CHAPTER II

KERALA AGRICULTURE
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The agricultural scenario in Kerala is somewhat unique and distinct from many other States in India in terms of land utilization pattern and the cropping pattern. Kerala’s agriculture as a whole is growing in terms of income generation from the mid eighties. This is mainly due to improvement in yield rates and to a smaller extent, due to shift in cropping pattern to high valued crops. In spite of significant advances in industrial and service sectors, agriculture continues to be the largest provider of employment and livelihood both at the national and state levels.

The share of agriculture in net state domestic product declined from 26.2 per cent in 1993-94 to 11.5 per cent in 2004-05. But the sector plays an important role in the state economy as it continues to engage around two-fifth of the population. At the time of First World War agriculture contributed two-thirds of the national income in India. After the initiation of planning in India the share of agriculture has persistently declined on account of the secondary and tertiary sectors of the economy. From 59.2 per cent in 1950-51 the share of agriculture in GDP at factor cost declined steadily to 34.9 per cent in 1990-91 and further to 24 per cent in 2003-04. In developed economies like USA and UK only 2 per cent of GDP is derived from agriculture. Likewise in 1951, 69.5 per cent of the working population was engaged in agriculture it fell to 60 per cent in 1999. In under developed countries there is heavy dependence of working population on
agriculture. For example, in Bangladesh, China and Pakistan it was 57 per cent, 68 per cent and 48 per cent respectively. But in Japan and France it was only 4 per cent and in USA and UK it was 2 per cent of economically active population that engaged in agriculture during 1999.

Agriculture in Kerala is passing through a very difficult period as a result of a steep fall in the prices of most of the farm commodities. The developments in global trade had adversely affected and being the major cash crop producing State in the country Kerala is perhaps the worst hit on account of the new agenda for trade liberalization adopted by Government of India through its import policies. The sector had been recording negative or very low growth from the mid-seventies to mid–eighties. There was some improvement thereafter until 1996-97. Subsequently the sector has been facing a serious crisis mainly due to stiff competition for its export and also following import of items like pepper, rubber, tea etc. after trade liberalisation. It is striking to note that the country has to support 16 per cent of population in the world with only 2.4 per cent of the geographical area. In contrast Kerala has to feed 3.1 per cent of population with only 0.28 per cent of the national area under food grains. Under these circumstances a review of the changing pattern of agriculture in Kerala is necessary to give some insights to the emerging tendencies in relation to land utilization, cropping pattern, shifts in productivity and production of major crops.
Figure 2.1

KERALA
NATURAL DIVISIONS

TAMIL NADU STATE

ARABIAN SEA

HIGH LAND ABOVE 250’ (76.2m)
MIDLAND-25’-250’ (7.6m-76.2m)
LOW LAND BELOW 25’ (7.6m)
2.1 TOPOGRAPHY:

Kerala State lying between $8^0 18^1$ and $12^0 48^1$ north latitude and between $74^0 52^1$ and $77^1 22^1$ east longitudes has three natural divisions of low land, mid land and high land forming parallel belts across the length of the state.

The low land with stretches of sand and numerous back waters lies on western fringe of the state along the seashore. This strip is ideally suited for the cultivation of coconut and rice. The mid land region with hills and valleys presents an underlying tract of laterite soil cut across by numerous rivers. This laterite belt is noted for a large variety of agricultural products like rice, coconut, pepper, cashew, ginger, tapioca and rubber. The high land consists mainly of mountains covered by dense forests bordering the Western Ghats. Important plantation crops like tea; cardamom, coffee, pepper and rubber are grown in this region.

2.2 CLIMATE:

The mean temperature varies from $75^0$ F to $90^0$ F. In the high land region the climate is cool and bracing well suited for the cultivation of plantation crops. The annual rainfall in the high land region ranges from 2540 to 5080 millimeters. The mid land region also receives good rainfall ranging from 1400 to 3940 millimeters per annum. The annual rainfall in the coastal belt ranges from 890 mm in the south to 3560 mm in the north. The relative humidity is high.
2.3. SOIL:

Figure 2.2
The major soil types in the State include laterite soil, black soil, peat soil, hill and forest soil, sandy soil, alluvial soil and red soil. The soil in the coastal strip forming the low lands is mainly of pure crystalline sands. The mid land is generally of laterite soil and the high land is of hill forest soil.

2.4. LAND UTILISATION PATTERN:

Data on land utilization pattern in Kerala are reported according to a standard nine-point classification. Government of Kerala publishes the area under different classification every year. Here the data relating to the different periods, which are 1970-71, 1975-76, 1980-81, 1985-86, 1990-91, 1995-96, 2000-01 and 2004-05, are considered.
TABLE 2.1  
CHANGE IN THE LAND UTILISATION PATTERN IN KERALA (in '000 hectares)  
From 1970-71 to 2004-05

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Total geographical area</td>
<td>3858 (100)</td>
<td>3885 (100)</td>
<td>3885 (100)</td>
<td>3885 (100)</td>
<td>3885 (100)</td>
<td>3885 (100)</td>
<td>3885 (100)</td>
<td>3885 (100)</td>
</tr>
<tr>
<td>2</td>
<td>Forests</td>
<td>1055 (27.35)</td>
<td>1082 (27.83)</td>
<td>1082 (27.83)</td>
<td>1082 (27.83)</td>
<td>1082 (27.83)</td>
<td>1082 (27.83)</td>
<td>1082 (27.83)</td>
<td>1082 (27.83)</td>
</tr>
<tr>
<td>3</td>
<td>Land put to non-agricultural use</td>
<td>275 (7.13)</td>
<td>259 (6.67)</td>
<td>270 (6.94)</td>
<td>279 (7.17)</td>
<td>297 (7.65)</td>
<td>313 (8.06)</td>
<td>354 (9.83)</td>
<td>409 (10.52)</td>
</tr>
<tr>
<td>4</td>
<td>Barren and uncultivable land</td>
<td>72 (1.87)</td>
<td>78 (2.02)</td>
<td>86 (2.21)</td>
<td>83 (2.14)</td>
<td>58 (1.5)</td>
<td>43 (1.11)</td>
<td>29 (0.75)</td>
<td>29 (0.74)</td>
</tr>
<tr>
<td>5</td>
<td>Permanent Pastures &amp; other grazing land</td>
<td>28 (0.73)</td>
<td>20 (0.51)</td>
<td>5.4 (0.14)</td>
<td>4.2 (0.11)</td>
<td>2 (0.05)</td>
<td>1 (0.03)</td>
<td>1.6 (0.04)</td>
<td>0.32 (0.08)</td>
</tr>
<tr>
<td>6</td>
<td>Land under miscellaneous tree crops not included in net area sown</td>
<td>132 (3.42)</td>
<td>84 (2.17)</td>
<td>64 (1.65)</td>
<td>50 (1.29)</td>
<td>34 (0.89)</td>
<td>27 (0.69)</td>
<td>15 (0.4)</td>
<td>11 (0.28)</td>
</tr>
<tr>
<td>7</td>
<td>Cultivable waste</td>
<td>80 (2.07)</td>
<td>113 (2.92)</td>
<td>129 (3.32)</td>
<td>126 (3.23)</td>
<td>95 (2.43)</td>
<td>74 (1.91)</td>
<td>60 (1.53)</td>
<td>64 (1.66)</td>
</tr>
<tr>
<td>8</td>
<td>Fallow and other than current fallow</td>
<td>23 (0.6)</td>
<td>23 (0.6)</td>
<td>27 (0.7)</td>
<td>28 (0.72)</td>
<td>26 (0.68)</td>
<td>29 (0.75)</td>
<td>34 (0.87)</td>
<td>36 (0.92)</td>
</tr>
<tr>
<td>9</td>
<td>Current fallow</td>
<td>24 (0.62)</td>
<td>37 (0.94)</td>
<td>44 (1.12)</td>
<td>43 (1.11)</td>
<td>44 (1.14)</td>
<td>51 (1.32)</td>
<td>78 (2.004)</td>
<td>82 (2.1)</td>
</tr>
<tr>
<td>10</td>
<td>Net area sown</td>
<td>2172 (56.3)</td>
<td>2189 (56.34)</td>
<td>2180 (56.1)</td>
<td>21.91 (56.39)</td>
<td>2247 (57.83)</td>
<td>2265 (58.29)</td>
<td>2206 (56.78)</td>
<td>2173 (55.9)</td>
</tr>
<tr>
<td>11</td>
<td>Area sown more than once</td>
<td>761 (19.73)</td>
<td>792 (20.39)</td>
<td>705 (18.15)</td>
<td>676 (17.39)</td>
<td>773 (19.9)</td>
<td>802 (20.65)</td>
<td>816 (20.99)</td>
<td>770 (19.81)</td>
</tr>
<tr>
<td>12</td>
<td>Total cropped area</td>
<td>2933 (76.02)</td>
<td>2981 (76.73)</td>
<td>2885 (74.25)</td>
<td>2867 (73.76)</td>
<td>3020 (77.72)</td>
<td>3067 (78.94)</td>
<td>3022 (77.77)</td>
<td>2942 (75.7)</td>
</tr>
<tr>
<td>13</td>
<td>Cropping intensity</td>
<td>135</td>
<td>136.2</td>
<td>132.3</td>
<td>131</td>
<td>134.4</td>
<td>135.4</td>
<td>137</td>
<td>135</td>
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Figures in the parentheses are percentages
The total geographical area, which was 3858 thousand hectares during 1970-71, comes to 3885 thousand hectares in 2004-05.

Land under forest ranges between 1055 and 1082 thousand hectares. Forestland includes all forested areas and land classified or administered as forests under any legal enactment dealing with forests, whether State owned or private. If any portion of such land is not actually wooded, but put to some agricultural use, that portion is included under the appropriate heading of cultivated or uncultivated land. The area under forests for different years was reported as stable at the same level. Though the ground realities indicate that the forest area has dwindled on account of various factors such as encroachment, development of projects etc. Official statistics continue to report the same number since the land classified as forest retains the same status until any fresh survey and reclassification occurs. In fact the studies based on the Survey of India topographical sheets for 1905, 1965 and 1973 indicate that the area under forest has declined from 44 per cent of the geographical area in 1905 to 27.7 per cent in 1965 and to 17.1 per cent in 1973.

Land put to non-agricultural use include land occupied by buildings, roads, railways or water (e.g. Rivers, canals) and land put to uses other than agricultural purposes. From 1970-71 onwards area under this category had been steadily increasing from 7.13 per cent to 10.52 per cent in 2004-05 of the total geographical area of the State.

Barren and uncultivable land includes areas such as mountains, deserts etc. and land that cannot be brought under cultivation except at a prohibitive cost. This land could be isolated blocks or within cultivated holdings. There has been a
continuous decline in the area from seventy two thousand hectares in 1970-71 to thirty thousand hectares in 2004-05.

