total cost of cultivation among the blocks and also between Ayacut and Non-ayacut farms. The cost of cultivation per hectare in Non-ayacut farms is found to be higher, cost being Rs. 22579.20. On an average Non-ayacut farms incurred 10.67 % more cost than the Ayacut farms (Table 5.4).

The cost of production of paddy per quintal was found to be higher in Ayacut farms than in Non-ayacut (Table 5.9).

Multiple regression equations fitted with total cost as dependent variable and Labour cost, Cost of organic manure, Cost for Plant protection, Machine labour, Cost of fertilizers and seed cost as independent variables indicates that more than 80 per cent of the variation in total cost was explained by labour cost both in Ayacut and Non-ayacut farms.

The average yield per hectare in Ayacut farms was found to be 41.93 quintal while it was 47.14 quintal in Non-ayacut farms. The gross income per hectare amounted to Rs. 31682.40 in Ayacut farms as against Rs. 35036.50 in Non-ayacut farms.

An inverse relationship between farm size and cost of inputs is found to exist in the study area. Both Ayacut and Non-ayacut farms exhibit the same trend. This means that large sized farms are more economic in working and conducive to greater efficiencies than small farms.

The size-wise analysis of cost of production of paddy per quintal shows that in general, there is a trend of decreasing production cost per quintal from Class I to Class IV. But in the case of Non-ayacut farms, highest production per quintal was observed in Class II and lowest in Class III.

If all the farms are taken together, the net income decreased from Class I to Class IV. The same trend is observed in the case of Ayacut farms. But in the case of Non-ayacut farms higher net income was observed in Class II and lower in Class III.

Production function with area of land, seedling, ploughing, labour, fertilizers, and plant protection also indicate that yield is mostly influenced by labour cost both in Ayacut and Non-ayacut farms.

The average net income per hectare worked out to Rs. 9103.20 for Ayacut farms and Rs. 10048.90 for Non-ayacut farms (Table 5.7).

The Benefit cost ratios in Non-ayacut farms were found to be marginally higher than those in Ayacut farms. The ratio is highest in Palakkad and Lowest in Malampuzha. Further, the ratio is highest in Class IV for Non-ayacut and for Class I in Ayacut farms.

Comparative analysis regarding the per hectare profit and profitability of paddy crops and four of its alternate crops namely, coconut, tapioca, plantains and mixed crop invariably shows that paddy cultivation is relatively less remunerative in the study area. It is found that profitability for plantain is the highest and it is lowest for paddy. Thus the analysis shows that one of the prime causes for the conversion of paddy fields for the cultivation of alternate crops in the study area is the comparative advantage of alternate crops over paddy in terms of profit and profitability.

However, paddy farmers expressed their anxiety and worry regarding the future of paddy cultivation. The opinions of the sample farmers are classified and analysed which are summarised below;-

- As a whole, paddy cultivation is found to be profitable except in Malampuzha Block where a few selected paddy farmers got negative returns from their cultivation.

- It is unprofitable and unremunerative in the sense that almost all paddy farmers' expectation of profit fell short of their realisation. When they could not achieve what they have calculated or expected to get from the cultivation, they take it as unprofitable.
- 50% of the sample farmer still wishes to continue to cultivate paddy. They find no other occupation which can equal paddy farming.
- 25% of the sample farmers wish to retain the paddy fields because of the personal attachment to ancestral property. These farmers neither want to dispose of it nor keep it fallow, but to cultivate paddy.
- 10% of the farmers prefer cultivating paddy in their own paddy fields in order to avoid the consumption of adulterated and low quality rice from outside.
- 15% of the farmers represent the new generation, both employed and unemployed whose attachment to land as a way of living is found to be reduced .Because of the several problems associated with paddy cultivation like lack of timely availability of agricultural labour and low price of the produce and high cost of cultivation, the employed part time farmers found it better to cultivate paddy only once and keep it as fallow. The young generation's response to farming is found to be negative.

Suggestions

Agriculture in study area still remains the biggest provider of seasonal employment to the largest number of the poor, especially women. The ecological functions of paddy fields like ground water recharge can not be discarded. Severe ecological deterioration has been experienced indirectly by filling low lying paddy fields for construction purposes and also for cultivation of alternate crops, the cultivation of which is considered to be comparatively profitable. So, in order to retain the area under paddy several measures are to be implemented .On the basis of the findings of the study the following suggestions are made for necessary consideration.

- ***Restriction of shifting cultivation***. Shifting cultivation issue should be handled properly while preparing the agricultural development plan for the district. The government must immediately reorient the structure of our age old Land Utilisation Act. So far, the measures taken by the government regarding this has not given desired results due to some loopholes. In some areas it has brought adverse impact on agricultural population. As such it is suggested that the following steps are to be taken to prevent the indiscriminate conversion of paddy land and maintain an equilibrium between the requirements of residential area and cultivable area in the district Wet lands should not be used to grow dry crops as it can harm the very balance of nature. The paddy farmers should be taken care of by providing production bonuses. Any further conversion should not be allowed under any circumstances. All transfers of agricultural land in future should be only to persons who reside in the same village in which the land is located.

- Increase the total cropped area through increase in cropping intensity and bringing under cultivation the fallow and cultivable waste land which accounts for about 33.403 million hectares in the district.

- Prepare a master plan for each Grama panchayath demarcating residential area and cultivable area as is being done in the case of major towns in Kerala. Enforce this master plan strictly so that cultivable area should not be reduced further Also, the paddy fields kept idle should be taken up for cultivation by the PNS registered under the group farming programme of the Department of Agriculture.

- Agriculture should be declared as an industry and appropriate steps should be taken to motivate more and more educated youths to take up farming. Giving subsidy alone will not help to boost production. Paddy Board should come into existence to bring back our loosing paddy land and thereby paddy self-sufficiency.

- Strong safety nets to weaker sections and people below poverty line in rural areas to face problems of marketing and price volatility. To protect the consumers from the exploitation of unscrupulous traders and middlemen, regulated markets should be setup in Grama panchayath with storage facilities so that the farmers can store their agricultural products and wait for a better price later. Proper marketing channels and marketing policies are necessary to increase the cash income of the farmer. From the point of view of regional equity, price supports need be analysed against wide variations between regions in the cost of cultivation of paddy per hectare and per quintal. With rising input costs, the Government will have to take a fresh look at the pricing policy for food grains. Besides, Government, Non-Governmental Organisations, Self Help Groups, Co-operatives and Panchayath will need to play a greater role.

- The existence of a mechanism that can absorb high transportation costs is a must for the lower and middle classes. Increasing the paddy production requires massive investments in rural infrastructure (roads, electricity, irrigation, storage, whole sale and retail markets, up to date market intelligence etc.).

- Promotion of location specific practices based on land suitability analysis should be encouraged and adopted to promote crop diversification and stabilise farmer's income. Multiple cropping systems should be encouraged to boost the production and economy of the farming community .Moreover, the procurement of paddy from the open market by PNS should be supported and encouraged. The procured paddy can be sold to the mills directly and a better price can be ensured to paddy farmers. Dry sowing paddy with pulses as experienced by the farmers under Kulkallur Krishibhavan should be popularised and experienced in other parts of the district also. Proper advice may be provided to the paddy farmers in this direction.

- Considerable reduction in labour requirements can be achieved through selective mechanisation thus to make paddy cultivation economically viable. But large scale adoption of machines in paddy cultivation is possible only through government support to co-operative groups of farmers to make them economically viable and to enable farmers to meet local requirements. So it is essential to formulate a package for adopting mechanisation after conducting a through investigation.

- Increased attention has to be paid to the aspect of fertilizer use efficiency. It is only through increased efficiency that the cost of production could be reduced. Suitable implements and tools are yet to become available. Organic, inorganic and bacterial fertilizers need to be used in a supplementing and complementing manner and it is only then that soil fertility can be maintained indefinitely and enhanced so as to produce increasing agricultural commodities

- The District has enormous potential of developing ginger and turmeric cultivation, plantation of fruit trees, live-stock and dairy farming, goat farming and rearing of milk cows. By developing these potentials the paddy farmers could compensate the loss incurred in paddy cultivation due to natural hazards.

- Government must encourage "flat" system so that pressure on land will be less. Rent controls would help to make the cost of rising housing expenses borne by landlords. Thus the conversion of paddy fields for non- agricultural purposes, especially for construction purposes can be controlled.

