Summary and Conclusions
CHAPTER XII

SUMMARY AND CONCLUSIONS

In Tamil Nadu, the scope for bringing more land under cultivation has been limited. Nearly 50 per cent of the land (1986-87) has been already brought under cultivation. The current fallows constitute only 11.2 per cent of the total geographical area of the state (129.9 lakh hectares in 1986-87). Hence, any improvements in agricultural production will largely depend on the adoption of intensive cultivation practices. However, the monsoon and the rainfall influence area, production and productivity levels in a very significant manner.

In the cropping pattern of the state, the proportion of acreage under foodgrains declined from 70.9 per cent in the triennium ending with 1961-62 to 65.5 per cent in the triennium ending with 1985-86. On the other hand, the area under non-foodgrains had increased from 24.8 per cent to 28.8 per cent and the area under foodcrops other than foodgrains had increased from 4.3 per cent to 5.7 per cent during this period. Among the foodgrains, paddy continued to be the dominant crop accounting for 35 per cent (average for the period 1960-86) of the cultivated area in Tamil Nadu. Among the non-foodgrain crops,
groundnut was the most important crop cultivated accounting for 13.7 per cent of the total area cultivated (1985-86).

Both at the district and the state level, there was substitution of coarse cereals by high value crops like paddy and groundnut. The expansion of irrigational facilities was to a large extent responsible for the shift in acreage under coarse cereals to other crops.

Data on gross cropped area and net area irrigated revealed that while the former did not show a significant increase since 1970-71, the latter had been fluctuating from time to time. The intensity of cropping was varying within a small margin between 119 to 122 percent. Tamil Nadu had already utilised 80 per cent of its available surface water potential through the irrigation schemes completed so far. The prospects for well irrigation was also limited because of the over-exploitation of groundwater resources. The need to strive for greater economy in water use and promoting greater efficiency, therefore, becomes imperative.

Of the seven agro-climatic zones in the state discussed in ChapterIII, the eastern region showed notable performance in regard to paddy when compared to South-east
and South-west regions. All these regions were however prominent for paddy cultivation in the State. Between 1960-61 and 1985-86, the production of paddy increased by 58.5 per cent (on an average in the districts constituting the eastern region). The increase in productivity was 72.2 per cent during this period. The eastern region was also in the forefront with regard to the application of modern technology like HYV seeds (96.95 per cent of the total area cultivated in 1985-86), higher percentage of gross irrigated area to gross sown area (91.98 per cent in 1983-84) and increased consumption of fertilizers (123.3 kgs per hectare in 1985-86) when compared to other regions in Tamil Nadu. The green revolution was more widespread in this region.

During the triennium ending with 1960-61 and that ending with 1985-86. In the South-west region there was a decline in the area under cultivation (29 per cent) as well as a decline in the production of paddy (13.5 per cent) during this period. However, the productivity increased by 19.8 per cent during the same period. the south-east region thus showed a
better performance when compared to South-west region. The area under irrigation and per hectare consumption of fertilizer were relatively lower in South-east region (84 per cent in 1983-84 and 63 kgs in 1985-86 respectively) when compared to South-west region (87 per cent and 83.9 kgs respectively).

The North-west region, the northern region and the West-central region showed peculiarities of their own in respect of millets. Between the triennium ending with 1966-61 and that ending with 1985-86, the area under millets declined in all three regions. The northern region showed the maximum decline of 53 per cent, followed by north-west and west-central region both showing a decline of 36 per cent. Besides the decline of area, the production of millets also declined in all the three regions with the northern region registering the maximum decline of 54 per cent followed by north-west region (35 per cent) and west-central region (26 per cent) during this period. However, the productivity of millets showed an upward trend with north-west region showing an increase of 61 per cent, followed by northern (47 per cent) and west-central (20 per cent) regions during the triennium ending with 1960-61 and that ending with 1985-86. In the north-west region there was a more widespread application of new technology. In
this region, the area under HYV millets (74.4 per cent in 1985-86) was the maximum and the per hectare consumption of fertilizers (134.4 kgs in 1985-86) relatively higher when compared to northern and west-central regions (vide Table III.6).

