In a predominantly agricultural economy, the overall rate of economic growth depends to a very large extent on the rate of growth in agriculture. In India, achievements in the agricultural sector will continue to be a determining factor in the achievements of plan targets for many years to come. The success or failure of programmes of agricultural development depends decisively on the way farmers react to such programmes, since it is ultimately the farmer who makes the final decision concerning the allocation of land and other resources for particular enterprises. Highest priority should be given to the farmer and his farming methods because these are the corner stones of the country's economy.

India has a long and proud tradition of agriculture, starting with the end of nomadic life and leading to a highly developed self-contained village economy, based on the principle of the static division of labour. The cropping patterns followed were based on traditional systems of subsistence farming, where the farmer tries to produce everything he needs like cereals, pulses, vegetables etc. and this practice continued until the launch of 'Green Revolution' and the introduction of technology in agriculture in the early sixties. More importantly, our ever increasing population is compelling us to give up the old way of maintaining soil fertility. Manures are being replaced by chemical fertilizers. Even marginal lands are being ploughed. Irrigation is being extended even to the most arid areas, changing the age-old ecosystem. The production possibilities have increased with the use of costly inputs. The farmers have started producing surplus with the result that they think of maximising the returns from their lands. The price which the farmer gets for his produce became of vital importance. The Indian agriculture has now been shedding its subsistence character and is poised
to enter into an entirely different phase of commercial agriculture.

It is true that the Indian farmer devotes a significant proportion of his land to fulfill his own requirements, but it is natural to expect that in sowing the surplus lands, farmer would look to the market. In the case of cash crops at least, profit motivation should be effective and prices ought to influence the variations in areas. Even in case of foodgrains, which are largely grown for self consumption and partly for market, we can not deny the role of prices. With the development of money economy and technological changes, the traditional concept of subsistence farming has undergone radical changes. The subsistence producer also has to sell a certain portion of his produce to get cash for his domestic requirements and he also has to spend a substantial amount of money on inputs. Now after the 'Green Revolution', the output has increased substantially and the psychology of scarcity, which regulated farmers attitude in the past is now changing. Though the farmers at near subsistence level grow primarily for the family, the variations in prices of the crops may still be important for them, because if the price of basic food crop rises, it would be costlier for them to meet their subsistence requirements if they buy it from the market.

Area under any crop is governed largely by physical, cultural, social, technological and economic factors. Physical factors specify the range of crops that can be grown in a region. It describes the production possibilities of crops but they don't determine as to which crop is the most profitable. Economic factors determines the particular kind or combination of crops that are most profitable to produce on the farm.
in the present work an attempt has been made to study the influence of changing prices on cropping pattern in the districts of upper Ganga - Yamuna region. This region has been selected as the study area because this region is the seat of Green Revolution. It is one of the agriculturally most prosperous, fertile, highly irrigated and thickly populated part of Uttar Pradesh. It also enjoys the highest level of agricultural efficiency in the state. It provides many choices to farmers to grow their desired crops. The study region consists of five districts namely, Sanaranpur, Muzaffarnagar, Meerut, Ghaziabad and Bulandshahr. It lies between the two master streams - the Ganga and the Yamuna. It covers an area of about 20,624 square kilometers. It spreads from 26°4' to 30°24' north latitudes and 77°2' to 79°29' east longitudes. This region had a population of 14,243,132 (1991, census Report) with a density of about 696 persons per square kilometer. Cultivation of crops has been the main occupation of the people and of the total workers, 39.01 per cent are cultivators.

The salient features of the present study are:

1. To assess the physical environment - physical features, drainage, climate and soils and how these factors have helped in making the study region a prosperous agricultural region.

2. To assess the changes in the land use pattern - net sown area, gross cropped area, net irrigated area, gross irrigated area, fallow lands and culturable wastes etc., in the study region (from 1986-87 to 1990-91).

3. To assess the changes in cropping pattern - changes in area under important foodgrains and non-foodgrains in the study region (from 1986-87 to 1990-91).
4. To study the trends in production of the selected foodgrains and non-foodgrains (from 1966-67 to 1990-91).