Permanent pastures and other grazing land includes all grazing lands, whether they are permanent pastures and meadows or not and village common grazing lands within forest areas. There has been a steady decline of area from 28 thousand hectares to 0.5 thousand hectares i.e. from 0.73 per cent to 0.013 per cent of total geographical area during the period under study.

Miscellaneous tree crops and groves not included in the net area sown represent lands, which are not included under the net area sown, but is put to some agricultural use. Land under casuarinas trees, thatching trees, bamboo bushes and other groves fuel etc. that are not included under orchards are also included under this category. The total area under this category also declined continuously from 132 thousand hectares 42 per cent) in 1970-71 to 11 thousand hectares (0.28 per cent) in 2004-05.

Cultivable waste represents land available for cultivation but not taken up for actual cultivation or abandoned after a few years of cultivation for one reason or other. Such lands may be either fallow or covered with shrubs or jungles, which are not put to any use. Land once cultivated but not cultivated for five years in succession is also included in this category. Cultivable waste showed an increase in area from 1970-71 (2.07 per cent) to 1985-86 (3.23 per cent) and after that the declining trend in the area is noted. It reached only 1.66 per cent of total geographical area in the year 2004-05.

Fallow other than current fallow includes all lands, which were taken up for cultivation but are temporarily out of cultivation for a period of not less than
one year and not more than five years. The reasons for keeping such lands fallow may include factors such as (1) financial problem of cultivators (2) inadequate supply of water (3) silting of canals and rivers (4) soil erosion and (5) unremunerative nature of farming. In 1970-71 areas under this category was 23 thousand hectares (0.6 per cent of total geographical area), which increased to 27 thousand hectares in 1995-96 (0.75 per cent) and reached 36 thousand hectares (0.92 per cent) in 2004-05. From this trend the tendency of farmers to keep land idle can be noted.

Current fallow indicates the cropped area, which is kept idle during the current year. If any seedling area is not cropped again in the same year it is also treated as current fallow. An increasing trend in the area under current fallow can be noted in the period of study. It ranges from 24 thousand hectares (0.62 per cent of total area) in 1970-71 to 82 thousand hectares (2.1 per cent) in 2004-05.

Net area sown consists of area sown with crops and orchards, with area sown more than once during the same year being counted only once. Net area sown had increased from 2172 thousand hectares (56.3 per cent) in 1970-71 to 2265 thousand hectares (58.3 per cent) in 1995-96 then declined to 2173 thousand hectares (55.9 per cent) in 2004-05.

Total cropped area represents the net area sown and area sown more than once during the same year. During the period under study area sown more than once showed a fluctuating trend reached the peak level during 2000-01 with 816 thousand hectares (20.99 per cent of total geographical area). By 2004-05 area sown more than once had come down to below the 1975-76 level.
Thus the following conclusions can be derived from the land use pattern of Kerala from 1970-71 to 2004-05. A steady increase in land put to non-agricultural use over the entire period and rapid increase in total cropped area from 1970-71 to 1975-76 followed by a slow increase from 1975-76 to 1995-96 and a reduction in cropped area from 1995-96 to 2004-05 could be noted. Increased cropped area was due to increase in both net sown area and area sown more than once. Highest total cropped area recorded in 1995-96 where both the net sown area and the area sown more than once were in the peak level. In terms of relative share during 1995-96 total cropped area was 78.94 per cent where net sown area was 58.29 per cent and area sown more than once was 20.65 per cent. The intensification of land use as reflected by the cropping intensity (total cropped area divided by net area sown) indicates that there was a substantial increase in intensive use of land during the period 1970-71 to 1975-76 but in the subsequent years cropping intensity was stagnant.

2.5 AGRO-ECOLOGICAL ENVIRONMENT:

Despite, the ability acquired by human beings to create changes in natural environment, its characteristics such as soil nature, climate and ecology continue to influence the choice of crop production in a significant manner. This influence seems to be very crucial in tropical climates. Kerala is agro-climatically rainfall regime with 200 to 400 centimeters of rainfall extending to five to six months and a temperature regime ranging from 25 to 35 degree centigrade. The high rainfall-warm coastal climate is eminently suited for a variety of cash crops and plantation crops. Humid-tropical regions like Kerala have somewhat unique problems and prospects for agricultural development. These regions are well known for high
degree of bio-diversity, high rate of bio-mass growth, diverse tree crops with multiple products, home stead cultivation and the possibility of rain fed paddy cultivation.\(^5\)

The average rainfall with an annual precipitation of 300 cm., with warm temperature has created rich bio-diversity in the state with high degree of crop diversification. The unique feature of Kerala’s agriculture is the predominance of home stead farming over commercial farming and the latter is confined to tea, coffee, cardamom, and rubber.\(^6\)

The crop choices in agro-climatic zones are influenced by social and water availability. A study was made by Department of Agriculture to identify the agro-climatic zones of the state and to identify major crops that each zone can sustain productivity.\(^7\) It was identified that there exists thirteen agro-climatic zones in the state. At macro level, Kerala is divided into three major zones based on altitude from sea level such as: high lands, having humid-temperate characteristics, suitable for plantation crops such as tea, coffee, cardamom; mid-land and coastal land with paddy in the low lying fields and coconut, rubber, tapioca and other crops in the upland. There are variations not only at the macro-level (i.e., agro-climatic zones) but also at the micro-level. Each micro-watershed has different zones based on topography, soil drainage, moisture availability and so on. For example, the valley bottoms, which store the drain-out runoff is used for paddy cultivation, well-drained level fields are used for the cultivation of coconut and drought prone up-lands are used for the cultivation of trees like rubber and cashew. There exist a high level rigidity in the sense that paddy cannot be cultivated in the dry lands without irrigation, coconut cultivation in valley may
pose problems if there is no adequate drainage, coconut in uplands may not yield satisfactorily, etc.

Micro-level variation in agro-climatic characteristic put considerable restriction on the cropping pattern. For example, valley bottoms are suitable only for water-hungry crops like paddy, or probably paddy is the only crop that can remuneratively grow under such swamp natural conditions. The well draining uplands are suitable for perennial crops, which can withstand low moisture during dry seasons. The conversion of a valley bottom to cultivate a perennial crop may require significant fixed investment, or the cultivation of water-hungry crop in upland may necessitate investments in irrigation and water distribution. Thus agro-climatic and topographic parameters either fix the cropping pattern or impose a cost on shifting cropping pattern.

Relative profitability decides whether to incur the cost of conversion. In several localities while considering paddy cultivation is found profitable. In many areas the converted land does not have very high real estate value also. Not only that, during monsoon season, only paddy can grow in non-converted fields. So continuation of paddy cultivation becomes profitable considering high cost of conversion and low opportunity income of such lands.

Some features of natural environment like highest incidence of pests, insects and diseases and competition from weeds make certain crop-production risky. Natural characteristics create seasonal fluctuations in agricultural operations important leading to high demand of labour for short periods. The features such as high run-off, high leaching and the reduction of nutrients and organic matter, cloudiness during monsoons etc. limit the success of green
revolution package in wet-tropical regions. The ‘naturally’ low yield rates of paddy in several places and the high cost of converting paddy fields may lead to a situation of the continuation of paddy cultivation with low levels of inputs in several parts of Kerala. Due to these reasons near substitution trend is visible in the case of production of paddy.

Because of the undulating topography where coconut has been extended providing irrigation is not easy. The areas where coconut was planted in converted paddy fields irrigation may not be necessary. However where coconut replaced tapioca and cashew in the dry lands the lack of adequate moisture may be a crucial constraint. The emergence of new homesteads mainly because of population transition, and the subsequent extension of coconut cultivation to areas facing moisture stress/excess increase the inability to provide irrigation or drainage at reasonable expenditure.

While considering the plantation crops like tea, coffee and cardamom the current stagnation in the area is due to the exhaustive use of lands suitable for that purpose. The expansion of these crops into areas not suitable for their cultivation might have obstructed yield growth. The slow expansion of rubber to sandy coastal regions and the northern mid-land is partly due to the impact of agro-climatic factors.

The agro-climatic conditions have influenced the crop shift occurred in Kerala which is evident from district level variations. The fall in area under rice, that has occurred between 1970 and 1985 is relatively higher in Thiruvananthapuram and districts north of Palakkad and is lower in other districts which have traditionally a larger area under paddy.
Thus there is limited scope for area shift away from paddy in the major paddy-growing areas situated in the low-lying areas of the state. The crop shift in the seventies in the northern districts was found to be more towards coconut, while that in southern districts is more towards rubber. However the current trends indicate that rice is coming down even in the traditional rice regions while rubber is going up even in the northern districts still there are significant differences in Kerala’s agriculture determined by agro-climatic aspects.

2.6. CROPPING PATTERN:

Agriculture, no doubt, is the foundation of Kerala’s economic edifice. During the last two decades, particularly eighties this vital sector witnessed a transformation in favour of commercial crops. One of the dynamic factors contributing to structural changes in State Domestic Product (SDP) and employment is the changes in the cropping pattern triggered by market opportunities and demand factors. The most important structural change is the relative decline in the proportion of area under food grains. Food crops like rice, tapioca and pulses, have became less remunerative compared to the more patronized commercial crops.\textsuperscript{11} Though this could be justified by the increase in agricultural incomes achieved from such a change, its inevitable consequences of having to compromise in the welfare angle cannot be lost sight of.

With ever-increasing population the pressure on land is fast mounting. The land is a limited resource and therefore efficient and judicious use of the same has got to be made. The decision of the farmers to allocate more resources would much depend on price-expectation and productivity of substitute crops. While food grains accounted for approximately two-third of the gross cropped area
(GCA) at the national level the share was as low as 10.73 per cent in Kerala during 2002-03. Food grains crop in the state also declined from 33.16 per cent to 10.27 per cent during this period.12

2.6.1 Cropping pattern in India:

The crop-pattern of any country is due to a number of factors, which can be classified as natural, economic, historic and social. Government policy also affects the changes in cropping pattern. As mentioned earlier the natural factors such as soil, type of climate, extent of rainfall etc. will determine the basic crop-pattern of a region over a period of time. Like natural factors economic factors such as, increase in price of a certain crop consistently for some years relative to other crops can induce the farmers to shift over to that crop. Policies of the Government relating to different crops, exports, taxes etc. can affect the cropping pattern in a significant way.

Cropping pattern in India is determined mainly by natural factors, yet technological factors have also played an important part. Food crops cover nearly three-fourths of total cropped area in which a large portion is occupied by cereals. Of the total area under food grains 80.4 per cent were under cereals and 19.6 per cent under pulses in 2003-04.