- The rain fed area is denied of the advantages of CADA and their kerosene permits are cancelled. So to compensate the lack of larger irrigation projects the rain fed areas should be treated preferentially. Highest priority should be given to the completion of all unfinished irrigation projects.

- The rainfall gauges should be extended to all regions. The information about the monthly rainfall for the entire year can be made use of in understanding the water availability pattern. Instead of the monthly rainfall sub-regional level weekly rainfall analysis will have to be done so as to suggest the growing of two crops in the area instead of one long duration crop.

- Efforts must be done to understand the water requirement of each crop and conserve water and check soil erosion. Efforts must be done to conserve water by constructing check dams and storing water in ponds and reservoirs. Storing the rain water in the soil by preventing the run off to the maximum extend possible is the solution of the problem. Research programme will have to be drawn up keeping this objective in view so that much can be achieved with regard to increasing agriculture production through rain-fed agriculture by adopting better water management practices.

- Necessary steps should be taken to regulate extraction as well as replenishment of ground water. Conveyance losses could be minimised to a great extent by lining the canals and keeping the canals free from aquatic weeds. Steps should be taken to maintain the canals and ensure better irrigation efficiency. The farmers are required to be educated and prepared for participation in making the required decisions and implementing these decisions.

- Cropping patterns along with water management schedules should be worked out and implemented for different regions to ensure maximum water use efficiency. The delivery of water has to be decided considering the rainfall during the current seasons. The crop variety must be selected considering the water available for irrigation.

- More studies are necessary to understand the level of water use efficiency in different regions.

- Paddy cultivation can be sustained only by attracting younger generations to the farms, by introducing appropriate mechanical practices, which would reduce drudgery, improve timeliness of operations and provide attractive wages to farm workers.

- The Government should take proper steps to create awareness regarding the ill-effects of pesticides and propagate the adoption of alternate method of pest control with the help of mass media programme.
- Soil fertility can be built up by using various kinds of manures and fertilizers. Grasses and legumes can be introduced in rotation with cultivated crops, with a view to improving soil properties.
- Identification of suitable equipments and machineries and field evaluation for farmer's acceptance, supply of sufficient machineries on individual basis /group basis, setting up of adequate number of agro-service centres for providing machinery and repairing services, attracting unemployed and rural youth and women entrepreneurs for mechanisation services and repairs, expansion of training facilities, particularly to farmers and labourers. Labourers and effective planning, implementation and co-ordination can go a long way in improving farm mechanization.

Thus it should be reckoned that every inch of our paddy land is precious from the economic point of view of our food security and we should be forewarned against the tendency to convert it to other uses, lured by the new market liberalization process.

CHAPTER IX

SUMMARY AND CONCLUSION

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The agricultural economy of Palakkad is a typical combination of vast drought prone areas, coexisting with regions with assured irrigation, supported by Command Area Development Programme. It is the Granary of Kerala State, as it stands foremost in paddy production. But over the past several years, paddy sector of Palakkad District had shown declining trends, both in area and production, due to many reasons. As a result of high labour demand, the wage rate and resultant cost of cultivation shot up. The adoption of high yielding varieties of seeds and the consequent need for increased use of fertilisers, pesticides, etc. have also contributed towards the increasing cost of cultivation. Because of the comparatively high cost of cultivation and the relatively low value of the produce, the profit margin of paddy cultivation tends to be less. The farmers have to face the uncertainty, arising from natural hazards. At the same time they find that the cultivation of alternate crops is more profitable and less labour intensive. All these factors compel many of the paddy farmers, to think in terms of leaving paddy cultivation. But many of them are not able to leave it all on a sudden, as it is their main traditional occupation and source of livelihood. They are managing to compensate the loss incurred from paddy cultivation by converting a part of paddy land for the cultivation of other more remunerative crops.

The declining trend in the cultivation of paddy would aggravate the food scarcity and non-availability of fodder for livestock, reduce income and job opportunities for agricultural labourers and adversely affect the ground water status of the study area. It is in this context that an intensive study was attempted to investigate into the declining trend of area under paddy cultivation in Palakkad District and to identify the possible factors for shifting from paddy to other alternate crops, along with the implications of such shifting. The study also aimed at analyzing the increasing trend of using paddy land for non-agricultural purposes and leaving land fallow. The cost and profitability of paddy and alternate crops were studied to identify the causes of shifting and its consequences. Farm size – productivity relationship was also examined.

The study was based on two hypotheses, viz; (1) Low profitability of paddy when compared to its alternate crops induced paddy farmers either to keep their paddy fields fallow or shift to the cultivation of alternate crops which are less labour intensive and (2) Small size of per capita holding, part time nature of cultivation and other non-economic factors like the changing outlook of the agricultural labourers and their resultant non-availability for work in paddy fields also forced them to shift from paddy cultivation.

The economics of paddy cultivation has been examined in this study with net returns approach. On the basis of estimated cost of cultivation and the gross income generated, the net returns and the cost benefit ratio were estimated. The relationship between farm size and productivity was examined by estimating a log-linear regression of farm size on productivity.

The study was conducted in two western blocks representing the Non-ayacut region and four eastern blocks representing the Ayacut region of the district. Primary data were collected from 302 sample farm households during 2003-04 of Virippu season. A multistage circular systematic random sampling method was used to select the ultimate units of farm households. Information on sizes of all holdings was collected, with the help of "Krishibhavan Officials" .Pre stratification of the sample was done based on holding size as class I (less than 0.25ha), class II (between 0.25 and 0.50 ha), class III (between 0.5 and 1 ha) and class 1V (above 1 ha).

The overall economics of paddy cultivation showed that of all the inputs, human labour claimed the highest share in the cost of paddy cultivation in the study area. It accounted for 45.81 to 52.83 per cent of the total variable costs in the sample farms. Human labour was found to be predominantly wage labour. Fertilisers and manures accounted for the next highest share in the cost. As between Ayacut and Non-ayacut farms, the former used more quantities of fertilisers and manures than the latter. While as much as 57.35 % of the farmers in the sample have used organic manures in sufficient quantity, others have applied more chemical fertilisers on their farms.

The average cost of cultivation per hectare of Ayacut and Non-ayacut farms worked out to Rs.21345.70 and Rs.22760.40 respectively. The average variable cost of Non-ayacut farms was as much as 6.2 % higher than that of Ayacut farms. A high degree of variation in total cost of paddy cultivation among the blocks and as between Ayacut and Non-ayacut farms was found.

Multiple regression equations were fitted with total cost as dependent variable while Labour cost, Cost of organic manure, Cost for Plant protection, Machine labour, Cost of fertilizers and seed cost as independent variables. In both Ayacut and Non-ayacut farms, more than 80 per cent of the variation in total cost was explained by labour cost.

A size-wise examination of the cost per hectare in general and in Ayacut and Non-ayacut farms in particular, brought out the fact that, the costs of inputs in all cases is having an inverse relation to farm size. As farm size increased, average cost per hectare decreased. Small size farms, both in Ayacut and Non-ayacut farms applied more human labour per hectare. It was also observed that, both in Ayacut and Non-ayacut farms, the fertiliser intake in farms of size I and II was more when compared to size III and IV. In Non-ayacut farms, per hectare cost variation among different size groups was more significant. Production function with area of land, seedling, ploughing, labour, fertilizers and plant protection also indicate that yield is mostly influenced by labour cost in both Ayacut and Non-ayacut farms.

Cost of production of paddy per quintal was worked out in general and size-wise. It shows a comparatively lower cost of production for Non-ayacut than Ayacut farms, being Rs 436.8 and Rs 443.8 respectively.

The income measures in relation to different cost concepts among the farm households showed that net income and cost benefit ratio were higher for Non-ayacut farms.

Comparative analysis of profit and profitability of paddy with four of its alternate crops showed that, paddy cultivation is less remunerative in the study area. Profitability of alternate crops was found to be relatively higher. The proportion of labour cost to total cost was high the case of plantain on an average of all farms. Per hectare profit from plantain was much higher than paddy and other three alternate crops.

The percentage difference in profit from paddy for these four alternate crops were 108.23 for coconut, 1902.57 for plantain, 556 for tapioca and 719.85 for mixed crops. This has resulted in farmers shifting from paddy to plantain and other crops.

Cultivation of Nentran banana is found to be an important activity in the project area. Insufficient application of organic manures, imbalance in use of chemical fertilizers and loss due to pests and diseases are the problems identified. Paddy land is used to raise crops other than paddy, the most important among other crops being plantain/ banana (Table 4.49). This is seen in both Ayacut and Non-ayacut farms.