To study the production elasticities at the regional level, the production function was fitted to the regional data, arrived at by pooling together the data pertaining to the districts constituting a particular region. The analysis covered a period from 1979-80 to 1985-86. The analysis revealed that in the east coast region, where the spread of green revolution was widespread, fertilizer consumption, area irrigated and area cropped had a significant (10 per cent) impact on the production of paddy. In the south-west region, the paddy output was more responsive to area cropped and the area under high yielding varieties. Both fertilizer consumption and area irrigated had insignificant impact on paddy output. In the south-east region all the variables were found to be insignificant in explaining the variation in paddy output.

In the millet growing regions, the output levels was more responsive to area cropped and the acreage under HYV in both northern region and west-central region. Other
inputs like fertilizer consumption and area irrigated was found to be insignificant factor in explaining variations in millet output. Since the millets are grown mostly in dry areas, the impact of area irrigated and fertilizer consumption were bound to be less. In the north-west region, all the variables were found to be have insignificant impact on output levels.

Paddy, the important food crop grown in Tamil Nadu, accounted for 74 per cent of the foodgrain produced and 33 per cent of the gross sown area in the state in 1985-86. Though the area under paddy cultivation was slow to rise in the past two decades, the production and yield per hectare increased significantly since the introduction of new technology. The yield and production of paddy which was 1050 kgs per hectare and 33.3 lakh tonnes respectively in 1959-60 increased to 1889 kgs per hectare and 50.07 lakh tonnes respectively in 1970-71. In 1985-86, the yield exceeded 2,000 kgs per hectare and production 53.7 lakh tonnes.

A comparison of the yield and production of paddy before (1960-1970) and after (1970-1986) the introduction of new technology was made by computing the coefficient of variation. The coefficient of variation of paddy
production increased from 9.9 per cent in 1960-70 to 14.13 per cent in 1970-86. However, the coefficient of variation of productivity declined from 8.9 per cent to 8.7 per cent in 1970-86. Thus, the new technology had stabilized the yield per hectare of paddy in Tamil Nadu.

A study of the exponential rate of growth of area, production and yield of paddy revealed that productivity has been the major factor responsible for growth in paddy output in Tamil Nadu (Vide Table VI.2). This was confirmed by the decompositional analysis (Vide Table VI.6). Between 1966-67 and 1985-86, the area and interaction effects were found to be negative, while the yield effect was positive.

The exponential function fitted to the district-wise data on area, production and productivity of paddy for the period 1960-86 revealed that the area under cultivation had declined on North Arcot (1.27 per cent), South Arcot (0.56 per cent), Chingleput (0.53 per cent) and Thanjavur (.29 per cent), the important paddy growing districts in Tamil Nadu. However, both production and productivity showed an upward trend in all the important paddy growing districts during this period. Chingleput district registered the highest rate of growth in production of 1.9 percent, followed by South Arcot (1.52 per cent), Thanjavur
(1.21 per cent), North Arcot (0.99 per cent) and Ramanathapuram (0.87 per cent). In the case of productivity, North Arcot showed the maximum average annual rate of growth of 2.46 per cent, followed by Chingleput (2.42 per cent), South Arcot (2.07 per cent), Thanjavur (1.66 per cent) and Ramanathapuram (0.42 per cent). At the district level the variability in the area, production and productivity of paddy had increased during the period 1970-86 when compared to the earlier period 1960-70 (vide Table VI.4)

During periods of good rainfall and assured irrigational facilities, the increased acreage under HYV seeds and increased fertilizer consumption were bringing about productivity rise. The association between productivity and rainfall was indicated by the study in Chapter VI. Regression of irrigated area, fertilizer consumption per hectare of cropped area, area under HYV to total area under paddy and rainfall relative on yield per hectare of paddy for the period 1969-86 revealed that the productivity level of paddy responded to rainfall relative (significant at 5 per cent level) and the area under HYV (significant at 10 per cent level). Fertilizer consumption per hectare and irrigated area did not have much impact on the productivity level of paddy.
The area under coarse cereals constituted 47 per cent of the total area under cereals in the state in the triennium ending with 1961-62. The area declined to 32 per cent in the triennium ending with 1985-86. The major factor responsible for this decline was the shift in the acreage from low value cereals to high value paddy. The tendency was noticed even at the district level.

