CHAPTER VIII

SUMMARY AND CONCLUSION

Agriculture is the main source of livelihood for more than half of the world's population. In some countries like India, more than 70 per cent of the inhabitants support themselves by farming. From the 1981 census, it is learnt that 76 per cent of India's total population lives in rural areas. Among them about 42 per cent of the total population are classed as cultivators. Further, agriculture accounts for more than 40 per cent of the net national products and agricultural commodities accounting for about 40 per cent of the country's total export earnings. This proves that agriculture is the backbone of Indian economy. In this context the present study is made to study some aspects of agriculture in Nellore District.

The main aim of the study is to analyse the spatial distribution of crops for the year 1987-88, on mandal wise and to examine the changes in crop land use that took place during the decade, from 1974-75 to 1984-85, on talukwise in Nellore district. Further the present study aims to assess the level of modernization of agriculture in Nellore district.
The area selected for the study is Bellary district, located in coast influenced a lot by Green revolution and other modern methods of agriculture, since 1970 availability of irrigation facilities, fertile soils, suitable climatic conditions, awareness of farmers, and other institutional factors led the district towards modernization of agriculture.

The district is located between $13^\circ\ 30'$ and $15^\circ\ 6'$ of the northern latitude and $70^\circ\ 5'$ and $80^\circ\ 15'$ of the eastern longitude. This district has a total population of 20.17 lakhs spread over an area of 13,160 Sq. Km. (1981).

Physiographically, the district is flat and of low elevation (< 150 mts) excluding Veligondas, the important ranges of eastern ghats running in the western most part of the district. In Veligondas there are few peaks with an elevation more than 900 mts. height.

The important rivers that drain the district are the Pennar and Swarnamukhi and they flow from west to east and south-west to east respectively, the important brakish water lake, Pulicat lake is located in southern most part of the district.
The study area has five major types of soils, namely, red, black, alluvial, sandy and lateritic soils, of which the first red soils accounts for about 43 per cent. Alluvial soils are predominate in Pennar deltaic area.

The district has a hot climate, and is generally dry and salubrious. It receives an annual average rainfall of 1081 mm. The rainfall in general increases from west to east. The district gets the benefit of rainfall both from the south-west and the retreating monsoon seasons. Analysing the season wise distribution of rainfall, it is clear that the north-east monsoon brings in more rainfall (651 mm) than south-west monsoon (304 mm). In general, the eastern and southern parts of the district receive fairly good amount of rainfall when compared to the northern and western parts.

Due to its coastal location, storms and depressions are the annual features in the district, causing widespread heavy rain and gusty winds, some times devastation of crops are also experienced.

The forests in the hilly tracts are of mixed deciduous type, while the forests in the plains are evergreen scrubby. The forests of Nellore district are not of great economic importance.
Nellore district accounts for 79.3 per cent of rural population to the total population, which is roughly 4 per cent more than state. The district has a population density of 153 per sq. km. The percentage of cultivators and agricultural labourers constitute 23 per cent to the total population of the district. The highest concentration of agricultural workers are found in Thotapalligudur (35.16%) mandal followed by Dakkili (27.07%) mandal. And the lowest proportion is found in Nellore mandal (10%). The literacy rate in Nellore district as per 1981 census was 32.16% which slightly higher than that of Andhra Pradesh state (29.72%).

Nellore district is well served by roadways and railways. National High way No. 5 passes through this district to a length of 185 kms and State high ways are of a length of 1048 kms. The length of broad gauge railway line running to a distance of 222 km. in the district.

The present study of landuse classification in Nellore district is accomplished on the basis of the standard classification designed by the technical committee on co-ordination of Agricultural Statistics in 1950 which suggested nine categories of landuse namely: (i) forest (ii) area under non-agricultural use,
(iii) barren lands (iv) permanent pastures and other grazing lands, (v) area under miscellaneous tree crops etc., (vi) culturable waste land, (vii) current fallows (viii) other fallow lands, and (ix) net area sown.

