

Impact of Integrated Farming Systems on the Socio-economic Status and Profitability of the Farmers in Western Plain Zone of Uttar Pradesh, India

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ABSTRACT

The farming system is an integrated set of activities that farmers perform on their farms under their resources and circumstances to maximize the productivity and net farm income on a sustainable basis. The present study was conducted to identify the socio-economic status of the farmers practising sugarcane and rice-based farming systems in Western Plain Zone of Uttar Pradesh. The study was carried out in fifteen villages of three sampled districts of WPZ of Uttar Pradesh using Multistage purposive-cum random sampling. Results reveals that most of the farmers studied up to junior high level, belonging to middle age group, OBC category, nuclear family type, agriculture with livestock was the major source of income, tubewell and canal for the irrigation source. Highest number of milch animals were found in sugarcane-based farming system as compare to rice-based farming system and per annum income and investment was highest on sugarcane-based farming system.

Keywords: Sugarcane-based farming system, rice-based farming system, western plain zone, multistage random sampling, investment, income

The farming system conceptually is a set of elements or components that are interrelated and interact among themselves. At the centre of the interaction is the farmer exercising control and choice regarding the types of results of an interaction. The income from cropping alone from small and marginal farms is insufficient now to sustain the farmer's family. A judicious mix of any one or more of these enterprises with agronomic crops. Should complement the farm income and help in recycling the farm residues/wastes. The selection of enterprises must be based on the cardinal principles of minimizing the

competition and maximizing the complementary between the enterprises. Of late, the researchers on multi-disciplinary approach greatly realized and started developing the various farming systems models as per the zones of the agro-ecosystem. The agro-climatic zone planning aims at scientifically

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managing regional resources to meet the food, fibre, fodder and fuel wood without adversely affecting the status of natural resources and the environment. While assessing the resources base required is the holistic perspective, the development will have to be achieved through an appropriate mix of crop production and allied activities including horticulture, forestry, animal husbandry and agro-processing etc. improved farming systems technologies will replace traditional crop production approach to minimize regional variations in rural income. With 329 million hectares of geographical area, the country presents a large number of complex agro-climatic situations. However, for this exercise, Planning Commission has delineated 15 agro-climatic regions which were proposed to form basis for agricultural planning for the Eighth Plan. Uttar Pradesh is divided into four economic regions i.e., Western Region, Central Region, Eastern Region and Bundelkhand Region and also divided into 9 agro-climatic zones, namely, Bhabhar & Tarai, Western Plain, Central-Western Plain, South-Western Plain, Central Plain, Bundelkhand, North-Eastern Plain, Eastern Plain, and Vindhyan region. (LDWR, U.P. 2009). Uttar Pradesh has been divided into 9 agro-climatic zones based on agro-climatic features, particularly soil type, climate including temperature, rainfall and its variation and water resources availability. The Western Plain Zone of Uttar Pradesh covers 8 districts namely, Saharanpur, Muzaffarnagar, Shamli, Meerut, Baghpat, Ghaziabad, Gautam Budh Nagar and Bulandshahar with a total geographical area of 16,37,424 hectares.

This study was done to analyse the Impact of Integrated Farming Systems on the socio-economic status and Profitability of the farmers in Western Plain Zone of Uttar Pradesh.

METHODOLOGY

Multistage purposive cum random sampling has been adopted for the selection of districts, blocks, villages and farmers in the Western Plain Zone of Uttar Pradesh due to the huge diversity seen there in the farming systems, income, investment, cropping pattern, livestock production and other socio-economic characteristics. Among the eight districts of WPZ Saharanpur, Meerut and Bulandshahar, were selected due to the rich farming system dominance in

the area (Source: District profile, KVK Bulandshahar, Meerut and Saharanpur). Similarly total three blocks, one block from each district has been selected based on the area present of major crops i.e., paddy, wheat, sugarcane, mustard, sorghum (fodder) and livestock. Likewise, a total of fifteen villages and 270 farmers of different categories were selected based on probability proportion to the number of major crop growers for the study. The data regarding socio-economic points was collected through proper schedule and questionnaires during personal interview with the farmers. Data was analysed and results were interpreted with the incorporations of Simple tabular analysis using frequencies (n) and percentages of descriptive statistics in the study.

