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## Agricultural Inputs in Uttar Pradesh: Regional Level Analysis

Dr. Aloka Kumar Goyal

Department of Economics, D.D.U. Gorakhpur University, Gorakhpur, India

### Abstract:

Uttar is the most populous state in India with rural dominance. Agricultural sector is the main source of livelihood for rural population. Activity of this sector is way of life and output depends on agricultural inputs and natural condition, but availability of agri-inputs and climate condition differ from region to region. Therefore, there is a need to analyze the availability of agri-inputs at regional level. This paper deals with an area under different sources of irrigation, irrigation intensity, cropping intensity, use of chemical fertilizer and pesticides and status of groundwater utilization in regions under different sections (I-VIII).

**Keywords:** Irrigation Intensity, Cropping Intensity, Net Sown Area, Rural Dominance, High Potential, HYV Seeds etc

### 1. Introduction

Agriculture is the major livelihood activity of majority of rural population in Uttar Pradesh. It is, therefore, necessary to study the trends in agriculture and agricultural practices and suggest alternative livelihood options to augment income of rural workforce and agricultural inputs. Agriculture is the major consumer of water in the basin area. Against 71 percent of total global consumption of water in agriculture, the corresponding percentages for India and Uttar Pradesh are 89 and 93 respectively. Uttar Pradesh has a wide network of around 73,637 km canals, 27,600 State owned tube-wells, 17,768 deep tube-wells and 3.96 million shallow tube-wells owned by individual farmers. These systems irrigate around 13.08 million hectares area in which canals share 18 percent, state tube-wells 3 percent and private tube-wells share 70.2 percent. The entire Ganga basin is divided into three stretches, namely, Upper Ganga Basin (Uttarakhand), Middle Ganga Basin (Uttar Pradesh) and Lower Ganga Basin (Bihar and West Bengal). Regional analysis of agricultural inputs in Uttar Pradesh is carried out here into four regions –Western ( North Upper Ganga Plain & South Upper Ganga Plain), Central, Eastern and Bundelkhand, that is Bundelkhand Regions.

### 2. Region-wise Trend in the Net Sown Area (NSA)

Table: 1 brings to the fore that the percentage of net sown area to the total geographical area is highest in the north upper Ganga plains, followed by the south upper Ganga plains (17 districts of Westren region). North upper Ganga plains, on an average, have about 76 percent of total area under cultivation. The percentage of NSA has slightly declined from 76.8 percent in 2000-01 to 75.9 percent in 2007-08. Similarly, the percentage of NSA in south upper Ganga plains (17 districts of Westren region) declined from 73.6 percent in 2000-01 to 73.4 percent in 2007-08. Central region, on the other hand, registers a rising trend in the percentage of NSA. The percentage increased from 55.9 in 1984-85 to 67.4 in 2004-05 and then declined to 66.6 in 2007-08. A perusal of Table: 1 reveals that after 1990-91, percentage of NSA in almost all the regions increased slightly up to 2004-05 and then declined. In this regard, it is interesting to compare the NSA of Ganga bank districts with that of nonbank districts. The results are displayed in Table: 1 which reveals that the percentage of NSA to total reported area has been higher in Ganga bank districts than that in non-bank districts of the State.

|                      | 1984-85 | 1990-91 | 1994-95 | 2000-01 | 2004-05 | 2007-08 |
|----------------------|---------|---------|---------|---------|---------|---------|
| N.Upper Ganga Plains | 76.3    | 75.8    | 76.5    | 76.8    | 76.5    | 75.9    |
| S.Upper Ganga Plains | 71.5    | 72.1    | 72.1    | 73.6    | 73.1    | 73.4    |
| Bundelkhand Region   | 62.6    | 64.3    | 62.8    | 68.4    | 68.7    | 61.5    |
| Eastern Region       | 67.9    | 64.5    | 66.4    | 68.4    | 67.4    | 66.6    |
| Central Region       | 55.9    | 57.4    | 64.6    | 66.7    | 66.0    | 66.2    |

Table: 1 Regionwise NSA (%)

Source: (Basic Data): Uttar Pradesh Ke Krishi Ankare (Various Issues of Agriculture Statistics of U.P.)

