



## AGRO -ECONOMIC STATUS AND PRODUCTIVITY LEVEL OF CROP-CULTIVATORS IN UTTAR PRADESH: A COMPARATIVE REGIONAL INVESTIGATION

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### **ABSTRACT**

*This paper has explored regional variation in the cropping pattern and productivity level between eastern and western region of Uttar Pradesh. The state had witnessed fairly satisfactory agricultural growth in the post green revolution period; however, decelerated in the post-reform period. Even though the state is still predominantly agricultural, productivity levels in agriculture are relatively low and rural poverty is endemic. The basic agro economic characteristics of cultivators, reveals that regional disparity is clearly noticeable between two regions of the state on the basis of cropping pattern and productivity level among all farm holdings size groups of farmers. Cropping intensity on sample farms is inversely related with the size of holding due to scarcity of labour on larger farms especially at the peak period of cultivation in both regions. Cropping intensity on large and medium farms, particularly in western UP was relatively below the average of all farms because of cultivation of sugarcane in large scale, a crop of long duration. The productivity level is much higher in western region due to cultivation of cash crop like sugar cane in larger area as compared to eastern region .The small farmers have adopted new technology, and are able to obtain high yields per hectare. Productivity of medium and large farms was much higher than marginal and small farms in both regions of Uttar Pradesh.*

**Kew-words:** rural farm households, Agro-economic status, cropping pattern, extent of irrigation, eastern and western region, farm productivity

## **I. Introduction**

Uttar Pradesh is the biggest State in the country which endowed with natural resources, favorable climate, blessed with mineral wealth and, fertile land. On the other hand, Uttar Pradesh is the most populous state of India with a very high population density. The State's economy is primarily based on agriculture which provides employment to more than 50% workers. But it is also considered among the most backward states in India, with high levels of poverty and low levels of social and economic development. Its rapidly expanding population makes it more difficult for development gains to be felt in the state.

Approximately 77.4% rural population are cultivators out of 22.15 million rural households residing in Uttar Pradesh, and about one fourth of farmers among them did not like farming and felt that agriculture was not profitable (NSSO, 2003). About 41% farmers in the state felt that, given a choice, they would take up some other career. This indicates a serious problem with agriculture sector where in the main characteristic is suffering from low self esteem. In the social hierarchy, farming as a profession now figures considerably low in the social order. With the aforesaid backdrop the researcher delved to explore the socio-economic and agro-economic situation of rural household of different farm size groups in the state.

This paper is divided into five sections. Section one describes introduction and review of several studies focused on regional development of the state of Uttar Pradesh. Study design and methodology has been discussed in second section. Third section explores social status of farm households in regions, based on the data collected from sample households. Total output and productivity in physical and financial terms of sample cultivators have been discussed in section four and section five summarized the findings of the paper.

### **Objective of the study -**

The main objective of the study is to explore the regional differences in the agro- economic status, cropping pattern, cropping intensity, extent of irrigation, and productivity level of different farm size groups in eastern and western regions of Uttar Pradesh.

### **Review of Literature**

Several studies conducted on the economic development of Uttar Pradesh revealed the fact that the State economy is characterized by significant inter-regional variations in overall economic as well as agricultural development. Eastern region of the State is particularly known

for its poverty and backwardness, while Western region is regarded as one of the agriculturally more developed and prosperous regions of the country. Eastern region is less developed than Western region of the state in every dimension of economic development. (Sinha,1979; Singh,1969, 2002; Subbarao 1980). In Uttar Pradesh, cropping patterns are largely determined by natural physical conditions, such as soil type, climate, rainfall patterns, elevation and topography (Bhalla and Singh, 2001; Pant, 2004).

Traditionally, eastern and western U.P. had different systems of landholdings, and although land reforms have been put in place, eastern U.P. still has a higher share of marginal land holdings (Stokes, 1978). Dreze and Gazdar,( 1998) point out that in the eastern, western and central regions of U.P., land is predominantly owned by upper castes. Female participation in the labor force is lacking throughout the state and the class and caste system are resilient, even in relation to the rest of northern India. The gap between landowning castes and the dispossessed is sizeable throughout the state and this, combined with U.P.'s patriarchal nature; continue the pattern of uneven development (Shah and Agrawal,1970).

