

Crop-Wise Productivity in Uttar Pradesh: An Analysis of Regional Variation

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Abstract – Uttar Pradesh has important role agricultural production food security in India. It has four economic regions with very diversification of agricultural produce and productivity. There is need to identify inter-regional disparities and regional variations in agricultural productivity in Uttar Pradesh. This paper deals with in six sections - I. Introduction, II. Methodology, III. Economic Regions, IV. Diiversification of Agriculture in Different Regions, V. Inter-Regional Comparison and lastly concluded in section VI.

Keywords – Potential Areas, Water Saving Devices, Multiple Cropping Socio-Cultural And Economic Conditions, One Way ANOVA, Inter-Regional Disparities, Regional Variations, Diversification.

I. INTRODUCTION

Agriculture has an important role in the context of rural economy and country. Food security development of agro-based industries, livelihood for rural poor, cottage industries etc. are linked to agricultural sector performance. The share of agriculture in GDP decreased from 56% in 1950-51 to 13.9% in 2013-14 at national level but its absolute production has increased. The State of Uttar Pradesh is privileged with certain distinctive characteristics amongst other states of the Indian Union. The State is having a preponderant influence on the economic as well as political affairs of the country due to its size, strategic position and being the most populous territory in the country. Uttar Pradesh has one of the most fertile land masses for agriculture with a powerful river-system including the Ganges, Yamuna, Ramganga, Gomati and Ghaghara. . It contributes about one-fifth of the total foodgrains production in the country, which was highest among all the states.. The state produces 38 percent of India's Wheat, 20 percent of Paddy, 34 percent of Groundnut, 17.5 percent of Rape-seed, 8 percent of Fruits and 16 percent of Vegetables. Uttar Pradesh is the largest potato producer in the country, contributing 43 per cent of the total production. Similarly, around 40 per cent of the country's sugarcane comes from Uttar Pradesh. Evidently, agriculture of the state has a paramount role in the context of the food production and food security of the country.

II. METHODOLOGY

Data and Data Source

The study is based on secondary data. Data pertaining to resource base of the State i.e. U.P. Development Reports, Directorate of Agriculture, Uttar Pradesh. Ministry of

Agriculture, Govt. of India, Directorate of Economics and Statistics, Govt. of India, Central Planning Commission, Economic Survey and related official web sites of Government of India and Uttar Pradesh.

Analysis of the model

The selected crops (Wheat Rice Sugarcane All crops Foodgrains Non Foodgrains) productivity of foodgrains have taken for the year TE 1982/1983 ,TE 1991/1992, TE 1999/2000 and 2008-09 .Appropriate statistical tools One way ANOVA method has been used for identification inter-regional disparities in agricultural productivity and measurements of dispersion have been used to identify regional variations in use of agricultural inputs.

III. ECONOMIC REGIONS

The State of Uttar Pradesh had been divided into four broad regions Eastern region, , Bundelkhand region, Western region and Central region. The Eastern region is situated in the eastern part of the State having about 86 thousand square klm. of area. Bundelkhand region is situated in the southern part of the State with an area of 29 thousand square km. The Western region is situated in the western part of the State. The area and of the region are 82 thousand square km The Central region is situated in the central part of the State having an area of about 46 thousand square klm. Disparity in agricultural productivity in Uttar Pradesh across different regions is a matter of deep concern. In spite of planned efforts, the gap between developed and backward regions has not been bridged. The variation in agricultural productivity across various regions of the state may be attributed to differential resource endowment in terms of soil fertility, land pattern, average annual rainfall, irrigation and infrastructure and also socio-cultural and economic conditions of farmers. In the current era of liberalization and privatization and free play of market forces, many foresee that regional disparity may increase due to the logic of the survival of the fittest. But disparities have important socio-economic and political implications.