It is found that sample farms in Non-ayacut area solely depend on private source of irrigation. Therefore the average variable cost of irrigation is found to be higher in Non-ayacut farms. Water scarcity was the main problem faced by farmers. This is especially true in the case of Non-ayacut sample farms.

The study revealed that both on the part of the farmers and the labourers, there is a gradual change in attitude towards agriculture in general and paddy cultivation in particular. The tendency on the side of the labourers for migration to non- agricultural activities especially to construction sector was found to be on the increase. Both the land owner and the worker feel that rice which is used as staple food is freely available in the market without much fluctuation in price. This contributes to some extant to think of avoiding engagement in this crop which requires timely attention at all stages.

The study also revealed that wherever Padasekhara Nellulpadana Samithies are functioning efficiently, the cost of cultivation is low and the yield is more. Cost -benefit ratio is found to be high. The study has also brought to lime light that absence of a strong and dependable marketing system is also working against the cultivators retaining their traditional paddy cultivation and to make them think of shifting from paddy to other crops.

The causes and consequences of shifting of paddy cultivation followed by a decline in the area under paddy crop are so complex and inter related that it is difficult to classify and isolate individual factors. All sectors of the economy have been affected by this type of transformation. Decline in the number of persons engaged in farm-related activities, shift of employment opportunities from women to men, migration of rural labour in search of work, withering away of traditional and local institutions, commercialisation of agriculture etc are all features of this transformation.

But for the problems like difficulties in getting permission under Kerala Land Utilisation Act for conversion, the huge initial investment and the long waiting period for getting profit, the pace at which the paddy fields of the Palakkad granary of Kerala would have been vanishing, could have been much faster.

BIBLIOGRAPHY

BIBLIOGRAPHY

Agarwal, G.D. (1956-57). Studies in the Economics of Farm Management in U.P. Reports for the years 1954-55, 1955-56 and 1956-57, Ministry of Food and Agriculture, New Delhi.

Agriculture Industry Survey. (1998). From food crops to cash crops. Right or Wrong. 211-213.

Ahmed and Bhowmick (1991). Behaviour of Price in Assam. *Agricultural Situation in India.* Vol. XLVI (4), July.

Asok Gulati and Kalra, G.D. (1992). Fertiliser subsidy – Issue related to equity and efficiency, *Economic and Political Weekly*, March – 28.

Bal, H.S. and Singh, G. (1970). Pattern of Income Distribution in Rural areas. Indian *Journal of Agriculture Economics*. 25(1): 81-91.

Bardhan, P.K. (1973). Size Productivity and returns to scale. JPE.

Basak, K.C. and Chowdhiry, R.K. (11956-57). Studies in the Economics of Farm Management in West Bengal. Reports for the years 1954-55, 1955-56 and 1956-57, Ministry of Food and Agriculture, New Delhi.

Berry, R.A. and Cline, W.R. (1979). Agrarian Structure and Production in Developing countries, John Hopkins University. Press, Baltmore. 134p.

Bhalla, G.S. and Chadha, G.K. (1983). Green Revolution and the small Peasants. New Delhi, Concept Publishing Co.

Borboro, S. and Mahanta, R. (2001). District-wise study of Agricultural Production in Assam using Cobb – Douglas Production Function. *Journal of Regional Science*, Vol. 33(1): 33-38.

Central Government Drought relief Agency Report in Mathrubhumi on 28th Aug. 2004.

Chand, R. and Kau, J.L. (1986). A note on the use of Cobb-Douglas Production profit function. *American Journal of Agricultural Economics*. Vol. 68(1): 162-164.

Chanda, G.K. (1978). Farm size and Productivity Revised. Some Notes from experience of Punjab. *Economic and Political Weekly*, Vol. 13(39):

Chaudhari, D.P. (1973). New Technologies and Income Distribution in Agriculture. Lehmann, E.(ed.). Agrarian reforms and Agrarian Reformism London.

Deepak, M. (1963). On the Economics of Relative Efficiency of small Farmers, *Economic Weekly*, Vol. 15(28-30), July.

Dey. A.K. and Rudra, A. (1973a). A Test of Hypothesis of Rational Allocation under Cobb-Douglas Technology, *Economic and Political Weekly*, Vol. 8 (12):March 24.

Dey. A.K. and Rudra, A. (1973b). Crop Allocation Patterns: Spurious Quadratic cost curves, *Economic and Political Weekly*, December 15.

Dyer Graham. (1991). Farm size- productivity reexamined evidence from Rural Egypt. The *Journal of Peasant Studies*, Vol. 19(1): 51-92.

Dyer Graham. (1997). Output per acre and size of holdings: The Logic of Peasant Agriculture under Semi-Feudalism. *Journal of Peasant Studies*. Vol. 24(1,2):128.

Francis Buchavan: A Journey from Madras, through the countries of Mysore, Carnatic and Malabar, Vol, P.447.

George, P.S. (1982). Agricultural Prices Movements in Kerala, Agricultural Development in Kerala, edited by Pillai, P.P.

George, P.S. and Chandan Mukherjee. (1986). Rice Economy of Kerala – A disaggregate analysis of performance, Working Paper No. 213, CDS, TVM.

Ghosh, A.K. (1979). Farm size and Productivity in Indian Agriculture – A Reappraisal. *The Journal of Development Studies*, Vol. 16(1): 27-49.

Ghosh, M. (1980). Farm size-Productivity Nexus under Alternative Technology. Indian *Journal of Agricultural Economics*.

Gopinathan, C. and Sundaresan, C.S. (1990). Cropping pattern changes and Employment Effects in selected Districts of Kerala, Centre for management Development, TVM.

Government of Kerala, (1972). Report of the Kuttanad Enquiry Commission 1971, Govt. Kerala, TVM.

Government of Kerala, (1993). Economic Review 1992; SPB, TVM.

Hanumanth Rao, C.H. (1966). Alternative Explanations to the Inverse Relationship between Farm size and output per acre in India. *The Indian Economic Review* (New Series), Vol. 1(2): October.

Hati, A.K. and Rudra, A. (1973). Calculation of Efficiency Indices of Farms: A Numerical Exercise. *Economic and Political Weekly*, Vol. 8 (13):

Heady, E.O. and Sircar, P.K. (1983). Size – Productivity and returns to scale. *Agricultural situation in India.*

Hopper, W.D. (1965). Allocation Efficiency in Traditional Indian Agriculture, *Journal of Farm Economics*, V 46 (3): August.

Jaikrishna, (1972). Agricultural Prices: Problems and Policies, *Indian Journal of Agricultural Economics*, Vol. 27(2): 76-81.

Janvry, A.D and Kumar, P. (1981). The transmission of cost inflation in Agriculture with subsistence Production – A case study in North India, *Indian Journal of Agricultural Economics.* Vol. 36(3): 1-15.

Jeemol Unni (1981). An analysis of change in the cropping pattern in Kerala with particular reference to the substitution of coconut for rice1960-61 to 1978-79, (M.Phil Dissertation), CDS, TVM.

Johnkutty, I., Meagle Joseph and Prasanna, K.P. (2004) Problems and prospects of rice production in Palakkad. Kerala Agricultural University, Vellanikkara. 40p.

Joseph, C.J. (1984). Economics of minor Irrigation in Kerala – A case study, Ph.D. Thesis, Calicut University.

Joseph, K.V. (1989). Stagnation of the Agricultural Sector in Kerala, *Yojana*, October, 16-31.

Kannan, K.P. and Pushpangadan, K. (1988) Agricultural Stagnation in Kerala- An exploratory Analysis, *Economic and Political Weekly*, Vol. 23(39): A.120-128.

Kannan, K.P. and Pushpangadan, K. (1990). Dissecting Agricultural Stagnation in Kerala – An analysis across crops, Seasons and Regions. Working Paper No. 238, CDS, TVM.

Kareem, C.K. (1976). Kerala District Gazetteers, Palakkad, Govt. Press, Ernakulam

KAU, (1981a). Cost of cultivation and economics of paddy in Kerala 1978-79. July

KAU, (1981b). Cost of cultivation and economics of paddy in Kerala 1979-80. July

Kerala Agricultural University. (1989). Recommendations for group Management in Farming. Directorate of Extension.

Kerala State Planning Board. (1975). Minor Irrigation in Kerala – An Evaluation Study, Evaluation Series. 22

Kerala Statistical Institute. (1994). Conversion of paddy Land, Thiruvananthapuram.