### 3. Trends in Irrigated Area

Irrigation is the much more responsive factor for agricultural productivity. Table:2 represent Gross irrigated (GI) area at high level in Western region followed by Eastern, Central and Bundelkhand region. The percentage difference between GI and Net irrigation (NI) is high among regions. Adoption of new agricultural technique is highly correlated to irrigation. So, Western and Central, maintain high level of productivity in comparison to Eastern and Bundelkhand regions. The situation of is as same as available irrigation facilities among regions.

| Year/ Region | 1980-81 |     | 1990-91 |     | 1999-2000 |     |
|--------------|---------|-----|---------|-----|-----------|-----|
|              | GIA     | NIA | GIA     | NIA | GIA       | NIA |
| Western      | 72      | 62  | 78      | 77  | 88        | 85  |
| Central      | 42      | 41  | 56      | 57  | 75        | 71  |
| Eastern      | 53      | 40  | 60      | 48  | 69        | 61  |
| Bundelkhand  | 24      | 23  | 29      | 29  | 44        | 41  |

Table: 2 Trends in Irrigated Area in Different Regions of Uttar Pradesh in %

Source: (Basic Data) : Uttar Pradesh Ke Krishi Ankare (Various Issues of Agriculture Statistics of U.P.)

### 4. Fertilizer Use in Region

Region-wise per hectare use of chemical fertilizer is also estimated and is presented in Figure: 1. There has been exponential growth in the per hectare use of chemical fertilizer in the middle Ganga basin. North upper Ganga plains (10 districts of Westren region) show highest intensity of fertilizer application among all the regions. It is followed by south upper Ganga plains (17 districts of Westren region) and the eastern region. Bundelkhand region has the lowest intensity of fertilizer consumption among all the regions. It may be noted here that use of chemical fertilizer in agriculture is positively associated with the use of irrigation water in the agriculture. More the frequency of irrigation to the crop; more would be the frequency of use of fertilizer to the crop. Since North upper Ganga plains (10 districts of Westren region)are having better access to both surface and ground water as compared to other regions, the fertilizer consumption per unit of land is also higher in this region than that in other regions. In north upper Ganga plains, per hectare use of chemical fertilizer increased from 70.2 kg in 1980-81 to 182.1 kg in 2007-08, a more than 2.5 fold increase. In the eastern region, use of fertilizer increased from 48 kg/ha in 1980-81 to 167 kg/ha, a more than three-fold increase. Similar pattern of fertilizer consumption is observed in the south upper Ganga plains (17 districts of Westren region) where per hectare use of fertilizer increased from about 50 kg in 1980-81 to 165 kg in 2007-08. Except for the Bundelkhand region which does not have adequate irrigation facilities, in all other regions, use of fertilizer has significantly increased during the period under study.

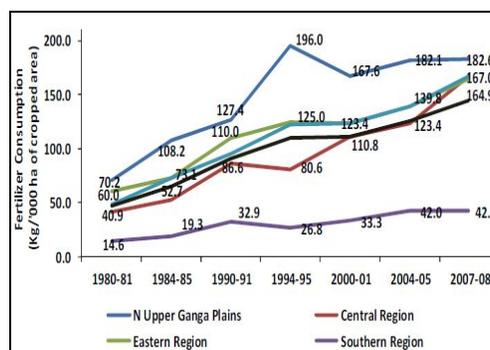


Figure 1: Region-wise trend in per hectare use of chemical fertilizer

Adoption of improved varieties of rice and wheat in Western, Eastern and Central regions has already reached to 100 per cent ceiling level. Their adoption was lower in Bundelkhand region. Adoption of improved varieties of maize has picked up sharply in the Western region after 1987; mainly to meet the fodder and feed requirements. It is noted that the improved varieties were better suited to irrigated and favourable regions. The varieties developed for Bundelkhand region mostly remained in the shelves and did not percolate to the target domain. Slow dissemination of new knowledge and complete absence of the seed sector in the backward and unfavourable regions are the major obstacles in the spread of improved varieties.

