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Study on the role of infrastructure, technological, institutional and socio-economic factors in promoting agricultural diversification

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ABSTRACT

The study was conducted in 2006-07 two districts Baghpat and Ghaziabad based on high and low productivity of major crops of Western U.P. Two blocks randomly selected for study from Ghaziabad and Baghpat district, respectively. In total 240 respondents from Ghaziabad and Baghpat district were interviewed.

Key words : Diversification, Role of infrastructure, Technological, Institutional

INTRODUCTION

The studies of socio-economic characteristics provides a strong base for the formulation of policies for planning of the human resources in the perspective of development. It helps in pinpointing the dominating characteristics and throws light on other lagging behind. Thus the identification and proper planning of such variables can prove useful in stimulating the future growth of economy.

It was observed during the survey that sugarcane - wheat is predominant cropping system in the western Uttar Pradesh. Wild animals like, wild pig, blue bulls, insects and disease are major bio-physical constraints. Marketing and cost factor are major socio-economic constraints for diversifications of farming system towards vegetables, fisheries, piggery, poultry etc. Majority of farmers are keeping dairy animals for their home consumption. Small farmer were found to sale milk for enhancing their income to fulfill their family requirements. Crop + dairy was major farming system in the area. Generally, farmers were not availing agriculture credit facility to diversify their farm business.

In general farmers of the area were following traditional farm business. Crop + dairy is a traditional farming system. Dairy activity is taken as complimentary enterprises on the farms.

MATERIALS AND METHODS

In western Uttar Pradesh, the Baghpat district characterizes high productivity and Ghaziabad represents low productivity district. Three villages from each block (two blocks from each districts) were selected randomly, for selection of households. Different strata were drawn based on the prevailing farm enterprises. The households of marginal (< ha) small (1 to 2 ha) medium (> 2 to 4 ha) and large (> 4 ha) groups were selected randomly for survey, In total farmers of which 120 from Baghpat and 120 Ghaziabad district were interviewed.

Measurement of crop diversification :

Harfindahal index as diversification measures were used in the following form:

$$HI = \sum_{i=1}^{n} P_i^2$$

Where, $P_i = A_i / \sum_{i=1}^{n} A_i$, i = 1, 2, 3, ... Number of crop enterprises.

Pi is the proportion of area under crop, Ai is the area under ith crop and a gross cropped area.

The value varies from zero to one. It takes the value one when there is complete specialization and value zero when there is a perfect diversification *i.e.* it has inverse relationship with diversification. Fragmentation and sub division.

Farm business income was computed by deduction the cost incurred on seeds, fertilizer, plant protection, hired human labour, farm machinery and implements, taxes, cess, water charges interest on working capital and expenditure on livestock maintenance, such as feed and fodder, mineral mixture, medicine and depreciation of owned farm machinery, buildings and animals from gross return.

To analyze the impact of diversification on income

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and employment, multiple regression analysis was used. The Cobb- Douglas production function in the following form / was fitted to the data:

$$Y_i = b_0 x_1^{b1} x_2^{b2} X_3^{b2} x_4^{b4} u_i$$

where, Y = Gross farm income (Rs)

X_1 = Diversification index (DI)

X_2 = Cropping intensity (CI)

X_3 = Area under high value crops (HVC)

X_4 = No. of man days/year (EMP)

i = 1, 2, 3, ..., n farms, b_o = Constant and u_i = Random variable.

The Cobb-Douglas type function was used in this used in this study since the elasticity co-efficients were free from the unit of measurement, computational ease and theoretical fitness to the agriculture data. The function was estimated using the ordinary least square method. Zero order correlation matrix for each case was computed to check the multicollinearty among the independent variables. Multicollinearty was considered high if the value of 'r' was more then 0.8 (Heady and Dhillon, 1961).

