CHAPTER VII

SUMMARY AND CONCLUSIONS

In the face of our growing population, agricultural development has posed a big problem for policy makers both to feed our growing population and to stabilise our economy so that agriculture starts playing a significant role in the development of our overall economy. Unfortunately, all our efforts have been concentrated for a long time in areas which were already developed to a considerable extent. This created the problem of regional imbalances as well. Some areas have been neglected because of a prevailing belief that its people are conservative, unresponsive and tradition bound. If these areas do not have any natural constraints and have been neglected only because of the human factor, a careful study to see if agriculture in these areas can be moved out of its traditional stage, will be of great national significance.

Eastern U. P. is a glaring example of such an area.

Eastern U. P. is proverbial for its poverty and backwardness. The main causes of this state of affairs are the high density of population, the virtual absence of industrial development and the necessary infrastructure for agricultural growth. All the agricultural development during British rule was concentrated in Western U. P. The development of Eastern U. P. was neglected even after independence which is evident from the relatively low per capita investments during the successive plan periods. However, recent changes in this area would reveal that the farmers of this area are in no way inferior to their progressive
counterparts in Western U. P. inspite of their many handicaps. Wherever consolidation of holdings was completed and electric power for agricultural purposes was made available, farmers have gone ahead with the adoption of new technology. This has completely changed the face of these areas.

The main purpose of this study is to look into these changes which mark the development of agriculture from the traditional to the modern one. The attributes of traditional agriculture are that production is mainly for consumption, there is very little marketable surplus, and the allocation efficiency is high. Land contributes a significant share to the production process. Modern agriculture on the other hand is expected to have disequilibrium in its allocation efficiency in the initial stages and land has a diminishing share in overall production. The relevance of caste in the production mechanism has also been explored. In addition, an index of modernisation has been prepared to see what factors are responsible for the different levels of modernisation.

The area chosen for the study is the Dobhi Block of district Jaunpur in Eastern U. P. All the villages were ranked on the basis of certain indicators of modernisation. Four villages, selected from the top 15 per cent, are referred to as modernised villages and two from the bottom 15 per cent are referred to as traditional. A comparative picture of the farms in both sets of villages has been studied.
Primarily, tabular analysis based on simple means and percentages has been used in this study. Production function analysis has also been used to show the contribution of individual factors in combination with other factors influencing the production process. In addition to overall farm business, some important crop enterprises have also been analysed.

The two sets of villages selected for the comparative study, are similar in several respects. They have almost identical size of holdings. The average size of holding is 6.58 acres and 6.34 acres for modernised and traditional villages respectively. In both sets of villages upper castes happen to dominate the ownership of land. It is a common feature of this area that every family sends out its surplus labour to cities in search of jobs so as to supplement the family income because the holdings are small and it is very difficult to maintain even a subsistence level of existence on the farm income alone. In both the sets of villages consolidation of holdings has been completed.

The variations start with the fact that electricity for agricultural purposes is available only in some villages. This difference set in motion a whole chain of reactions which caused these villages to take the first steps towards modernisation. A new technology based on high yielding varieties of cereal seeds was available during that period. Assured irrigation was very essential for the adoption of this technology. Once electric power was made available, those farmers who had income
from outside sources used it to create their own irrigation sources. This outside income played a crucial role in the process of development. Nearly 46 per cent of the finances for the installation of irrigation sources in the modernised villages came from the earnings of those living outside the village. Government and cooperative loans accounted for only 26 per cent of the total expenditure. Once the irrigation facilities were created, farmers started experimenting with the new technology and tried to adopt it with all its components including the use of chemical fertilisers, plant protection etc. This resulted in boosting up the yields and enhancing the intensity of cropping, which in turn necessitated the use of new improved implements. This chain of changes was confined only to those villages where electricity was easily available. Villages without electricity remained in almost the same traditional state.