A study by Srinath Singh (1976) highlighted that in Eastern U.P. agriculture was a very low paying business because holdings were small and scattered and prevailing technology made large scale investments in agriculture both risky and uneconomic. Misra (1979) highlighted the uneven growth across regions in Uttar Pradesh and concluded that different regions have shown significant variations in productivity growth. Similar conclusions were drawn by Sen (1979) that the problem of variations in the agrarian conditions in different regions of the State existed even before Independence. With a dense population, high pressure of population on agricultural land, and very low per capita income, the incidence of poverty in Eastern region is extremely high. U.P. still has a higher share of marginal land holdings (Stokes, 1978, Bajpai and Volavka, 2005). Some studies concluded that land is predominantly owned by upper castes in the state. Female contribution in the labour force is missing all through the state and the class and caste system are resilient. The regional variations in investment in agriculture persist in eastern and western regions of Uttar Pradesh (Singh, 2015 'a').

This study is expected to make further contribution by throwing up fresh primary data on agro-economic status of farmers and by looking at the regional picture of agriculture sector in the state in the changed economic regime.

## **II- Study Design and Methodology**

The primary data were collected from 256 selected rural households to study the Agro-economic status and productivity level of farmers with the help of a field study. A multi-stage random sampling design was used for the selection of households.

In the first stage two districts, one each from the eastern and western regions of U.P. was selected. We have selected Bijnor district of west U.P. and Faizabad district of east U.P., as they represent the average situation prevailing in the two regions. In the second stage, two blocks were selected from each district, one with good irrigation facilities, and the other with poor irrigation facilities to take into account the variations in resource endowment. The percentage of irrigated area to the net sown area was the criteria of irrigation facilities. In the third stage, two villages were selected from each of the selected blocks, one with better infrastructure facilities in terms of roads and banks and the other with relatively poorer infrastructure facilities. In the final stage, 32 cultivating households were selected from each of the selected villages.

## **III. Agro -Economic Characteristics**

The discussion on agricultural economy of the crop cultivators in both districts covers various aspect of the crop economy including Land ownership, area owned and operated, cropped area, cropping intensity, extent of irrigation, cropping pattern, productivity and Per hectare yield.

### **3.1 Area Owned and Operated**

The extent of leasing out operation was relatively lower in Bijnor district in comparison with Faizabad district. The area leased out was about three times of the area leased out in Bijnor. More over leasing in operation are practically limited to marginal and small category of farmers in Faizabad. Thus marginal farmers get it essential to resort to leasing-in of land in order to supplement their low income. A few small farmers however also reported leasing- out of land but they have agriculture as secondary occupation and don't have sufficient time and resources to agriculture. But in Bijnor all categories detailed leasing- in operation and medium and large farmers also leased-in a large area for cultivation despite the fact that most of them hired their relative's land that resides in other cities or busy in business and services.

**Table1:** Total Operational Area of cultivators (Hectare)

	Land Holding	Total Land Area owned	Area Leased out	Area Leased in	Total Operational Area
<b>Faizabad</b>	Marginal	21.70(0.68)	0.00(0.0)	6.80(0.21)	28.50(0.89)
	Small	51.70(1.62)	2.50(0.08)	4.30(0.13)	53.50(1.67)
	Medium	99.50(3.11)	0.50(0.02)	1.00(0.03)	100.00(3.13)
	Large	226.60(7.08)	17.60(0.55)	0.00(0.0)	209.00(6.53)
	All Farms	399.50(3.12)	20.60(0.16)	12.10(0.09)	391.00(3.05)
<b>Bijnor</b>	Marginal	19.92(0.62)	0.00(0.0)	7.83(0.24)	27.75(0.86)
	Small	46.58(1.46)	0.83(0.02)	9.42(0.29)	55.17(1.72)
	Medium	82.77(2.59)	0.00(0.0)	12.92(0.40)	95.68(2.99)
	Large	184.32(5.76)	6.83(0.21)	9.17(0.29)	186.65(5.83)
	All Farms	333.58(2.61)	7.67(0.06)	39.33(0.31)	365.25(2.85)

Note: Figure in parenthesis indicates area per farm.