RESULTS AND DISCUSSION

Distribution of human population in various classes in Baghpat and Ghaziabad districts is given in Table 1 Baghpat districts accommodated a population of 1164388 and 3289540 persons, which includes about 54 per cent male and 46 per cent female. The population of respective district was 0.70 and 1.98 per cent of state population. The sex ratio in the state as well as in the district was favorable to the males. The large number of people (near

Table 1 : Distribution of human population of various classes in Baghpat, and Ghaziabad in Western Plain Zone of Uttar Pradesh

Sr. No.	Particular	Baghpat	Ghaziabad	Uttar Pradesh
1.	Total population	1164388 (100)	3289540 (100)	166052859 (100)
2.	Male	630244 (54.13)	1768215 (53.75)	87466301 (52.67)
3.	Female	534144 (45.87)	1521325 (46.25)	78586588 (47.33)
4.	Rural population	934824 (80.28)	1473559 (44.80)	131540230 (79.22)
5.	Urban population	229564 (19.72)	1815981 (55.20)	34512629 (20.78)
6.	Cultivators	154986 13.31	159501 4.85	22172563 (13.35)
7.	Agricultural labourers	71516 (6.14)	69647 (2.12)	13604812 (8.19)
8.	Other agril. labourers	142916 (12.27)	671436 (20.41)	15517261 (9.34)
9.	Female for per 1000 males	848	860	898
10.	Density of population/ sq. km.	838	1682	689

Source : District Statistical Report 2003 and At a glance of U.P. Jagran Research of year 2003

Table 2 : Economic indicator of Baghpat and Ghaziabad in Western U.P.

Sr. No.	Particular	Baghpat	Ghaziabad	U.P.
1.	Number of villages	287	685	97134
2.	Community development blocks	6	8	807
3.	Number of tehsil	3	4	299
4.	Village served per development block	47	85.6	120
5.	Population covered per development block	194064	411152	205765
6.	Village served per tehsil	96	171	324
7.	Population covered per tehsil	388129	822385	555361
8.	Number of post office	143	248	17533
9.	Population served per post office	7206	9097	9471
10.	Number of Towns	8	17	703
11.	Nagar Palika	2	5	194
12.	Gram Panchayat	236	404	51855
13.	Junior basic school	719	681	86361
14.	Senior basic school	122	176	19639
15.	Inter collage	95	160	N.A
16.	Degree collage	3	13	406
17.	Universalities	0	0	20
18.	Ayurvedic & Unani hospital	8	45	390
19.	Drimary health center	21	48	3444
20.	Veterinary dispensaries and hospitals	46	97	1730
21.	Number of village electrified	287	521	808
22.	No. of mandi samiti	2	3	242
23.	No. of cold storage	7	34	1118

Source : District Statistical Report 2003 and Uttar Pradesh at a glance of Jagran Research Center year 2003

Table 3 : Land use classification in Baghpat and Ghaziabad districts in of U.P. **(Area in ha.)**

Sr. No.	Particular	Baghpat	Ghaziabad	Western U.P.
1.	Total reported area	134531 (100.00)	200914 (100.00)	1579219 (100.00)
2.	Area under forest	1525 (1.13)	2470 (1.23)	56696 (3.59)
3.	Cultivable waste land	2032 (1.51)	3710 (1.85)	22705 (1.44)
4.	Current fallow land	2411 (1.79)	6543 (3.26)	31395 (1.99)
5.	Barren and uncultivable land	1966 (1.46)	5422 (2.70)	31306 (1.98)
6.	Land put to non agriculture	14593 (10.85)	32533 (16.19)	187677 (11.88)
7.	Permanent pasture and other grazing land	101 (0.69)	88 (0.04)	2360 (0.15)
8.	Fallow land other than fallow	1744 (1.30)	5548 (2.76)	28419 (1.80)
9.	Land under miscellaneous trees	26 (0.02)	303 (0.15)	15196 (0.96)
10.	Net cultivable land	110133 (81.86)	144297 (71.82)	1203461 (76.21)
11.	Net irrigated land	104550 (77.71)	140682 (70.02)	1114516 (70.57)

Source : Agriculture Statistics of UttarPradesh (1999-2000)

Table 4 : Average Family composition of sample households of western U.P.