Rice is the most important food grain crop in India. In 2003-04 rice was grown on 34.1 per cent of total area under food grains shows an increase in area from the earlier periods. In most of the states in India the area under rice increased on account of to the improvement in production of rice owing to special rice production programme and rice technology. When rice constituted more than one third of the total area under food grains the second important food grain crop,
wheat, occupies more than one fifth of total area under food grains. Since coarse cereals face competition from superior cereals like rice and wheat in most of the states the area under coarse cereals either stagnated or decreased significantly.

Due to the various programmes launched by government to achieve self-sufficiency in edible oils area under oilseeds increased rapidly in 1998-99 but fell in 2003-04. Area under commercial crops like sugarcane, cotton and jute showed increment in 2003-04.

Cropping pattern is a manifestation of the cropping systems, which is described as the kind, and sequence of crop grown over a period of time under the specified soil conditions. Cropping pattern is a dynamic process and occurs due to changes over space and time with cumulative effects of past and present deviations. Farmers allocated their land among alternative crops in order to maximize their expected returns subject to economic, technical and institutional constraints. The area allocation decisions of the farmers are conditioned not only by the indigenous factors associated with the farm household but also by a group of exogenous variables.

India is endowed with diverse climatic, edaphic and socio-economic conditions and this has given rise to many location-specific cropping systems. Peter Robb while searching for the meaning of agriculture through experts in South Asian context writes “Agriculture also relates differently to physical environments. Its role and conditions are different in marginal areas and in the areas with various forms of artificial irrigation. It appears differently in villages, smallholdings and states. It has different imperatives and rhythms according to whether the main crop is wheat or rice, sugarcane or cocoa, pulses or groundnut
or cotton and so on. Hence different practices are associated with the demands of particular crops. But there are also standardizations existing from beliefs and customs, social or gender roles, or indeed in accordance with broader forces devised from law, terms and trade so on—factors which might extend across different agricultural regimes”.¹³

Major cropping systems followed in India includes paddy based cropping system which is practiced in the region extending from the eastern part to include very large part of north—eastern and south eastern India and also strips along the eastern and western coast. This is predominant in Assam, West Bengal, Orissa, Bihar and Eastern states, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala and the western coast.

Paddy is grown in high rainfall areas or in area where irrigation facilities are available. In southern states namely Andhra Pradesh, Tamil Nadu and Kerala paddy is grown in more than one season. Area under paddy in these three States, taken together, account for nearly one fifth of the paddy area in the country. In Andhra Pradesh pulses, groundnut, jowar, maize and sugarcane are major alternative crops where as in Karnataka alternative crops to paddy are ragi, plantation crops, cotton, groundnut, sorghum and maize. In Kerala plantation crops and tapioca are the main alternatives for paddy. Paddy based cropping system is predominantly subsistence- oriented till the recent past. Today surplus is being generated for trade.

The next and the largest surplus generating system which can be termed, as the major food basket of India is wheat based cropping pattern. Wheat is concentrated on sub-tropical region in northern India.
Another popular cropping system is paddy-wheat based cropping system, which exists in non-traditional paddy growing states of Punjab, Haryana and Uttar Pradesh and less in traditional states like Bihar and West Bengal falling in the Indo-Gangetic plains. The entire area under paddy in Punjab and Haryana and 96 per cent of Uttar Pradesh was under paddy-wheat cropping system.

Sorghum based cropping system is typical of the Deccan plateau and hill region. This can be a typical example of adjusting to climatic variations through diversification across crops and spreading the crops across season. This cropping system is mainly found in Maharashtra, Madhya Pradesh, Rajasthan, Andhra Pradesh, Karnataka and Gujarat.

Other cropping systems could be called as convenience based cropping systems and developed by cumulative causation. Constraints are in the form of climate and market. The plantation crop based cropping systems have also been developed under the climatic constraints but optimized with economic incentives to generate high net income flow.

Diversification of agricultural production is emerging as an essential component for stabilizing farm income and augment employment in agriculture. During the Tenth Plan, emphasis was laid on stepping up of export and diversification of agriculture towards export-oriented crops. It is observed that supply of cash crops was more responsive to price changes than the crops largely cultivated for subsistence needs of the farmers.14

At the national level during the sixties and seventies area under the food grain crops increased with the expansion of the gross cropped area. After 1970s the rate of growth in the area under food crops decelerated. Now there are clear
indications that the cropping pattern is leaning towards non-food crops and consequent commercialization. At the all India level the area under wheat registered a significant increase from 8.92 per cent to 13.68 per cent at the cost of area under coarse cereals. Due to low productivity and lack of price advantages the share of area under pulses experienced decline.

Though commercialization and diversification of agriculture began since fifties it picked up a real momentum only in the early eighties. The increase in the share of non-food grains is conspicuous in southern region where it increased from 27.53 per cent in 1962-65 to 32.70 per cent of the gross cropped area in 1980-83 and further to 42.73 per cent in 1992-93.  

The changes in crop acreage take place in two ways (1) through expansion in the gross cropped area and (2) through substitution of low-value-high-volume crops with low-volume-high-value crops. During 1967-80 at national level the expansion effect was more pronounced when compared to substitution effect. But in 1982-96 changes in the cropping pattern were effected more through substitution of crops rather than expansion in the gross cropped area.

The changes in the cropping pattern varied over space and time. Different states experienced different types of cropping pattern.

2.6.2. Cropping pattern changes in different states:

In Assam acreage under crops like paddy, rapeseed and mustard, potato and plantation crops increased due to expansion in the cropped area. In Bihar are under wheat, potato, rape-seed experienced growth during the last two decades mainly through substitution of area under paddy, maize and pulses.
In West Bengal area under paddy declined during the 70s but picked up during 80s. The expansion of cultivated area, irrigation facilities and spread of HYV technology facilitated expansion of paddy area in West Bengal. In Orissa area under paddy declined and cropping pattern changed in favour of maize, ragi, small millets, fur and groundnut due to expansion effect. In Punjab the expansion effect is more. In Haryana changes in the cropping pattern during 1967-81 were mainly due to expansion of area and in the later part was due to strong substitution effect. In Maharashtra, Gujarat and Uttar Pradesh strong substitution effect was acted. Rajasthan and Jammu and Kashmir the expansion effect was strong. In Madhya Pradesh 1967-81 the area expansion of crops were due to expansion effect and during 1982-96 it was due to substitution effect.

South Indian states experienced substitution of area under coarse grains by non-food grain crops. In Andhra Pradesh, Karnataka and Tamil Nadu substitution effect was very strong. Kerala experienced growth in the under plantation and spices crops which substituted paddy, tapioca and pulses. Area under pepper, areca nut and banana declined during 1967-81 but increased in 1982-96.

Considering the regional patterns, Northwestern region, which includes Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab and Uttar Pradesh, which are agriculturally the most prosperous region of the country follows basically wheat based cropping system. In Eastern region, which includes Assam, Bihar, West Bengal and Orissa paddy based cropping system dominates the cropping pattern of the region. Central region encompassing the states of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan coarse cereal based cropping system is predominant. Andhra Pradesh, Karnataka, Tamil Nadu and Kerala are grouped
under the southern region where coarse cereals were the lead crops with 37 per cent of the cropped area in the southern region during 1962-65 declined to 30 per cent 1980-83 and 21 per cent 1992-95.

As mentioned earlier different regions follow different cropping systems best suited to the regional agro-climatic conditions. In different states, different crops are grown according to the regional agro climatic conditions. Kerala state can be classified into three physiographic regions namely coastal mid land, midland and hills. Plantation crops dominate agriculture in Kerala. Coastal and mid land regions have paddy based cropping system and tapioca forming the component of the system. In the hill region tapioca is the lead crop followed by paddy and banana. Coconut, rubber, areca nut are important commercial crops of Kerala.

The major observation aroused from the above analysis of Indian agriculture and state wise analysis is that during the last twenty years the relative area under food grains as a group declined and that under non – food grains increased. In most states food grains occupy more than 65 per cent of gross cropped area with the exception of Kerala and Gujarat. In all the states except Tamil Nadu the share of food grains in GCA declined during the last two decades. In three eastern states of Assam, West Bengal and Bihar rice alone accounts for more than half of GCA. In Haryana, Orissa and Punjab proportionate area under rice increased and in Assam, Kerala, West Bengal and Madhya Pradesh relative area under rice decreased during the last twenty years. The crops, which dominate the cropping pattern, are different in different states.
The ranking of first five dominant crops in different States has undergone conspicuous changes during the last twenty years.

2.6.3. Cropping Pattern in Kerala:

After the formation of the Kerala State there has been diversification in the cropping pattern. In addition to rice and tapioca a number of other garden land crops have contributed to the State’s food supply. Predominance of cash crops and plantation crops, home stead farming system, high rainfall etc. make Kerala agriculture unique in many respects compared to other parts of the nation. Owing to climatic reasons the state has opted for commercial agriculture more than food crops.

“One of the major changes that has been taking place in Kerala is the gradual shifting of areas from food crops like rice and tapioca to plantation crops like rubber, coconut, cashew and coffee. The relative position of pepper, tea, areca nut and ginger have mainly stabilized with slight decrease from the base period. To a large extent this switch over to high value crops for optimizing income from the limited land resources”.

The figure 2.3 gives an overview of cropping pattern in Kerala.
Figure 2.3

[Map showing the cropping pattern in Kerala, with various crops and states marked.]
Even though rice is the single largest crop grown in Kerala even today the area under its cultivation has come down to 10.27 per cent of total cropped area in 2004-05, which was nearly 30 per cent during seventies. Rising cost of cultivation, stagnation of rice prices and lucrative alternative uses of paddy lands are the main reasons for the decline. “As regards the cash crops pepper, ginger and other traditional export crops has virtually stagnated. Cardamom and tea have not shown any substantial increase area wise. Areas under coconut and coffee have increased slightly. The single crop, which has gained immensely during the last 30 years, is rubber with a four-fold increase in area. The institutional promotion and guidance encouraged farmers to take to rubber cultivation. Cultivation of rubber spread from High Ranges to mid lands and even to marshy coastal lands due to the steady increase in rubber prices and assurance given to rubber growers by the Government.”

The increase in production of most of the perennial crops during the past four decades was mainly due to the increase in the area under these crops rather than improvement in productivity. Although the growth performance of the sector as a whole is encouraging since 1990-91 it is noteworthy that the engine of growth is fueled by two principal crops namely coconut and rubber, that too on account of large scale area expansion through the shift in cropping pattern. Food crops in general have suffered severe set back in production mainly on account of the reduction in area under rice and tapioca.