### 5. Region-wise HYV

Adoption of improved seeds of other crops was low in most parts of the state. Non-availability of sufficient quantity of seed of appropriate varieties of crops like maize, sorghum, sunflower, chickpea, pigeon pea, green gram and groundnut has become the most important limiting factor in raising their productivity. Since the public seed sector and the government agencies focused on seed production and distribution of rice and wheat only, the area under improved varieties of other crops lagged behind. Such biased attitude towards rice and wheat has adversely affected the prospects of other crops in the state despite their high potential.

The yield levels of rice and wheat were considerably low in Central and Eastern regions in spite of the large area covered by high-yielding varieties. The main reason ascribed is low seed replacement rates in these regions. This must be stepped up by encouraging seed production programme.

### 6. Region-wise total number of pump-sets

Installing a tube-well in the canal command area has lesser cost than that in the non-canal command area. Figure: 2 shows the regional trends in the number of pump sets used in agriculture. The number of pump sets per 1000 ha of GCA has significantly increased in all the regions, except for Bundelkhand region. In north upper Ganga plains, the number of pump sets increased from 46.1 per 1000 ha of GCA to 105.8 per 1000ha in 1991 and then declined to 94.6 per 1000ha in 1999. Similarly, in central region, the number of pump sets increased from 43.2 in 1980 to 148 in 1999. South upper Ganga plains (17 districts of Western region) also witnessed fast growth in the number of pump sets per 1000 ha of GCA as is evident from the data presented in Figure: 2. In eastern region, the number of pump sets increased from 14.7 per 1000ha in 1980 to 129.4 per 1000ha in 1999. On an average, between 1980 and 1999, number of pump sets in the State has registered about five-fold increase. The rapid growth of number of pump sets per 1000 ha of GCA in the region. One major factor that contributed to the fast growth of pump-sets in the state is the flat rate electricity tariff system which encourages the farmers to extract more groundwater for irrigation as marginal cost of drawing extra unit of water is almost zero for them.

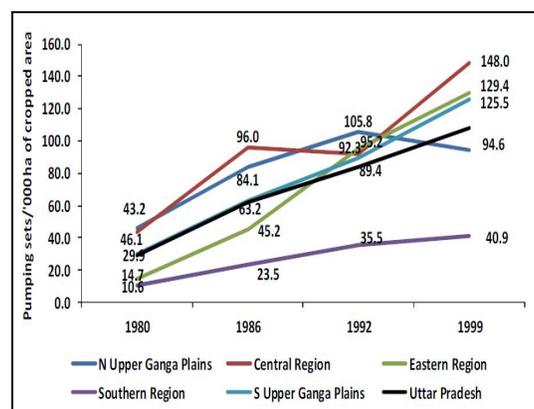


Figure 2: Regional trends in the number of pump sets

### 7. Analysis

Net sown area to the total geographical area is highest in the north upper Ganga plains, followed by the south upper Ganga plains. The percentage of NSA has slightly declined from 76.8 percent in 2000-01 to 75.9 percent in 2007-08. Central region, on the other hand, registers a rising trend in the percentage of NSA. Western region is way ahead in irrigation development, which is followed by Eastern and Central regions. These are part of the Gangetic plain with immense wealth of surface and groundwater. Bundelkhand region is lagging far behind in irrigation development. Scanty rainfall in Bundelkhand region impedes irrigation development in the region. There is a large variation in fertilizer consumption across regions in the state. Western region, to be far ahead in fertilizer consumption than other regions. Bundelkhand region was still applying less fertilizer than the national average. The cropping intensity was highest in the Western region, while lowest in the Bundelkhand region. In the state, only less than half (9.5 m ha) of the net cropped area is cultivated more than once. It is better than the national average but lagged far behind than one of the neighbouring states, Haryana.

### 8. Conclusion

Western region is very rich while Bundelkhand region is poor region in terms of availability of agricultural inputs, economic backwardness and geographical condition. For Bundelkhand region, it is suggested that the research programmes of the Indian Council of Agricultural Research (ICAR) institutes and the State Agricultural Universities should reorient and reprioritise their research portfolio in view of available resources and environment.

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