### 3.2 Cropping Intensity

The Cropping Intensity on sample farms is inversely related with the size of holding due to scarcity of labour on larger farms especially at the peak period of cultivation. Secondly in order to utilize the available all resources and to get more return small size group farmers try to grow more than one crop. The cropping intensity on all farms would have been higher in both the district. Cropping intensity was found to be lower on medium and large farms as compared to the marginal and small farms indicating that the latter are under greater pressure to utilize their land resources more intensively.

**Table 2:** Cropping Intensity on sample farms

	Land Holding	Total Operational Area	Net Sown Area	Uncultivated Area	Area Sown more than once	Gross Cropped Area	*Cropping Intensity
<b>Faizabad</b>	Marginal	28.50(100.00)	26.30 (92.28)	2.20 (7.72)	24.10 (84.56)	50.40	191.6
	Small	53.50(100.00)	49.40 (92.34)	4.10 (7.66)	38.60 (72.15)	88.00	178.1
	Medium	100.00(100.00)	94.20 (94.20)	5.80 (5.80)	58.40 (58.4)	152.60	162.0
	Large	209.00(100.00)	203.80 (97.51)	5.20 (2.49)	110.80 (53.01)	314.60	154.4
	All Farms	391.00(100.00)	373.70 (95.58)	17.30 (4.42)	231.90 (59.31)	605.60	162.1
<b>Bijnor</b>	Marginal	27.75(100.00)	26.85 (96.75)	0.90 (3.24)	22.58 (81.38)	49.43	184.1
	Small	55.17(100.00)	54.58 (98.94)	0.58 (1.06)	33.25 (60.27)	87.83	160.9
	Medium	95.68(100.00)	94.67 (98.93)	1.02 (1.07)	52.17 (54.52)	146.83	155.1
	Large	186.65(100.00)	185.58 (99.42)	1.07(0.58)	96.67 (51.79)	282.25	152.1
	All Farms	365.25(100.00)	361.68 (99.26)	3.57(0.74)	204.67 (56.04)	566.35	156.6

Note: Figure in parenthesis indicates percentage to total operational area.

\*Cropping intensity=gross cropped area/ net sown area \*100

A large proportion of net sown area of marginal and small farmers in both districts was under double cropping; on the other hand cropping intensity on large and medium farms, particularly in

Bijnor was relatively below the average of all farms because of cultivation of sugarcane in large scale, a crop of long duration.

### 3.3 Extent of Irrigation

A large area (more than 91 % irrigated area to total operational area and 95% irrigated area to net sown area in both districts) of the holdings in the selected farms is under irrigation while it varies among different size of holdings. Nearly all of the net sown area and total operational area of large and medium farms was under irrigation in both districts. Canal, tube wells and pumping sets are the main source of irrigation. Among the traditional means of irrigation Kachcha well was still used by few sample farmers but they used it by pumping sets or electric motors especially in Bijnor district. farmers have invested substantial amount on private means of irrigation. The relative importance of particular means of irrigation is different for different categories of farmers. The dependence of marginal farmers on canals and hired resources for irrigation is larger than other categories as only 22% and 25% of marginal farmers in both districts respectively reported their own resources (mostly pumping sets) for irrigation. Even as 71.88% small farmers in Faizabad and 84.38% in Bijnor having pumping sets. On the other hand 87.5% medium farmers and 93.75% large farmers reported ownership of pumping sets and