Out of a gross cropped area of 29.42 lakh hectares in 2004-05 food crops comprising rice, pulses minor millets and tapioca occupy only 13.6 per cent. Kerala state, which had a low base in food production, is facing serious
challenges in retaining even this meagre area. Kerala agriculture economy is undergoing structural transformation from mid seventies by switching over to a large proportion of its traditional crop area which was devoted to subsistence crops like rice and tapioca to more remunerative crops like coconut and rubber.\textsuperscript{20}

According to the latest report available the area under rice has increased from 2.87 lakh hectares in 2003-04 to 2.90 lakh hectares in 2004-05. During the same period the area under tapioca has increased from 0.942 lakh hectares to 1.04 lakh hectares. Area under commercial crops in general and rubber in particular has increased considerably during the last two decades. During Ninth plan average annual increase in area under rubber was 1951 hectares while during 2004-05 area increased by 2141 hectares compared to the previous year and the increase was mainly due to upsurge in prices. In the case of coconut area was its peak during 2000-01. During the year 2004-05 area declined by 731000 hectares over 2003-04. Major commercial crops, which had recorded expansion of area during 2003-04 from previous year, include ginger (347 ha.), tapioca (10091ha.) and turmeric (83 ha.). The major crops with considerable loss in area include cashew nut (271 ha.), cardamom (265ha.), pepper (7456ha.), areca nut (4936ha.), coffee (40ha.) and banana (164ha.).

2.6.4. Crop-Wise Analysis:

The study is based on twelve major crops- Rice, Coconut, Tapioca, Rubber, Cashew nut, Areca nut, Pepper, Cardamom, Tea, Coffee, Banana and other plantains and Ginger- which constitute more than 83 per cent of total cropped area of the state in 2004-05 in fourteen districts of Kerala state during 1974-75 to 2004-05.
1. **RICE:**

Rice, which is the staple food of Kerala, has experienced continuous decline in area over two decades. The average annual decline in area under rice during the Eighth Five Year Plan was around 22000 hectares whereas it has come down to an average of 13000 hectares during the Ninth plan period. However during 2004-05 a slight increase in area was recorded by 2634 hectares from 2.87 lakh hectares in 2003-04 to 2.90 lakh hectares and rice production increased from 5.70 lakh metric tones to 6.67 lakh metric tones. The lease land-farming project implemented by ‘Kudumbasree’ is one of the reasons for the increase of area and production under rice. During 2004-05 the total area under lease land cultivation was 21554 hectares indicating an increase of 3979 hectares over 2003-04. Rice is the major crop cultivated in these lands. During 2005-06 Department of Agriculture has stated another scheme on rice cultivation in fallow lands by utilizing the services of unemployed youths.  

With just 1.1 per cent of the country’s geographical area Kerala has to support about 3.4 per cent of the country’s population and 1.75 per cent of cattle population. The gap between demand and supply of food grains which was around 50 per cent till the mid seventies started widening there after consequent to the large scale shift in paddy lands for cultivation of more remunerative crops like coconut. The fifteen-year period from the mid seventies witnessed a large-scale shift in area under the crop resulting in a loss of around four lakh hectares of gross cropped area. Even though the state could make some dent into this problem by slowing down the decline in paddy area in the initial years of Eighth Plan, the estimates of 1996-97 shows that this could be sustained. Cost –price squeeze
eroded the profitability of rice cultivation. Also reduction in area due to increase in land value, increase in urbanisation, brick industries, rising labour costs coupled with the unmanageability and unavailability of labour had also promoted conversion to other crops. Trend analysis, component analysis, instability analysis all lead to predominant influence of area. Within a period of 15 years from 1980-81 the proportion of area under paddy which is the predominant food crop in the State declined from 27.79 per cent to 16.51 per cent showing an overall decrease of 40.59 per cent and an annual growth of –3.75 per cent. Meanwhile proportion of area under coconut increased from 22.58 per cent to 29.88 per cent registering an impressive growth of 2.71 per cent per year. Coconut is widely regarded as the principal competitive crop of paddy and the two crops show opposite growth trends in area, it is the conversion of paddy land to coconut that is often mentioned in the Kerala context.

Figure 2.4
2. TAPIOCA:

The trend in the case of tapioca was more or less similar to that of rice. The same reason that was attributed to the reduction in area and production of rice can be applicable to tapioca also. Declared as a food crop and once a staple food for the large rural population the demand for tapioca is declining owing to the socio-economic changes and arrival of more cereals from other states.

During the period under study area under tapioca shows a very sharp declining trend. Area under tapioca, which was 317 thousand hectares in 1974-75 steadily, declined and reached at the level of 216 thousand hectares in 1984-85. Recent estimates showed that area under tapioca declined to 94 thousand hectares in 2003-04. Only in 2004-05 it shows an expansion in area from the previous year (10091 ha.)

![Figure 2.5](image)

3. COCONUT:

India is the third largest country in terms of global area and production after Philippines and Indonesia. Kerala was traditionally a coconut growing area along with the coastal States of Karnataka, Tamil Nadu and Andhra Pradesh.
and 1985-86 the total increase in area was 11.8 thousand hectares (1.7 per cent growth), between 1985-86 and 1995-96 total increase in area was 209.6 thousand hectares (29.7 per cent growth) and between 1995-96 and 2004-05 the decline in area was noted to be –16.3 thousand hectares (1.8 per cent decline). The maximum growth in area happened between 1985-86 and 1995-96.

The substantial increase of coconut area in Kerala occurred due to substitution of paddy area by coconut. The coconut- paddy price ratio continued to remain in favour of coconut throughout all the years after 1977-78 except for a major decline in the price of coconut during 2000-01. Decline in area after 1995-96 was due to the sharp decline in farm level prices of coconut. The fall in price of coconut combined with the wide – spread attack of coconut mite depressing the yield considerably in the central region which has affected the livelihood security of a vast majority of small and marginal farmers of the state.²⁹

**Figure 2.6**
4. RUBBER:

Natural Rubber cultivation in India has been traditionally concentrated in Kerala and to some extent in the adjoining states of Karnataka and Tamil Nadu. The agro-climatic conditions in the state were very favourable for rubber cultivation. Kerala accounts for 83 per cent of the area under rubber in the country. The coverage under the crop in 2004-05 was 4.81 lakh hectares higher by 2141 hectares over the previous year.

Among the four plantation crops rubber emerged as the most significant crop with the largest area in the state next only to coconut. The proportion of area under rubber went up by three folds from 5.23 in 1960-61 to 16.14 in 2004-05. Kerala has near monopoly in natural rubber as it produces 92 per cent of the natural rubber in India from 88 per cent of the area. During Eighth Plan nearly 30,000 hectares were brought additionally under rubber. Out of 574 thousand hectares in India, Kerala occupied 478 thousand hectares (83.23 per cent).

Mixed cropping system is destroyed when the land is used for rubber cultivation since no other crops grow under rubber trees. Earlier rubber was grown in the valleys and other areas where miscellaneous tree crops were grown. Most of the land converted to cultivation of rubber were those in mid land region where a variety of seasonal and perennial crops used to be cultivated. In the case of rubber, the development support given by Rubber Board through financial and technical assistance and existence of an assured market for rubber provided the incentive for cultivators to bring new areas under the crop.

Rubber, which occupied fourth position in area went to the second position in 2004-05 where coconut is the first and rice which was in the first
position during 1975-76 came down to third in 2004-05. Rubber and pepper had a clear advantage over tapioca in terms of gross income per unit of land during the period when tapioca production declined. The calculations showed that one percent increase in relative income of rubber reduces the area under tapioca by 0.9 per cent. The falling profitability of tapioca led to the area shift towards rubber.

**Figure 2.7**

5. PEPPER:

Pepper is one of the most ancient and traditional crops of Kerala whose origin is traced to be the natural evergreen forests of the Western Ghats. Black pepper, which is considered as the king of spices, has played an important role in Kerala economy for a number of centuries. Kerala has near monopoly of area and production of pepper in India with about 95 per cent coverage of all India area. Like coconut area under pepper showed an increasing trend.

During 1980-81 the first five crops, which constitutes 72 per cent of total cropped area, were rice, coconut, tapioca, rubber and cashew nut. But in 1998-99
During the middle of the last century Kerala had accounted for about 70 per cent of the area under coconut in India against relatively small share about 15 per cent in Karnataka, 10 per cent in Tamil Nadu and 5 per cent in Andhra Pradesh. By the turn of this century Kerala’s share has dropped down to about half the all India’s area (46.5 per cent in 2004-05) while the other States have increased their share to 19 per cent in Karnataka and 17 per cent in Tamil Nadu.

During mid seventies coconut occupied only the second position with 23.3 per cent of the cropped area after rice with 29.4 per cent of the cropped area. By 1993 coconut occupied about 28 per cent of the cropped area against 24 per cent area of rice. The expansion of coconut area was mainly from conversion of rice area from the low land and mid land regions in the State. Area under coconut in Kerala has been steadily increasing except during 1975-76 which was partially recovered during 1976-77, but the next five years indicated a declining tendency. The recovery initiated in 1982-83 continued until 1989-90. Though there had been a decline in area during 1990-91 and 1991-92, the next four years witnessed increased area, which was followed by three years of declining area from 1996-97. The recovery in 1999-2000 continued in 2000-01 and achieved a peak level of 925.8 thousand hectares. The next four years area showed a declining trend, which reached 898 thousand hectares in 2004-05.

The changes in area under coconut over five year intervals beginning from 1975-76 indicate negative values for the periods 1980-81 and 2004-05. All the other periods have positive growth in area. The maximum increase of 165.3 thousand hectares occurred during the five years from 1985-86, which also corresponds, to the maximum percentage increase of 23.5. Between 1975-76
black pepper replaced cashew nut and coconut and rubber improved their ranking in the first five crops-coconut, rubber, rice, black pepper and tapioca. Again in 2004-05 plantains replaced tapioca and the first five crops became coconut, rubber, rice, pepper and plantains including banana.

The area under pepper during 1974-75 was 118.4 thousand hectares, which seemed to decline slightly and reached 108.8 thousand hectares in 1984-85. There was an upward movement for next ten years, which reached 191.6 thousand hectares in 1995-96. Up to 1999-2000 area remained more or less same and there was a revival in 2000-01, followed by a gradual increase during next five years. In 2004-05 it registered an area of 209 thousand hectares.

Though there had been some annual fluctuations in the area under pepper there was a consistent upward trend in the pepper area in Kerala. During late 1980’s there was a major increase of 77 per cent in the pepper area, which was triggered by the response to the high price level during this period. During post globalization period the area had increased only by about eight per cent.

**Figure 2.8**
6. CASHEW NUT:

India is the second largest producer and exporter of cashew in the world. India’s share in world production is 17 per cent. In spite of operating special schemes for expansion of area under cashew in Kerala the coverage has been steadily declining during the last two decades. The decline in area suffered during the period is to the tune of around 30,000 hectares. The share of Kerala in the area under cashew in the country has come down from 23 per cent in 1987-88 to 12 percent in 2003-04. The State’s share in All-India production is 11 per cent.