Particular	Sample Size	Age of HF	Male	Female	Children	Total
Baghpat						
Marginal	30	55	4.19	2.89	2.26	9.33
			44.84	30.95	24.21	100.00
Small	30	61	3.7	3.4	4.5	11.60
			31.9	29.31	38.79	100.00
Medium	30	50.6	3.13	2.13	1.38	6.63
			47.17	32.08	20.75	100.00
Large	30	56.3	4.75	3.5	4.75	13.00
			36.54	26.92	36.54	100.00
Total	120	55.9	3.94	2.98	3.22	10.14
			38.88	29.39	31.78	100.00
Ghaziabad						
Marginal	30	53.35	3.2	2.45	2.1	7.75
			41.29	31.61	27.1	100
Small	30	57.75	3.05	2.5	2.6	8.15
			37.42	30.67	31.9	100
Medium	30	70	4	4	7	15
			26.67	26.67	46.67	100
Large	30	50	2.5	3	4	9.5
			26.32	31.58	42.11	100
Total	120	57.78	3.19	2.99	3.93	10.10
			31.56	29.58	38.86	100.00
Overall						
Marginal	30	54.18	3.69	2.67	2.18	8.54
			43.07	31.28	25.65	100
Small	30	59.35	3.38	2.95	3.55	9.88
			34.66	29.99	35.35	100
Medium	30	60.31	3.57	3.07	4.19	10.82
			32.96	28.34	38.74	100.00
Large	30	53.13	3.63	3.25	4.38	11.25
			31.43	29.25	39.32	100
Total	120	56.82	3.57	2.98	3.57	10.12
			35.23	29.48	35.31	100.00

about 80 %) of the state and district live in the villages in Ghaziabad district the ratio of rural and urban population was 45:55, it is because of increasing industrialization in the district.

Ghaziabad district is more thickly populated as compared to Baghpat district as well as state as a whole (Table 1) as there were 1682 persons per square kilometer in the Ghaziabad district as against 838 in Baghpat district and 689 is state as a whole. The population of cultivators and agriculture laboures contributes more in Baghpat district (20 %) and Ghaziabad district (8 %) as against 22 per cent for the state.

Community development block :

There are 6 and 8 Community Development Blocks in Baghpat and Ghaziabad, respectively as against 807 blocks in the state. On an average the population covered per block about 2 lakhs in Baghpat and 4 lakhs in

Table 5 : Employment of family members of sample households

Farm size	Regular salaried	Temporary salaried	Casual labour	Engaged in agriculture	Dependent	Total
Baghpat						
Marginal	0.76	0.38	0.27	3.48	4.45	9.33
	8.15	4.07	2.89	37.25	47.64	100.00
Small	0.60	0.15	0.15	5.05	5.65	11.60
	5.17	1.29	1.29	43.53	48.71	100.00
Medium	1.25	0.50	0.00	2.38	2.50	6.63
	18.87	7.55	0.00	35.85	37.74	100.00
Large	0.50	0.00	0.00	5.00	7.50	13.00
	3.85	0.00	0.00	38.46	57.69	100.00
Total	0.78	0.26	0.11	3.98	5.02	10.14
	7.67	2.54	1.04	39.21	49.54	100.00
Ghaziabad						
Marginal	0.25	0.35	0.05	3.15	3.95	7.75
	3.23	4.52	0.65	40.65	50.97	100.00
Small	0.40	0.25	0.00	3.10	4.40	8.15
	4.91	3.07	0.00	38.04	53.99	100.00
Medium	0.50	0.50	0.00	5.00	9.00	15.00
	3.33	3.33	0.00	33.33	60.00	100.00
Large	0.00	0.00	0.00	4.00	5.50	9.50
	0.00	0.00	0.00	42.11	57.89	100.00
Total	0.29	0.28	0.01	3.81	5.71	10.10
	2.85	2.72	0.12	37.75	56.56	100.00
Overall						
Marginal	0.51	0.37	0.16	3.31	4.20	8.54
	5.69	4.30	1.77	38.95	49.31	100.00
Small	0.50	0.20	0.08	4.08	5.03	9.88
	5.04	2.18	0.65	40.79	51.35	100.00
Medium	0.88	0.50	0.00	3.69	5.75	10.82
	11.10	5.44	0.00	34.59	48.87	100.00
Large	0.25	0.00	0.00	4.50	6.50	11.25
	1.93	0.00	0.00	40.29	57.79	100.00
Total	0.53	0.27	0.06	3.89	5.37	10.12
	5.26	2.63	0.58	38.48	53.05	100.00

