CHAPTER V

SUMMARY, CONCLUSIONS AND SUGGESTIONS
CHAPTER V
SUMMARY, CONCLUSIONS AND SUGGESTIONS

Present study deals with the shifts in the cropping pattern in Kerala agriculture. In order to know the importance of this component in total productivity growth and output growth decomposition techniques are used. In the first chapter the research design of the study is included where the major objectives, the hypotheses which are tested, conceptual and theoretical framework are noted, data sources and analytical framework included, review of earlier studies analysed, significance and context of the study also discussed.

The land use pattern of Kerala, other States and India is discussed in the second chapter. Growth trends in area, production and yield of major twelve crops analysed by using components growth rates where the exponential form of the equation is fitted. Growth rates are tested by F-test and the reference period divided into three sub periods. From 1974-75 to 1980-81 represents the first period, 1981-82 to 1991-92 the second period and 1992-93 to 2003-04 the third period of analysis.

Decomposition of total productivity into its components like yield effect, locational effect and cropping pattern effect is discussed in the Chapter III. Usage of both end points and time series values are used for study. Since Kerala agriculture situation is not stable there is some slight differences in the two analyses. Each impact component of each component is tested by using paired t-test and arrived at the conclusion that locational and yield effects acted
positively in the determination of productivity growth while the impact of cropping pattern effect is negative but highly correlated.

District wise analysis of cropping pattern has done in the Chapter IV. In the first section the cropping pattern of each district is analysed in four-time periods-TE 1976-77, TE 1983-84, TE 1994-95 and TE 2003-04. For twelve crops cropping pattern is computed and the changes in the cropping pattern are noted. In the second section of the Chapter IV is the decomposition of output growth into area effect, yield effect and cropping pattern effect using regression techniques. For each district the output growth and share of each component is noticed. Also a humble attempt has made to explain the components of output growth of each 12 crops. At the State level the determining factor of output growth is found as yield effect. In the district wise component analysis it is understood that cropping pattern has the influence on output growth in some districts.

By the calculation of index of crop diversification the diversities in the crop pattern can be noticed. The measure of diversification tells about a high diversification exists in Kerala and very high in districts- level. Among a number of diversification index, one index (Herfindahl index) is calculated to study the diversification of crops.

From the foregoing discussion it emerges that the growth in area, production and yield of major crops revealed a mixed trend.

Compound growth rates of each crop during the three periods and overall period give the results as follows:

1. The major food crop rice shows a declining tendency of growth rate in each period. The crop shows negative growth rates where the highest decline is
noted in the third period. The decline in area is due to the large-scale conversion of area from rice to another crop and also for other non-agricultural purposes.

2. Area under tapioca, which is cereal substitute of rice, also followed the same pattern of decline in the growth rates. In the case of tapioca the rate of decline is the highest in second period. Since the tendency of conversion of area under food crops to cash crops is visible from 1975 onwards. The same reason can be attributed here also.

3. Compound growth rates of the cash crop, coconut, shows a rise where in the first period growth rate is negative. But it recovered in the second period. The highest positive growth rate is in the second period.

In most of the studies about cropping pattern of Kerala showed the tendency of coconut in the gain of area from rice. Large portions of the paddy fields are being converted during the second period (1981-82 to 1991-92) since the coconut cultivation was profitable at that time. The rational decision of the farmers to convert the paddy fields into coconut gardens has experienced during the eighties.

The plantation crop rubber is the next gainer in the area during the second period. The highest area gained in this period by rubber where the growth rate is 5.84 per cent. During the second period rice lost its area at a rate of 4.23 per cent while tapioca lost at 5.76 per cent compound rate. Total cropped area growth in the State is only 5 per cent. So it is clear that the area from food crops is converted to rubber also. This is due to the relative non-profitability of the food crops.
Pepper which is recorded the highest growth rate in area in the second period among other crops. The same period is the highest decline of area under tapioca and relatively higher decline for rice has happened. Shift in cropping pattern has happened during this period from food crops to non-food crops, which is confirmed by this analysis.

Cashew nut recorded a positive growth rate in area only in first period along with rubber and coffee. In all other periods negative growth rates are found in the case of cashew.

Even though areca nut lost area at the rate of 6.43 per cent it recovered during third period with high positive growth rate along with banana and other plantains. This food crop also gained the area in Period II and Period III and recorded the highest in third period among all crops under consideration. The main loser in this period is rice where the conversion is very easy to cultivate the plantains.