3. To study the trends in prices of the selected foodgrains and non-foodgrains (from 1963-66 to 1989-90).

6. To assess the relationship existing between price area and price – production of the twelve selected crops (taking yearly data from 1963-66 to 1976-91).

7. To examine the influence of other important factors like preceding year's price, production, irrigated area and total area on the acreage of the selected crops.

8. To study farmers response to price changes and its effect on the cropping pattern of sample farms – socio-economic profile of the sample farmers, farm practices adopted by them cropping pattern adopted by them and various factors influencing the cropping pattern of these farmers were examined.

The work has been divided into three parts, spread over six chapters.

Part one is devoted to the general description of the study area – Upper Ganga-Yamuna doab. This part has been covered in chapter one. In this chapter an attempt has been made to assess how the physical environment – physical features, drainage, climate and soils have helped in making the study region a prosperous agricultural region. In this part, an attempt was also made to assess the changes in land use pattern and changes in cropping pattern of the study region.
Part two is devoted to study the trends in area, production and prices of the twelve selected crops of the study region. This part comprises of two chapters – second and third. Second chapter deals with the trends in area and production of selected foodgrains and non-foodgrains in the study region. Third chapter deals with the trends in prices of the selected foodgrains and non-foodgrains in the study region.

Part three presents the crux of the problem investigated. This part spreads over the last three chapters. Chapter four makes an attempt to assess the influence of prices on cropping pattern and production pattern of selected crops in the study region. Fifth chapter investigates the influence of preceding year’s price, production, irrigated area and the total area of a particular crop on the acreage in the current year for all the selected crops in the study region. Sixth chapter analyses the farmers response to price and its effect on the cropping pattern of the sample farms. In this chapter social and economic profile of the sample farmers, farm practices adopted by them, cropping pattern adopted by them and various factors influencing their cropping pattern were studied.

The study is based on both primary as well as on secondary sources of data. Data from primary sources have been collected through field surveys, interviews with farmers and discussions with the government officials. The survey in the study region was conducted during 1990 and 1991. The survey was based on ‘Stratified Random’ basis and the sample design adopted was of two stage, in the first stage, selection of villages from the five districts of the region was made and 45 villages were selected. In the second stage, selection of farmers were made and 237 farmers were selected and they were categorised on the basis of their farm sizes. For getting accurate information the farms were visited frequently. Data
from secondary sources have been collected principally from various bulletins like Uttar Pradesh Statistical Bulletins, Statistical Abstracts of Various Districts, Farm Harvest Prices of Principal Crops in India, District Census Hand Book of Uttar Pradesh etc. Since our study is from 1965, district level published data were available for the four districts from 1965 onwards to 1970. The fifth district of Ghaziabad was formed in 1976, so the data for this district has been taken from 1976 onwards. All the analysis has been done for the five districts of the study region till 1970-71 only, since the data is available till this year only.

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, during the study period, area under these crops also varied. 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 acreage 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 is resulted in increase in production of crops despite 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, Bulandshahr 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. Earlier, farmers were growing all types of crops but now they are growing only those crops which brought 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.

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.

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 mainly influenced by economic factors. Farmers, whether rich or poor look towards the profit the crop will fetch and then only they 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 total area in the preceding year, also showed a high degree of positive impact of prices on acreage under most of 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 farmer 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, bajra, 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 but timely and adequate supply of water will enhance their productivity.

Previous year’s acreage also affects the allocation of land to 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 for cash crops like sugarcane, mustard, potato and arhar 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 category of farm size shows that there is a close relationship between the socio-economic status of the farmers, farm practices and cropping pattern adopted by them and the factors which influences their decision making processes.

The large farmers belong to the high and sound economic status, they are wealthy, educated, influential and politically strong. They have a greater capacity to invest their resources, greater capacity to take risk, better access to information and
improved capabilities in terms of education and skills. Their better wealth position and political power has biased the distribution of credit and other facilities towards them. This has strengthened their ability to adopt innovations at a faster speed. They are in a position to own agricultural implements, apply prescribed doses of fertilizers, high yielding variety of seeds, pesticides, insecticides and even maintain a permanent work force. Since they are educated, they can acquire information about recent developments in agriculture and are aware of the prospects of various crops.

