CONCLUSIONS
Profit is the motive behind all the activities of the farmers whether rich or poor. If a farmer is poor, he grows cereals for his subsistence and vegetables to get returns to meet his daily needs. But if the farmer is rich and the owner of a large landholding, he selects crops on the basis of the profitability of the crops. For getting higher yields he uses modern agricultural technology. The new technology is size-neutral in the sense that improved seeds, fertilizers and even tractors can be used on all farms independent of their size, but it is not resource neutral. That is to say, only those farmers who have a greater command over resources can buy and use these inputs to get more yields and more profits. The rich farmers have the money to invest in the use of modern technology to get more profits. So the crops are chosen on the basis of profits the crop will fetch.

From the analysis in the foregoing chapters, it can be concluded that it was variations in prices which had brought the changes in cropping pattern in Upper Ganga - Yamuna doab, substantial increase in the use of modern technology and intensification of agriculture led to increase in the area under remunerative crops. This has also resulted in an appreciable increase in crop yields and has opened new economic possibilities for the farmers of the study area. The author has made extensive use of secondary data and has also gathered information by sampling 237 farmers to assess the impact of changing prices on their cropping pattern. The analysis presented in earlier chapters has a number of far reaching implications for the formulations of appropriate policies related to farm prices and agricultural development in the study region.
The study reveals that prices of all the twelve selected crops have increased but there were some disparities in increase of prices. Prices of pulses like gram and arhar and non-foodgrains like potato, sugarcane, cotton and mustard have increased tremendously. Prices of fine cereals like rice and wheat also registered substantial increases while coarse cereals like jowar, barley, bajra and maize recorded marginal increases.

Similarly, the increase in area under these crops also varied during the study period. Area under non-foodgrains like mustard, potato and sugarcane, pulses like arhar and fine cereals like wheat recorded massive increases in all the districts, and they showed a high degree of positive correlation with prices. Crops like rice (in northern districts) and maize (in southern districts) also showed positive correlation. The crops which have recorded decreases in their acreage also showed negative correlation with the prices. It consists of coarse grains like jowar, bajra and barley, pulses like gram. Cotton also showed negative correlation with its prices.

Due to the adoption of modern technology, better irrigation facilities and improved farm implements in the study region, a tremendous increase in yields of crops was observed. It resulted in an increase in production of crops despite of decreases in area under some crops. It points towards the fact that farmers of this region are getting more production from lesser area and this has also affected the cropping pattern. The production of cash crops like mustard, potato and sugarcane recorded massive increases and showed strong positive correlation with prices. Similarly, the production of foodgrains like wheat, rice and arhar also showed a high degree of positive correlation with prices. Maize (in Saharanpur,
Bulandshahar and Ghaziabad), also showed positive correlation. Generally the production of cereals like jowar, bajra and barley has decreased and it showed negative or no relation with their respective prices. While crops like gram and cotton showed a high degree of negative correlation between prices and production.

From the very beginning the study region was pioneer in agriculture. It is one of the most developed and prosperous region of Uttar Pradesh. It is endowed with flat alluvial plains, fertile soils, vast reservoirs of surface and underground water and good climatic conditions which have favoured a number of crops to be grown in this region. Earlier the farmers of this region were more or less indulged in subsistence farming. But the introduction of 'Green Revolution' in the early sixties and the adoption of new technology brought a sea-change in the agricultural scenario and this further added to the prosperity of the region. Earlier, farmers were growing all types of crops but now they are growing only those crops which bring them better returns. This shows that:

(i) Price emerged to be the major factor which helped in bringing about a change in the cropping pattern. There was a clear shift from the cultivation of coarse cereals, gram and cotton to the cultivation of cash crops and fine cereals.

(ii) But this does not mean that there was a total shift from the cultivation of cereals to the cultivation of cash crops. Farmers still give preference to the cultivation of foodgrains especially wheat, rice and maize. They devote a significant proportion of their land to raise
their own requirements and in sowing their surplus land, they look towards the cultivation of cash crops.

(iii) Profitability of the crop dictates the changes in the cropping pattern. Crops which registered significant increases in their area also showed strong positive correlation with prices (mustard, potato, sugarcane, wheat and arhar). Crops which registered marginal increases in their acreage showed weak positive correlation (rice and maize). Crops which registered decreases in their acreage, showed negative correlation with their prices.