IV. DIVERSIFICATION OF AGRICULTURE IN DIFFERENT REGIONS

Nature and scope of agricultural diversification was quite dissimilar across different regions. It was observed that the share of food-related enterprises was declining in all but the Eastern region (Table:1). In the Eastern region, it was obviously due to high incidence of poverty, where farmers are forced to produce food crops to ensure their food security. Nonetheless, maize in the upland of Eastern

region provides huge promise for diversification during winter season. Diversification was relatively more pronounced in the Western region in contrast to other regions. Central region followed it. In the Western region, the non-food crops contributed about 43 per cent in total value of agricultural output from 27 per cent cropped area. In Central region, share of non-food crops in total value of agricultural output was 25 per cent from 18 per cent area. Area under vegetables is growing in the Western region. Area substitution between different crop enterprises suggests that existing conditions favour the Western region for diversification. Better market network, roads, agro-processing and irrigation development pre-empted the Western region for diversification. Proximity to Delhi market appeared to be the attraction for diversification in this region. Bundelkhand region was far behind with respect to markets and other infrastructure development, so was the fate of diversification. Providing appropriate markets and processing plants would go a long way to raise farm income and alleviate rural poverty in the rainfed environment of Bundelkhand region through production and processing of pulses and oilseeds. in rice-fallow system in Eastern region; wheat in sugarcane-based system in Western region; wheat and mustard in potato-based system in Central region; and production of green gram and black gram during summer season. These could be possible due to availability of short duration varieties of different crops.

Table 1: Diversification of Agriculture in Different Regions of Uttar Pradesh

| Region | Commodity Groups | Share in Value of Output (%) | Share in Total Area (%) |
|-------------|---------------------|------------------------------|-------------------------|
| Western | Cereals | 53 | 67 |
| | Pulses | 4 | 5 |
| | Commercial Crops | 35 | 22 |
| | Fruits & Vegetables | 8 | 5 |
| Central | Cereals | 66 | 72 |
| | Pulses | 9 | 11 |
| | Commercial Crops | 21 | 14 |
| | Fruits & Vegetables | 4 | 4 |
| Eastern | Cereals | 77 | 81 |
| | Pulses | 8 | 11 |
| | Commercial Crops | 8 | 2 |
| | Fruits & Vegetables | 7 | 4 |
| Bundelkhand | Cereals | 38 | 42 |
| | Pulses | 54 | 49 |
| | Commercial Crops | 8 | 89 |

Source: Uttar Pradesh Development Report .Vol.-2

Availability of water has led to higher agricultural productivity and facilitated multiple cropping. Water availability opens up more opportunities for crop choices.

To underpin the diversification in water-scarce regions, introduction of water saving devices, such as sprinkler, drip systems, should receive incentives. Lessons should be drawn from Maharashtra, where the water saving devices in water-scarce regions have intensified diversification in favour of fruits, vegetables and floriculture by substituting coarse cereals.

Possible areas for diversification have been identified in different regions based on the past trends and future prospects. Table:1 summarises the potential areas for diversification. Future strategies must consider the production and marketing needs of diversification. Therefore, pro-diversification policies (both in production and post-harvest) and adequate institutional arrangements are required to create suitable conditions. Expanding the GCA through raising cropping intensity and bringing the fallow and cultivable wastelands under cultivation would further step up the pace of diversification. In Uttar Pradesh, such lands together accounted for area in TE 2004-05.

V. INTER-REGIONAL COMPARISON

For the purpose of inter-regional comparison in terms of yield of different crops-wheat, rice, sugarcane, all crops, foodgrains and non foodgrains. The yield of wheat varied from 689.36 kg (in Bundelkhand region) to 1384.66 kg (in Western region) in the TE 1981-82, 827.96 kg (in Bundelkhand region) to 2191.67 kg (in Western region) in 1991-92, 10.66.45 kg to 2393.75 kg in 1999-2000 and 1320 kg to 2250 kg in 2008-09 . This indicates a widening of the differential in the TE 1991-92 as compared to TE1981-82 but narrowing of the differential in2008-09 as compared to 1999-2000. The average productivity(Mean) increased during the period of 1981-82 to 2008-09 (Table: 2). A more precise answer can be given by measuring the standard deviation[SD] (testing the figure for their statistically significance) and by finding the co-efficient of variation (CV) in yield of wheat in regions in the different years. The measures indicates (Table:2) that although there has been greater divergence in 1991-92 compared to 1981-82 and less divergence in 2008-09 compared to 1999-2000. The regional disparity in yield of wheat is not statistically significant on the One Way ANOVA analysis (Table: VI.3 &4).