Khusro and Saini (1964). Returns to one Variable Input

Khusro, A.M. (1964). Returns to scale in Indian Agriculture, Indian Journal of Agricultural Economics, Vol. 19 (3 & 4) July – December.

Krishna Bharadwaj. (1975). Production conditions in Indian Agriculture. Oxford University Press, New Delhi.

Krishna Iyyer, K.V. (1967). Presumes that, the name Palakkad might have derived from the word Parakkad (Para – granite stone and Kadu – forest). Mathrubhumi weekly, dated October 29th 1967

Kuttappan, M. (1979). Coconut Production in Kerala – An Economic Analysis, Ph.D. Thesis, University of Kerala.

Lalithabhai, (1993). Constraints in Productivity growth in Kerala Agriculture, a micro level study. Unpublished M. Phil Thesis, J.N.U. New Delhi

Lau, I.J. (1976). A characterisation of the normalized Restricted Profit Function. *Journal of Economic Ttheory*. Vol. 12 (1)

Lau, I.J. (1978). Application of profit function in M.Phil and Daniel McFadden (eds) Production Economics. A dual Approach to Theory and applications, North Holland, Amsterdam, 133-215.

Mani, K.M. (1998). Kerala Agriculture, Development as Ever? Upon outside food supplies.

Md. Abdul Wadub and Ben, W. (2002). The determinants of Technical Inefficiency of Farms in Bangladesh. *Indian Economic Review*. Vol. 37(2): 183-197.

Michael Todaro (1981). Economic Development in the third world. Pongman, Newyork, 262p.

Muraleedharan, P.K. (1982). Resource Use Efficiency in Rice Cultivation in Low Lying Lands in Kerala, Pillai, P.P.(ed.) Agricultural Development in Kerala, Agricole Publishing Acadamy, New Delhi, 147-153.

Naik, B.K. (1965) Production function of sample village. *Indian Journal of Agricultural Economics,* Vol. 20(3), July-Sept.

Nambiar, A.C.K. (2000) Determinants of rural wages, An Enquiry Across Occupations. NLI Research Studies Series No. 009/2000

Narayana, D. (1983). Linking Irrigation with Development – The Experience, ELW, November, 5-12.

Narayana, D. (1990). Agricultural Economy of Kerala in the past seventies – Stagnation or Cycles, Working Paper No. 235, CDS, TVM.

Narayana, D. and Nair, K.N. (1989).Trends in Area, Production And Productivity of coconuts in Kerala, *Indian Journal of Agricultural Economics*, Vol. 44 (2): April June.

National Council of Applied Economics Research. (1962). Techno-Economic survey of Kerala, NCAER Report, New Delhi.

NelVayal Samrakshana Samithy' (1998). Cost cultivation

Ninan, K.V. (1984). Labour Use in Agriculture – Case studies of Tapioca and Paddy. *Economic and Political Weekly*, Vol. 19 (52&53): A. 199-204.

Nulty, L. (1972). The Green Revolution in West Pakistan, Implications of Technological Change, NewYork.

Ommen, M.A. (1994). Land Reforms and Economic Change, In B.A. Prakash (ed.), Kerala Economy Ibid, 117-140.

Panikar, P.G.K. (1980). Recent trends in the area and production of Rice in Kerala, Working paper No. 116, CDS, TVM.

Panikar, P.G.K. (1981). High yielding varieties of Rice – A study of selected areas in Kerala, Working Paper No. 140 CDS, TVM.

Parikh, A. (1966). Rates of returns on chemical Fertilisers in the package programme district. *Indian Journal of Agricultural Economics,* Vol. 20 (2), April – June.

Pillai, P.P. (1967). Rice Production in Kerala – An Econometric Study. Indian Statistical Institute, Planning Unit, New Delhi.

Pillai, P.P. (1982). Agricultural Development in Kerala. Agricole Publishing Acadamy, New Delhi.

Pillai, P.P. (1994). Kerala Economy – Institute of Planning and Applied Economic Research, John Mathai Foundation, Aranattukara, Thrissur, 59-101.

Pillai, V.R. and Panikar, P.G.K. (1962-63). Studies in economics of farm management in Kerala, Ministry of Food and Agriculture, New Delhi.

Pillai, V.R. and Panikar, P.G.K. (1966). Land reclamation in Kerala, Asia publishing House, Bombay.

Prakash, B.A. (1993). Unemployment in Kerala - Problems and Policy options. Department of Economics, University of Calicut, Fr. John Mathai Centre, Thrissur, November.

Prakash, B.A. (1994). Kerala Economy; Performance of rice crop in Kerala, sage Publications.

Prakash. E.A. (Ed.). (1994), Kerala Economy, An Overview – Sage Publications, New Delhi.

Pushpangadan, K. (1990). Agricultural Stagnation in Kerala – An Econometric Study of Tapioca, Working Paper No. 226, CDS, TVM.

Pushpangadan, K. (1992). Wage determination in a casual labour Market – The case of Paddy Field Labour in Kerala, Working Paper No. 234, CDS, TVM.

Radhakrishna, V., Thomas, E.K. and Jessy Thomas (1994). Performance of rice crops in Kerala, in B.A. Prakash (ed.), Kerala's Economy performance, Problems, Perspectives, Sage Publications, New Delhi, 160-179.

Radhakrishnan, V. (1981). Cost of cultivation and Economics of Paddy in Kerala 1978-79, Department of Agricultural Economics, Kerala Agricultural University, Thrissur.

Rajkrishna, (1964). Some Production Functions for the Punjab, *Indian Journal of Agricultural Economics*, Vol. 19 (3&4) July – December.

Rao, A.P. (1967). Size of holding and Productivity. *Economic and Political Weekly*, Vol. 2(44):.

Reji. D. (1993). Land use in Kerala – A case study of Thiruvananthapuram City. M.Phil. Thesis, University of Kerala, Thiruvananthapuram.

Reji. D. Nair, (2003). Land Economics, Issues in Land use, Center for studies in Development Strategy, Thiruvananthapuram.

Report of Kuttanad Enquiry Commission. (1971). Government of Kerala, Thiruvananthapuram.

Report of the Chief Engineer, Irrigation (Planning) dated 12th Sept, 1968- Gazetteers-Palakkad.

Rudra A. (1968). More on returns to scale in Indian Agriculture. EPW, Vol. 3(43):33p.

Rudra, A. (1973). Allocative Efficiency of Indian Farmers: Some Methodological doubts. *Economic and Political Weekly*, Vol. 8 (20): 109-110.

Rudra, A. and Sen, A.K. (1980) Farm size and Labour Use: Analysis and Policy. *Economic and Political Weekly*, Vol. 15(4-6): 693.

Saini, G.R. (1969). Farm size Productivity and Returns to scale. *Economic and Political Weekly*, Vol. 4(26):

Saini, G.R. (1971). Holding size Productivity and some related aspects of Indian Agriculture, *Economic and Political Weekly*,

Sampath, R.K. (1979). Nature and Measurements of Economic Efficiency in Indian Agriculture. *Indian Journal of Agricultural Economics*, Vol. 34(2):

Sankhayan, P.L. (1978). Size of Holding and Productivity. *Agricultural situation in India*.

Santha Kumari and Rajagopalan, (1996). Green Revolution in Kerala, a discourse on technology and nature, South Asia Bullettin.

Saswati Das and Chattopadhyay, M. (1998). Farm Efficiency under Cobb-Douglas Production Technology. *Economic and political Weekly*, September 26.

Schultz, T.W. (1964). Transforming Traditional Agriculture. Yale University Press, New Haven, 16p.

Sen, A.K. (1962). An Aspect of Indian Agriculture, *Economic Weekly*, Vol. 14(4-6): February.

Sen, A.K. (1964). Size of Holding and Productivity. *The Economic Weekly*, February 16.

Sharma, H.R. and Sharma, R.K. (2000). Farm size – Productivity Relationship – Empirical evidence from an agriculturally developed region of Himachal Pradesh. Department of Agricultural Economics, Himachal Pradesh Agricultural University, Palampur, *Indian Journal of Agricultural Economics*, Vol. 55(4):

Shergill, H.S. (1987). Impact of new Technology on Farm size Productivity Relationship in Punjab Agriculture, A Decomposition Analysis. Department of Economics, Punjab University. Chandigarh.

Singh, J.P. (1975). Resource Use, Farm Size and Returns to scale in a Backward Agriculture, *Indian Journal of Agricultural Economics*. Vol. 30(2).