RESULTS

The general information consists of family size, monthly income of the family, classification of operational holding, education, occupation, caste wise distribution, cropping pattern, investment and income under both two farming systems in the study area which is given as follows. The education level of the respondents and adoption behaviour of latest technology in farming systems activities. Education significantly affects decisions making regarding enterprises selection and input use efficiently. From table 1, it is found that 6.75 per cent respondents in FS-I and 10.56 percent respondents in FS-II were illiterate, 31.33 per cent in FS-I and 23.71 percent respondents in FS-II had primary level education, 30.96 percent in FS-I and 29.93 percent respondents in FS-II had studied up to Junior high school. 22.98 per cent in FS-I and 27.26 percent in FS-II completed high school/intermediate and 7.98 per cent in FS-I and 8.54 per cent in FS-II had studied up to Graduation/post-graduation. It can be concluded from the Table 5.2.1 that a majority of the respondents studied up to high school/intermediate level, which has a significant role in adoption of latest farming system for income enhancing of farmers. Three categories of age were made on the basis of population of farmers in the study area (Table 2). Three categories were following: young (up to 40 years), middle (40 to 58 years) and old (>58 years). Most of the respondents were belong to middle age group i.e., 49.98 per cent in FS-I and 45.45 per cent in FS-II and young age contributes 28.35 per cent in FS-I and 31.71 per cent to total overall population. It

Table 1: Distribution of respondents based on education level (n=270)

Sl. No.	Education level	Marginal		Small		Medium		Overall	
		FS I	FSII	FS I	FSII	FS I	FSII	FS I	FSII
1	Illiterate	6 (6.25)	9 (12.86)	4 (8.89)	1 (2.78)	1 (8.33)	0 (0.00)	5.02 (6.75)	5.7 (10.56)
2	Primary	30 (31.25)	18 (25.71)	15 (33.33)	6 (16.67)	1 (8.33)	2 (18.18)	23.31 (31.33)	12.8 (23.71)
3	J.H. Sc	32 (33.33)	18 (16.67)	9 (20.00)	16 (44.44)	4 (33.33)	5 (45.45)	23.04 (30.96)	16.16 (29.93)
4	H. School/ Intermediate	21 (21.88)	19 (27.14)	12 (26.67)	10 (27.78)	5 (41.67)	3 (27.27)	17.1 (22.98)	14.72 (27.26)
5	Graduation/ Post-graduation	7 (7.29)	6 (8.57)	5 (11.11)	3 (8.33)	1 (8.33)	1 (9.09)	5.94 (7.98)	4.61 (8.54)
Total		96 (100)	70 (100)	45 (100)	36 (100)	12 (100)	11 (100)	74.41 (100)	53.99 (100)

#Weighted average calculated in the overall section; *Data collected by author through personal interview.

Table 2: Distribution of respondents based on the Age group (n=270)

Sl. No.	Education level	Marginal		Small		Medium		Overall	
		FS I	FSII	FS I	FSII	FS I	FSII	FS I	FSII
1	Young (40 yrs.)	30 (31.25)	23 (23.96)	9 (20.00)	10 (27.78)	3 (25.00)	3 (27.27)	23.18 (28.35)	17.12 (31.71)
2	Middle (40- 58 yrs.)	47 (48.96)	32 (45.71)	24 (53.33)	16 (44.44)	5 (41.67)	5 (45.45)	40.86 (49.98)	24.54 (45.45)
3	Old (58 yrs. & above)	19 (19.79)	15 (21.43)	12 (26.67)	10 (27.78)	4 (33.33)	3 (27.27)	17.72 (21.68)	12.33 (22.84)
Total		96 (100)	70 (100)	45 (100)	36 (100)	12 (100)	11 (100)	81.76 (100)	53.99 (100)

#Weighted average calculated in the overall section; *Data collected by author through personal interview.