Forest land use:

In importance the forest land use in Nellore district is second only to arable land. In 1987-88, it accounted for 18.63 per cent to the total geographical area of the district. Highest concentration of forest landuse is found in Udayagiri mandal with 74.95 per cent. Lowest concentration has been observed in parts of Pennar delta. The analysis revealed that interior uplands of the district are having dense forest cover when compared to coastal plains.

It is observed that there is marginal positive change in forest land use during the period between 1974-75 and 1984-85, and it is an increase of 7976 acres. Considerable increase is recorded in Atmakur, Venkatagiri and Gudur taluks. This increase is nullified by decrease of forest land in Udayagiri, Sullurpet, Nellore, Kovur and Kavali taluks. The over all increase in forest land use is due to the efforts of the government which launched schemes of afforestation, conservation and plantation of economically useful plants and development of social
forest in the open lands and old forest areas.

About one-third of the total geographical area of the district must be under forest cover to maintain a proper ecological balance, where as the present forest cover in the district falls too short of the optimum level. Much has to be done not only to increase the forest cover in the district but also to improve the quality of it.

**Barren and uncultivable land:**

During the year 1987-88, the non-cultivable land in the district accounted for 14.57 per cent to the total geographical area. High (20.1 - 25%) to very high (>25%) concentrations of Barren and uncultivable land found in parts of interior upland region, south coastal plain and north coastal plains.

During the decade 1974-75-1984-85 positive change is observed in Barren and uncultivable land of Nellore district. In actual acreage it account for an increase of 2665 acres. High increase is found in Gudur taluk (+ 9.04%) and high decrease is observed in Sullur pet taluk (- 15.65%).
Land put to non-agricultural use:

About 14.93 per cent of area in Nellore district is under this category of land use during 1987-88. A high (>20%) concentration of non-agricultural land is confined to urban areas, Industrial belts and the regions of National and State highway. Further they are also found as marshy areas.

The land put to non-agricultural use in the district has registered an increase of 15,026 acres between 1974-75 and 1984-85. High increase is found in Nellore and Venkatagiri taluks. This is due to increased area under urban settlements, industrial establishments and so on. Similarly a high decrease is found in Sullurpet and Kavali taluks. This may be attributed to the reclamation of land and development of irrigation.

Permanent pastures and other Grazing lands:

The area under pastures and other Grazing lands is 9.13 per cent to the total Geographical area of the district (1987-88). In about 2/3 of the mandals there is a low concentration of this land use. Poorly developed dairy industry may be the main cause of low percentages of land under this category and further it may be due to demand from other uses.
This category of permanent pastures and grazing lands registered a negative change during the decade 1974-75 and 1984-85. In terms of acreage it accounts for about 4,707 acres. The decrease is due to increasing urban activities and crop land.

**Miscellaneous tree crops:**

According to 1987-88 data the distribution of miscellaneous crops to the total geographical area in the district is only 1.32 per cent. In about 2/3 of the mandals there is a low (+1-2%) and very low (≤1%) concentration of miscellaneous tree crops.

During the period 1974-75 to 1984-85 there is a decrease of 2863 acres of miscellaneous tree crops. This decrease is due to ruthless cutting of trees for fuel and cultivation. The highest increase (+0.84%) is found in Kavali taluk and highest decrease is observed in Gudur taluk (-1.52%).

**Cultivable waste:**

In 1987-88, the land under cultivable waste accounted for 5.07 per cent of the total geographical area in the district. In more than 3/4 of the mandals the concentration is low (2.51-5%) to very low (≤2.5%).
There is a considerable decrease (40,359 acres) in cultivable waste land is registered in Nellore district during the decade 1974-75 and 1984-85. The decrease is due to improving socio-economic conditions, increased irrigation facilities, more land might have been brought under cultivation due to various schemes launched by the Government. The increase in volume is observed only in two taluks i.e. Venkatagiri and Gudur. In other taluks there is a significant decrease in cultivable waste category of land use.

**Current fallow lands**:

About 4.42 per cent of area was classified as current fallows in Nellore district during the year 1987-88. In more than 2/3 of the total mandals, the current fallow land concentration is low (5%-10%) to very low (≤ 5%), and it is completely absent in 6 mandals.