In the study region several crops are sown and farmers are seen to respond to prices significantly. Amongst foodgrains, wheat is the most favoured crop and the farmers of this region specialize in wheat cultivation. Following the introduction of high yielding variety of seeds, fertilizers and technology together with the generous supply of irrigation water the farmers took almost exclusively to the cultivation of wheat. This crop was grown by the farmer partly for self consumption and mainly for the market because of its high yields, fairly high prices, massive procurement by the government on farmers door step, cash payments by the government agencies and also the sale of wheat straw. So in this region wheat crop is considered as a cash crops. Rice is also one of the favoured crops because of favourable climatic conditions, highly developed irrigation facilities and the adoption of high yielding variety of rice, which has also helped the farmers in getting higher yields and more profits. Another crop which has gained popularity in this region is arhar. This is because of the introduction of early maturing strain of arhar. Short duration arhar takes about five months
and it can be cultivated in the normal cropping pattern as a
bonus crop. Amongst coarse cereals, maize is a preferred crop
and is considered to be the poor man's food. Maize is cheaper
to grow than both rice and wheat. It is also profitable, since
every part of the corn plant can be utilized. The real earning
in maize comes not from the coarse cereal but from the wide
range of value added items that are manufactured from it.

Crops which have lost their popularity and their area are
side tracked by remunerative crops, are coarse cereals like
jowar, bajra, barley and pulses like gram. Although coarse
cereals are considered to be the poor man's food, but now in
rural areas even poor people like to eat the elite grains i.e.
wheat and rice. These crops depends upon rains and are grown
without irrigation waters and without other inputs. These crops
are grown more for fodder and fuel than for self consumption.
Inspite of increasing prices, farmers are hesitant to bring
more lands under the cultivation of these crops. Area under
gram has declined inspite of its soaring prices. The government
has increased the prices of pulses drastically mostly to goad
the farmers to raise production of pulses. But cultivation of
pulses is not popular because of its low yields, susceptibility
to pests, diseases and weather fluctuations, inadequate
facilities to store them and still traditional methods of
processing, dehusking and milling pulses in to dal is carried
on.

The farmers like to cultivate those crops from which they
can get returns. So there was a switch from the cultivation of
coarse cereals to the cultivation of cash crops like mustard,
sugarcane and potato because they are more profitable. Area
under mustard is increasing due to its increased prices and it
requires only two waterings. Many new high yielding variety of
seeds have been introduced and they can yield almost four fold
over the normal average. To goad farmers to bring more area under its cultivation the government offers subsidy to oilseeds growers in it. Such an approach is beneficial to both, the oil seed growers and the industries. Sugarcane is highly favoured by the farmers because it fetches them good returns. The presence of a number of sugar factories made available to the farmers, an assured market, diffusion of information about its production and the higher benefits brought by this crop than foodgrains also attracted the farmers for its cultivation. Again the remunerative nature of potato motivates the farmers to bring more area under its cultivation. The favourable physical conditions of the study region, its high yielding nature and assured market has favoured its cultivation. This crop is used by all the section of the society for their meals because it is nutritive and cheap. Cotton is not favoured because of its low yields and it is very susceptible to pests, diseases and weather fluctuations.

Decision regarding what to grow are based on many socio-economic, physical and even political factors. These factors have a combined impact on the decision making process of the farmers. Any factor can be more influential at any given time, depending on the situation. Decision making process is now highly influenced by economic factors. Farmers, whether rich or poor look towards the profit the crop will fetch and then only decide as to what they will be growing. An investigation of the influence of price in the presence of some other important factors like irrigated area, production and area in the preceding year, again showed a high degree of positive impact of prices on acreage under most of the selected crops, this again shows that:
The crops which showed positive response to prices also showed positive response to their production. This points towards the fact that profitability of crops is the basic factor for the farmers and they allocate land keeping these factors in mind. The crops which came under this category were mustard, potato and sugarcane amongst non-foodgrains and *arhar*, wheat and rice amongst foodgrains. Increase in prices were followed by massive increase in area and production. This motivates farmers to allocate more land to these crops. Increase in the production of foodgrains means that the farmers' subsistence need is fulfilled and the surplus production is sold in the market, ensuring good income. The coarse cereals showed negative response to prices and production because these crops are not remunerative.