The area under the crop which touched all time high of around 1.55 lakh hectares by the end of Seventh Plan has come down to around one lakh hectares by the end of Eighth Plan. The sustainability of the crop in Kerala is in real threat on account of the surging pressure for replacement with rubber. Despite implementing a special programme for area expansion the crop suffered loss in area to the extent of around seven thousand hectares. The decline in area from 1980-81 to 2004-05 was to the tune of 55160 hectares.

In 1970-71 area proportion of cashew nut, Kerala was in the sixth position, which improved in 1980-81 to five. But during nineties pepper replaced cashew and it came back to the sixth position. According to the latest report available share of area under cashew is in the eighth position, nearly 3 per cent of the total cropped area of the State.

In 1974-75 areas under cashew nut was about 104.9 thousand hectares, which increased slowly and reached 137.7 thousand hectares in 1985-86. After that it showed a declining trend and reached 86.1 thousand hectares in 2004-05. Between 30 years the area change under cashew nut is 18.8 thousand hectares.
(18 per cent reduction in area). The increasing trend in area was noted up to 1985-86 and constituted 31.3 per cent growth. Declining trend, which was noticed after 1985-86 contributed 37.3 per cent reduction. Cashew processing industry is finding it difficult even to maintain the present level of capacity utilization because of lower availability of local raw cashew nut. Concerted efforts are needed to nurture this crop in the State with programmes to promote high density planting with high yielding cashew grafts.\textsuperscript{36}

\textbf{Figure 2.9}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{chart.png}
\caption{Graph showing data over time.}
\end{figure}

7.\textbf{ARECANUT:}

After 1970’s there was a decline in areca nut area and production. But after 1985-86 the area and production showed positive trend. Competition from other countries in the international market and resultant decline in demand may be the reason for declining trend in area.\textsuperscript{37}

Areca nut occupied 2.7 per cent of state’s total cropped area in seventies whose position was seventh in share of area remained in the same position in
eighties even though the share decreased to 2.1 per cent. During nineties the position was on ninth even though there was a slight improvement in share (2.2 per cent). But in 2004-05 again the seventh position was regained and the share became 3.35 per cent.

Considering the area in 1974-75 crop occupied 93 thousand hectares and after that it showed a declining trend. Very minute improvement showed after 1994-95 and reached 102.5 thousand hectares in 2003-04 and 97.6 thousand hectares in 2004-05. Change in area between 1974-75 and 1986-87 was –35.3 thousand hectares (37.9 per cent decrease). Between 1987-88 and 2003-04 the trend was that of increase noted as 42 thousand hectares (69.3 per cent growth).

Fluctuating trend is noted in the case of area under areca nut as the declining trend during earlier periods and revival trend after mid eighties.

**Figure 2.10**
8. PLANTAINS:

Banana and plantains, which together occupied 50 thousand hectares in 1974-75, reached 71 thousand hectares in 1980-81 and in 2004-05 it reached 110 thousand hectares. In the analysis, which began in the year 1974-75 the share of banana and plantains, was only 1.7 per cent (ninth position in area) raised to 3.7 per cent in 2004-05 stood in fifth position areawise.

The conversion of paddy lands usually takes place in three phases. Most of the conversions start with the shifting of the area to cultivation of vegetables, banana and plantains and tapioca. This area conversion from paddy encouraged the increasing trend of area under banana and other plantains. A portion of shifted land is used for growing seasonal crops like banana and plantains.

Area under banana and other plantains in 1974-75 was 47 thousand hectares and up to 1984-85 it showed a fluctuating trend in the area. After 1985-86 there was a continuous increase in area, which reached 110.9 thousand hectares in 2004-05. Between 1974-75 and 2004-05 area under banana and other plantains more than doubled. Large-scale conversion of paddy lands is responsible for this change. Most of the paddy lands used firstly for the cultivation of vegetables and plantains. Change in area under plantains noted was 63 thousand hectares, nearly 135 per cent growth.
9. CARDAMOM:

A number of spices grown in India are indigenous. Among them cardamom is very important. Kerala, Karnataka and Tamil Nadu are the states growing cardamom. Among these states, Kerala shares 60 per cent of the area and production. Cardamom grows wild in the evergreen monsoon forests of the Western Ghats in South India. The Western Ghats are the original home of cardamom, the ‘Queen of Spices’. In certain areas of Karnataka and Kerala the cardamom is grown as an inter crop in areca nut gardens where areca nut provides the necessary shade conditions required for the crop.

In India, Kerala has the monopoly of cardamom production. In Kerala cardamom is mainly cultivated in the districts of Idukki, Wayanad and Palakkad. During the period under study area has been decreasing at a diminishing rate. The area under cardamom has been decreasing over the period and the rate of decrease has declined gradually throughout the period of analysis.
The small and marginal farmers have already quit the production scene due to huge losses. Farmer’s are not getting a profitable price and as a result of hike in the wage rate and shortage of labourers they are shifting to coffee, areca nut, pepper and as a last report to vanilla. Massive shifting of cardamom to other crops is mainly due to recurrent fluctuations in prices.\textsuperscript{38}

Area under cardamom shows accelerating nature till 1990-91. After that a declining trend was noted. The change between 1974-75 and 1990-91 was 20 thousand hectares (43.4 per cent). The change between 1990-91 and 2004-05 was 25.8 thousand hectares (38.6 per cent decline). Fluctuating trend in area was noted in most of the years. This may be due to the recurrent fluctuation in prices. Since small and marginal farmers quit the cultivation of cardamom and opted for more competitive and remunerative crops like vanilla.

**Figure 2.12**

![Chart showing area and production of tea in Kerala]

**10.TEA:**

Area and production of tea in Kerala has remained more or less constant during the period under study. Against the total area of 5.11 lakh hectares under
tea in the country Kerala accounts for only 0.37 lakh hectares. Tea plantations owned by big companies employ a labour force of over 84,000 in the organised sector. Of late, small plantations of tea have started emerging in Idukki and Wayanad Districts.

As mentioned earlier area under tea was stagnant and the area ranges between 37 thousand hectares in 1974-75 and 38 thousand hectares in 2004-05. During eighties and nineties the area was more or less same as 35 thousand hectares. The proportion of area of tea in total cropped area showed a very minute change. In 1974-75 area was 0.87 per cent of total cropped area fluctuated in eighties (1.23 per cent) and nineties (1.14 percent) and in 2004-05 it reached 1.3 per cent. Position of tea in the first twelve crops is in eleventh position throughout the years under consideration.

After the removal of quantitative restriction in April 2001 one of the major threats faced by the tea industry is the increased import of inferior quality teas into India particularly from Indonesia resulting in further depression in prices.

**Figure 2.13**
11. COFFEE:

Area under coffee increased from a growth in the share from 1.33 to 2.84 per cent between 1974-75 and 2004-05. Actual area increased from 40 thousand hectares to 85 thousand hectares. The area under coffee in Kerala was 0.846 lakh hectares out of 3.28 lakh hectares in the country during 2004-05, which works out to be 26 per cent. The major variety grown in Kerala is Robusta with a share of 95 per cent in planted area. Area under coffee registered substantial increase during the last two decades with an annual growth of over 2 per cent.

Coffee provides opportunities for livelihood to nearly one-lakh families including agricultural labourers. In Kerala coffee is also one of the smallholder plantation crops with nearly 76,000 holdings coming under the category with an average size of 1.1 hectares\(^{39}\). In Kerala the cultivation of coffee is concentrated in Idukki, Palakkad and Wayanad districts.

There is an increasing trend from 1974-75 in the area and reached 84644 hectares in 2004-05. Between these periods, the area change noted is 48 thousand hectares; growth was nearly 131.3 per cent increase. Being a perennial crop coffee does not respond to price fluctuations in the short run. The high positive growth rate may be attributed to the positive trend in the international market some time in the past, which is reflected in a high growth, rate in area\(^{40}\). The proportion of area under coffee increased and the position of coffee in the first 12 crops is tenth in seventies, eighth in eighties during nineties it is seven and in 2004-05 the position is ninth.
12. GINGER:

In the case of ginger although production increased the relative contribution declined from 65.68 to 16.11 per cent. This is because of the significant expansion in area in other states due to high prices.\(^4\)

Area under ginger, which is a minute spice, fluctuates up to 1991-92. After that it showed a declining trend. In 1974-75 the area under ginger was 12 thousand hectares reached at the highest level in 1986-87 as 16.6 thousand hectares. The latest data shows that area under ginger is only 8.9 thousand hectares.

Position of ginger in the proportion of area in Kerala is remained as twelve in all periods under study. In seventies the share was 0.38 per cent rose to 0.48 per cent in eighties slightly declined to 0.43 per cent in nineties and in 2004-05 it is only 0.30 per cent of the total cropped area.
2.7. GROWTH RATES OF AREA OF PRINCIPAL CROPS:

The growth rates of area of principal crops in Kerala over three periods of time are presented in the Table (2.2). The result of this analysis revealed a mixed trend in respect of growth in area under important crops in Kerala State. For overall period coconut, rubber, pepper, areca nut, plantains and coffee recorded a growth in area while rice, tapioca, cashew nut, cardamom, tea and ginger showed a negative growth in area.
TABLE 2.2

COMPOUND GROWTH RATES OF AREA UNDER PRINCIPAL CROPS IN KERALA (Percent)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Period I</th>
<th>Period II</th>
<th>Period III</th>
<th>Overall Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>-1.97 **</td>
<td>-4.23 **</td>
<td>-5.97 **</td>
<td>-3.9 **</td>
</tr>
<tr>
<td>Coconut</td>
<td>-1.98 **</td>
<td>3.04 **</td>
<td>0.16</td>
<td>1.35 **</td>
</tr>
<tr>
<td>Tapioca</td>
<td>-5.48 **</td>
<td>-5.76 **</td>
<td>-1.74 **</td>
<td>-4.3 **</td>
</tr>
<tr>
<td>Rubber</td>
<td>2.11 **</td>
<td>5.84 **</td>
<td>0.89 **</td>
<td>3.53 **</td>
</tr>
<tr>
<td>Pepper</td>
<td>-1.2</td>
<td>6.02 **</td>
<td>1.2 **</td>
<td>2.87 **</td>
</tr>
<tr>
<td>Cashew nut</td>
<td>5.64 **</td>
<td>-2.41 **</td>
<td>-2.03 **</td>
<td>-1.46 **</td>
</tr>
<tr>
<td>Areca nut</td>
<td>-6.43 **</td>
<td>0.76 *</td>
<td>3.08 **</td>
<td>0.68 *</td>
</tr>
<tr>
<td>Cardamom</td>
<td>1.8</td>
<td>0.43</td>
<td>-0.61 **</td>
<td>-1.18 **</td>
</tr>
<tr>
<td>Banana &amp; Plantains</td>
<td>0.2</td>
<td>3.21 **</td>
<td>3.84 **</td>
<td>2.73 **</td>
</tr>
<tr>
<td>Coffee</td>
<td>8.24 **</td>
<td>3.19 **</td>
<td>0.14</td>
<td>2.52 **</td>
</tr>
<tr>
<td>Tea</td>
<td>-0.72 *</td>
<td>-0.25 **</td>
<td>0.67 **</td>
<td>-0.08</td>
</tr>
<tr>
<td>Ginger</td>
<td>2.27</td>
<td>0.81</td>
<td>-3.59 **</td>
<td>-0.67 *</td>
</tr>
</tbody>
</table>

Note: ** Significant at 1% level, * Significant at 5% level.