Singh, R. and Patel. (1973). Returns to scale, Farm size and Productivity in Meerut District. *Indian Journal of Agricultural Economics*. Vol. 28(2): 43-48.

Sivanandan, P.K. (1985). Kerala's Agricultural Performance – Differential Trends and determinance of growth, M.Phil, Thesis, CDS, TVM.

Soni, R.N. and Bagai, O.P. (1983). Problems of small Farmers, A study (sponsored by I.C.A.R.) conducted by the Department of statistics, Punjab University, Chandigarh.

State planning Board, TVM. (1976). High yielding Varieties Program on Kerala (Punja 1973-74), an Evaluation study.

Surendran, P. (1991). The Kerala Economy Development, Problems and Prospects

Surendran, P. (1999). The Kerala Economy Development, Problems and Prospects. Vrinda Publications, New Delhi.

Suseelan, P. (1988). Problems and prospects of Rice in Kerala, Paper presented in VIIIth Five Year Plan, Workshop on Agricultural Development, October 6, TVM.

Thakur, D.C., Bhatti, J.P. and Sharma, K.D. (2001). *Indian Journal of Regional Science*, Vol. 33(1): 22-27

Thomas, P.M. (1996). Decline of paddy cultivation in Kerala – A study of Economic causes, Ph.D. Thesis, Calicut University.

Umadevi, S. (1984). Impact of plantations on Kerala's economy with special reference to rubber - some historical and Quantitative aspects. Ph.D. Thesis, University of Kerala, Thiruvananthapuram.

United Nations (1975). Poverty Unemployment and Development policy A case study of selected Issues with special reference to Kerala, United Nations, Newyork.

Usha Rani, (1971). Size of Farm and Productivity. *Economic and Political Weekly*, Vol. 6(26):

Venugopal, P. (1994). Paddy fields fast becoming housing plots. The Indian Express (Kochi), February 16.

Wellisez S., *et. al.* (1669). Resource Allocation in Traditional Agriculture, A case Study of AndraPradesh. *Journal of Political Economy*. Vol. 78 (1):

Zacharias, C.W.S. (1956-57). Studies in the Economics of Farm Management in Madras. Reports for the year 1956-57, Ministry of Food and Agriculture, New Delhi.

APPENDICES

Appendix 1.

Average Rain Fall in Kerala and Palakkad (Ten years average 1991-2000)

Month	Kerala	Palakkad
April	110.28	86.5
May	262.9	161.4
June	697.06	500.0
July	764.86	647.0
August	439.72	354.9
September	252.07	171.8
October	297.03	251.6
November	166.16	145.0
December	43.02	27.7
January	14.56	8.3
February	17.15	8.9
March	36.46	26.7
Total	258.44	199.20

Source: DES Palakkad, 2002-03

Appendix 2.

Principles of Land utilisation

No.	Principle	Explanation
1.	Principle of Maximisation	It is based on the assumption that people attempt to maximise the utilisation of land in an earnest possible manner. The use of land is also determined by the cost involved and the incurred profit.
2.	Marginal Principle	The transfer of resources from one use to another will occur until the rate of achievement from transference equals the rate of loss from withdrawal.
3.	Principles of Diminishing Marginal Productivity	According to Malthus the growth of population surpassed food production and food supply and this principle is known as the principle of diminishing physical returns.
4.	Principle of first choice	Certain lands are more suited for the production of only certain particular crops and so these crops should be the first choice for the use of such lands
5.	Principle of mapping and search for alternative better utilization of the land	Mapping the use of land through field to field survey, data analysis, cartographic analysis of maps and statistical analysis are the fundamental issues of this principle

Appendix 3.

Selected Features of Population of the State and Palakkad District

Sl. No.	Items	Population			
		Kerala		Palakkad	
		No	%	No	%
1.	Total Population	31,838,619	100	2,617,072	100
2.	Male Population	15,468,664	48.58	1,265,794	48.37
3.	Female Population	16,369,955	51.42	1,351,278	51.61
4.	Rural Population	23,571,484	74.03	2,260,611	86.38
5.	Urban Population	8,267,135	25.97	356461	13.62
6.	Total Worker (main + marginal)	10291258	32.32	946527	36.17
7.	Cultivators	740403	2.33	85788	3.28
8.	Agricultural Labourers	1653601	5.19	318990	12.19
9.	Other Workers	7532484	23.66	510541	19.51
10.	Non-Workers	21547361	67.68	1670545	63.83
11.	Work Participation rate (%)	32.3		36.2	

Source: Provisional Population Total, Paper 38, Census 2001

Appendix 4

Number of Farm Machineries in the Selected Blocks

Machineries	Kollengode	Malampuzha	Palakkad	Coyal-mannam	Ottapalam	Pattambi
Transplanter	75			1		
Plough	70	65	50	60	70	59
Tractors	8	10	10	15	13	14
Thresher	2	2	3	75	62	39
Electronic pump set	435	410	480	320	245	625
Wet seeder and conoweeder	100	88	100	150	11	5
Winnower	6	10	6	42	20	10
Combined harvester	3	1	1	1		1
Power sprayer	257	78	70	47	40	10
Knapsack sprayer	175	120	125	60	55	224
Tiller	21	45	75	74	3	6

Appendix 5.

Water Bodies in Sample Blocks

Source	Usage	KLD	MLA	PKD	CLM	OTP	PTB	District
River (km)		5250	34900	31175	9600	2900	43100	641668
Thodu (km)		82845	163565	107195	149815	118060	207078	2227310
Canals	being used (km)	93430	271026	148300	116635	9510	9830	1488219
	not being used (km)	1615	1790		11910	50176	5500	150426
Total		95105	27816	148300	128545	59685	15330	1638645
Pvt & other water bodies	no	339	262	219	205	304	81	3070
	area	327.01	260.71	106.31	244.61	63.5	21.61	2142.2
Ponds (nos)	Pvt	1083	998	1047	1321	846	1370	14490
	Public	116	143	177	200	131	328	2359
	Total	1199	1141	1224	1521	977	1698	16849
Panchayath ponds	No	-	20	53	26	58	102	633
	area(acres)	-	8.64	33.04	41.23	33.26	43.22	401.34
Irrigation Tanks	No	3	9	1	2	4	14	61
	area(acres)	6.5	54.15	2	7	0.6	1540.4	1895.49
Holy ponds & Streams	No	15	10	26	31	27	38	314
	area	39.7	10.17	19.28	69.45	15.12	21.13	302.03
Reservoirs	No	12	7	11	5	4	-	89
	area	492.5	2381.5	14.85	8.55	269.4	-	4673

Source: Pan Fish Book – Palakkad District
KLD – Kollengode, MLA – Malampuzha, PLD – Palakkad, CLM – Coyalmannam
OTP – Ottapalam, PTB - Pattambi

Appendix 6.

Number and Average Size of Operational Holdings 1990- 1991 and 1995-1996

Name of Blocks/District/State	Marginal		Small		Semi medium		Medium		Large		Total	
	No	Size	No	Size	No	Size	No	Size	No	Size	No	Size
1. Kollengode	27480	0.13	2011	1.53	1661	2.46	521	5.51	5	35.60	31678	0.44
	18383	0.11	1661	2.46	1276	2.77	521	5.69	93	15.79	21934	0.55
2. Malampuzha	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	37489	0.13	2320	1.37	1270	2.56	374	5.29	20	25.4	41473	0.33
3. Palakkad	85818	0.09	2953	1.43	1476	2.61	454	5.09	10	18.6	90711	0.38
	34142	0.15	1837	1.35	734	2.56	132	5.63	25	12.58	36870	0.28
4. Coyalmannam	38457	0.16	3024	1.38	1769	2.68	460	5.12	-	-	43710	0.40
	8972	0.54	2303	1.37	1059	2.59	221	5.10	21	17.38	12576	0.37
5. Ottapalam	19370	0.24	1455	1.34	628	2.54	108	5.53	-	-	21561	0.41
	26139	0.19	1891	1.33	682	2.52	157	5.65	39	21.12	28908	0.38
6. Pattambi	36343	0.20	2406	1.36	925	2.65	176	5.09	-	-	39850	0.34
	41397	0.18	1999	1.35	612	2.83	92	5.92	5	41.4	44105	0.28
7. Palakkad District	381252	0.18	38506	1.11	15530	2.61	4218	5.25	215	27.56	439721	0.42
	435828	0.16	32466	1.36	15154	2.62	4338	5.37	562	35.89	488348	0.41
8. Kerala State*	62.110	0.40	199.7	1.44	139.1	2.76	76.30	5.90	16.7	17.30	493.91	1.57
	59.18	0.18	2.62	1.36	0.95	2.60	0.21	5.27	0.03	55.74	62.99	0.33

Source: Indian Agricultural Sector CMIE. September 1998.
Figures in the second row of each Block/District/State are as per 1995-96 agricultural census.