The exponential function fitted to the data on area, production and productivity of Cholam, Cumbu and Ragi for the period 1960-86 revealed that the area under cultivation showed a declining trend with Ragi showing the maximum decline by 2.32 per cent, followed by Cumbu (1.62 per cent) and Cholam (0.32 per cent). Both Cholam and Cumbu showed a positive rate of growth (.06 per cent and .48 per cent) in production during this period. However, Ragi recorded a negative rate of growth of 0.45 per cent during the period 1960-86. All the three crops however showed a positive rate of growth with Cumbu showing a maximum growth of 2.07 per cent, followed by Ragi (1.83 per cent) and Cholam (0.38 per cent).

There was an increase in the area, production and yield of pulses in Tamil Nadu during the period 1960-86. The compound rate of growth in area, production and yield
of pulses in Tamil Nadu was 2.98 per cent, 5.3 per cent and 2.25 per cent respectively during the triennium ending with 1960-61 and 1985-86. Though the acreage under pulses had increased in Tamil Nadu, there was no shift of area from cereals to pulses or vice versa. This is brought out clearly when we analyse the ratio of area under pulses to area under foodgrains, the ratio of area under pulses to gross cropped area and the ratio of area under foodgrains to gross cropped area for the period 1960-61 to 1985-86. Both the ratios, the ratio of area under pulses to gross cropped area and the ratio of area under pulses to foodgrains was rising. Thus, the shift in area from pulses to cereals did not take place in Tamil Nadu.

The exponential rate of growth in area, production and productivity of pulses during the period 1960-86 in Tamil Nadu was 2.37 per cent, 4.90 per cent and 1.83 per cent respectively. The t ratios indicate that there was significant differences in the growth rate in area, production and productivity in the two sub-periods: period I (1960-67) and period II (1967-86). Despite the significant increase in production and productivity the state was not in a position to meet the domestic requirement adequately. The per capita net availability per day of pulses which was 44 gms in 1971 in the state had
declined to 39 gms in 1982, falling short of the revised nutritional norms (40-60 gms per day) for a balanced diet.

The foodgrain economy of Tamil Nadu was faced with instability of production, arising due to weather and technology. Graphical analysis reveals that there was a noticeable tendency for area and productivity of foodgrains to vary with variation in actual rainfall. To find to what extent the rainfall had contributed to a decline in area, production and productivity of crops, a dummy variable model was used in Chapter VII. It was found that during periods of low rainfall there was significant decline in area, production and productivity of both rice and millets (vide Chapter VII Table VII.3). This in turn has affected the production causing the wholesale prices of cereals to rise.

The inputs used under conditions of stable irrigation would contribute to growth with stability, but if used under conditions of uncertain rainfall or in areas irrigated by tanks and wells which have fluctuations in water supply may result in fluctuations of output. This is found to be true in the case of Tamil Nadu. The coefficient of variation had increased for all food crops during the period 1970-86. But in the case of productivity, the coefficient of variation had declined for
rice during the period 1970-86. However, for coarse cereals and pulses the variation in productivity had increased during this period.

Among non-foodgrain crops; groundnut is the most important commercial crop grown in Tamil Nadu, accounting for 14 per cent (1985-86) of the total cultivated area in the state. The exponential function fitted to the data on area under groundnut cultivation revealed that the area declined in South Arcot (.24 per cent), Salem (.44 per cent), Coimbatore (.83 per cent) and the state (.19 per cent). The exception being North Arcot district where the area under cultivation increased by 1.66 per cent during the period 1960-86. During the same period, the production of groundnut declined in all the districts and the state. However, the productivity of groundnut showed an upward trend during this period. The t ratios were used to test whether there was significant differences in the growth rates in the two sub-periods: Period I (1960-67) when compared to period II (1967-86). The computed values revealed that for the state there was significant differences in the growth rates of area, production and productivity in the two sub-periods. In Coimbatore district too significant differences existed in production growth rates of groundnut. For other districts the growth
rates in the two sub-periods did not show significant differences in the growth rates.