Inter period comparison revealed that the growth rates of coconut, rubber and pepper were higher for the second period (1981-82 to 1991-92) than the first period (1974-75 to 1980-81) and the third period (This is due to the shift of area from food crops to cash crops due to the declining profitability, shortage of labourers, increasing cost of production etc.). Highest growth rate was recorded by coffee during the first period under study. For areca nut and plantains
including banana growth rates for the third period were higher. For cashew nut and ginger growth rates were positive only in the first period. In Kerala the most important food grain is rice, which recorded a sharp decline in area and showed a negative growth rate in all periods, particularly the high negative growth rate was recorded in the third period. The share of rice in total cropped area, declined from 29.21 per cent to 9.97 per cent in between 1974-75 and 2004-05. Earlier studies revealed this pattern and came to the conclusion that the area shifted from rice was used for the cultivation of coconut and rubber that are named as cash crops.

High negative growth rate in area under rice and tapioca in the second period and positive growth rates in coconut, rubber and pepper in the same periods confirmed the shift in cropping pattern in favour of cash crops. Not only that the land put to non-agricultural uses has been relatively higher since the beginning of 1990’s.
Figure 2.16

Graphs showing actual and trend values

Area under Coconut
1974-2005

Area under Rice
1974-2005
Area under Pepper
1974-2005

Area under Cashewnut
1974-2005
Area under Ginger
1974-2005

Sequence

Area under Banana
1974-2005

Sequence
Area under coffee
1974-2005

Observed
Exponential

Area under Tea
1974-2005

Observed
Exponential
But in the third period rice area growth, which is negative, is higher than first and second periods. Unlike in the second period the area growth for the cash crops is low in third period, which arrived at the conclusion that the area under rice is shifted to non-agricultural, uses since the proportion of area under this category is very high in the land utilization pattern. The crops whose growth rate in area is positive includes coconut, rubber, pepper, areca nut, plantains includes banana, tea and coffee. But its rate of growth was not much in the case of rubber, coconut, pepper, tea and coffee compared to other periods. Only areca nut and banana and plantains together made a positive growth considerably.

While analysing the growth rates in crops for overall period there is a clear shift of area from food crops mainly rice and tapioca to cash crops rubber, pepper, coffee and coconut.

Taking into consideration the crops individually rice showed a negative growth rate at increasing rate. It recorded the highest negative growth rate in the third period.

For coconut the highest positive growth rate was in the second period, in the first period the growth rate in area was negative. In third period it was positive but the rate was very low. The overall period showed a low positive value compared to second period.

The growth rate of tapioca was negative for all the periods but during first and second periods growth rate, which was negative, is high compared to third period. In all periods growth rate was negative.
High growth rate was noted for rubber in the second period and the lowest growth rate was during the third period. Positive growth rate was recorded in all periods.

Except in the first period growth rate in area under pepper was positive and among twelve crops it recorded the highest growth rate during the second period.

Cashew nut growth rate was positive and high only in Period I and in all other periods the growth rate was negative.

Areca nut area growth was negative only in the first period and in all other periods it was positive.

Area growth under banana and plantains was insignificant only for Period I and during other periods it noted a positive growth rate.

Plantation crops cardamom and tea recorded a negative growth rate in area except for one period and coffee recorded a positive growth rate during all time periods.

Ginger area showed a positive growth during first period and all other periods recorded a negative growth rate in area.

2.8. PRODUCTION TRENDS OF MAJOR CROPS:

Growth in total agricultural production over a period of time gives an idea of pace of agricultural development in the state. The unique feature of Kerala agriculture is the high share in the production of certain plantation crops and spices. Kerala accounts for 42 per cent of the area under four plantation crops and 45 per cent of output. Kerala’s share in the national production of rubber is 92 per cent, cardamom 78 per cent, coffee 20 per cent and tea 6 per cent.\textsuperscript{42}
The production of food crops (paddy and tapioca) has declined mainly due to decrease in the area of cultivation. The production of rice has continued to decline. The tapioca production too has declined due to the reduction in area. However during 2004-05 rice production increased from 5.70 lakh metric tones to 6.67 lakh metric tones an increase of 17 per cent during this period compared to a reduction of 17 per cent in 2003-04 with that of 2002-03. The unprecedent drought in recent years has contributed to this decline of paddy production during 2003-04, which was reversed in 2004-05. Tapioca production declined to 2.43 lakh metric tones from 2.54 lakh metric tones in 2003-04.

Coconut is grown in over 93 countries. Indonesia is the largest producer (27 per cent) followed by Philippines (23 per cent) and India’s share in world production is 22 per cent fourth being Sri Lanka with 5 per cent share.

During 1974-75 Kerala had accounted for about 62 per cent of the coconut production in India and by 2003-04 Kerala’s share had declined to about 49 per cent. Coconut production in Kerala during 1974-75 was 3719 million nuts, which had increased to 5727 in 2004-05. There was a contrast downward trend in production from 1974-75 to 1983-84(except for 1978-79 and 1982-83). When the production level had fallen to 2602 million nuts, which was 30 per cent below 1974-75 production level. Up to1994-95 recovery continued and next four years the fluctuations in production noted. In 1999-2000 production increased to 5680 million nuts declined for next two years. This declined production coincides with reduced area under coconut. The highest production level showed in the year2003-04 recorded 5876 million nuts, which decreased, to 5727 in 2004-05.
Kerala has near monopoly in natural rubber as it produces 92 per cent of the natural rubber in India. There is a continuous increase in rubber production. In 1974-75 the production level was 121.6 thousand tones reached 690.7 thousand tones in 2004-05 with a steady increasing trend. Between these periods there was 569.1 thousand tones increase was noted in the production level. Area change noted in this time period was 137 per cent but production level change was 468 per cent. Production of natural rubber in Kerala during 2004-05 was 6.91 lakh tones indication a 5 per cent increase over the previous year. India is the fourth largest producer and consumer of natural rubber. During the twenty years starting 1974-75 production increased by 321.28 thousand tonnes, which represents 264 per cent, increase over 1974-75 levels. Same time period area increased by 119 per cent based on 1974-85 level. Ten years followed by 1994-95 production increased by 45.6 per cent and area increment is only 7 per cent.

Because of the dominant position in world production of pepper India was also sometimes referred to as the ‘kingdom of pepper’. The production of pepper in Kerala was either stagnant or declining during 70s and up to mid eighties. The production level has touched an all time low level of 17350 tonnes during 1984-85 and after that the production level has more than doubled within three years. The peak production of 69015 tonnes was reached in 2003-04. Area was the highest during 2003-04. The area effect on production of pepper can be noticed in the analysis of data regarding area and production.

India is the second largest producer and exporter of cashew in the world. India’s share in world production is 17 per cent with a production of 4.6 lakh metric tonnes in 2004. Area and production in Kerala is declining. Share of
production of cashew is declined from 31 per cent in 1987-88 to 12 per cent in 2003-04. Highest production recorded is 1,22,360 tonnes in 1975-76 and after that it declined and reached 63,701 tonnes in 2004-05 nearly 48 per cent reduction in the production. At the same time the area reduction noted was 22 per cent.

Areca nut production, which was 13,777 tonnes in 1974-75, declined over years and reached the lowest level of 8,318 tonnes in 1983-84. After that the production showed a recovery and reached the highest level 1,06,389 tonnes in 2004-05. The effect of area change occurred in the case of production of areca nut.

Production of Banana and other plantains together account an increase in the first four years and then began to decline up to 1982-83, which recorded the lowest production level. After that the production level showed an increasing trend (except for the years 200-01 and 2001-02). In 2004-05 it noted a slight decrease in production from the previous year. The same trend could be noticed in the area. During the period of analysis there was large-scale expansion in area mainly due to the land conversion of food crops mainly rice and tapioca. Paddy lands were converted for cash crops. In the first stage it was used to cultivate plantains and vegetables. So in the case of increased production of plantains area is a decisive factor. In 1974-75-production account only 356 thousand tonnes, which came to lowest value of 289 thousand tonnes in 1982-83 and reached the highest value of 841.9 thousand tones in 2003-04. Production change was 136 per cent growth with regard to 1974-75.

Plantation crops tea, coffee and cardamom showed different trends in production. Major variety of coffee is Robusta whose share of production
increased from 53.7 per cent in 1995-96 to 62.5 per cent in 2004-05 indicating 3.7 annual growth while Arabica production remained more or less the same. During the last two decades the increase in production recorded was much higher and registered an annual growth rate of nine per cent.43

A declining trend in production of tea in the state was observed for the last three years (2001-02, 2002-03, 2003-04). In respect of production the share of Kerala declined slightly to six per cent in 2004 from seven per cent in the previous year. Though area under tea showed more or less constant trend, production recorded a fluctuating trend.

The share of Kerala in the production of cardamom at the All India level increased from 41 per cent in 1993-94 to 76 percent in 2004-05. The market for cardamom is domestic which could be seen from the declining share of exports. In the case of cardamom, production increased from 2,050 tonnes in 1974-75 to 8,931 tonnes in 2004-05.

In the case of ginger although production increased the relative contribution declined from 67.64 to 12.5 per cent between 1974-75 and 2004-05. This is because of the significant expansion in area in other states due to high prices.

Compound growth rates (CGR) of production of principal crops in Kerala are presented in the Table (2.3). Results are shown in the Table crop wise and period wise

During the overall period rice, tapioca and cashew nut production showed a negative value. Highest positive growth rate was attained for rubber. The other crops coconut, pepper, areca nut, banana and plantains, cardamom, coffee, tea and
ginger showed a positive growth rate in production. During this period for the crops rice, coconut tapioca, rubber, pepper, areca nut, banana and coffee the same trend was noted in the case of area growth rates. For cardamom and tea the two growth rates are in different trends.