High yielding varieties were grown in larger areas and investments were made in modern inputs like fertilisers and plant protection measures. In traditional villages where the farmers are at the mercy of the vagaries of the monsoon, the situation is unchanged. As a result, cropping intensity is only 136.5 per cent in the traditional villages as compared to 186.7 per cent in the modernised villages. Cropping pattern also has changed drastically in the modernised villages. Barley which was a major rabi crop has been slowly replaced by new varieties of wheat. In 1965-66 wheat and barley account for 5.5 and 11.4 per cent of the gross cropped area in Dobhi Block. Now wheat and barley are grown
in 26.1 and 7.3 per cent of the gross cultivated area respectively in the modernised villages. As against this, wheat and barley still account for 8.8 and 20.2 per cent of the gross cultivated area in the traditional villages. 71 per cent of the area under paddy and 79 per cent of the area under wheat are now under high yielding varieties in the modernised villages as compared to only 2.6 and 5.7 per cent in the traditional villages. In the case of fertiliser use as well, modernised villages are using almost the recommended dose of fertilisers for the high yielding varieties. The recommended dose of fertilisers for high yielding paddy and wheat for this area in terms of NPK is 36 - 18 - 18 kgs. making a total of 72 kgs. of plant nutrients per acre. The average actual use of these plant nutrients in modernised villages is 71.5 and 76.0 kgs. per acre for paddy and wheat respectively. In traditional villages very few farmers have grown high yielding varieties and the use of plant nutrients is also very low due to the absence of assured irrigation. In addition, new crops are being grown in the modernised villages. New and zaid crops account for 8.5 per cent of the gross cultivated area in modernised villages as against only 0.4 per cent in traditional villages. The adoption of HYV technology has resulted in greater use of plant protection as well in the modernised villages. Now the average use of plant protection per acre in modernised villages amounts to Rs. 4.25 as against only 23 paise per acre in traditional villages.

A comparison of input use in these two sets of villages reveals that farming has become capital intensive in the modernised villages. A greater
share of the expenditure is incurred on modern inputs. The share of chemical fertilisers, plant protection, irrigation etc. is 36.6 per cent in the modernised villages as compared to only 14.5 per cent in the traditional villages. As a result of the new technology the value of use of the human labour and bullock labour (especially human labour) per acre of net cultivated area in modernised villages has gone up considerably. The per acre expenditure on human labour is Rs. 357 and Rs. 174 in modernised and traditional villages respectively. Per acre expenditure on (net cultivated area) chemical fertilisers have risen very substantially in the modernised villages. It is Rs. 135 and Rs. 12 in modernised and traditional villages respectively. Irrigation expenditure also shows a similar trend.

Assured irrigation, cultivation of high yielding varieties and new crops have resulted in boosting the overall production in the modernised villages. Taking the yields in traditional villages as base the percentage increase in yields for different crops in modernised villages range from 27.9 per cent to 98.5 per cent.

These changes have resulted in moving agriculture from its traditional stage to modernisation. In modernised villages, marketed surplus has gone up. The average value of marketed surplus per farm in modernised villages is nearly Rs. 4,460.00 as against Rs. 370.00 only in traditional villages. The value of marketed surplus per acre net cultivated area comes to Rs. 678.00 and Rs. 58.00 in modernised and traditional villages respectively. In the modernised villages, all
except two small farmers have some marketable surplus. Whereas in traditional villages the number of those selling some produce is small. Although some of these farmers sell some produce to pay land revenue and other dues, they have to purchase later for home consumption. Thus, very few have real marketable surplus. On the selected farms in modernised villages the percentage value of the marketed surplus is 37.6 per cent of the gross produce, as compared to only 8.8 per cent in the traditional villages. The productivity index prepared by taking the value of gross production in traditional villages as base = 100 reveals that the productivity index per acre of net cultivated area has gone up to 255 in the modernised villages. This ranges from 158 to 271 for small and large farms.

An analysis of the selected farms in the two sets of villages has been done on the basis of their caste composition also. The results indicate that so far as physical achievements are concerned, variation between the farms of different caste groups of both sets of villages follow the same pattern as has been observed between the different size groups although there is some difference in the magnitude. A perusal of tables 23 and 24 in Chapter - IV would reveal that both the big land holders and the high caste (which follow almost the same pattern) do not do as well as the small and medium farms in traditional villages; whereas the contrary is true in the modernised villages. This supports the hypothesis that caste as such does not play any significant role in the production process.
Had it been so, the results would have been similar for both sets of villages. It is only the ownership of resources which is an important factor in the production process. These very high caste farmers who appear to be inefficient in traditional villages have done significantly better when given access to a profitable technology. Therefore, it can be safely concluded that caste hierarchy will not stand in the way of agricultural development, once the pre-conditions for it are met.