**Table 3 : Irrigated Area (Hectare) on sample farms**

	Land Holding	Total Operational Area	Net Sown Area	Net Irrigated Area	Net Non Irrigated Area	% Irrigated Area to Total Operational Area	% Irrigated Area to Net Sown Area
Faizabad	Marginal	28.5	26.3	23.7	2.6	83.16	90.11
	Small	53.5	49.4	44.8	4.6	83.74	90.69
	Medium	100	94.2	88.9	5.3	88.9	94.37
	Large	209	203.8	198.5	5.3	94.98	97.4
	All Farms	391	373.7	355.9	17.8	91.02	95.24
Bijnor	Marginal	27.75	26.85	22.25	5.5	80.18	80.18
	Small	55.17	54.58	51.33	3.25	93.05	94.05
	Medium	95.68	94.67	92.42	2.25	96.59	97.62
	Large	186.65	185.58	179.83	5.75	96.35	96.9
	All Farms	365.25	361.68	345.83	16.75	94.68	95.38

**Table .4:** No. & Amount spent on Private Means of Irrigation by sample farmers

Land Holding	Numbers			Values in Rs.		
	Pumping sets	Tube wells	Kachcha well	Pumping sets	Tube wells	Kachcha well
			<b>Faizabad</b>			
Marginal	7 (21.88)	1 (3.13)	0(0.0)	74,000 (2313)	30,000 (938)	0(0.0)
Small	23 (71.88)	0 (0.0)	0(0.0)	246,000 (7688)	0 (0.0)	0(0.0)
Medium	28 (87.50)	14 (43.75)	0(0.0)	303,000 (9469)	555,000 (17344)	0(0.0)
Large	30 (93.75)	19 (59.38)	3(9.38)	345,000 (10781)	780,000 (24375)	25,000 (781)
All Farms	88 (68.75)	34 (26.56)	3(2.34)	968,000 (7563)	1,365,000 (10664)	25,000 (195)
			<b>Bijnor</b>			
Marginal	8 (25.00)	0(0.0)	4 (12.5)	103,000 (3219)	0 (0.0)	34,000 (1063)
Small	27 (84.38)	0(0.0)	5 (15.63)	321,000 (10031)	0 (0.0)	42,000 (1313)
Medium	34 (106.25)	5(15.62)	15 (46.88)	454,000 (14188)	210,000 (6563)	138000 (4313)
Large	37 (115.63)	16(50.00)	11 (34.38)	493,000 (15406)	890,000 (27813)	115500 (3609)
All Farms	106 (82.81)	21(16.41)	35 (27.34)	1,371,000 (10711)	1,100,000 (8594)	329,500 (2574)

Note: Figure in parenthesis indicates percentage to total number of sample households in the categories and values of means of irrigation per farm

about half of the sample households in this categories also reported ownership of tube wells in Faizabad district and in Bijnor some large and medium farmers reported more than one pumping sets but quite less percentage of tube wells have been reported by medium farmers than Faizabad. Dependency on this means was relatively higher for medium and large farmers.

Table also provides a clear indication of the fact the farmers of both districts are keen to invest in assured means of irrigation like tube wells and pumping sets in order to take full advantage of the production potential of new farm technology. Even marginal farmers are conscious of the importance of irrigation and have invested a good amount in pumping sets and wells. Although they have been able to bring the entire their holdings under irrigation, they have to rely to a greater extent on canals and tube wells owned by others.

### 3.4 Cropping pattern

The income from cultivation partly depends upon the nature of crops grown and partly upon the intensity of cultivation. The more the intensive methods of cultivation are the higher are the net profits. Table 5 indicates that more than 60% of the cropped area was under food grains, in which wheat and Paddy being the most important cereal crops in both districts. The majority of marginal and small farmers were oriented towards food grain crops, which accounted more than 70% in both districts.

