Agriculture has held a dominant position in the economy of this country. But this major occupation has been rendered hazardous by scanty rainfall in some areas and by uncertain monsoons in others. The case of Upper Ganga Yamuna Doab is no exception. This region is dependent for its rainfall on the south west monsoons, which is not only concentrated in a brief period of 4 to 5 months, but is also unevenly distributed in both time and space. The failure of the monsoons has often resulted in extensive damage to the crops. Hence, it was deemed necessary to supplement rainwater to ensure the success of the crops. Irrigation is a phenomenon not unknown to the farmers of this region, but it was limited to the extremely primitive means of irrigation like ordinary wells. This source of irrigation suffered from certain limitations and defects. For one, the water level changed with the amount of rainfall - the greater the rainfall the lower the water table. Secondly, well water is brackish in most part and this destroys the irrigated crops. Moreover these wells are shallow and dry up during the summer season when the demand is great. Hence, the water supply of these wells was both uncertain and inadequate. Canal irrigation, on the other hand, though available for the last 100 years or so, was used more to ward off famine than to produce higher yields. Moreover a lot of
water was not only wasted in the absence of proper channel linings and banking, it caused problems of water logging as well.

However, an analysis of the primary data available for the 25 years period (1950-51 to 1975-76) under study shows that irrigation has made great progress during this period. Cultivated area under irrigation has gone up from 875,627 hectares in 1950-51 to 1225,338 hectares in 1975-76 in 4 districts of the Upper Doab. This phenomenal increase in irrigated area was brought about by the integrated use of both ground and surface water resources. In order to utilise the various irrigation resources to their maximum capacity a canal-cum-tubewell scheme was implemented in this region. Moreover, canals were not only remodelled and expanded out their channels were also lined in order to avoid water loss through seepage. Tubewells on the other hand served the double purpose of pumping out excess water from the ground to prevent water logging, as well as supplying water for irrigation purposes. Canals however, proved to be less elastic, hence their expansion ratio was low, compared to tubewells which brought extensive tracts of land under irrigation. Tubewells have an added advantage over the canals in that the water can be taken directly at the places required and the flow on the spot takes place by gravity. Moreover, they reduce the danger of water logging which is the concomitant of canal irrigation. Hence, where it comes to the expansion
of irrigated land more it seems is owed to the increase in the number of tubewells than that of any other source of irrigation in practice in the Upper Ganga Yamuna Doab. And it is largely as a result of irrigation that the proportion of cultivated land reaches the high figure of 69%.

Such an increase improvement in the irrigation facilities with consequent expansion in the irrigated land was bound to affect the crop land use. Hence this study spread over a period of 25 years has attempted to establish a definite relationship between the increasing irrigation facilities and the cropping pattern changes during the period under study. Although these changes have been the result of a multitude of factors, but the vital role played by irrigation in this instance cannot be ignored. During the last couple of decades a gradual shift from drought resistant crops and cereals to the more valuable crops like sugarcane and oilseeds with higher water requirements has been witnessed. It is obvious from the data available that sugarcane has become a first ranking crop in atleast 3 districts of the area barring Bulandshahr.

Moreover, the availability of adequate irrigation facilities has ensured not only the cultivation of a greater variety of crops but has made possible even double and triple cropping. The reason for the predominance of wheat (especially the hybrid Mexican varieties with higher water requirements) in the area under review can be ascribed to adequate irrigation
facilities and also because it constitutes the staple food crop of the area. Rice, a crop with exceptionally high water requirements, which was earlier confined to only the two districts of Saharanpur and Muzaffarnagar, now occupies a considerable area in the districts of Meerut and Bulandshahr as well, where it occupied the fourth and sixth ranks respectively in the years 1970-71 and 1974-75.

And it is due to the availability of plentiful irrigation facilities in certain parts of the area that a 'Zaid' crop preferably a short duration legume or a green manure is now being widely cultivated.

On the whole with the increased irrigation facilities the trend in cropping patterns has shifted from mono-culture and cultivation of long duration crops to multiple cropping and cultivation of hybrid crops which are of short duration with greater water requirements, as well as cash crops.