There is an increase of about 18,893 acres of current fallow land during a decade 1974-75 and 1984-85 in the district. In order to make out the fertility of soil by natural process farmers keep their lands as fallows period for some in an year. Further it may be due to variation in rainfall and extent of irrigation available.
Other fallows: It is found that about 8.04 percentage of land was under this category of landuse. Due to intensive method of farming, most of the land is put to cultivation. Therefore, in about 60 per cent of the mandals the concentration of this landuse is low (5-10%) to very low (≤ 5%).

During the decade 1974-75 - 1984-85 the area under this type of landuse has increased by about 1,00,081 acres. Positive changes are observed in most of the non-deltaic taluks it has registered a negative change.

Net area sown:

The area under arable land in Nellore district accounts for 23.98 per cent to total geographical area during the year 1987-88. In general, in a majority of the mandals the proportion of the net sown area is low (10-15%) or very low (≤ 20%). High (> 50%) proportion of net sown area is confined only to 6 out of 46 mandals. A high proportion of land (> 50%) under net area sown is found in deltaic region and coastal low lands. It is due to assured irrigation facilities, fertile alluvial soils and other suitable climatic conditions.

A negative change is observed in arable land between the years 1974-75 and 1984-85. In terms of
acreage the decrease is about 60,076 acres of land. It is clear that in deltaic taluks like Kovur, Nellore and Kavali positive change is observed. Whereas in non-deltaic taluks considerable amount of decrease in arable land is registered.

Cropping pattern represents the spatial crop sequence or association in a given area at a point of time. A systematic study of cropping pattern helps to regionalise agriculture which in turn forms the scientific basis for land resources allocation to various crops and planning for maximum productivity.

For the purpose of present analysis only 11 crops are taken, since each crop accounts for more than one per cent of the total cropped area in the district. They are paddy, jowar, bajra, ragi, pulses and grams, spices and condiments, sugarcane, fruits, tobacco, cotton and groundnut. Other crops like vegetables, sesamum, coconut, castor, linseed, betel leaves and eucalyptus individually account for less than 1 per cent of the gross cropped area and hence they are not considered for discussion.

A detailed spatial distribution of these crops is attempted at mandal level for the year 1987-88,
and volume of change or variation in percentage of area to the gross cropped area is made out for a decade 1974-75 - 1984-85, on taluk level. Food crops play a major role in the crop land utilisation of Nellore district accounting for 68.37 per cent of the gross sown area in the district (1987-88).

Paddy is the most important and widely grown crop in the district accounting 55.16 per cent of the total cropped area. The crop is grown both in the kharif and rabi seasons. The spatial distribution of paddy cultivation in the district exhibits a great regional variation ranging between a maximum of 96.67 per cent in Allur mandal to a minimum of 5.64 per cent in Duttalur mandal. High concentration of paddy cultivation coincide with the plain areas, fertile alluvial soils, sufficient rainfall and more importantly high intensity of canal and well irrigation. Paddy is intensively grown throughout the district except in north western region. Particularly the Pennar delta and coastal plains have the highest concentrations of paddy cultivation.

During the decade 1974-75 - 1984-85 there is no change in areal extent of paddy cultivation. For this stability, one reason can be attributed. That is,
the farmers would have already brought all favourable land under paddy. Further it may be due to the traditional behaviour of farmers in cultivating the paddy crop.

In low rainfall regions, it is advisable to grow other crops which are economical than paddy. It increases both the intensity of cropping and production also could be increased many fold by this. But in the low lying areas of the deltas and coastal plains, paddy cultivation is ideal. Here the paddy can withstand water logging conditions, alkalinity of canal water etc.

Jowar is the second most important cereal crop in Nellore district, next to paddy. It is mostly cultivated as rabi crop. About 7.49 per cent of the total area sown in district is under jowar cultivation. It occupies 75 per cent of area to the total major millets sown area. However, its concentration varies between a maximum of 45.07 per cent in Chegerla mandal to a minimum of 0.009 per cent in Indukurpet mandal. The concentration of this crop is mainly found in western half of River Pennar region and northern most tip of interior upland region.