**Table.5:** Cropping pattern on sample farms (Hectare)

Crops	Faizabad					Bijnor				
	Marginal	Small	Medium	Large	All Farms	Marginal	Small	Medium	Large	All Farms
<b>Food Grains</b>										
Paddy	0.50 (31.94)	0.78 (28.35)	1.27 (26.61)	2.23 (22.73)	1.20 (25.29)	0.42 (26.92)	0.73 (23.85)	0.98 (21.45)	1.64 (18.57)	0.94 (20.92)
Wheat	0.61 (38.89)	1.03 (37.39)	1.43 (29.88)	2.64 (26.86)	1.43 (30.15)	0.51 (32.78)	0.83 (27.09)	1.37 (29.80)	2.04 (23.09)	1.19 (26.31)
Coarse Cereals	0.08 (5.36)	0.17 (6.02)	0.19 (4.06)	0.28 (2.80)	0.18 (3.80)	0.13 (8.26)	0.21 (6.83)	0.26 (5.68)	0.49 (5.61)	0.27 (6.06)
Pulses	0.05 (2.98)	0.06 (2.16)	0.24 (5.11)	0.36 (3.66)	0.18 (3.75)	0.14 (9.26)	0.12 (3.99)	0.18 (3.97)	0.40 (4.49)	0.21 (4.68)
Total Food -Grains	1.25 (79.17)	2.03 (73.92)	3.13 (65.66)	5.51 (56.04)	2.98 (62.99)	1.20 (77.22)	1.89 (61.76)	2.79 (60.90)	4.57 (51.76)	2.61 (57.98)
<b>Non Food- Grains</b>										
Sugarcane-	0.12 (7.54)	0.35 (12.73)	1.11 (23.33)	2.98 (30.32)	1.14 (24.11)	0.11 (7.29)	0.89 (29.13)	1.44 (31.39)	3.52 (39.87)	1.49 (33.07)
Vegetables	0.08 (4.76)	0.15 (5.63)	0.21 (4.46)	0.65 (6.64)	0.27 (5.79)	0.12 (7.67)	0.10 (3.24)	0.11 (2.33)	0.37 (4.22)	0.17 (3.87)
Oilseeds	0.13 (8.13)	0.17 (6.08)	0.29 (6.09)	0.62 (6.33)	0.30 (6.38)	0.09 (5.98)	0.10 (3.34)	0.16 (3.58)	0.28 (3.14)	0.16 (3.53)
Other Crops	0.01 (0.40)	0.05 (1.65)	0.02 (0.46)	0.07 (0.67)	0.03 (0.73)	0.03 (1.83)	0.08 (2.54)	0.08 (1.82)	0.09 (1.01)	0.07 (1.55)
Total Non Food-Grains	0.33 (20.83)	0.72 (26.08)	1.64 (34.34)	4.32 (43.96)	1.75 (37.01)	0.35 (22.78)	1.17 (38.24)	1.79 (39.10)	4.26 (48.24)	1.89 (42.02)
Gross cropped Area	1.58 (100.0)	2.75 (100.0)	4.77 (100.0)	9.83 (100.0)	4.73 (100.0)	1.56 (100.0)	3.06 (100.0)	4.59 (100.0)	8.82 (100.0)	4.51 (100.0)

Note: Figure in parenthesis indicates percentage to gross cropped area

Among *Kharif* crops sugarcane and paddy are the main crops accounting for about 53% in Faizabad and 59% in Bijnor district. In *Rabi season*, wheat is the most important food grain crop accounting for nearly one third in both districts while pulses occupy the next place. In Faizabad oilseeds (*mustard and alsii*) is second major non-food crop of *Rabi* season accounting about 5% of total cropped area. *Zaid* crops constitute only about 5% in Faizabad and 35% in Bijnor.

The table also reveals that as the size of farm increases the area under food grain crop decreases while in case of cash crop (mainly sugar cane) a reverse trend is noticed. This is due to the fact that in subsistence type of farming, the farmers grow crops with a view to meet the family requirement and it is the only the surplus area which is devoted to cash crops. Since the marginal and small farmers have less area, almost all of it is devoted to non cash crops. Thus the marginal and small farmers are less commercialized and more subsistence oriented as compared



to other categories. Percent area under other crops (mainly fodder) is higher in Bijnor most likely because of larger no. of livestock owned by sample farmers in the district. The area under pulses and miscellaneous crops does not show any marked variation in different size groups.