Appendix 7.

Cultivable Command Area in Palakkad District

Sl No	Name of Project	CCA in ha
1	Malampuzha	21,732.00
2	Walayar	4,122.50
3	Pothundy	5,466.00
4	Gayathri	5,466.00
5	Mangalam	3,639.00
6	Chittur puzha	15,700.00
7	Kanhirapuzha	9,710.00
Total		62,103.50

Source: DES, Trichur and Palakkad, 2003-04

Appendix 8

Cropping Pattern in the sample blocks

Area	KLD	MLA	PKD	CLM	OTP	PTB
Converted wet land Total	**146.39**	**422.53**	**364.68**	**109.37**	**199.88**	**198.13**
Cocunut	1284.80	1100.45	943.41	241.62	543.41	1140.10
Arecanut	0.00	17.37	31.50	571.25	18.84	100.25
Plantatin	40.57	22.25	24.79	10.00	36.60	67.63
Other plants	0.00	0.00	640.88	0.00	0.00	0.00
Vegetables	0.00	63.75	9.25	9.75	0.25	6.38
Rubber	0.50	500.36	1826.83	248.68	1619.97	929.50
Tubers	3.00	13.29	15.25	62.00	6.15	18.00
Mixed crop	3745.51	4152.19	4652.07	4429.69	5203.98	7747.09
Cashew	6.50	61.18	23.75	4.75	143.48	80.00
Mango	0.00	24.00	0.00	0.00	0.00	0.00
Mangium	130.95	0.88	0.00	3.88	0.50	0.50
Mixed trees	772.96	1284.54	3065.32	2105.53	2957.42	5715.64
Teak	187.97	101.53	57.75	44.00	88.34	24.75
Sugarcane	61.95	92.86	2.50	8.00	0.00	0.00
Cotton	1150.36	3.50	0.00	0.00	0.00	0.00
Ginger	12.33	4.50	0.01	0.25	0.00	0.00
Forest	712.01	20517.91	355.75	871.88	269.25	216.75
Protected forest	0.00	0.00	0.00	693.75	0.00	0.00
Wetland fallow	27.75	302.50	72.25	94.94	3.00	12.50
Cultivable waste	170.47	1786.48	557.75	248.38	329.81	277.89
fallow	139.05	366.65	281.05	188.49	169.16	179.20
Clay mining	0.00	0.00	1.25	0.00	0.00	0.00
Rock	175.83	200.12	29.25	73.13	398.75	46.50
Industrial area	0.00	992.00	0.00	0.00	0.00	0.00
Builded aera	711.45	1113.10	472.75	80.13	82.56	233.56
Others	3.55	0.00	5.00	14.25	22.25	0.00
Cereals	0.00	0.00	1.00	0.00	1.20	1.25
Waterbodies	240.66	1046.46	745.75	64.00	303.95	538.95
Dam	360.33	2071.00	0.00	0.00	0.00	0.00
Marsh land	8.38	0.00	0.00	0.00	0.00	0.00
Ponds	118.65	0.00	0.00	13.00	0.00	0.00
Rivers	104.99	0.00	0.00	198.23	0.00	0.00
Sub Total 2	**833.01**	**3117.46**	**745.75**	**275.23**	**303.95**	**538.95**
Total	**16331.92**	**46288.52**	**20585.01**	**19183.63**	**16508.71**	**22421.05**
Tapioca	0.00	20.59	0.00	28.12	0.00	0.00
Ground nut	0.00	177.50	0.00	0.00	0.00	0.00
Groundnut+Ellu	0.00	12.25	0.00	0.00	0.00	0.00
Cholam	0.00	39.50	0.00	0.00	0.00	0.00
Kuttimulla	0.00	2.50	0.00	0.00	0.00	0.00

Source: DES, Palakkad 2003-04

Appendix 9

Cafeteria of varieties

Ayacut				Non-ayacut	
Kollangode	Malmpuzha	Palakkad	Coyalmannam	Ottapalam	Pattambi
Cheruthazhama and vellakazhama Jothy, Kanchana, Kunjukunju, Jaya, Ponmani ASD 16	Cheruthazhama and vellakazhama, Kanchana, Kairali, ASD 16, Lakshmi, Sulochana, , Jaya, Ponmani, Aryan,	Cheruthazhama and vellakazhama, Kanchana,Uma, Jaya, Sulochamna	Cheruthazhama and vellakazhama, Kanchana, Ponmani, Kunjukunju, Jaya , Aiswarya, Matta, Thriveni	Kanchana, Cheruthazhama and vellakazhama, Aiswarya. Jyothi, Athira, Kunjukunju, Matta, Triveni, Kairali, Rudra,	Cheruthazhama and vellakazhama, Athira, Kairali,

Appendix 10.

Source of Irrigation in the Study Area

Source of irrigation	Net irrigated Area(ha)
1. Government canal	41347
2. Private canal	982
3. Government tanks	161
4. Private tanks	4365
5. Government wells	29
6. Private wells	15947
7. Minor lift Irrigation	1043
8.Other sources	10718
9. Tube wells	939
10. Total	75531
11. Gross Irrigated area	56482

Source: PLDP Palakkad 2004 -05

Appendix 11.

ABC Costs

The following 'ABC' cost concepts were used to estimate various crop income measures.

Cost A_1 - All actual expenses in cash and kind incurred in production

Cost A_2 - Cost A_1 + rent paid for leased-in land

Cost B - Cost A_1 + interest on value of own fixed capital assets

Cost C - Cost B + imputed value of family labour

In the present study Cost A_1 includes.

1. Value of hired human labour

Human labour employed for various farm activities like land preparation, intercultural operations, harvesting, looking after livestock etc. were included in determining the value of hired labour. The actual wages paid for labour was considered as value of hired labour.

2. Value of machine use

Machines are used by some farmers for land preparation. Hiring charge paid/payable was reckoned as cost of machinery.

3. Value of seeds and planting materials

Purchased seeds and planting materials were evaluated on the basis of their purchase price. The same price was used for evaluating farm produced seeds.

4. Value of other inputs

Manures, fertilizers and plant protection chemicals were valued at their purchase price and market prices. Farm produced items were valued at prices prevailing in the area.

5. Miscellaneous expenses

Expenses incurred for electricity, irrigation, land revenue etc. were included. The actual rate of land tax paid to the revenue department at Rs.40 per acre was taken.

In the study area, leasing in of land by the respondents was not found. Hence Cost A2 is the same as Cost A1. Cost of family labour was imputed based on the prevailing wages for hired labour in man-equivalent days. The wage rates were Rs.175 per day for male and Rs.80 per day for female. For converting to man-equivalent days, the usual norms of 2 female equivalents to 1 male have been used.

Appendix 12.

Cost of Cultivation of Paddy given by the respondents

A. Western Block

Respondent I

1. **Name of the respondent** : Prof. M.K. Rajagopal
2. **Address of the respondent** : Midhila, Ottapalam
   Phone: 0466 2246182
3. **Name of Padasekhara Samithy** : Thottakkara Padasekhara Samithy
4. **Cost of cultivation of paddy (per acre):**

Crop I		Crop II	
Item	Cost (Rs)	Item	Cost (Rs)
1. Seeds (15 Paras)	750.00	1. Seedling	750.00
2. Labour (7 x 150)	1050.00	2. Labour	1050.00
3. Weeding (20 X70)	1400.00	3. Transplanting (40 X70)	2800.00
4. Manure	500.00	4. Manure	500.00
5. Fertilizers	500.00	5. Fertilizers	500.00
6. Harvesting (reaping expenses – 1 para paddy or Rs. 50 wage) (50 x 50)	2500.00	6. Harvesting (reaping expenses)	2500.00
Total	**6700.00**	**Total**	**8100.00**

5. **Returns :**

Item	Amount Rs)	Item	Amount Rs)
Normal yield (15 quintals)	9000	Normal yield (20 quintals)	12000
Manure Subsidy	250	Manure Subsidy	250
Incentives or Production bonus	250	Incentives or Production bonus	250
Straw	Nil	Straw	2000
Total	**9500**	**Total**	**14500**