The variability in area, production and productivity of groundnut was higher in 1970-86 when compared to the period 1960-70 in nearly all the districts and the state. The exception was however Salem where the variation of area and production was found to be lower in period 1970-86 indicating stability in the area and production of groundnut.

The area under cotton had declined but production had risen in the state between 1960-85. In Madurai district however the area increased at an exponential rate 0.61 per cent. The production of cotton increased in Madurai (the average annual rate of growth being 4.74 per cent), Tirunelveli (4.45 per cent) district and also in the state (0.30 per cent). In Coimbatore and Ramanathapuram districts the production declined at an average annual rate of 1.86 per cent and 3.15 per cent respectively during this period. The t ratio which were applied to test whether there was any significant differences in the growth rates in area, production and productivity during the two sub-periods: Period I (1960-61) and Period II (1967-86) revealed that there was significant differences in the
growth rates in area in the two sub-periods in Coimbatore, Madurai and Tirunelveli districts. Similarly, the production growth rates were found to be significant in Madurai district and the state. It thus, appears that the Madurai district was becoming prominent with regard to cotton cultivation. The variation in area and production of cotton as estimated by the coefficient of variation was found to be high in all the districts and the State. The Ramanathapuram district, however, showed less variability in area and production during 1970-86 when compared to the period 1960-70.

Sugarcane showed an upward trend in area and production in all the important sugarcane growing districts like South Arcot, North Arcot, Salem, Coimbatore, Tiruchirapalli and the State between 1960-86 (Vide Table VIII.16). Productivity also registered a positive increase during the period 1960-86 for the state as a whole, but the average annual rate of growth was small (.89 per cent). The comparison of growth rates in the two sub-periods revealed that there was no significant (t values) differences in the growth rates for all the districts and the state as a whole. The coefficient of variation computed to study the variation in area, production and productivity of sugarcane revealed that the fluctuations in
the area and production of sugarcane in Tamil Nadu had been diminishing, though productivity variations were looming larger.

The operation of the regulated markets in Tamil Nadu reveals that the number of traders and the volume of transaction handled by the markets declined during the period 1984-85 to 1988-89. Similarly, the quantities handled by the regulated markets as a percentage of marketable surplus declined in the case of rice (6 per cent to 0.5 per cent), cotton (17 per cent to 8 per cent), groundnut (18 per cent to 5 per cent) and sugarcane (7 per cent to 0.3 per cent) during the period 1984-85 to 1988-89. However it increased in the case of millets (2 per cent to 5 per cent) and pulses (0.5 per cent to 1 per cent).

The co-operative marketing societies made great strides in the field of rural marketing. During the period 1974-75 to 1986-87, the volume of transactions handled by the societies had increased. However there were fluctuations in the volume of commodities transacted by these societies. Hence, there is a need to strengthen the agricultural marketing system in Tamil Nadu so that they can serve better the needs of the farmers.
The analysis of the agricultural price policy reveals that since 1978-79, the state government was fixing the price higher than the price announced by the central government. This entails a financial burden for the state exchequer. The declining parity index (complied by the Department of Statistics, Tamil Nadu Government) implies that there had been deterioration in farmer's income.

The distributed lag model was fitted to study the relationship between the acreage under the crops and the variables like lagged acreage, lagged farm harvest prices, lagged yield per acre and sowing period rainfall for the period 1970-86. The model was fitted for the state level data for selected crops like paddy, cholam, Cumbu, ragi, groundnut, cotton and sugarcane. The analysis revealed that the area under paddy was influenced by lagged acreage, yield per acre and rainfall. Rainfall and lagged acreage were the important factors influencing area under Cholam, Cumbu and groundnut. The crops which responded to farm prices significantly were ragi, sugarcane and cotton. Hence, there was no one variable which was equally important for all crops.

Co-operative credit institutions, over the years (1961-86) have been providing increased assistance in the
form of short term, medium term and long term loans to the farmers in Tamil Nadu. But the constraint faced by these institutions was the mounting overdues. The overdues of primary Agricultural credit societies as a percentage of total loans advanced by these societies to the farmers increased from 13.67 per cent in 1957-58 to 41.2 per cent in 1987-88. This is a matter of grave concern as it will mean a reduction in the flow of finance from NABARD to the state.