#### IV. Productivity and Per Hectare Yield

In this section total output and productivity in physical and financial terms of sample cultivators have been discussed. Value of output has been computed at actual prices received by each farm households. Differences between the big and marginal farmers are as much as seventeen times in case of per farm output and more than two times in case of output per hectare of net sown area in Faizabad. Almost same situation is prevailing in Bijnor district though output per farm and per hectare of net sown area in the district is much greater than Faizabad, which establish the fact that the productivity levels are higher in Western region of Uttar Pradesh. In case of cereals like wheat, paddy coarse cereals like maize and bajra productivity is highest on marginal farms in both districts. Productivity of pulses is highest on marginal farms in Bijnor ,

**Table 6:** Total Output of Main Crops per Hectare of net sown area (In Q)

Land Holding	Paddy	Wheat	Coarse Cereals	Pulses	Sugarcane	Vegetable	Oilseeds	Other Crops
<b>Faizabad</b>								
Marginal	31.83	27.46	37.86	22.00	438.16	57.08	15.78	32.10
Small	33.06	26.84	25.42	24.95	556.07	39.68	17.38	46.14
Medium	35.88	29.61	34.26	31.64	541.29	56.03	21.38	23.84
Large	36.45	30.27	36.74	34.43	606.26	29.58	27.79	44.10
All Farms	34.21	28.97	33.43	30.12	540.99	41.43	18.47	39.23
<b>Bijnor</b>								
Marginal	32.50	28.50	25.90	31.52	732.59	59.28	16.92	38.44
Small	35.49	29.85	32.55	37.92	671.46	81.69	20.25	42.36
Medium	36.89	31.79	48.13	52.92	837.40	86.93	18.39	50.76
Large	38.58	31.38	49.61	53.97	702.29	44.65	20.23	31.50
All Farms	36.42	30.45	41.95	47.18	731.41	62.20	19.16	41.87

while on small farms in Faizabad. Only productivity of sugar cane is highest on large and medium farms in both districts. There is significantly positive relationship between physical productivity of crops and size of holding in both districts. It can be also surmised from the table that the marginal and small farmers have also adopted the new technologies and are able to get high return per hectare. The marginal farmers are leading in terms of value productivity in case of wheat, paddy and other crops but large farmers are leading in case of sugar cane.

It is important to add that the larger farmers are getting a better price for their farm produce. Sugarcane accounts for 39.94 % of total value of output in Faizabad and 60.09 % in Bijnor on sample farms followed by paddy which accounts of 25.08 % of total value of output in Faizabad and 17.9 % in Bijnor on sample farms. Among other crops vegetables and pulses in Faizabad are of some significance with a share of 4.97 % and 3.05 % in total output respectively. The relative importance of sugar cane increases with the size of holdings while that of wheat and paddy shows a down ward trends in both districts.

### **Conclusion**

In spite of the small land and asset base marginal and small farmers have invested substantial amount on irrigation facilities and other farm assets. They are also making more intensive use of their land. The cropping pattern is market oriented with substantial area devoted to sugar cane cultivation among large farmers in both districts but very significant in Bijnor district. However, the marginal holdings are relatively less commercialized and more subsistence oriented as compared to other holdings. Cropping intensity on sample farms is inversely related with the size of holding due to scarcity of labour on larger farms especially at the peak period of cultivation in both regions. Cropping intensity on large and medium farms, particularly in western UP was relatively below the average of all farms because of cultivation of sugarcane in large scale, a crop of long duration.

The productivity level is much higher in Bijnor by reason of cultivation of cash crop like sugar cane in larger area as compared to Faizabad .The small farmers have adopted new technology, particularly in Bijnor districts, and are able to obtain high yields per hectare The productivity of land is increased with the size of holdings for almost all the crops in both the districts. Productivity of medium and large farms was much higher than marginal and small farms in both districts. Output per hectare in Bijnor is much higher than in Faizabad, since productivity levels are higher in Western region of Uttar Pradesh.

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