Respondent II

1. **Name of the respondent** : U. Kumaran Nair
2. **Address of the respondent** : Unnikkumarath House, House No. 10/340, Kanniyampuram, Ottapalam. PIN: 679 104 Phone: 0466 2246182
3. **Name of Padasekhara Samithy** : Payar Padasekhara Samithy
4. **Paddy Land** : 196 Cents (Double crop wet land)
5. **Cost of cultivation of paddy (Expense for one year):**

Item	Cost (Rs)
1. Ploughing	5100
2. Female Labour	10800
3. Male Labour	2000
4. Fertilizers	1200
5. Other espenses	1000
Total	**20100**

6. **Returns :**

Item	Amount Rs)
Normal yield (3500kg x Rs. 6.25/kg)	21875
Hey	3000
Total	**24875**

The approximate expenses connected with the cultivation of one acre of wet land have been worked out. There could be slight variations from place to place in Ottapalam Taluk depending on various factors like the type of land, irrigation facilities available and mechanization etc. Based on the actual experience the cultivation of the first crop is comparatively more difficult than the second crop. The expenses connected with sowing and weeding in Ottapalam Municipal area are higher. The total expense for first crop amounts to Rs.8450. The net yield from the first crop amounts to Rs. 8000 there by resulting in a loss of Rs.450. The second crop is comparatively better in yield fetching the yield of Rs.12,000, when the expense is below Rs. 10,000. These figures have been worked out without considering any returns for the land and entrepreneurship. If these two factors are given due consideration, cultivation of paddy would prove to end in heavy loss.

A general observation on the problems of the farmers in and around Ottapalam

Agriculture has been a main source of income for the middle class families in the area. The farmers of the present times face innumerable problems which compel them to withdraw from this profession.

1. First and foremost problem is that there is acute shortage of labourers for cultivation. The majority of the labourers are engaged in other jobs like building works or industries. Consequently, there is a great demand for labourers and the available few always demand greater wages at par with other skilled jobs or even more.
2. In the absence of proper irrigation facilities agriculture proves to be a gambling
3. The fertility of the soil has almost disappeared and the farmers depend on chemical fertilizers, which further destroy the soil.
4. Use of organic manure is almost becoming impossible due to the disappearance of livestock from the life of the farmers.
5. Mechanisation (Ploughing, filling+ reaping) is a costly proposition. There is an increased attack of pest and the farmer is forced to resort to pesticides several times.

The functioning of the PNS is far from satisfactory. Most of the small landholders refuse to engage in co-operative farming. The encouragement from the Government through subsidies and incentives is hardly worked mentioning compared to the growing needs. Marketing of paddy has become a very big problem for the farmer and is subjected to exploitation by the businessmen. The promises from the Government remain in paper only. The farmers do not get a reasonable price for their commodities. Unlike the past labourers refuse to accept wages in kind.

Trade unions and the other organized movements have indirectly brought very evil effect on the labourers. Despite rules and directions about the working hours, the labourers virtually restrict the working hours 4 or 5 hours a day. The employer finds it very difficult to tackle these problems.

Cultivation of paddy becomes a complete drain on the resources of the farmer who obviously tries to shift from paddy to other cash crops. A special problem faced any farmers in and around Ottapalam is the destruction of crops by wild boars. A stage has come that a farmer has to leave his land vacant as all types of crops are destroyed by wild animals. It is strange that wild animals are protected by laws while farmers are left helpless.

Price of land for non-agricultural purposes has gone high. Consequently every farmer dreams of converting his land for other purpose. Availability of paddy and rice in abundance in the open market brought from neighbouring States makes the farmer think that it is high time for him to resort to other professions.

B. Eastern Block

Respondent I

1. **Name of the respondent** : N.K. Chandran
2. **Address of the respondent** : Narekkode House,
Thennur, P.O. Parli, Palakkad
PIN: 678 616
3. **Name of Padasekhara Samithy** : Kundur Padasekhara Samithy
4. **Paddy Land** : 4 Acres and 73 Cents

5. Cost of cultivation of paddy:

Crop I	
Item	Cost (Rs)
1. Seeds (30 kg per Acre) (150kg x Rs. 12 /Kg)	1800
2. Labour (Rs. 400 per acre) (Rs. 100 for Male & 60 for Female)	1892
3. Fertilizers (Rs. 4000/Acre)	18920
4. Miscellaneous (Rs. 1500/Acre)	7095
5. Ploughing ((Rs. 300/Acre)	900
6. Plant protection	3000
7. Water adjustment (Supervision over watering)	500
6. Harvesting (20 labourers - wage "Patham' 1/6)	

6. Straw yield : From 1 acre 1800 kg. Price varies between Rs. 1 &2.50

7. Price of Paddy : Varies between Rs. 6.45 and 8.00

8. Yield : From I acre 1600 kg (768 kg from 4.73 acre)

9. Total income : 7568 x 8.50 = Rs. 64328

10. Total Cost : Rs. 27815

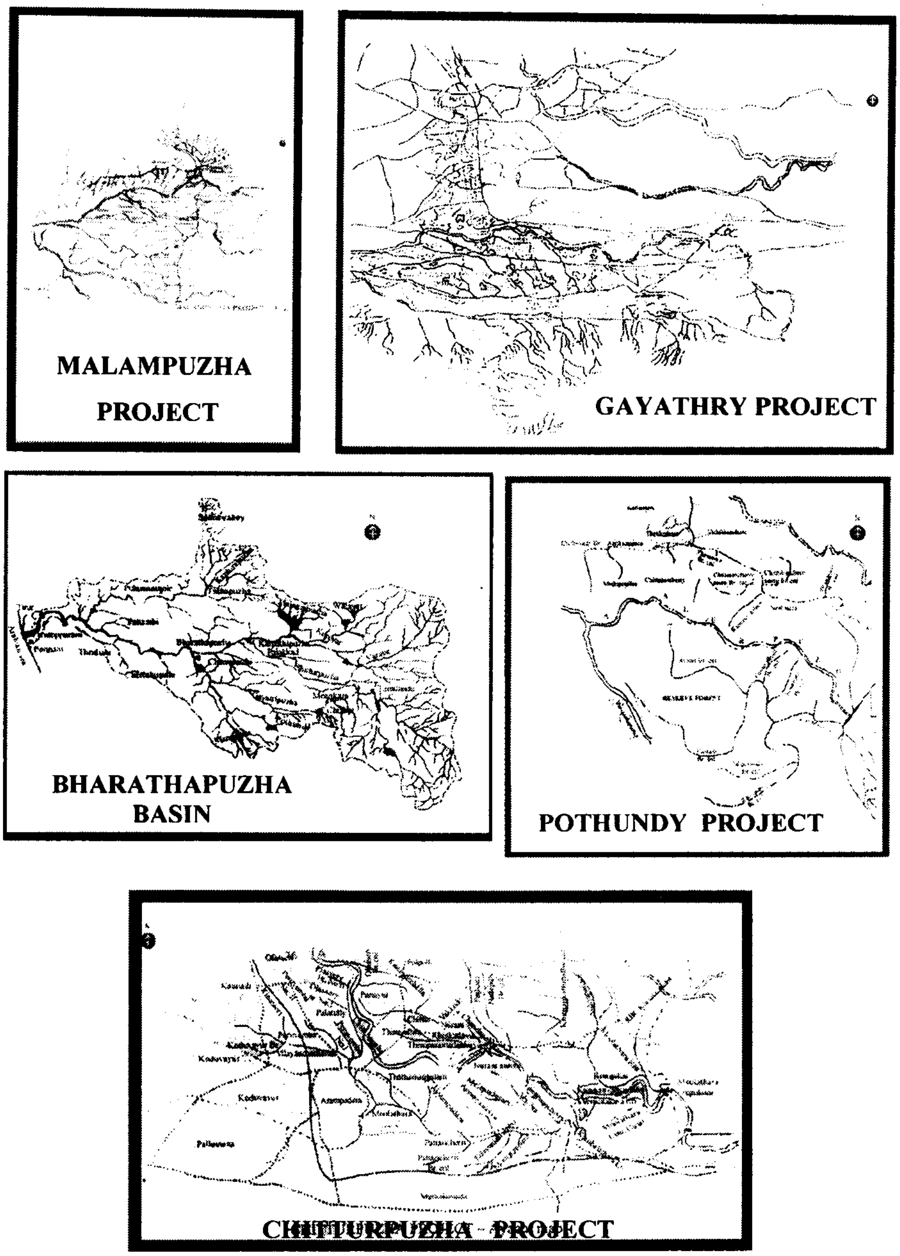
11. Net Income : Rs. 36513

Problems

1. Labour Shortage
2. Shifting to construction sector
3. Marketing of Paddy
4. Rice Mills not functioning
5. Import of paddy from Andra Pradesh and Tamil Nadu at reduced price
6. Krishibhavans are not functioning properly
7. Subsidy distribution is defective and untimely

Suggestions

1. Attitude towards agriculture especially to paddy should change
2. Younger generation should come forward to agriculture
3. A new land reform is essential to bring back the agricultural land to those who stick to cultivation of paddy than other crops
4. Better not to provide agricultural loan which is misused. But provide alternate help which directly provides incentives to the farmers.