The expansion of commercial banks in Tamil Nadu was impressive during 1969 to 1986. The expansion could be noticed in terms of branch expansion (17.22 per cent per annum), deposit mobilisation (31.15 per cent per annum), credit deployment (33.18 per cent per annum) and the credit-deposit ratio (2.51 per cent per annum). At the district level, however, certain districts like Kanyakumari, Pudukottai and Ramanathapuram lagged behind others in branch expansion, deposit mobilisation and credit-deposit ratios.

Comparing the short term and medium term loans given by the co-operative institutions (Primary Agricultural Credit Societies and Primary Land Development Banks) with that of commercial banks including regional
rural banks, it was found that while the lending operation of the former had declined, that of the latter had increased during 1973-85.

Step-wise regression analysis revealed that the major factors influencing co-operative bank credit were agricultural production and cropping intensity, while in the case of commercial banks it was agricultural production, income from agricultural sector and cropping intensity. Financial assistance generally goes in favour of farmers showing higher production levels.

The analysis of the state domestic product in Tamil Nadu reveals that the compound rate of growth in SDP had increased from 2.97 per cent in 1960-70 to 3.19 per cent per annum in 1972-85. But it was a poor performer when compared to the country. At the all-India level, NDP at factor cost increased from 3.10 per cent per annum in 1960-70 to 4.05 per cent per annum 1972-85. The share of agriculture in SDP had declined from 43.37 per cent (average for the period) in 1960-70 to 34.93 per cent in 1972-80 and further to 24.07 per cent in 1980-85. But there was no similar decline in the share of labour force in agriculture. The share of manufacturing sector in SDP, on the other hand, increased from 19.5 per cent in the
period 1960-70 to 20.86 per cent in 1972-80 and further to 24.01 per cent in 1980-85.

Comparing the performance of the state with that of the country, it was found that the performance of the state was below the national average in the case of agricultural sector. The share of agriculture in Net Domestic product was 43 per cent (average) during 1960-61 to 1984-85. The share of agriculture in Tamil Nadu's State Domestic product was 36.3 per cent (average) during this period. However, the performance of the manufacturing sector was better in Tamil Nadu when compared to all India performance. In Tamil Nadu, the share of manufacturing sector was found to be 21.08 per cent (average for the period 1960-85) while it was only 18.11 per cent (average for the period 1960-85) at all India level.

Year-by-year variation reveals that there was sharp declaration in agricultural income during certain years: -28.84 per cent in 1974-75, -5.51 per cent in 1976-77, -2.17 per cent in 1978-79, -14.24 per cent in 1979-80, -15.38 per cent in 1980-81 and -34.53 per cent in 1982-83. The exponential function fitted to the data on income originating from agricultural sector and manufacturing sector between 1972-85 revealed an annual average rate of
growth of -1.84 per cent in the agricultural sector and 4.44 per cent in the manufacturing sector. The analysis of the various agricultural indices by computing four yearly moving averages for the period 1970-71 to 1983-84 revealed stagnation in the seventies and a decline in indices in the eighties.

An attempt was made to relate the income generated from agricultural sector to a number of variables related to this like the index of area under crops, index of net area sown, index of cropping intensity, index of yield, index of productivity per net hectare and index of agricultural production. Step-wise regression method was used to identify the important variables influencing agricultural income. The analysis which covered a period 1972-86 revealed that important factors influencing the income from agricultural and allied services were index of net area sown and the index of agricultural production. These variables together explained 81 per cent of the variations in agricultural income.

The average annual rate of growth in per capita income in the state was 1.68 per cent during 1970-86. While the all India figure was 1.67 per cent during the same periods. The movements in per capita in terms of
agricultural income, manufacturing income, index of agricultural production and index of industrial production reveals that the per capita income was more elastic with reference to manufacturing sector during the period 1970-86. The association of per capital income on selected agricultural variables revealed that yield was the single most important factor influencing per capita income.