Table 3: Distribution of the respondents based on Caste / Category (n=270)

Sl. No.	Social Category	Marginal		Small		Medium		Overall	
		FS-I	FS-II	FS-I	FS-II	FS-I	FS-II	FS-I	FS-II
1	General	36 (37.50)	26 (37.14)	16 (35.56)	14 (38.89)	6 (50.00)	6 (54.55)	27.76 (37.31)	20.43 (37.84)
2	OBC	51 (53.13)	37 (52.86)	24 (53.33)	21 (58.33)	6 (50.00)	5 (45.45)	39.53 (53.12)	29.07 (53.84)
3	Scheduled Caste	9 (9.38)	7 (10.00)	5 (11.11)	1 (2.78)	0 (0.00)	0 (0.00)	7.12 (9.56)	4.49 (8.33)
Total		96 (100)	70 (100)	45 (100)	36 (100)	12 (100)	11 (100)	74.41 (100)	53.99 (100)

#Weighted average calculated in the overall section; *Data collected by author through personal interview.

is found that 37.31 per cent in FS-I and 37.84 per cent respondents in FS-II were belong to General category (Table 3). It was interesting to see that more than 50 percent of the respondents in both the farming systems were from other backward caste (OBC). A little population of schedule caste i.e., 9.56 percent in FS-I and 8.33 percent in FS-II were identified from sample population. No farmers were belonging to Schedule tribes in both the farming systems. Most

of the respondents were belonging to nuclear family in both farming systems FS-I & II, i.e., 67.12 and 66.06 per cent respectively, whereas 32.89 and 33.94 percent respectively belongs from the joint family in FS-I and FS-II (Table 4). Thus, it is clear from table 5 that a greater number of the respondent adopt the farming system belonged to nuclear family system. In FS-1 only few farmers in Marginal category were involved in Agriculture Dairy and Agriculture

Table 4: Distribution of the respondents based on Family size (n=270)

Sl. No.	Family Type	Marginal		Small		Medium		Overall	
		FS-I	FS-II	FS-I	FS-II	FS-I	FS-II	FS-I	FS-II
1	Joint	31 (32.29)	23 (32.86)	16 (35.56)	13 (36.11)	4 (33.33)	6 (54.55)	24.47 (32.89)	18.32 (33.94)
2	Nuclear	65 (67.71)	47 (67.14)	29 (64.44)	23 (63.89)	8 (66.67)	5 (45.45)	49.94 (67.12)	35.67 (66.06)
	Total	96 (100)	70 (100)	45 (100)	36 (100)	12 (100)	11 (100)	74.41 (100)	53.99 (100)

#Weighted average calculated in the overall section; *Data collected by author through personal interview.

Table 5: Distribution of the respondents based on Occupation and source of income (n = 270)

Sl. No.	Particulars	FS-I				FS-II			
		Marginal	Small	Medium	Overall	Marginal	Small	Medium	Overall
1	Agriculture + Dairy	73 (76.04)	37 (82.22)	8 (66.67)	118 (77.12)	62 (88.57)	32 (88.89)	6 (54.54)	100 (85.47)
2	Agriculture + Dairy + Services	23 (23.96)	8 (17.78)	4 (33.33)	35 (22.87)	8 (11.43)	4 (11.11)	5 (45.45)	17 (14.53)
	Total	96 (100)	45 (100)	12 (100)	153 (100)	70 (100)	36 (100)	11 (100)	117 (100)

#Weighted average calculated in the overall section; *Data collected by author through personal interview.

Table 6: Distribution of the respondents based on Sources of irrigation (n = 270)

Sl. No.	Sources of Irrigation	Marginal		Small		Medium		Overall	
		FS-I	FS-II	FS-I	FS-II	FS-I	FS-II	FS-I	FS-II
1	Tubewell only	72 (75.00)	42 (60.00)	35 (77.78)	28 (77.78)	3 (25.00)	5 (45.45)	55.70 (74.86)	34.21 (63.37)
2	Canal only	6 (6.25)	6 (8.57)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3.76 (5.06)	3.59 (6.65)
3	Tubewell + Canal	18 (18.75)	22 (31.43)	10 (22.22)	8 (22.22)	9 (75.00)	6 (54.55)	14.94 (20.08)	16.19 (29.98)
	Total	96 (100)	70 (100)	45 (100)	36 (100)	12 (100)	11 (100)	74.41 (100)	53.99 (100)

#Weighted average calculated in the overall section; *Data collected by author through personal interview.