In the plantation crops only gainer of area is coffee, which recorded the highest during first period and rate of growth declined in second period. Area growth of cardamom is negative and very minute gain is noted for tea. Ginger lost its area at the rate of 3.6 per cent during the third period.

Within 30 years of analysis of the compound growth rates of area the growth rate of paddy, which is the predominant crop in the State, declined at the rate of 3.9 per cent along with the other food crop tapioca with the decline of 4.3 per cent. Along with these food crops other crops whose growth rates are negative include cashew nut, ginger and the plantation crop cardamom.

The major gainers are coconut, rubber, pepper, areca nut, plantains and
coffee. Rubber attains the highest positive growth rate and the highest negative rate is recorded by tapioca and next paddy.

In order to assess the growth performance of the crops the growth rate in productivity is to be considered along with area.

Among the food crops rice accounts for nearly 95 per cent of food grains produced within the State. Per hectare productivity of the crop showed a positive growth rate during all periods where the highest rate is showed in second period with 2.4 per cent. Among this period in 1989-90 the Group Farming Programme in paddy was first introduced in the State. Meanwhile in spite of positive growth trends in yield, rice production in the State shows declining trends. The rate of decline in area is higher than rate of increase in productivity. So ultimately growth rate in production becomes negative.

A similar growth pattern is discernible in the performance of tapioca. In spite of the positive growth trend in yield, production growth rates of tapioca are in declining trend. This is due to the high negative growth rate in area.

Thus, the dismal production performances of two main food crops in the State- rice and tapioca- are exclusively due to the sharp decline in their area.

However banana and plantains has showed a positive growth rate in production and yield. The growth performance of this food crop is due to the positive rate of growth in area and yield together. Thus among the food crops itself there happened a shift in cropping pattern. Two major food crops lost their area and other food crop gained shows the shift of area from one crop to another within the food crops.
The major cash crops coconut, pepper, areca nut and ginger showed positive growth rates in yield in all periods. Compared to food crops cash crops in general have shown better growth trends, both in production and yield.

Per hectare yield of coconut in the State had shown a sharp decline in the first period which is often considered as the major cause of the crisis that had developed which resulted in the negative growth rate in production during the first period. However the crop has improved its performance and achieved a positive growth rate in yield and in production in the next periods. Mean while pepper production recorded a high growth rate of 8.64 per cent during the second period due to an increase in area under the crop. Production of cashew nut recorded positive growth rate only in the second period due to the high productivity growth during that period.

Production of areca nut improved from the declining trend in the first period and reached to the positive growth rate due to area increase and productivity growth. Areca nut production growth was negative during the first period due to the high negative area growth even though the productivity growth rate showed positive. Production and yield growth rates were positive in the case of ginger even though the area growth showed a negative rate.

Among plantation crops the growth performance of cardamom has been particularly spectacular. In spite of decrease in its area, cardamom production has also displayed a laudable growth rate of 9.28 percent in the third period. Growth rate of production of coffee was influenced by area increase in the first period and due growth of productivity during the third period. Production rates of tea are also influenced by productivity growth rates. In all periods both in terms of production
and productivity the crop rubber showed outstanding performance. Again compared to the earlier periods, growth rates in its production and productivity have decelerated in the third period.

From the analysis of area, production and productivity of food crops, cash crops and plantation crops during the overall period the general conclusions derived include:

1. The production of major food crops rice and tapioca reached at negative growth rates due to the declining trend of their areas. But plantains including banana, production rate increased due to the increase of both area and yield.

2. Among cash crops, both area and productivity growths influenced the production rates. Pepper production has determined more by increase in area. Yield growth of areca nut was responsible for growth rate in production while area decline was the cause of negative growth rate in production for cashew nut. Productivity growth recovered ginger from the declining trend of production.

3. Among plantation crops rubber and coffee attained a high production growth rate due to the combined growth of area and productivity. But for cardamom and tea only yield growth is responsible for production growth.

During the reference period the highest production growth rate and area growth rate is recorded by rubber while the other plantation crop cardamom attains the highest productivity growth.

Total productivity growth decomposed into three major effects, which are the pure yield effect, locational effect and cropping pattern effect. Again locational effect split into pure locational effect and location interaction
effect and cropping pattern effect split into pure cropping pattern effect and cropping interaction effect. In the state level analysis using the end point study, where base year is TE 1994-95, the contribution of each effect has measured.