Irrigation was positively influencing the acreage of those crops which are not favoured by farmers like *jowar*, *pajra*, maize, barley and gram. These crops are not provided with adequate irrigation and they depend on monsoon rains for their survival. Better irrigation facilities will definitely increase their production. Sugarcane, rice and *arhar* also showed positive response to irrigation. Although irrigation is provided to these crops out timely and adequate supply of water will enhance their productivity.

Previous year's acreage also affects the allocation of land to a particular crop. This factor was positively influencing area under foodgrains. Farmers don't want to take risk and hesitate to make changes and are stuck to the crops, which they were growing earlier. However, cash crops like sugarcane, mustard, potato and *arhar* showed negative response which indicates that the farmers are
taking risk and are venturing for the new crop combinations and patterns to get maximum returns from their lands.

The analysis of the 237 sample farmers belonging to the various categories of farm size (36 large farmers, 51 medium, 54 semi-medium 46 small and 46 marginal farmers) revealed that there was a close relationship between the socio-economic status of the farmer, the farm practices and cropping pattern adopted by them. Field surveys revealed that there were ten major factors namely, prices, irrigation facilities, yield of the crop, crop prospects, availability of high yielding variety of seeds and chemical fertilizers, financial problems, traditions, physical factors, labour and governmental policies which have influenced their decisions in the selection of crops.

The large farmers belonged to the high and sound economic status, educated and politically strong. They have a greater capacity to invest their own resources, greater capacity to take risk and better access to information etc. This has strengthened their ability to adopt innovations at a faster speed and they are in a position to use modern technology in their farms. The economic background of the large farmers contributes substantially in their decision making process. The most important factor influencing the cropping pattern of the large farmers was price. This was evident from the two crops i.e. wheat and sugarcane, which dominate the cropping pattern. Apart from these two crops they also devote a substantial area to mustard, gram, peas, arhar and cotton. These crops are highly remunerative. The next two important factors influencing their cropping pattern were yield and crop prospects. These factors are interrelated and it shows that farmers are very much concerned about the returns from
their lands and they try to get maximum profits. Another factor which has very significantly influenced their cropping pattern is the availability of labour. These farmers still suffer from the same old problem of indifference and uncertainty of hired labour. All the large farmers are not associated full time with the farming activity. So there is a heavy reliance on labour and they require labour for most of the agricultural operations. The large farmers hence avoid the cultivation of labour intensive crops.

Medium farmers also have great capacity of invest their resources, better access to credit facilities, information, education, skills, wealth position and a greater capacity to take risk. All this has contributed towards the increase in productivity. But there is a slight difference between large and medium farmers. They are in a position to take advantages on both the counts i.e. greater access to technology and more concentration on their fields. The intensive utilization of land coupled with the intensive use of inputs has resulted in high production. The cropping pattern of these farmers also dominated by foodgrains. Wheat during rabi and maize and rice during the kharif season were the three important cereals grown. These farmers specialized in the cultivation of cash crops like sugarcane, mustard, cotton and pulses like gram and arhar. These crops gave them higher monetary benefits. The crops which were grown traditionally were not preferred until it fetches them good income. The most important factor influencing the cropping pattern of the medium farmers was price. That's why they grow remunerative crops. The degree of commercialization is greater among these farmers as compared to large and semi-medium farmers.
The conditions of the semi-medium farmers are different from large and medium farmers. These farmers have smaller land holdings and are economically not so strong. There is intensive utilization of land. Foodgrain dominate the cropping pattern, wheat in rabi and maize and bajra during kharif were the important foodgrains grown. The cultivation of coarse grains is gaining importance on these farms. Price once again was the most influencing factor followed by crop prospects and irrigation. Once again it was noticed that farmers whether rich or poor look towards the monetary benefits from their lands. Amongst this category of farmers, we find that factors like irrigation, availability of high yielding variety of seeds and chemical fertilizers and financial problems were becoming important. This shows the difference in socio-economic status of these farmers from large and medium farmers.