The per hectare production of rice , sugarcane ,allcrops, foodgrains and non Fooddgrains varied in different year-1981-82, 1991-92, 1999-2000 and 2008-09. The yield of different crops varied from lowest in Bundelkhand region to highest in Western region with increasing trends of average yield (Table:2)as shown in above mentioned tables. These indicate widening of the differential in the TE 1991-92 as compared to TE1981-82 but narrowing of the differential in2008-09 as compared to 1999-2000. The regional disparities are statistically significant in the productivity of rice, all crops,foodgrains and non foodgrains but in case of sugarcane productivity is not statistically significant on the basis of One Way ANOVA analysis (Table: 3 &4).

Table 2: Statistical facts about regional Disparity in crops

| Crop | TE 1982/1983 | | | TE 1991/1992 | | | TE 1999/2000 | | | 2008-09 | | |
|----------------|--------------|---------|-------|--------------|---------|-------|--------------|---------|-------|---------|---------|-------|
| | Mean | S.D. | C.V | Mean | S.D. | C.V | Mean | S.D. | C.V | Mean | S.D. | C.V |
| Wheat | 1028.82 | 290.74 | 28.26 | 1599.80 | 568.24 | 35.51 | 1886.4 | 571.23 | 30.28 | 1957.50 | 433.69 | 22.15 |
| Rice | 1612.16 | 328.91 | 20.40 | 2055.97 | 450.27 | 21.90 | 2438.52 | 466.05 | 19.11 | 2875 | 439.27 | 15.27 |
| Sugarcane | 40658.64 | 6543.40 | 16.09 | 46068.09 | 6610.76 | 14.34 | 51385.1 | 9722.82 | 18.92 | 46400 | 8067.76 | 17.38 |
| All crops | 4158.86 | 397.42 | 9.55 | 4963.29 | 429.27 | 8.64 | 5109.53 | 411.38 | 8.05 | - | - | - |
| Foodgrains | 946.57 | 123.66 | 13.06 | 1264.37 | 195.07 | 15.42 | 1506.22 | 252.60 | 16.77 | - | - | - |
| Non Foodgrains | 7118.23 | 523.82 | 7.35 | 7776.26 | 697.60 | 8.33 | 8843.47 | 520.78 | 6.09 | | | |

Table 3: Result of One Way ANOVA Analysis

| Crop | F | F crit |
|----------------|----------|----------|
| Wheat | 3.094022 | 3.490295 |
| Rice | 6.438763 | 3.490295 |
| Sugarcane | 1.248688 | 3.490295 |
| All crops | 6.148164 | 4.256495 |
| Foodgrains | 8.069525 | 4.256495 |
| Non Foodgrains | 7.067504 | 4.256495 |

Table 4: Regional disparities in productivity of different crops

| Crops | Statistically Significant/ Insignificant |
|----------------|---|
| Wheat | Insignificant |
| Sugarcane | Insignificant |
| Rice | Significant |
| Foodgrains | Significant |
| Non foodgrains | Significant |
| All crops | Significant |

VI. CONCLUSION

The regions of Uttar Pradesh are very diversified in terms of agricultural produce. Cereals is the major crop and commercial crop is less shared area across the regions. Average productivity of all crops have increasing trend among all regions. The regional variation of wheat is very high and low in case of non foodgrains. The regional disparity of crops-rice, foodgrains, nonfoodgrains and all crops are statistically significant but insignificant for wheat and sugarcane.

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