For TE 1976-77, only pure locational effect and pure yield effect contributed to the total productivity change. In Kerala, pure yield of twelve major crops contributed to the total productivity change and since pure locational effect also is responsible for this change, the conclusion can be drawn that locational shifts in the areas under individual crops has occurred during this period.

In the case of TE 1983-84 the same picture of the influence of pure yield effect and pure locational effect can be noted.

After the benchmark year, for TE 2003-04 the picture has changed. During this period except pure cropping pattern effect all other components have their contribution in the absolute change in productivity. In recent period, the locational effect, pure yield effect and cropping interaction effect acted positively to the change in absolute productivity. Only pure cropping pattern effect acted negatively to the changes in productivity.

Thus the shifts in cropping pattern negatively reacted to the changes in total productivity.

In time series analysis the general conclusion is the same even though there exists some variations in the values of the components. Except pure cropping pattern effect all values of the other components showed an increasing trend and absolute values changed from negative to positive above and below the benchmark year.
In both the studies yield dominated the changes in productivity. Pure locational effect present in Kerala agriculture is an influencing factor of total productivity.

In crop wise analysis the growth rates of cropping pattern effects of rice and tapioca showed negative value in all periods while rubber, coffee and plantains showed positive growth rates. Except for the first period growth rates of coconut, pepper and areca nut are positive. Growth shows negative values of the crops whose cropping pattern is declining and cropping pattern is in the increasing trend where cropping pattern effect showed positive growth rates. Since declining growth rates are higher than the increasing rates the aggregate effect turned out to be negative.

Since the presence of pure locational effect is confirmed in the analysis a look on the individual crop’s locational effect is a necessary. In time series analysis the average value of each period is taken for the analysis. The growth rates of locational effect are positive for rice, pepper, cashew nut, areca nut, tea and ginger during the first period where the highest growth rate is recorded by cashew nut. During the second period the major crops recorded the positive growth rates included rice, pepper, areca nut and ginger where the highest growth rate was showed by ginger. Rice, pepper, cashew nut and cardamom are the crops, which influence the total locational effect to become positive during the third period.

In the reference period significant positive growth rates in pure locational component is shown by rice, pepper, coffee and ginger.
Growth rate in pure yield effects at the State level showed negative growth only in Period I due to the high significant negative growth rate of cashew nut. During the reference period the highest positive growth rate is recorded by rubber (124.9 per cent) followed by cardamom (29.2 per cent).

From the analysis of decomposition of total productivity of Kerala agriculture in the reference period, general conclusions derived are:

1. Growth rate in total productivity of major food crop rice and tapioca is negative due to the negative growth rate in cropping pattern effect.
2. Positive growth rates in cropping pattern effect and pure yield effect exerts a high influence on the positive growth rates in productivity in the case of coconut and rubber.
3. For pepper all three effects- pure cropping pattern effect, pure locational effect and pure yield effect- are responsible while in the case of cashew nut negative growth rate in total productivity is the contribution of significant growth rates in pure cropping pattern effect and pure locational effect.
4. For plantains, the main contributor is the pure cropping pattern effect and for areca nut it is the pure yield effect and pure locational effect.
5. The factor responsible in the case of cardamom is the pure yield effect alone and for coffee all components show the responsibility.
6. The total productivity change in tea and ginger is the contribution of their pure yield effects.

To know the extend of diversification of Kerala agriculture, Herfindahl index computed. This index shows the concentration and 1-HI would give the nature of diversification. In the analysis the State showed a high degree of
diversification. During the TE 1976-77 the index value was 0.84, which increased to 0.86 in TE 2003-04. This shows the increase in the diversification of crops in the State. The increment in the degree of diversification affects the cropping pattern of the State. In the district level also very high value of index can be noted. Increase in the degree of diversification shows the shift in the cropping pattern in the districts as well as in the State. In the districts the value of diversification is very near to the perfect diversification.

District-wise analysis of cropping pattern and decomposition of output growth at the district level leads to some important results. As explained by the nature of diversification in all districts different types of crops are cultivated. No concentration can be noted for a particular crop. Even though the studies on cropping pattern explained about the regions for the crops where they can attain a high production growth the theory is not practically utilized in the State.

From the analysis of cropping pattern of each district a clear shift of area from food crops to cash crops and plantation crops can be noticed. During the first time period all districts are not formed. Hence the cropping pattern of the second time period (TE 1982-83) can take for the valid conclusions.