The percentage of jowar area in the district has decreased from 14.18 per cent in 1974-75 to 10.62 per cent in 1984-85. The decrease is attributed to
improved irrigation facilities and cultivation of other crops.

Bajra claims 7th rank in the district accounting for 1.58 per cent of the gross sown area (1987-88). It is cultivated as a kharif crop under rainfed conditions on poorer and light soils. In northern part of the district, more concentration of Bajra is seen. There has been a decrease in bajra cultivation during decade 1974-75 (5.02%) - 1984-85 (3.25%). It is concluded that the interest of farmers in bajra cultivation is declining significantly. It is facing a severe competition from other crops like groundnut, pulses which are more remunerative.

Ragi accounts for 1.32 per cent of the gross cropped area in the district. It is predominantly a rabi crop here. Its concentration is mostly confined to north-western corner of the district. Especially in deltaic alluvial soils, the west crops like paddy, sugar-cane and some commercial crops competing with ragi crop. Area under ragi cultivation has been decreased from 3.23 per cent to 1.68 per cent during the decade 1974-75 - 1984-85.

The important pulses and grams cultivated in the district are green gram, hongsegram, redgram, blackgram
and cowgram. Since they have high nutritional values, people consider them as an important diet. It is also used for cattle feed and grown to improve soil fertility by fixing nitrogen in the soil. Its cultivation is possible even in poor and dry areas and are more remunerative to the farmers.

Pulses and grams accounted for 2.6 per cent of the gross area sown. Generally, in Nellore district, pulses are cultivated as a rotation crop especially after the cultivation of paddy as the first crop. Major concentrations are noticed in north-western part of the district. Pulses and grams cultivation is almost stagnant during the decade 1974-75 - 1984-85 in terms of acreage. Among the pulses and grams the greengram has the largest area under its cultivation.

In Nellore district, the spices and condiments is a wide spread commercial crop. The important spices and condiments in the district are chillies, turmeric and coriander. The area under cultivation of spices and condiments accounts for 1.57 per cent to the gross sown area. Chillies plays a very vital role in commercial farming. It accounts for 1.44 per cent to the gross sown area. The increase in percentage of spices and condiments is marginal during the decade.
Tobacco cultivation accounted for 2.07 per cent of gross cropped area in the district. Significantly it is a rabi crop. It is found that all the tobacco cultivated areas are concentrated in the northern part of the district only. The increasing demand and fair prices in the market enhancing the cultivation of tobacco in Nellore district especially in Udayagiri and Atmakur taluks. In Kavali taluk, increasing salinity in the soil affecting the quality of tobacco here. As a result considerable stretches of tobacco land are diverted towards paddy and groundnut cultivation.

Most of the fruit crops urge large initial capital. The total area under both fresh and dry fruits account for 3.8 per cent of the gross sown area in the district. Fresh fruits consist of Lemon and citrus, oranges and batavia, mango, plantain, guava and sapota. Cashewnut is an important dry fruit. Fresh fruits registered 3.54 per cent of area to the gross cropped area. Heavy concentrations of fruit farming is noticed in southern part of the district. Lemon and citrus fruits leading the list of fruits. It ranks 4th position of all the crops grow in the district. An increase of 1.55 per cent to the gross cropped area is observed in fruit farming area during the decade 1974-75 - 1984-85. In coastal area cashewnut is gaining ground. NABARD
and other National Banks sanctioning the loans to cultivate cashewnut on large scale.

The oilseed cultivation in the district accounts for 13.12 per cent of the gross sown area and ranks second in terms of acreage. Oil seeds form a valuable group of industrial crops and play a significant role in the agro-industrial economy of the district. Important oil seeds which are grown in Nellore district are groundnut, castor, sesamum, linseed and coconut.