Map Showing Different Irrigation Projects in Ayacut Area

Land Used for Construction Work

Land Converted for Mixed Cropping

INTERWIEW SCHEDULE

Shifting of paddy Cultivation in Palakkad District –A Micro Level Study

I. General Particulars

a) Taluk :

b) Panchayath :

c) Ward No :

d) House No. :

e) Religion :

f) Caste :

II. Particulars of Family Members

Sl. No.	Name	Age & sex	Education SSLC/Degree/P.G	Occupation* (F) (P)	Income(Annual) Agri. Non-gri.

* F= full time P= Part time

III (a) Land resources and Agricultural out put – current year 2003 -04

Particulars	Area (ha / Acre)			Annual output		
	Irrigated	Non – Irrigated	Total	Qty(kg) Per Ha	Term price Per Kg	Total Production in (Rs.)
1.Total area Owned a) Dry Land b) Wet Land c) Any other						
2. Cultivated area a) Paddy i) Single Crop ii) Double iii)Triple iv) HYV						
b) Coconut						
c) Arecanut						
d) Rubber						
e) Tapioca						
f) Plantain / Banana						
g) Ginger						
h) Vegetable						
i) Others						

HYV = High Yielding Varieties; NHYV – Non High Yielding Varieties.

(b) Land and Area Under Paddy in the last 3 years (ha)

Year	HYV	NHYV	Paddy Land converted	Land left fallow	Reason for decline
2000 - 01					
2001 - 02					
2002 - 03					

(c) Yield rates of the Paddy in the last 3 years (Kg/ ha)

Year	Paddy Season-wise			By Product
	Virippu	Mundakan	Punja	Total
2000 - 01				
2001 - 02				
2002 - 03				

IV (a) Source of Irrigation & Area (Area in ha)

SI.No	Source of Irrigation	Nature of Ownership			Area Irrigated (ha)	Crops in the irrigated area
		Public	Owned by Farms	Others		
1	Well					
2	Ponds					
3	Tube Wells					
4	Canal					
5	Rivers					
6	Malampuzha Irrigation					
7	Lift irrigation					
8	Tank					

(b) Motive Power used for irrigation

No	Items	Cost for Crop per Hectare	Total cost incurred during a crop period
1	Electric Pump		
2	Diesel Pump		
3	Bullock Power		
4	Human Labour		
5	Country- Water wheel		

c) Source of money to own pump set and amount of money :

SI. No	Source	Amount (Rs)
1	Self Finance	
2	Nationalised Bank	
3.	Co-operative Society	
4	Money lender / relatives	
5	SFDA	
6.	Commercial Bank	

V. Extent of damage * to crop, if any in the last three years (Per Hectare):

Damages due to	2000 - 01 >80% =50% <20%		2001 - 02 < 80% = 50 < 20%		2002-03 >80% = 50 < 20%	
	Qty.	Amount	Qty	Amount	Qty.	Amount
1. Untimely rain						
2. Heavy Rain fall						
3. Drought						
4. Attack of pests or disease						
5. Any other						

* Full damaged = More than 80 %, Partly damaged = 50 %, Very small = below 20 %

VI Credit demand and availability:

(a) Loans taken during the last 3 years (In Rs)

Year	Amount of loan	To which purpose it is spent	Amount spent solely for Agri.	Interest	Amount repaid
2000-01					
2001-02					
2002-03					

(b) Subsidies / Grants received during the last 3 years.

Year	Source / Scheme	Date/ Month	Amount (Rs.) Per Ha/Tree	Total amount received	Purpose
2000-01					
2001-02					
2002-03					

(c) (i) Demand for Credit

What are your difficulties in getting loans for agricultural purposes.

(ii) Difficulties of repayment?

VII. Labour Requirements – operation wise (per hectare)

Items operation	Family M. F	Hired M. F	Permanent M. F	Casual M. F	Local M. F	Total M. F	Total wages paid per ha
1. Ploughing-Oxen							
2. Sowing/ Transplanting							
3. Weeding							
4. Harvesting							
5.Ploughing							
6 Mannuring							
7 Plant Protection							
8. Other works							

(b). 1. Do you experience a labour shortage? If yes, extent of shortage?

2. Do you give non-wage benefits or items (food, other payments?) If yes, details.

3. Reason for labour shortage:

a) Low wages b) High Education Status

c) Aversion of new generation d) Other employments

e) Other reason (specify)

4. Can mechanisation solve the labour shortage?

VIII. Cost of Cultivation Per hectare / Acre.

Value = (Labour hours x Existing wage rate)

Items (cost per hectare)	Virippu	Mundakan	Summer	Total
1. Labour charges (Family + Permanent + Hired labour)				
a. Land Preparation				
b. Seed fertilizer application, Irrigation				
c. Plant Protection				
d. Inter cultivation				
e. Harvesting				
f. Post harvesting operations				
g. Family labour				
h. Permanent labour				
i. Hired labour				
Total labour cost				
2. Fertiliser				
A. Organic				
a. Green Manure				
b. Compost				
c. Cow dung				
d. Oil cake				
e. Bone meal				
f. Farm Yard Manure				

Items (cost per hectare)	Virippu	Mundakan	Summer	Total
B. Inorganic				
a. Urea, Potash, Sulphate				
b. Factum Fose				
c. Super Phospate				
d. Paddy Mixture				
3. Insecticides, Pesticides				
4. Seed. (Home made or purchased				
5. Harvesting + Threshing				
6. Winnowing + Drying				
7. Repair of tools				
8. Customary payments				
9. Capital cost (per hectare) Rent, Interest(for borrowing)cess / tax, Transportation cost, (Input)Electricity/Petrol-charges				
10. Maintenance of bullocks				
a. Fodder, Labour charges to lookafter, veterinary charges and others				
b. No. of days bullocks hired out charges received (Rs)				
11. Operational cost of Tractor				
a. Tractor in Service, fuel, lubricant oil, Insurance Premium, Operator – No. of months and wages paid				
b. Repair and maintaince cost of hiring tractor. Total No. of hours used				
No. of hours used for : Own Farm : Other's farm : Total charge received (Rs):				
12. Operational cost of Pump Sets Cost of hiring (Rs): Maintaince Cost (Rs): Total Cost (Rs):				

IX. Income (Returns) from Paddy & other alternative crops (per ha / per plant)

Crops	Total Quantity Produced (in kg)	Quantity retained for consumption (kg)	Total Qty. sold in kg	Price per kg	Income from by products (Rs)
1. Paddy					
2. Plantain Banana					
3. Rubber					
4. Coconut					
5. Tapioca					
6. Vegetables					
7. Other Crops					

Total Income = Quatnity (Q) X P.........+ By product Income

A. Benefit Cost Ratio of Paddy + Alternative Crops

Cost of Cultivation of crops (per ha)	Income/Returns (in Rs)	Benefit Cost Ratio (per ha)
Labour		
Fertiliser		
Seed		
Capital cost		
Bullock		
Irrigation		
Total		

b) Plantain/Banana

c) Rubber

d) Coconut

e) Vegetables

f) Others

X. Current Difficulties / Problems faced by the Paddy Cultivators.

XI. Major Consequences of the shift in the cropping pattern against Paddy cultivation.

a) Increased Income

b) Increase in Social Status

c) Defaulters

d) Indebtedness

e) Miscellaneous

XII. Details of Cropping System Adopted in the Current year

No	Item	Area	No. of Plants	Annual output		Cost
				Qty.(kg)	Value (Rs)	
1.	Rice-Rice-Pulses					
2	Rice-Rice-Plantain					
3	Rice-Rice					
4	Rice-Plantain					
5	Rice-Tapioca					
6	Others					

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