During TE 1982-83 the highest proportion of area under paddy was found in Palakkad (53.2 per cent) tapioca in Thiruvananthapuram (25.1 per cent), banana and other plantains together in Thiruvananthapuram (2.8 per cent), coconut in Kozhikkode (50.1 per cent), rubber in Kottayam (28.5 per cent), pepper in Kannur (7.4 per cent), cashew nut in Kannur (20.2 per cent), areca nut in Kannur (4.3 per cent) cardamom in Idukki (26.15 per cent), coffee in Wayanad
(38.56 per cent), tea in Idukki (13.8 per cent) and ginger in Wayanad (1.3 per cent).

In 2003-04 the highest proportion of area under different crops noted are: Rice in Palakkad (35.2 percent), tapioca in Thiruvananthapuram (12.9 per cent), plantains in Malappuram (4.8 per cent), coconut in Kozhikkode (56.9 per cent), rubber in Kottayam (50.6 per cent), pepper in Idukki (23.1 per cent), cashew nut in Kasargode (13.5 per cent), areca nut in Kasargode (9.5 per cent), cardamom in Idukki (11.9 per cent), coffee in Wayanad (33.3 per cent), tea in Idukki (9.002 per cent) and ginger in Wayanad (1.98 per cent).

From the above analysis the conclusion regarding the district- level-cropping pattern can be derived.

1. In both time periods rice recorded the highest share in Palakkad but the share has declined from 53.2 to 35.2 per cent while for tapioca in Thiruvananthapuram reduced from 25.1 to 12.9 per cent. The other food crop banana and other plantains recorded an increase in the share from 2.8 to 4.8 per cent.

2. The main cash crop coconut showed an increase in the share from 50.1 to 56.9 per cent in Kozhikkode district. Share of pepper increased from 7.4 to 23.1 per cent, cashew nut’s share declined from 20.2 to 13.5 per cent while the share of areca nut changed from 4.3 to 9.52 per cent and for ginger the share improved to 1.98 from 1.3 per cent.

3. Among plantation crops rubber recorded a high increase in Kottayam from 28.5 to 50.64 per cent. Cardamom showed a decline in the share in Idukki from 26.15 to 11.9 per cent, coffee noted a decline from
38.56 to 33.3 per cent in Wayanad and the share of tea declined from 13.8 to 9 per cent in Idukki district.

Most of the crops retained in the same district with the highest share in two time periods. The major losers in the share include rice, tapioca in food crops cashew nut in cash crops cardamom and tea in plantation crops.

In all districts the share of food crops mainly rice and tapioca has declined very sharply and plantains improved its share in all districts.

Among cash crops, coconut improved its share except in Pathanamthitta, Kottayam and Idukki. Pepper increased its share in all districts except in Alappuzha, Kottayam and Kozhikkode with a slight decline. Share of cashew nut declined in most of the districts where a slight improvement noted in Alappuzha in third time point. Northern districts showed improvement in the share of areca nut but in southern districts slight decline in share is noted.

Plantation crops are the main gainers of area and among them rubber reached the highest level. In all districts the performance of rubber is fantastic. In Kottayam district more than half of the total cropped area of the district is under rubber cultivation. But cardamom lost its area during the reference period. Major district, Idukki, showed a decline of share from 27.3 to 11.9 per cent. The cultivation of coffee is concentrated in Wayanad district and a small portion of area is in Palakkad (1.5 per cent) and Idukki (4.43 per cent). Proportion of tea is more or less stagnant and a decline in the share of area is noted for ginger.

Since much change in total cropped area of the State is noted, the areas under different crops are distributed between the crops itself. Much shift can be noticed from food crops to cash crops and plantation crops. Among food crops
only gainer is plantain including banana. Re-allocation of area under different crops have acted and shifts in cropping pattern has happened in the districts.

By decomposition of output growth in each district, study analysed the impact of various components of output growth along with cropping pattern effect. State level analysis showed the complete dominance of yield effect in the output growth. Even though area effect has influenced in earlier periods in the third period the entire contribution of output growth is by yield effect. Cropping pattern effect shows a high negative impact on output growth. This tells about the adverse effect of cropping pattern which existing in the State. Rational decisions of producers to shift the area under different crops have not done any help in the output growth. So the yield improving methods are needed for the State.

In the district wise analysis the components of output growth acted in different way in three periods. In the results a permanent impact of one factor cannot be noticed.

In Thiruvananthapuram district the more influential factor in output growth is the cropping pattern effect than yield effect and area effect. The impact of cropping pattern is positive in the determination of output growth than the other two components.