The Cobb-Douglas production function has been used for the analysis of gross returns of all farms and for inter-farm size and inter-caste group comparisons of modernised and traditional villages. Several different combinations of independent variables have been attempted. Generally the results of model - II which incorporates all the independent variables has been presented except in the case of all farms where two models: (i) with all the independent variables including caste dummies, and (ii) with all the independent variables after dropping caste dummies have been used for the interpretation of the results. In model - II all the variables are significant in both sets of villages.

A careful look into the elasticities reveals that the elasticity of land is nearly twice in traditional villages (0.46) as compared to modernised villages (0.23). This supports the hypothesis that the relative importance of land would decline in the process of modernisation. Also the elasticities of manures and fertilisers are 0.31 and 0.12 for modernised and traditional villages respectively (Model - II). The
higher elasticity of manures and fertilisers in modernised villages supports the contention that modernisation of agriculture places a higher premium on investments in technological changes.

The results of the inter-farm size analysis follow a similar pattern as has been found in the case of all farms. This gives added support to the validity of the hypotheses formulated in this study.

Coming to the influence of caste on the production process, the coefficient for the high caste dummy turns out to be positive and significant at 10 per cent level in the modernised villages; whereas it is negative but non-significant in the traditional villages. As such, low castes have come out technically more efficient in traditional villages; whereas high castes are more efficient in modernised villages. This suggests that something other than the caste hierarchy (economic factors) influences the production. Had it not been so, the coefficients of caste dummies would have shown a similar pattern in both sets of villages. The caste groupwise analysis also supports this finding. Thus the hypothesis that caste is not significant in the development of agriculture has been proved.

The coefficients of multiple determination show that about 99 per cent of the variation in the gross returns for both the sets of villages is explained by the combined effect of the independent variables.

From the point of view of policy, the study of the efficiency of resource use is important because such an analysis indicates the extent to which the modern inputs can be used to get the specified level of
production. The general approach for judging the efficiency of resource use has been the comparison of marginal returns with marginal cost. But in practice, it is rather difficult to get any idea of marginal cost particularly of traditional inputs used in underdeveloped agriculture. Still, the analysis reveals that marginal value productivities of land, human labour and bullock labour are quite close to their acquisition costs in the traditional villages. But this is not the case in modernised villages. This is probably due to the fact that farmers in the modernised villages are still in the initial stages of modernisation and have yet to reach the equilibrium.

Broadly these results indicate that farmers in traditional villages have achieved an equilibrium by adjusting the use of traditional inputs like land, human and bullock labour, indicated by the fact that in traditional villages the marginal value productivities of these resources are very close to their acquisition costs. The equilibrium is of course at a low level probably due to the inherent bottlenecks such as low level of technology and non-availability of new inputs (such as irrigation). Some of the differences in MVP and acquisition cost of resources may be due to the fact that traditional farmers too have started using some of the modern inputs like fertilisers, though their use is at a very low level, resulting in high marginal value productivity. This indicates that in traditional villages too, the returns could be increased by using the modern inputs.
Another important conclusion which could be drawn from this analysis is that the farmers in modernised villages have yet to achieve equilibrium. They are still in the stage of experimentation and would take some time to reach a new equilibrium which would be at a higher level. This may also be the reason for unexpected values of marginal value productivities of resources on the farms in modernised villages.

The results of the crop-wise analysis have more or less a similar pattern as has been found in case of total farm enterprises although the magnitudes differ.

An index of modernisation for the farms of modernised villages has been prepared with a view to study the factors affecting the level of modernisation. The tabular analysis indicates that farm size and caste groups are highly related to the level of modernisation. The mean modernisation index rises with a rise in size of farm. It has the same relationship with caste hierarchy i.e. mean modernisation index rises with the rise in the social hierarchy. This again supports the view that caste and size of farm are identical.

So far as the educational level of the farm operator is concerned the mean modernisation level rises with the level of education upto junior high school. Then it drops down and again rises for those with the educational level upto graduate and above. The mean modernisation index for those with junior high school qualifications is 53.24; whereas it is 58.91 for graduates and above. This suggests that there is a 'critical' minimum level of education which is necessary
to facilitate the adoption of new technology after which education appears to play a very minor role. The highest level of the family education also has similar pattern.