The economic background of the large farmers contributes substantially in the decision making process. They can take risk in changing their cropping pattern and they grow those crops which give them higher monetary benefits. Although, their cropping pattern was dominated by food grains but they also specialize in the cultivation of non-food grain. Wheat was the most favoured food grain, which covered the bulk of the area during the rabi season, while sugarcane dominated the cropping pattern during the kharif season. Apart from these two crops large farmers devote substantial area to cash crops like mustard, cotton and remunerative food crops like gram peas, arhar and rice etc., which fetch them higher monetary benefits.

The most important factor influencing the cropping pattern of the large farmers was price. This is evident from the crops they grow. The next two important factors influencing their cropping pattern were yield and crop prospects, since these farmers are educated and rich they can collect all the new informations about the crops they grow. They provide all the necessary inputs required by the crops they grow and get significant income. Another factor which has very significantly influenced their cropping pattern is the availability of labour. These farms still suffer from the same old problem of
indifference and uncertainty of hired labour. The availability of labour at peak season is very difficult. On these farms labour is required for most of the agricultural operations and it restricts large farmers to cultivate labour intensive crops.

Medium farmers have also great capacity to invest their own resources, greater capacity to take risk, better access to credit, information, education and skills and good wealth position. All this has contributed towards the increase in productivity. But there is slight difference between the large and medium farmers. Medium farmers are in a position to take advantage on both the counts i.e., greater access to technology and more concentration on their farms. The intensity of cropping is highest on these farms. The cropping pattern of these farmers is also dominated by foodgrains. Wheat during the rabi and maize and rice during kharif season were the three important foodgrains grown. These farmers specialize in the cultivation of cash crops like sugarcane, mustard and cotton. They also devote substantial area to remunerative crops like gram, peas and arhar etc. The crops which were grown traditionally are not preferred until it fetches them good income. The most important factor influencing the cropping pattern of the medium farmers was price. They devote comparatively more land to remunerative crops. The degree of commercialization is also greater as compared to other farmers.

Conditions of the semi-medium farmers are not similar to the medium and large farmers. They have smaller land holdings and they are not economically very sound. There is intensive utilization of land and the family members work in fields. They generally do not hire labour. Again the cultivation of foodgrains dominated the cropping pattern. Wheat during the rabi and maize and bajra during the kharif season were the
main foodgrains grown. Among non-foodgrains sugarcane was the preferred crop. On these farms the cultivation of coarse grains are gaining importance. The important factors influencing their cropping pattern were price, crop prospects and irrigation facilities. Economically they are not as strong as large or medium farmers, that's why the factors influencing their cropping pattern are related to financial problems, which shows the difference in socio-economic status of these farmers.

The small and marginal farmers generally belong to the economically under privileged section of the society. They are socially and economically backward and belong to the category of rural poor. They do not have the access to credit, technical know how, information, education and skills etc. They don’t have their own irrigation facilities and are unable to invest on costly inputs. They also think of getting returns from their land but they are engulfed in poverty and it prevents them from the cultivation of remunerative crops. They also can’t take the risk of changing their cropping pattern. Hence, they have a very limited choice of crops. The major handicap on these farms appears to be the limited resources and investment capacity. Their cropping pattern is significantly dominated by foodgrains, wheat and barley in rabi and maize, bajra and jowar during the kharif season. These crops are grown basically for self consumption which requires low inputs and these crops are part of their tradition. These farmers cultivate only vegetables for the market which fetches them quick money for their daily needs.

Lastly it can be said that profit is the driving factor for all the farmers, whether rich or poor, although the magnitude may vary.
From the perspective of the results discussed above the study suggests the following measures to develop better agricultural system, profitable cropping pattern for enhancement of farmers social and economic status for the upliftment of society as a whole.

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

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

v) Loans and credit facilities should also be distributed in such a way that only needy farmers are benefited.

vi) A sure and adequate irrigation system is also very essential.

vii) General and mass education regarding latest developments in agriculture, technical know how and market knowledge should be carried on a war-footing.

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

ix) 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 the cultivation of remunerative crops.

x) 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. Although, the study region is a wheat growing area but the cultivation of peas, winter maize, oilseeds, sunflower and vegetable crops will 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. It will bring prosperity to the farmers of this region and to the nation as a whole.