In Pathanamthitta district yield effect is the most dominant factor of output growth.

Most important component in the determination of output growth in Alappuzha district is the cropping pattern effect. Even though the influence of yield effect and area effect is significant but the impact of these effects shows negative.
In Kottayam district yield effect is the most influential component due to the presence of high yielding rubber in the cropped area.

Only yield effect is the component, which has a strong impact on output growth in Idukki district.

Output growth in Ernakulam district is more influenced by yield effect than other components.

Even though a strong influence of any component could not notice in Thrissur district, comparatively yield effect can be considered as the component of impact. In Palakkad district very strong influence of yield effect exists in the determination of output growth.

Yield effect act as a major component in the output growth of Malappuram district.

No significant impact of cropping pattern could be found in Kozhikkode district and the result of the analysis revealed yield effect as the component of determination of output growth.

In Wayanad district the most important component that influences the output growth is the yield effect.

The impact of cropping pattern effect can be noticed in Kannur district in output growth.

No specific impact of any component can be noticed in Kasargode district.

The district level analysis of the decomposition of output growth in the reference period lead to the conclusion that yield effect is the dominant component of output growth in Ernakulam, Idukki, Kozhikkode, Palakkad,
Pathanamthitta and Wayanad and cropping pattern effect plays the important role in Alappuzha and Kannur districts in the determination of the output growth.

In the case of rice and tapioca output growth rates are negative due to the impact of the negative growth rates of their cropping pattern effect. For coconut and rubber both cropping pattern effect and yield effect contributed to the positive output growth rates. For pepper, for the first period cropping pattern and yield effect together contributed to the output growth. Yield effect is the influential component in the case of cashew nut. For areca nut the cropping pattern effect and yield effect together contributed to the output growth. The dominance of yield effect can be noticed in the case of plantains including banana. Yield effect determines the output growth for cardamom and also for tea. Cropping pattern together with yield effect contributed for coffee and for ginger it is the yield effect, which dominates the output growth.

Due to the increase in the total cropped area during the second period all crops showed a positive growth in area on the total output growth.

Suggestions:

The indepth analysis on Shifts in Cropping Pattern in Kerala prompted to deduce/ derives following broad suggestions so as to provide a beneficial and bright future to the agricultural scenario. The suggestions are turned and tuned with indomitable will, courage and made practicable by the administrators some problems crusting in this sector can be solved to a greater extend. In this connection the following suggestions can provide a guideline in making and shaping proper policies related to this sector.
1. The first and foremost panacea to be administered in addressing the problem of the sharp deterioration of the land use pattern especially with regard to paddy cultivation is the administration and strict enforcement of laws relating to the land use. The revenue authorities and the Department of Agriculture authorities should be very keen in administering the legislations enacted so as to save the land use pattern.

2. A rejuvenating effect can be exercised by the paddy cultivation sector if it is supported by a prompt and remunerative price. The price fixation should be made by an appropriate agency like Agriculture Price Commission taking into account the regional production cost structure. For this it is highly imperative to constitute a separate agency consisting of the experts in related fields like Agriculture Price Commission and Central Statistical Organisation.

3. To evacuate the existing problem of non-remunerative price to the agricultural output an agency of the type like Rubber Mark should be constituted to procure the product especially, during the reaping season, and also strict monitoring of the activities of these agencies on a time bound basis.

4. Setting up of a steering committee to identify and locate places suitable for appropriate crop cultivation to suite to the existing and emerging trends visible associated with agriculture field.

5. For revamping the present agricultural practices a time bound action plan is to be sort especially for the provision of seeds, fertilizers, pesticides and manure at appropriate hours.
6. At present the role of Primary Credit Societies are solely limited to the provision of short-term credit requirements of the farmers. So the need of the present hour is the reactivisation of the present role in a way as to help the farmers at the reaping season through the provision of thresher.

7. To promote and create confidence among the farmers it is highly essential to constitute an agency either at the Governmental level or on a co-operative level for procuring paddy from farmers immediately after reaping.

8. As a supportive measure for introducing innovations in mechanization the working of the Kerala Agro- Machinery Corporation Thiruvalla should be remodeled.

9. The present day Padasekhara Samithi’s and the working of the Krishi Bhavans should be activated in order to provide sufficient opportunities for the farmers to extend their initiatives for cultivation. The Krishi Bhavans should provide all the technical and non-technical help to the farmers so as to create an activism in the development of agricultural operations.