CHAPTER IX

SUMMARY AND CONCLUSIONS
Andhra Pradesh is predominantly an agricultural State and paddy occupies a pre-eminent position in its agricultural economy. The state is often referred to as "Rice granary of India". The study area accounts for about 49 per cent of the total area under the crop and it contributes 53 per cent of the total production of paddy in the State. Despite this, no studies have been conducted to provide reliable data on costs, returns and resource use management. The relative performance of local and improved varieties on different farm sizes have not been documented. Further, no attempt has been made to know the impact of technical changes on income distribution and employment when such a break-through has been achieved in paddy production. These considerations were responsible to undertake investigation on: "Resource use Management of paddy production in Coastal Andhra Pradesh", with following specific objectives.

1. To appraise the costs and returns of high yielding and local varieties of paddy according to season and farm size.

2. To assess the resource availability and resource use management on paddy farms in both the seasons and by different farm size groups.

3. To estimate returns to scale on paddy farms by season and farm sizes.
4. To determine the nature of technical changes involved in shifting from local varieties of paddy to high yielding varieties of paddy.

5. To evaluate the impact of technical changes on functional income distribution and employment.

The data for this study were collected through cost accounting method under the Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops during 1979-80 in the districts of East Godavari, West Godavari, Krishna, Guntur, Prakasam and Nellore. Stratified three-stage random sampling design was adopted with tehsil as primary sampling unit, a cluster of three villages as secondary unit, and an operational holding as the third and ultimate sampling unit. The sample consisted of 180 operational holdings in 40 villages in 15 tehsils of the six districts. The operational holdings in the sample were classified into three farm sizes, Small ($S_1$, less than 1.51 ha.), medium ($S_2$, 1.52 to 3.21 ha.) and large ($S_3$, 3.22 ha. and above).

Tabular analysis was done to assess the comparative economics of variety groups, seasons and farm sizes. To study the resource use efficiency, management and technical change, production function approach was used. The functional form chosen was of Cobb-Douglas type. The gross income ($Y$) from the farm was the dependent variable and the explanatory variables were land in
hectares \((X_1)\), expenditure on human labour \((X_2)\), expenditure on motive power \((X_3)\), expenditure on manures and fertilizers \((X_4)\) and expenditure on other capital services \((X_5)\) in rupees per farm. From the production elasticities, the marginal productivities and factor shares were worked out. 'Chow test' was employed to identify the structural break, if any, in the production function. Analysis of co-variance was applied to determine the nature of technical change. Dummy variable technique was used to see if there was a significant increase in the value of the intercept, assuming that the slope coefficients were the same for both local and high yielding varieties.

The important results of the study are summarised under the following sub-heads:

Costs and returns

In the aggregate analysis, the average cost of cultivation of paddy worked out to Rs.3.386/- ha, while the cost of production was Rs.80.45/qt. of paddy. Both the cost of cultivation as well as the cost of production were inversely related with farm size. The bulk-line costs of production of Rs.104.36, Rs.111.37 and Rs.120.99 per quintal of paddy covered 65 per cent of production, farms and area respectively. These costs of production were compared with the minimum support prices of Rs.95/-, Rs.99/- and Rs.103/- per quintal fixed for Common, Fine and Superfine varieties of paddy for the 1979-80. The
average gross return was Rs.3,945/- ha, yielding a net income of Rs.561/- ha.

The investment per hectare in high yielding varieties was Rs.3,449/- while the gross income was Rs.4,021/ha. Thus a net profit of Rs.572/- per hectare was earned. The net return from local varieties was only Rs.499/- (Rs.3,450 - Rs.2,961) per hectare. But the cost of production per quintal was lower with the local varieties (Rs.76.26) than with the high yielding varieties (Rs.81.01).

The cost of cultivation per hectare of paddy was higher in the rabi season (Rs.3,736) than in the kharif (Rs.3,212). Similarly the gross income (Rs.4,387/ha) was higher than in the kharif (Rs.3,728/ha). The additional benefit accrued to the farmer in the rabi season was Rs.659/- (8.95 quintals of paddy) per ha, at an extra cost of Rs.524/-.