**TABLE 2.3**

**COMPOUND GROWTH RATES OF PRODUCTION OF PRINCIPAL CROPS IN KERALA**

(Percent)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Period I</th>
<th>Period II</th>
<th>Period III</th>
<th>Overall Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>-0.8</td>
<td>-1.80 *</td>
<td>-5.02 **</td>
<td>-2.5 **</td>
</tr>
<tr>
<td>Coconut</td>
<td>-3.32 **</td>
<td>4.77 **</td>
<td>0.90 **</td>
<td>2.55 **</td>
</tr>
<tr>
<td>Tapioca</td>
<td>-6.12 **</td>
<td>-3.69 **</td>
<td>-0.22</td>
<td>-2.65 **</td>
</tr>
<tr>
<td>Rubber</td>
<td>1.53</td>
<td>8.64 **</td>
<td>4.26 **</td>
<td>6.67 **</td>
</tr>
<tr>
<td>Pepper</td>
<td>1.92</td>
<td>9.23 **</td>
<td>1.48</td>
<td>4.09 **</td>
</tr>
<tr>
<td>Cashew nut</td>
<td>-6.8 *</td>
<td>4.02 **</td>
<td>-4.21 **</td>
<td>-1.44 **</td>
</tr>
<tr>
<td>Areca nut</td>
<td>-3.08</td>
<td>2.92 *</td>
<td>2.85 *</td>
<td>2.26 **</td>
</tr>
<tr>
<td>Cardamom</td>
<td>11.02 *</td>
<td>3.64</td>
<td>9.28 **</td>
<td>4.84 **</td>
</tr>
<tr>
<td>Banana &amp; Other</td>
<td>-3.44</td>
<td>5.35 **</td>
<td>0.76</td>
<td>3.03 **</td>
</tr>
<tr>
<td>Plantains</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td>11.79 *</td>
<td>1.11</td>
<td>4.5 **</td>
<td>4.75 **</td>
</tr>
<tr>
<td>Tea</td>
<td>2.22</td>
<td>3.23 *</td>
<td>0.41</td>
<td>1.36 **</td>
</tr>
<tr>
<td>Ginger</td>
<td>4.69 *</td>
<td>3.97 **</td>
<td>-1.59</td>
<td>1.32 **</td>
</tr>
</tbody>
</table>

Note: ** Significant at 1% level,
* Significant at 5% level.
During Period I growth rates of production of rice, coconut, tapioca, cashew nut and areca nut showed negative for which the growth rates in area were also moved in the same direction except for cashew nut. For rubber, ginger, cardamom, tea and coffee growth rates were positive and area trend revealed the same movement except for tea. So area change became a decisive factor in the production of most of the crops except for cashew nut and tea for Period I.

During Period II except rice and tapioca all other crops showed a positive growth rate in production. Area growth rates were negative for rice, tapioca, cashew nut and tea and positive for other crops. For coconut, rubber, pepper and banana and other plantains recorded a high positive growth rate during Period II. Area growth rate for those crops showed a high positive growth rate (as per Table 2.2).

During the third period high negative growth rate was recorded for rice and high positive growth rate for cardamom. Rubber and coffee recorded a positive growth rates followed by areca nut. Other crops showed a low growth rate positive or negative.

In the case of rice, negative production growth rates increased between the periods. Area reduction also moved in the same direction, which takes us to the conclusion that area reduction became a factor for low production. Highest negative growth rate in area and production was in the third period.

Coconut which, showed negative growth rate for the first period became positive for the next two periods. It indicated high value for Period II, which was also the period for highest area growth. Here also area became a decisive element for production change.
Tapioca production growth rate was negative for all periods where the highest value was in the first period but negative area value was the highest for the second period. But trend was slowly declining like area growth rates.

Rubber recorded the highest production growth rate during Period II that was the same period for highest positive area growth.

Pepper recorded highest positive growth rate in production during Period II, which was also the period of highest positive area growth rate.

For coffee Period I is noted as the highest positive growth rates both for production and area. The contribution of area was more on the production change.

Cashew nut production growth rate was positive only in Period II. During all other periods it showed negative growth rates.

Areca nut production increased throughout the periods because the growth rate, which showed negative, rate in the Period I increased to positive rates.

Banana and other plantains showed growth rates as positive in the second period and in the other periods it showed insignificant values.

Growth rates of production of ginger recorded a declining trend since in the first and second periods positive growth rate obtained became negative in the third period.

Remaining two plantation crops are cardamom and tea. Cardamom growth rates in production were positive for all periods, the highest recorded was in the first period followed by second. But the production of tea was not as high as cardamom it showed a positive growth rates during all the periods in which the highest recorded in Period II.
From the above analysis of growth rates in production Period II (1980-81 to 1991-92) was a good atmosphere for revival of agriculture since most of the crops showed high positive growth rates except for rice and tapioca.

**Figure 2.17**

**Graphs showing actual and trend values**

**Production of Coconut**

1974-2005

**Production of Rice**

1974-2005
Production of Pepper

1974-2005

Production of Cashewnut

1974-2005
Production of Tapioca

1974-2005

Production of Rubber

1974-2005
Production of Ginger

1974-2005

Observed
Exponential

Production of Banana

1974-2005

Observed
Exponential
Production of Arecanut

1974-2005

Production of Cardamom

1974-2005
Production of Coffee

1974-2005

Production of Tea

1974-2005
2.9. PRODUCTIVITY TRENDS:

In the analysis of yield levels of different crops indicated mixed trends during the periods under consideration.

Paddy, tapioca and banana and other plantains are the major food crops cultivated in the state. Compound growth rates in their productivity are given in the Table (2.4). Among the food crops rice accounts nearly 95 per cent of the food grains produced within the state. Per hectare productivity of the crop showed a steady increase and the state could maintain a level of productivity higher than the national average during nineties. But it was not adequate enough to compensate the loss in production on account of decline in area under the crop.

A similar type of performance could be seen for tapioca also. In spite of substantial increase in productivity, production of tapioca has declined due to sharp decline in area. Productivity of banana and plantains has shown an impressive growth in production and productivity.

Coconut, cashew nut and pepper are the important garden crops raised in Kerala. Compared to food crops garden crops in general have shown better growth trend in productivity.

Per hectare yield of coconut in the State had shown a sharp decline during the 1970s which is often considered as a major cause of the crisis that had developed in the agricultural sector during the mid 1970s. However since the early 1980s the crop has improved its performance substantially.
**TABLE 2.4**

**COMPOUND GROWTH RATES OF PRODUCTIVITY OF PRINCIPAL CROPS IN KERALA** (Percent)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Period I</th>
<th>Period II</th>
<th>Period III</th>
<th>Overall Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>1.16</td>
<td>2.4 **</td>
<td>0.95 *</td>
<td>1.4 *</td>
</tr>
<tr>
<td>Coconut</td>
<td>1.34</td>
<td>1.73</td>
<td>0.74 *</td>
<td>1.2 **</td>
</tr>
<tr>
<td>Tapioca</td>
<td>-0.64</td>
<td>2.07 **</td>
<td>1.52 *</td>
<td>1.6 **</td>
</tr>
<tr>
<td>Rubber</td>
<td>-0.57</td>
<td>2.81 **</td>
<td>3.37 **</td>
<td>3.15 **</td>
</tr>
<tr>
<td>Pepper</td>
<td>3.12</td>
<td>3.2</td>
<td>0.29</td>
<td>1.2 **</td>
</tr>
<tr>
<td>Cashew nut</td>
<td>-12.44 **</td>
<td>6.42 **</td>
<td>-2.18</td>
<td>0.02</td>
</tr>
<tr>
<td>Areca nut</td>
<td>3.34 **</td>
<td>2.16 *</td>
<td>-0.23</td>
<td>1.58 **</td>
</tr>
<tr>
<td>Cardamom</td>
<td>9.21</td>
<td>3.21</td>
<td>9.89 **</td>
<td>6.02 **</td>
</tr>
<tr>
<td>Banana Other</td>
<td>-3.64</td>
<td>2.14 **</td>
<td>-3.08</td>
<td>0.3</td>
</tr>
<tr>
<td>Plantains</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td>3.55</td>
<td>-2.07</td>
<td>4.41 **</td>
<td>2.23 **</td>
</tr>
<tr>
<td>Tea</td>
<td>2.95</td>
<td>3.47 *</td>
<td>-0.26</td>
<td>1.44 **</td>
</tr>
<tr>
<td>Ginger</td>
<td>2.42 *</td>
<td>3.16 **</td>
<td>1.99 **</td>
<td>1.99 **</td>
</tr>
</tbody>
</table>

Note: ** Significant at 1% level, 
* Significant at 5% level.

Coconut being the crop occupying the largest area in net-cropped area and supporting the vast majority of the farming community the rural prosperity of Kerala is closely linked with the fortunes of this crop. Although the impressive and steady performance in productivity has helped in augmenting the income of the coconut its full benefit could not be realized since its farm price remained unstable throughout the Eighth Five Year Plan period. The fall in price of coconut
combined with the widespread attack of coconut mite depressing the yield considerably in the central region has affected the livelihood security of a vast majority of people. The average productivity has also slightly declined by 2.5 per cent in 2004-05 compared to the previous year 2003-04. The productivity levels in Kerala are also lower than other major producing states.

**Figure 2.18**

*Graphs showing actual and trend values*

*Yield of Coconut*

1974-2005

*Yield of Rice*

1974-2005
Yield of Pepper
1974-2005

Yield of Cashewnut
1974-2005
Yield of Tapioca
1974-2005

Yield of Rubber
1974-2005
Yield of Coffee
1974-2005

Yield of Tea
1974-2005
During the period under consideration the productivity of pepper recorded peak level in 1998-99 and the lowest was in 1984-85. During the Eighth Five Year Plan period although productivity of the crop recorded some improvement it remained within the range of 270 to 350 kilogram per hectare much below the potential. The crop suffered heavy damages in major producing districts due to wide spread attack of quick wilt disease in the first two years of Eighth Five Year Plan. The productivity of pepper recorded during 2004-05 was only 327 kilograms per hectare. Productivity in India is the lowest among the major producing countries.

Sustainability of cashew in Kerala is in real threat on account of the surging pressure for replacement with rubber. Productivity of cashew in 1974-75 was high compared to all other years under study. After that it started declining up to 1984-85 where the lowest value was recorded. From 1984-85 it slowly started increasing and reached a high value in 1991-92 and then declined except in 1994-95. Share of Kerala in cashew production was 23 per cent in 1987-88 reduced to 12 per cent in 2003-04. Productivity of the crop which was around 900 kilograms per hectare during late eighties also stated declining from 1995-96 onwards reached 562 kilograms per hectare during 1998-99 and there after hovering around 740 kilograms per hectare in 2004-05.