Small and marginal farmers belong to the economically under privileged section of the society. They do not have access to credit, technical knowhow, information, education and skills. They are socially, economically and politically backward. They belong to the category of rural poor. They are unable to provide adequate irrigation, high yielding variety of seeds, chemical fertilizers, pesticides etc. Although these farmers are also fairly responsive to prices but the magnitude was not as high as in large, medium and semi-medium farmers. These farmers are engulfed by poverty which prevents them from the cultivation of remunerative crops because the cost of inputs are very high and are not within the reach of these farmers. They also can not take the risk of changing their cropping pattern, so they have a very limited choice of crops. The major handicap on these farms appears to be limited resources and investment capacity. The cropping pattern of small and marginal farmers is significantly dominated by foodgrains especially coarse grains, wheat and barley in rabi.
and maize, bajra and jowar during the kharif season. These farmers prefer growing coarse grains because these crops could be grown with little inputs and also because they are growing these crops since long, they also use the by-products of these crops as fodder and fuel. They only cultivate vegetables for the market, which fetches them quick money for their domestic needs. The cropping pattern of small and marginal farmers was influenced mostly by financial problems, irrigation and availability of high yielding variety seeds. All these factors are interrelated. It is because of their poor economic condition they have to think of these factors before choosing the crops they will be growing.

Lastly, it can be said that the profit is the driving factor for all the farmers, rich or poor, price is found to influence acreage allocations and the study definitely shows that the farmers of the study region significantly and positively responded to price changes.

In India, the market mechanism does not operate properly, government policy has to play a major role in achieving developmental and social objectives. In this context, it is imperative, on the basis of the above conclusion, that the farmer should get an economic price for his produce, especially when the prices of all other commodities, particularly manufactured goods, are going up very fast. The rate of increase in the prices of inputs has been more pronounced than the increase in procurement prices of agricultural commodities. At the same time, over 300 million people below the poverty line should not be exposed to the exploitatively high prices of essential commodities. The best policy seems to be that of support price system followed in many western countries. The system to be evolved should be such that the price obtained by the farmer is remunerative
while the price paid by ordinary consumer of the country is low enough to maintain a good standard of life. Dual pricing system and fair price shop systems in practice today have not delivered the goods. These and similar measures are proving to be a heavy burden on the exchequer. While remunerative price for the farm producer and reasonable price for the poor consumer are very essential consideration and government should do much to ensure these, the long run solution should be to do everything possible to activate forces of price mechanism in the agricultural section and see to its continued operation. At the same time, some form of support price system should be continued. Educating the farmers to come out of their traditional bound shell, and to get under the influence of money economy, is another important measure to be undertaken.

Thus from the policy point of view, the present study suggests the following measures:

(i) A guaranteed minimum price should be ensured for the farmers, which should cover the total cost and secure a fair net return.

(ii) Cost of inputs should be reduced and subsidies must be provided in such a way that poor and weak farmers can also avail it.

(iii) Loans and credit facilities should also be distributed in such a way that only needy farmers are benefitted.

(iv) A sure and adequate irrigation system is also very essential.
(iv) General and mass education regarding latest developments in agriculture, technical knowhow and market knowledge should be carried on, on a war-footing.

(vi) Consumer interests should also be ensured by keeping the cost of production at a fairly low level.

(vii) Crop insurance scheme should be introduced and popularised to fight against the fear of risk and uncertainty of crop failure. It would strengthen the confidence of farmers and encourage them for cultivation of remunerative crops.

(viii) Finally, drastic changes are needed in the working of credit institutions and administrative procedures so that small and marginal farmers can also get benefits from their farms.

Thus, to enable a maximum number of farmers in diversifying their cropping pattern, a well planned strategy is needed, which will help them in obtaining maximum returns. Several approaches and enterprises should be identified for introducing commercialization, according to the different conditions of the farmers. Better cropping pattern should be recommended so that the farmers get higher profits. The study region is the wheat growing area but the cultivation of peas, winter maize, oilseeds, sunflower and vegetable crops can be more remunerative than the sowing of late sown wheat varieties. Cultivation of wide spaced crops like fruits, sugarcane, castor, potato and maize, pulses like arhar and oilseeds like mustard should be advised to grow as inter crops. Area under bajra and jowar needs to be replaced with cotton and its production can be increased
further with proper doses of irrigation, pesticides and insecticides. Area under maize both in kharif and rabi season should be increased because of rising demand for maize in starch and food industries. Besides cultivation of fruits, vegetable crops should also be increased.

Thus, adoption of a better cropping pattern by the farmers of the study region will further help them to receive remunerative prices for their produce.