The variations in costs and returns between the farm sizes were very narrow in HYV farms, while they were quite wide in local variety farms. In general, the medium sized farms (S2) performed better than the small and large farms.

Resource use Management

In all the 24 production functions selected for discussion, the coefficients of multiple determination ($R^2$) were quite high and significant. The five explanatory variables together explained more than 90 per cent of the
variation in the value of output. In none of the cases, the sum of the regression coefficients deviated significantly from unity, indicating the constant returns to scale prevailed.

Gross income was found to be significantly responsive to land in all the size groups. Expenditure on human labour influenced positively and significantly the gross income on small and medium farms, but not on large farms. The production elasticities of motive power were non-significant. Avoidable wastage was the case with the most important production input, manures and fertilizers in all farms, particularly in small farms. The coefficients of capital services were positive and significant in case of small and medium farms.

The marginal value productivities of land were higher than the acquisition costs (rents). The marginal value product of human labour was higher than the wages only in case of small and medium farms, while it was less and significantly different from the factor cost in case of large farms. The marginal value product of motive power was negative in case of the rabi season and was significantly different from its factor cost. Since the marginal value products of manures and fertilizers were negative and significantly different from their factor costs, a substantial reduction of expenditure on them would increase the farm incomes. Similar result was
obtained in case of capital services on large farms and in case of the kharif season. In the light of these results, it may be concluded that there was an irrational allocation of resources to a considerable extent by the farmers and a judicious reallocation and better management of the resources would increase the profits in these farms of the region.

**Technical Change**

The Chow tests indicated that there was a structural break in the production functions of paddy in the process of changing over from local to high yielding varieties. There was a significant spurt in the level of intercept between the production functions of local and high yielding varieties of paddy. The increase in the efficiency of parameter was quite marked in case of the small farms. In general, there was a Hicks-neutral type of technical change in production of paddy in the Coastal Andhra Pradesh.

**Factor Shares**

The relative factor share of land declined significantly due to technical change from local to high yielding varieties, while there were increases in the factor shares of labour, manures and fertilizers and capital services. The relative share of the motive power did not alter much. In case of small farms, the relative share of land declined significantly, while that of fertilizers increased. The relative shares of other
inputs were unaffected. No significant change was noticed in the relative shares of the factors on the medium farms. The share of land decreased on large farms because of the adoptions of new technology and those of labour, fertilizer and capital services increased significantly.

_Policy implications_

The findings of the study have some important policy implications:

The extension officials should dissuade the farmers from excessive use of manures and fertilizers for the high yielding varieties. Reduction of the expenditure on this input will increase the net profit of the farmers. Similarly, the expenditure on human labour and motive power should also be rationalised.

Although the minimum support prices were above the average cost of production of paddy, they were much below the bulk line costs. In the light of recent recommendation of the Indian Society of Agricultural Economics to take bulk line cost into account while fixing the minimum support prices, there is a case for upward revision of the support prices.

Constant returns to scale were observed in the study. Earlier studies in the sixties supported the contention that small farms have higher productivity.
The policy of imposing ceilings on land holdings were justified with that finding. The present study lends support to the findings of the recent studies that the inverse relationship between size and productivity is disappearing. This finding suggests that there is no economic justification for further reduction in the size of holdings.

The marginal value productivity of human labour was found to be positive and quite close to the market wage rates. The commonly held belief that the marginal value productivity of human labour is close to zero has been proved to be wrong. This finding supported the viewpoint that the human labour should be valued at the market wage rate while working out the cost of production of the farm enterprises.

The technological change observed in the production of paddy was progressive in nature, because the relative factor share of land decreased, while that of labour increased. Thus, it could be inferred from this that growth with equity and social justice was possible due to adoption of HYV paddy technology in the area, contrary to the apprehensions of certain researchers.

The increasing share of fertilizers and capital services indicated a gradual transfer of resources to the non-farm sector from the farm section, which may not be conducive to continue for a long time from the point of integrated rural development.
The technical change has increased the demand for labour considerably. But it increased the productivity of land also simultaneously. Given the unequal distribution of land, this may increase the incomes of large farms more than proportionately. The income inequalities may further get accentuated and they may create social and political unrest, unless checked through appropriate policy measures.