CHAPTER X

SUMMARY AND CONCLUSIONS

This study was aimed at examining the allocation of resources in agriculture in the Pasiliki-Muktsar Region of Ferozepur District in the State of Punjab (India). The major objective of the study were as follows:

(1) To analyse the changes in the input structure caused by the adoption of new seed-fertiliser technology in Agriculture and the impact of these changes on output-input relations and on functional distribution of income;

(2) To see whether the resources were optimally utilised before and/or after the green revolution, from the point of view of product-product relationship on the assumption that the factor-product and factor-factor relationships were given;

(3) To examine the direction in which the misallocation of resources had changed with the passage of time; and

(4) To investigate how the overall functional distribution of income would change in a given year of study if the resources were reallocated on each farm according to the optimum plan.
The two reference periods were the year 1956-57 and the year 1969-70. The data relied upon, were those collected by the Economic and Statistical Organisation, Punjab for the purpose of studies in the Economics of Farm Management and in the Economics of Tractor Cultivation, collected according to cost accounting method. The study analysed input-output data for 97 farms (50 for the year 1956-57 and 47 for the year 1969-70). The reference years were so selected that whereas the one (1956-57) could be deemed to represent the era of traditional agriculture (in the Schultsian sense), the other (1969-70) could be considered to be the period of non-traditional agriculture.

The analysis was carried on with reference to three objective functions, namely, the 'value of gross output', 'value added', and the 'profit'.

For the purpose of the study, the farms in each year were divided into small and large farms. This classification was prompted by the common belief that extent of adoption of new technology and also the resource allocation differs on farms of different sizes.

For studying changes in the cost structure over time, we divided the inputs used on land into three parts, namely the cost of human labour, the cost of mechanical
and the cost of biochemical inputs. We found that these costs have increased on both types of farms, with the passage of time. The increase in costs were partly due to increase in the general price level but mainly because of the nature of the new technology. Human labour costs increased because of the new varieties of crops needed more labour. Additional irrigation facilities also led to a demand for extra labour. Use of machinery, especially tractors, led to an increase in mechanical costs; and use of fertilizers and insecticides have been responsible for increase in the cost of bio-chemical inputs. The study revealed that whereas the absolute increase in cost for human labour was more on small farms, the increase in the absolute cost of mechanical and bio-chemical inputs was more on large farms. The overall increase in the cost of cultivation per acre was more on large farms when compared with that on small farms, both in absolute terms as well as in relative terms.

This increase in the use of inputs brought about a corresponding increase in the returns, measured in terms of any objective function, the proportionate increase in the returns being more than the proportionate increase in cost on both types of farms. Both large and small farms thus seem to have benefitted from the new seed-fertilizer
technology. However, it has come to light that whereas increase in returns per acre is relatively greater on large farms, increase in returns per rupee of cost is higher on smaller farms. Incidentally, relatively greater increase in returns per acre on large farms along with a relatively greater increase in the use of inputs on large farms confirms Bardhan's view that it was the smaller amount of inputs used per acre which was responsible for the lower per acre productivity on large farms in the pre-green revolution period.

The adoption of new technology has also caused a change in the functional distribution of income. Our study shows that both the absolute as well as the relative share of labour in the value added has increased after the green revolution. This finding thus does not support the conclusion of many studies which reveal that the relative share of labour has gone down after the green revolution. This difference in conclusions may be mainly because of the fact that our base period falls far back in the fifties when association of hired labour with agricultural operation was rather very limited.

For studying misallocation of resources on different farms, we used the linear programming method.

1 See also Soni.
Optimum allocation on each farm was determined according to the input-output relations (technical coefficients) actually observed on that very farm for various crops grown on it. The resource limits for each farm were again determined by the amount of resources actually used on it. The optimum values were found for each objective function for all farms for both the years. The actual as well as the optimum values of these objective functions were based upon the average prices of crops, prevailing in the year preceding the one under investigation. The procedure partly met one objective raised by Bhagwati and Chakravati [19] regarding Desai's [58] study. According to them, the misallocation, as found by Desai might not have been there if expected rather than ex-post prices had been used for studying misallocation.

We found that even on the basis of ex-ante prices, the misallocation existed on many farms both in the year 1956-57 - the year representing traditional agriculture and in the year 1969-70 - the year lying in the post green revolution era. The misallocation existed with reference to all the objective functions.

Once we had detected the misallocation, we proceeded to examine the direction in which the misallocation of resources, had moved over time. We developed certain
indices for measuring this change. These indices were 'Ratio of crops dropped after optimisation', 'Proportional Maximand difference-I', 'Proportional Maximand Difference-II', and the 'Ratio of optimally Allocated Farms'. The results show that on the whole the misallocation of agricultural resources has declined if measured in terms of the value of given output and has remained unchanged if measured in terms of value added or profit. If, however, we study the farms according to their classification into large and small farms, we find that whereas the misallocation has remained unchanged on the small farms, it has declined on large farms, whatever be the objective function and whatever be the index of change.

This conclusion is very important from the point of view of the prevailing controversy among economists regarding optimum allocation of resources in traditional agriculture. The Schultsian thesis fails to get confirmation through this study. Rather one feels tempted to agree with Shah [256] that the Schultsian assertion has not so far gone beyond the stage of a hypothesis.

A careful look at the process of development of agriculture in the region during the last 20 years or so, leads one to conclude that several factors have worked for
better allocation of resources, side by side with the movement of agriculture from the traditional stage to its present progressive stage. These factors are: better educational standard of the farmers, more certainty about crop yield; reduction in the number of crops grown; growing supplementarity of crops, exposure of farmers to the market forces because of improved yield and more marketable surpluses, better marketing facilities, a sound price support policy (reducing uncertainty in returns) etc.

The study showed that there was a scope for better allocation of resources even if the misallocation had declined. However, it was found that a better allocation would lead to such a crop pattern as would reduce the share of labour in the income generated within the agricultural sector. This is a price for optimal allocation. Some extra steps will be needed to reduce this price to the minimum.