The effect of age of the farm operator on modernisation level conforms to many earlier studies. The mean modernisation level for those in the age group of 31 - 40 is the highest and it is lowest for the age group below 30 years. This indicates that farm operators above 40 years of age are a bit conservative in adopting the new technology; whereas those below 30 years do not have sufficient experience. It is the farm operator within the age group of 31 - 40 who has enough farming experience and is also not averse to new ideas.

Off-farm income has played a very important role in modernising the farm structure in Eastern U. P. But here too it appears that a 'critical' minimum level of off-farm income is necessary for the adoption of new technology beyond which the off-farm income does not play very significant role. The mean modernisation index rises with the rise in annual off-farm income upto Rs. 6,000.00 where it is 64.73 and it drops to 60.45 for those having off-farm income over Rs. 6,000.00.

The regression analysis has also been used to identify the factors responsible for different levels of modernisation. The results show that area and off-farm income play a very significant role in determining the level of modernisation. Area and outside income
are significant at 1 per cent level. Educational level of the farm operator and the caste dummies are positive and significant at 10 per cent level. But age has a negative and insignificant coefficient suggesting that age is negatively related to the level of modernisation. Thus it can be concluded that off-farm income and size of farm are the most important of all the factors determining the level of modernisation.

The changes brought about by the adoption of the new technology in Dobhi Block of Eastern U. P. are obvious from this study. From a deficit area, it has now become a surplus area. Farmers now have two meals a day. Marketable surplus has increased, which has resulted in investment in the farm and also on things to better the living standards. Many brick kilns have come up in the area, supplying bricks for the construction of pump houses, storages, cattle sheds and better houses for the farmers. Three engineering workshops have been started by the local entrepreneurs manufacturing and repairing agricultural implements. But all this change has thrown up some new problems and inspired the farmers to try to solve existing ones, which they had ignored in the past.

All these changes require the building up of a new infrastructure to help the farmer avail himself and the country of the advantages that are inherent in the new technology. The farmer is beginning to be aware of the limitations that now bedevil him and is becoming more vocal in his demands.
The traditional villages have their special problems which, on occasion, overlap those of the modernised villages. One of the farmer's problems is that electric power connections are difficult to obtain and the supply of electricity is erratic and generally provided at night, even in winter. The number of State tubewells is insufficient and their performance is unsatisfactory. The result is that water is not readily available at the right time in the right quantities.

Credit is a problem faced by small and medium farmers in traditional as well as modernised villages. In both sets of villages, consolidation is not entirely satisfactory and farmers still find themselves with land in more than one area, which makes it uneconomical for them to instal pump sets.

Marketing of surplus grain and fodder present problems to the progressive villages because there are no mandis in Dobhi Block and no approach roads. They have to be content to deal with local traders who are tardy in paying even the low prices that they offer. Enterprising farmers who think in terms of dairy, poultry or vegetable farming are discouraged by the hampering lack of roads and markets.

Now that this area is well on the way to development, there are certain steps which the Government should take to help spread this development. Roads are a must. The present Kachcha roads need remetalling and the villages should be interlinked by all-weather roads.
The supply of electricity should be organised to meet the requirements of a modernised agriculture. Assured water supply is another vital necessity. The operation of state tube wells should perhaps be the responsibility of the farmers who use them with a trained operator who would be answerable to them for the proper operation of the tube well. Last but not least is credit, which should be made available through Banks. This will help the farmers not only with their immediate agricultural needs, but with other agro-industrial developments. There are entrepreneurs who have already started electrical and mechanical workshops, who need to be helped and encouraged with credit and training facilities.

Thus, the conclusion of this study is that given access to a new profitable technology agricultural development could be accelerated even in the 'so called' backward areas of the country. Social factors like caste cannot hold back this process once a suitable technology is available. Therefore, it is of paramount importance that the usefulness of such regional studies are realised, because the study of the process of agricultural development at national or state levels does not bring out the real situation. Such regional studies which look into the constraints holding back agricultural development could form the basis of formulating realistic plans for the development of the backward areas.