The analysis of the various poverty indicators reveals that in Tamil Nadu, the absolute levels of median and average per capita consumer expenditure in rural areas was lower than the poverty line. However, there was no indication of any increasing trend in these levels overtime. The average real per capita expenditure of both poor and non-poor since 1970-71 was stagnant. The value of Gini ratio for the poor ranged between 0.117 to 0.154 and was less than that for the whole population which ranged between 0.264 to 0.329.

The number of people living below poverty line in rural areas in Tamil Nadu had increased from 11.22 million in 1961-62 to 13.24 million in 1983. The foodgrain output per head of rural population had declined from 0.223 in 1961-62 to 0.187 in 1983-84. Relating the output per head to poverty indicators it was found that there was
significant negative association between agricultural performance (in terms of output per head) and the number of people below poverty line.

The rural population of Tamil Nadu had increased from 24.7 million in 1961 to 32.46 million in 1986. All the districts in Tamil Nadu also witnessed a growth in the rural population during this period. The fertility rate (total) for Tamil Nadu as a whole declined from 4.14 in 1958-59 to 2.8 1987.

The work participation rates had shown a significant increase both at the state and district level at every census. The work participation rate among the males was found to be higher than that of the females in all the three censuses. But the ratio declined for both sexes from 62.2 per cent in 1961 to 58.4 per cent in 1981 for males and from 37.1 per cent in 1961 to 27.4 per cent in 1981 for females. Coimbatore recorded the highest male (66.8 per cent) and female participation (37.5 per cent) among all the districts in Tamil Nadu during 1981 and Kanyakumari the lowest participation rate for both males (47.4 per cent) and females (6.99 per cent) in 1981.

The work participation rates also reveals a
regional pattern. South Arcot, North Arcot, Kanyakumari, Thanjavur, and Chingleput district have reported low work participation rate especially among the females. These districts are mainly the wet regions of the state with rainfall above 1000 mm and have the maximum (90-99 per cent) acreage under HYV.

The sectoral distribution of labour force reveals a definite increase in the proportion of agricultural labour force in the state. This tendency has been widespread among the district also.

Land reforms implemented in Tamil Nadu during the last three decades involved the abolition of intermediaries, security for tenants and ceiling on land holdings. Though the legislation was progressive the implementation of the acts had been notable for its tardiness and ineffectiveness. According to the ceiling act, the area declared as surplus was 1.65 lakh acres upto 1986 and the total area taken over as surplus was 1.56 lakh acres. This was much less than the various estimates of surplus made in the state - 2.55 million acres by Land Reforms Committee and the official estimate 2.82 lakh acres submitted to the State Assembly in early 1960's. Further, the scheduled tribes who have benefitted was .08 per cent
upto 1986 and the area allotted under the redistribution of surplus land was 0.09 per cent upto 1986. Similarly, the Government of Tamil Nadu had passed a number of Acts to protect the interest of the tenants till 1971. The total number of beneficiaries under this act was only 1,80,000.

The landless and land poor households who constituted 78.42 per cent in 1961-62 declined to 58.5 per cent in 1970-71 and subsequently increased to 71.4 per cent in 1985-86. The proportion of land owned by this class declined from 0.34 per cent in 1961 to 0.31 per cent in 1985-86. The increase in the number of landless and land poor households indicates that the agrarian reforms might not mitigate land hunger.

A study of the distribution of landholdings between 1970-71 and 1985-86 shows that the Gini ratio had increased from 0.4890 in 1970-71 to 0.5364 in 1985-86 indicating that there was no reduction in the inequality in the distribution of ownership holdings.

Thus, the land holding pattern as a result of the land legislation increased the number of small holders in the state. The problem of marginal farmers and non-land owning agricultural labourers came to the surface. Special
institutions became necessary to ensure that viable conditions of farming prevailed when the holdings were small. Support from the government also became necessary for ensuring input supplies, their prices, prices of output and also credit supplies. In short, an economy which needs to offer, service and support to the small holders had been gradually emerging after the period of reforms. The net result is the emergence of a high cost economy because of the increased expenditure on providing subsidies and welfare measures for the land-poor and landless households in Tamil Nadu.