Ghaziabad district as against 2 laks in U.P. Baghpat and Ghaziabad district have 287 and 685 Villages as out of 97134 in the state as a whole. On an average 47 village in Baghpat and 85 village in Ghziabad district are severed per development block as compared 120 for the state (Table 2).

Veterinary institution :

Baghpat and Ghaziabad district have 46 and 97 Veterinary Institutions as against 1730 in state (Table 2) which covered average live stock population 11850 in Baghpat and 6389 Ghaziabad district as against 42251 in state.

Transport and communication :

Just to give pace to agriculture and industrial development rather all around economic development, a reliable network of transport and communication facilities are at must required.

Baghpat and Ghaziabad district have an edge over the state with regards to availability of mettle road to the villages. More than 62 per cent of the village in the Baghpat and 82 per cent in Ghaziabad district have Pacca road. The rail transport facility is satisfactory in Baghpat and Ghaziabad districts; nearly 23 per cent villages are at a distance of upto 3.5 km and 77 per cent at the distance of more than 5 km in Baghpat district. In Ghaziabad district nearly 39 per cent villages are situated at a distance of upto 3.5 km and 61 per cent more than 5 km. There are 143 post offices in Baghpat district and 248 post offices in Ghaziabad district. There is very good net work of telephone, connection which indicates that there are well developed means of communication in the study area which are most essential for rapid economic growth specially in agricultural growth and development.

Area and land utilization :

Western plain zone is having a geographical area of 1580 thousand hectares out of which Baghpat occupies 134 thousand hectare (8.52 %) and Ghaziabad 200 thousand hectare (12.72 %) area. The land utilization pattern may be seen from Table 3. It can be observed that about 82 and 72 per cent area is net cultivated in Baghpat and Ghaziabad districts, respectively against 76 per cent area in the zone. Area put to non-agricultural occupied the next position sharing 10.85 and 16.19 per cent, respectively in both district under study while its share in the zone was 11.88 per cent.

Forest on the other hand occupied only 1.13 and 1.23 per cent in Baghpat and Ghaziabad, respectively against 3.59 per cent in western plain zone. Areas under cultivation were 1.51, 1.85 and 1.44 per cent in that order. In absolute term it commanded a sizeable area of 2032 hectare in Baghpat, 3710 hectare in Ghaziabad and 22705 hectare in western plain zone. Efforts should, therefore, be made to bring this land under cultivation for raising various crops (Baghpat and Ghaziabad was having about 95 and 97 per cent area under irrigation against about 93 per cent in western zone.

Socio-economic characters of sample households :

Demographic characteristics :

The study of demographic characteristics provides a strong base for the formulation of the policies for planning of the human resources in Thus identification and proper planning of such variables can prove useful in stimulating the future growth of economy. This paper is especially devoted to the study the demographic features like, family composition, education status, occupational status etc. which are important to characterize' the existing farming system. The populations have been divided in three groups such as male, female, and children below 18 years of age.

Family composition :

It can be seem from Table 4 that in general the family size was highest for large farmers (11.25) and it was lowest for marginal farmers (8.54). Out of which children consist of maximum 35 per cent at overall level and it varied from 26 per cent for marginal farmers to 39 per cent for large farmers. District wise analysis indicated that family size was greater in Ghaziabad district in comparison to Baghpat district. It is also worth mentioning here that that farm size had direct relation with family size *i.e.* smaller the farm size the smaller - the family size and *vice versa*.

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