+Dairy + services i.e., 76.04% and 23.96%, in which majority of farmers were involved in Agriculture + Dairy (Table 5). Overall, 118 respondents in FS-I and 100 respondents in FS-II were practices agriculture + dairy in the study area. Only 35 respondents in FS-I and 17 respondents in FS-II were having agriculture + dairy + services as income source. Out of 45 respondents, 37 respondents were rely on agriculture + dairy and 8 respondents on agriculture + dairy + services in FS-I. Out of 70 respondents, only 8 respondents as compare to 62 (agriculture + dairy) were depend on agriculture + dairy + services in marginal farms in FS-II. Table 6 shows that, 74.86 per cent respondents in FS-I and 63.37 per cent in FS-II were rely on tubewell only for irrigation. 20.08 per cent of the respondents in FS-I and 29.98 per cent

respondents in FS-II were have tubewell and canal for irrigation. Only 5.06 per cent respondents in FS-I and 6.65 per cent in FS-II were depend on canal only for irrigation. In the case of marginal category, out of 96 respondents 72 in FS-I and out of 70 respondents 42 in FS-II were rely on tubewell for irrigation. In small category, 35 respondents in FS-I and 28 in FS-II were have tubewell only for irrigation facility. There were no respondents found, who were only depend on canal for irrigation in both the farming systems. In medium category, 75 per cent respondents in FS-I and 54.55 per cent in FS-II were have tubewell and canal both for irrigation. Average number of cows were found 34.67 per cent, 27.50 per cent and 37.83 per cent in FS-I respectively. Similarly in case of FS-II, overall average 35.06 per cent buffalo, 23.62 per cent

Table 7: Distribution of the respondents based on Livestock related information (n=270)

Sl. No.	Livestock on farm	Marginal		Small		Medium		Overall	
		FS-I	FS-II	FS-I	FS-II	FS-I	FS-II	FS-I	FS-II
1	Cow	139 (34.41)	55 (20.52)	87 (35.37)	62 (31.47)	29 (37.18)	18 (26.87)	115.08 (34.67)	53.67 (23.62)
2	Buffalo	109 (26.98)	96 (35.82)	72 (29.27)	64 (32.49)	22 (28.21)	27 (40.30)	91.29 (27.50)	79.67 (35.06)
3	Young stock other than milch animal	156 (38.61)	117 (43.66)	87 (35.37)	71 (36.04)	27 (34.62)	22 (32.84)	125.59 (37.83)	93.91 (41.32)
4	Total Livestock	404 (100)	268 (100)	246 (100)	197 (100)	78 (100)	67 (100)	331.96 (100)	227.26 (100)

cent cow and 41.32 per cent young stock other than milch animal were found. Number of milch animals were highest in FS-I due to fodder availability from sugarcane crop during *rabi* season (Table 7).

Comparative analysis of profitability of FS-I and FS-II

Total cost incurred in FS-I was ₹ 160145.36 and 115696.97 in FS-II. Net return was higher in case of FS-I as compare to FS-II. Cost: Benefit ratio was also high in FS-I (1: 0.41) as compare to FS-II (1: 0.33). Overall, the FS-I was more profitable in terms of returns from the investment.

Income analysis of FS - I & FS - II

Sl. No.	Particulars	FS-I	FS-II
1	Total Cost/ C3	160145.36	115696.97
2	Net Returns	226241.65	154370.93
3	B:C Ratio	1:0.41	1:0.33

CONCLUSION

Results reveals that most of the Farmers were found literate in FS-I and FS-II except a little population illiterate. It was interesting to see some farmers have a qualification upto post-graduation in the study area in both the farming systems. Age group wise analysis shows that highest number of selected farmers were from middle age group in the study area in both the farming systems. Most of farmers from OBC category with nuclear family size were found engaged in farming in both the farming systems. Agriculture with dairy enterprise was found major source of income of the farmers in the study area. Main source of irrigation was tubewell in the study area. Except

that some farmers were having reach upto canal's water for irrigation facility. Farmers were practicing crops with livestock for their livelihood and cow and buffalo were main milch livestock. Net income was highest in sugarcane-based farming system as compare to rice-based farming system in the study area.

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