Groundnut is an important cash crop and registered 12.35 per cent of the gross sown area of the district. It is cultivated more in rabi season, both under irrigation and rainfed conditions. Groundnut cultivation in Nellore district is essentially a dry crop in the sense that its main concentration is found in interior uplands, where one finds poor irrigation facilities and scanty rainfall. In 10 years period, groundnut cultivation has increased by 1.36 per cent. Groundnut cultivation is generally favoured by the farmers of the upland areas and less rainfall areas because of the following reasons. (i) it fetches a good income (ii) it has a short growing season (iii) the cost of cultivation is less, (iv) it requires less water, and (v) it can be
cultivated under rainfed conditions. The other oilseeds are very insignificant comparing to groundnut.

Sugarcane area accounts for one per cent of the gross sown area in the district. Its concentration is mainly confined to deltaic alluvial soils of Pennar delta area, where good irrigation facilities are available. The location of Kovur Sugar Factory (in 1979) promoting the sugarcane cultivation in the district. Its acreage has increased from 221 acres in 1974-75 to 6755 acres in 1984-85.

Cotton cultivation occupies an area of one per cent to the gross area sown. It is mostly raised as rabi crop. With the introduction of hybrid varieties and the application of better farming technology, cotton is grown as an irrigated crop in some areas of the coastal plains. It is mainly observed in areas of black and alluvial soils. A considerable increase (almost six fold) of area under cotton cultivation is observed during this decade (1974-75 - 1984-85).

It is concluded that in Nellore district paddy is in a monopolistic position in most of the areas.

Crops are generally grown in combination or association as a response to physical, socio-economic,
demographic and technological factors. A study of crop combinations immensely helps regional agricultural planning and to optimise crop farming. In the present study Doi's method is employed. In all, as many as eight crop combinations are identified in the district. Broadly speaking, the following crops namely paddy, jowar, bajra, groundnut, fruits, tobacco, ragi, pulses, vegetables, spices and condiments, sesame, sugarcane figure at least in one of the crop combinations. The distributional pattern of the combinations revealed eight major crop combinations. In all, the above 12 crops are involved in these combinations. Both in area and number, a monocrop combination, such as 'paddy' is more significant in the district. One-crop and two crop combinations are more prevalent than many crop combinations. The crop combinations with less number of crops as well as specialisation of crops are mostly found in the high rainfall regions, irrigated areas, coastal plains and deltaic region. The number and spatial extent of each one of the crop combinations have shown a decline from 1974-75 to 1984-85.

Crop diversification implies raising a variety of crops from the soil. To identify crop diversification, Gibbs-Martin method is employed. The analysis revealed that more diversification is confined to dry
uplands, rainfed and scanty irrigated areas of the district. More diversification and the combinations with more number of crops are mostly prevalent in the western part of the Nellore district.

From the study on modernization of agriculture in the Nellore district, it is found that there is a overall modernization in agriculture. The indicators such as intensity of irrigation, concentration of high yielding varieties, concentration of agricultural machinery, farmers income, application of organic manures and chemical fertilizers, crop change, other factors including availing of loans, awareness regarding agricultural programmes in T.V. and Radio, personal factors of the farmers etc., considered to identify the level of modernization. In Nellore district, Pennar deltaic area and parts of coastal region, are highly modernized in agriculture. This area coincides with canal irrigation and fertile alluvial soils. The high concentration of high yielding varieties is also found in deltaic region, coastal plains and parts of southern half of the district. Especially paddy cultivation get highly modernized in Nellore district. The primary data analysis revealed that, the number of persons using tractors, sprayers,
(both power and Hand), selected organic manures, self mixed fertilizers, pesticides and insecticides is mostly used by the farmers of deltaic and part of coastal regions. The institutional factors like location of Rice Research Station in Nellore, availing of loans also influencing the farming operations in the region. Well developed transportation facilities (National Highway No. 5 is passing along the coast of Nellore district) also enhancing the modernization of agriculture. Southern and northeastern parts of the district are moderately modernized in agriculture. Where as in western side and north-western corners, the levels of modernization is very low. The main reasons are, scanty rainfall, interior location poor irrigation facilities and poor soils.