Areca nut productivity shows different types of trend during the period under study. From 1974-75 onwards it starts rising up to 1982-83 then began to fluctuate for five years. Up to 1995-96 it starts rising and reached the highest value 1239 kilograms per hectare and declined to 1090 kilogram per hectare in 2004-05.
Rubber, tea, coffee and cardamom are the principal plantation crops cultivated in the State. Both in terms of production and productivity performance of rubber in the State has been outstanding. Between 1974-75 and 2004-05 area under rubber more than doubled and productivity also doubled more than the base year values. At the beginning productivity was 601 kilograms per hectare reached 1437 kilograms per hectare in 2004-05. In terms of tapping area productivity recorded was 1715 kilograms per hectare during 2003-04.

The productivity of tea in Kerala as well as in the country remained much below its potential. Kerala’s productivity is below all India level. Productivity showed fluctuating trend, which reached highest level of 2055 kilograms per hectare in 1988-89 where production level is the highest. Most of the growth in tea production was due to the increase of productivity rather than expansion in area.

Under mixed cropping system there was still scope for the expansion of ginger, which is a minor spice. Productivity of ginger showed a steady slowly increasing trend with some exceptions in some years. The highest level of productivity was noticed during 2003-04, 3872 kilograms per hectare. Even though production showed an increasing trend up to 1991-92 it showed a declining tendency after that. Area also noticed the same trend as in case of the production.

Compound growth rates (CGR) of productivity of principal crops in the State are represented in the Table (2.4). Growth rates of per hectare yield of most of the crops were higher during the second period. For overall period cardamom crop recorded a higher rate of increase in productivity. Except for cashew and
plantains all other crops recorded a positive rate of increase in productivity during the overall period.

Rice recorded a positive growth rate during all periods under consideration. Period II recorded highest growth rate for rice. Even though productivity growth rate was positive, area growth and production growth rates were negative which overcame the positive rate of growth in productivity and led to failure of paddy cultivation in the state. Main factor contributing to the rise in productivity in the state is the coverage of HYV’S.

Tapioca, which is the substitute for rice also, moved along the same direction as rice. Tapioca’s growth rates in productivity showed positive trend even though growth rates in area and production were negative. Here also the negative growth rates in area led to a decline in the productivity of the crop.

Growth rates of coconut showed a different picture from rice and tapioca. In Period I, productivity growth rate was negative and in other periods those were positive. The same trend could be seen in area growth and production growth. All growth rates showed negative value during the first period. During the third period even though all growth rates were positive, the rates of growth were lower than that in the Period II. One reason for this slowing down of growth rates may be due to the sharp fall in prices of coconut in 1993-94 and 1994-95. The average price of coconut declined from Rs.3475 per thousand nuts in 1991-92 to Rs.3290 per thousand nuts during 1993-94 and Rs.2750 per thousand nuts in 1994-95. In real terms the decline in prices was much greater. The fall in price was attributed to the spurt in supply, consequent to the expansion of output and area.
Rubber attained a high rate of productivity during all periods, which was same for growth in area and production. By the combined effort of growth in area together with growth in yield led to a very high rate of growth in production. During Period II, rubber production in creased due to high growth in area and in the third period it was due to high growth in productivity. Even though there was a decrease in price of rubber to a lowest level of Rs. 28 per kilogram. State Government has initiated a number of steps for protecting the rubber growers from the sharp decline in prices.

Growth rate in productivity of pepper increased over periods. The production rate of pepper was high during the Period II due to a high increase in growth rate in area and productivity.

High negative rate of growth in productivity was noticed in the case of cashew during the Period I. Growth rate in area was positive during Period I but the negative yield rate overcame the growth in area, which led to a negative growth rate in production. The productivity barriers that can be listed are the low fertility status of the marginal lands in which cashew was cultivated, pest problem like tea mosquitoes and tree borers and the relatively high cost of plant protection measures due to widely distributed small farm holdings. In most of the traditional cashew plantations a large proportion of trees were old and have outlived their economic bearing period. Most of the plantations also do not have the optimum number of plants. For the second period, productivity indicated a recovery. Due to negative impact of area, growth in production was not much higher. During the third period the growth rates in area and productivity were negative resulted to the negative growth in production. In spite of operating special schemes for
expansion of area under cashew, the coverage has been steadily declining during the last two decades.

Productivity in areca nut showed a positive growth rate during Period I but area showed a negative trend, which overcame the positive growth in productivity, which resulted in a negative growth rate in production. But during the second period the growth rate in area, even though the value was small, was positive and productivity attained a positive growth, which reached a positive growth rate in production. Overall period all growth rates showed positive. Competition from other countries in the international market and resultant decline in demand may be the reason for the declining trend in area. The spread of MAHALI disease has done very serious damage to the production of areca nut in Kerala.

Banana and other plantains increased their productivity level during Period II but growth rates were negative in Period III. Due to the combine growth rates of both area and productivity made the production growth rate to a high level during Period II.

The other plantation crops, which recorded positive growth, rates included cardamom, coffee and tea.

Productivity of cardamom made a high positive growth rate during Period I and Period III and Period II represented a positive growth rate also. Due to high productivity and positive growth rate in area in Period I production of cardamom showed a very high growth rate. Period II represented a positive growth rate in productivity. During Period II even though area growth was negative, high positive growth rate led to high production level. Overall period
also signified the same trend level. The induction of new technology helped to raise the productivity level of cardamom. The commodity has registered new heights in production through productivity improvement.

Growth rate in productivity of coffee showed a positive rate during Period I and Period III. Area growth rate was high during Period I, which represented a high growth in production level. But during Period III production increment was due to the raised level of productivity. The present production level is in excess of demand. Hence high positive growth rate can be attributed to the positive trend in the international market sometimes in the past, which is reflected in a high growth rate in area (see Table 2.2).

Though the area showed a negative growth rate during most of the periods due to the positive growth rate in productivity, the production of tea showed a significant positive trend. The productivity of the crop in Kerala was much below its potential. Due to the import of inferior quality teas to India resulting a depression in prices. Since the removal of restrictions in April 2001, the disturbing fact is that most of them are exported to India at low prices, which affect our country’s tea production.

The analysis indicated a positive growth rates in all periods. Period I represented a positive growth rate in area and productivity come to the increased production rate. During the Period II area growth rate reduced, even though it was positive due to the impact of a moderately high positive growth rate, production growth rate showed a significant positive rate. But in Period III productivity rate was not as high as to overcome the negative rate of area and resulted to the negative rate in production. Considerable loss occurs on account of fungal disease
in soft root of ginger. In the mixed cropping system there is scope for area expansion of ginger.

The main conclusions derived from the above analysis included the dismal production performance of two major food crops- rice and tapioca- was exclusively due to the sharp decline in their area. Area based strategies are to be implemented to sustain these crops including sustaining area under food crops at the optimum level and stepping up production at least at a critical minimum level through productivity enhancement. Raised level of yield is necessary for the improvement of production levels. Generation of technologies for different agro-ecological situations might improve the level of adoption. The steep decline in area was mainly due to reduced dependence on tapioca as a substitute for staple cereals, which was fairly strong in certain areas during the sixties and seventies. The reason that could be attributed to the over all decline in production and productivity were the devastating disease of unknown etiology and unstable price of coconut. Being a traditional crop of Kerala, a substantial portion of the existing population was old and unproductive. Productivity of pepper declined due to devastating diseases like ‘pollu’, quick wilt etc. Slow wilt also acted as a major factor. The State has to bestow specialised attention for upgrading the productivity through an organized replanting programme.

In the case of cashew the steep decline in productivity was the main cause for low production (see Table 2.4). Earlier period’s area expansion could not make much improvement in production. Cashew processing industries are finding it extremely difficult even to maintain the present level of capacity utilization because of the lower availability of local raw cashew nuts. Concreted efforts are
needed to nurture this crop in the state with programmes to promote high density planting with high yielding cashew grafts. Production increase in areca nut was mainly due to area expansion in late eighties and early nineties. Productivity level was high in mid seventies and eighties, which was in a declining trend. Area increase was in an increasing trend so production also attained the same stature.

Area under plantains increased throughout the period but productivity trend was different. Production also varied according to the trend in area and productivity.

In plantation crops in terms of production area and productivity performance of rubber has been outstanding. Within a period of 30 years production of natural rubber has recorded a more than five times increase and its growth rate recorded as 6.67 per cent. After showing satisfactory growth rates during mid of seventies production and productivity of tea remained more or less stagnant since the beginning of the 1990s. The organic tea production is a major shift in this sector (e.g. Darjeeling tea). In Kerala coverage under organic tea could be increased. Nelliyampathi estates have already got organic certification. Production and productivity of coffee and cardamom growth rates are found to be lesser for coffee. In the case of ginger although production increased the relative contribution declined from 65.7 to 16.1 per cent. This is because of the significant expansion in area in other states due to high price.

As recommended by M.S. Swaminathan Commission there is an urgent need for increasing the productivity of important major commercial crops whose cost of production is higher in the state and a quality literacy movement to ensure
quality of the product. Large scale replanting of old, senile and diseased coconut palms, pepper wines and tea plantations are necessary.

Supply gap in food grains has grown to 90 per cent, which created irreversible threat on Kerala’s food security. Not only that it aggravated the adverse ecological consequences due to increasing conversion of low lying paddy lands, over exploitation of irrigation facilities etc. which have affected water conservation very adversely. There is also a growing tendency to leave part of the paddy growing areas as fallow because of the low income from paddy cultivation.

Through a scientific land use and cropping plan policy there is urgency to prevent further loss of cultivable land. Even though rice cultivation is limited to most appropriate area where irrigation facilities are available, by intensive cultivation Kerala can produce sufficient tones of rice. The less suitable areas can be profitably utilized for tapioca, ginger, banana, pulses and vegetables.

In agricultural census it was found that 88 per cent of the farms are owned and operated by person whose primary occupation is outside agriculture and they have little interest in investing in the land. In the Kerala context Self Help Groups of women and agricultural labourers are to enter into contract farming with the landowners.

‘Harithashree’ the lease land farming promoted by the State Poverty Eradication Mission, Kerala through ‘Kudumbasree’ had helped women farmers to stay on in agriculture for their livelihood. The area under leased land farming increased from 17575 hectares during 2003-04. Paddy, tapioca, other tuber crops, vegetables etc. are the major crops cultivated under lease land farming. Many Grama Panchayaths are also promoting farming through their women groups.
During 2004-05 the total area under lease land cultivation was 21554 hectares indicating an increase of 3979 hectares over 2003-04. Rice is the major crop cultivated in these lands. During 2005-06 Department of Agriculture has started another scheme on rice cultivation in fallow lands by utilizing the services of unemployed youths. All these measures have contributed to the increase in production and preservation of cultivable land area.
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