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Research Paper

Assessment of IFS Model in Context of Doubling Farmers Income in District Banda: A Micro Study

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ABSTRACT

The methodology adopted for the study was multistage purposive cum random sampling in the Banda District of Uttar Pradesh, and five villages from Badokhar-khurd Block were selected. Then, a sample of 50 farmers from the population of 550 respondents from the five villages were selected randomly in the proportion of the farmers falling in each village under the different size groups. The study revealed that the average gross income from the selected crops (paddy, wheat, and onion) was ₹ 115775.50, and the average input-output ratio was 1:1.96. The average gross income from different enterprises (cow, buffalo, goatery, and poultry) alone was ₹ 36499.52, and the average input-output ratio of different enterprises was 1:2.07. Upon integration of the crops and the different livestock enterprises, we found that the highest net income generated was from the crop + veg + dairy combination, of ₹ 284005.18. But I-O ratio was found to be highest for the crop + veg + poultry combination, i.e., 2.68. The average I-O ratio for all the integrated combinations was found 2.56. Hence, we can conclude that an integrated farming system enhances the net income of the farmers and is a profitable practice.

HIGHLIGHTS

◉ Integration of both the livestock and crops in different combinations gave I-O ratio 1: 2.56.
◉ Farmers can enhance their socio-economic& ecological benefits by the adoption of IFS models in their daily practice.
◉ IFS can play boon role for the marginal farmers towards their income improvement.

Keywords: Integrated farming system, livestock, doubling farmers income

The farming system holds the growing of the crops with different enterprises, *viz.* livestock production, poultry, dairy, fisheries, beekeeping, mushroom *etc.*, The farming system approach has emerged as a theme for agriculture research and farmers' development in the coming years. It refers to agricultural systems that integrate with livestock and the production of crops. It is sometimes called as integrated bio-systems or Integrated agriculture. Current conventional farming practices can be overtaken through natural farming practices i.e., integration of several enterprises as done in early

times to improve the results (Babalad *et al.* 2021). Integrated farming system research is considered to be an effective tool to answer many questions being raised todays in the agriculture context, *viz.* food and nutritional security, profitability, production sustainability, resources use efficiency, employability, and climate change; with particular

references to small and marginal farmers, that currently constitute about 86 percent of the country's total land holding (Patel *et al.* 2015; Sasikala *et al.* 2015; Singh *et al.* 2019). It can be the highest return giving practice (Khan and Sengupta, 2018) and employment-inducing venture (Singh and Meena, 2021). Integrated farming system inferred that vermicomposting had given maximum net profit with B:C ratio 4.89. it was followed by (3.34), apiculture (2.82), forage crop (2.71), sericulture (2.42), agriculture (2.28), and goat rearing (2.21) (Rathore *et al.* 2014.) Diversification of production portfolio towards high-value crop has considerable potential to accelerate growth in agriculture and farmer income. Post-harvest management and small-scale processing would help farmer capture the benefits of value addition (Saxena *et al.* 2017*).* The systems help poor small farmers with very small tiny land holding for crop production and few heads of live-stock to diversify from production, increase cash income, improve the quality and quantity of produce and exploitunutilized resources. IFS approach also reduces the use of chemicals and hence can provide a chemical-free healthy food to society (Gupta *et al.* 2020). The integrated systems also represent reduced erosion, increased crop yield, soil biological activities, nutrient recycling, and intensifying land use (Patel *et al.* 2015). Existing farming system productivity and profitability are hampered by increased market dependency and declining factor productivity. Whenever a farmer adopts Integrated Farming Systems along with technological enhancements on his farm, he will get more employment and income from that farming system (Saxena *et al.* 2017). Doubling farmers' income can be achieved on adding livestock's with crops and reaping the consequent social and ecological benefits (Ponnusamy and Devi, 2017). India is a gamble of monsoon, where most of the crop is due to the effect of monsoon, where Integrated Farming Systems also saves from risk. If one crop affected due to monsoon, the farmer may get income from the other crop. Integrated farming systems provide income to the farmer throughout the year and get maximum employment. The practice must be based on best-suited enterprises in the particular area *i.e.*, what integration systems are prevailing, to achieve the desired goal and enjoy it (Nikam *et al.* 2020). It's time the Government of India is also giving more emphasis on Integrated

Farming Systems so that the income of the farmer can be increased to a higher extent. Government on her target to achieve a doubling farmers' income by 2022 from ₹ 8059 (2015-16) to ₹ 21,146 per month had made assessments and found that on the half pathway, it was ₹ 10,218 (2018), and the projection seen was ₹ 12,445 only in next remaining years (*NSSO*, 77th round, 2021). So, it looks far enough to achieve the goal of ₹ 21,146. Therefore, further assessments are needed in this context. Keeping all the facts, this study is being done in district Banda of Uttar Pradesh to estimate the Impact of different enterprises in Integrated Farming System towards doubling farmers' income.

Research Methodology

The research methodology adopted for the study was multistage purposive cum random sampling. Banda District was selected purposely where a farmer adopts different farming systems in their farm business, and a block is the second stage of sampling techniques. Only Badokhar-khurd block was selected purposively for the study purposes from eight engaged blocks in district Banda. This block represents the district in terms of agro-economic condition. At the third stage of sampling, five villages from Badokhar-khurd Block were selected. A total number of 50 farmers were selected randomly from the 5 villages in the proportion of the farmers falling in each village under the different size of the group. These farmers were grouped according to the land holdings, i.e., marginal farmer (Less than 1 hectare), small farmer (1-2 hectare), and prominent farmer (more than 2 hectares). The secondary data were also referred from published materials, journals, books record of the block, *tehsil* and district headquarter statistical record, etc., for the research.

Analytical tool

The analytical tools were used for the analysis and interpretation of the data.

Tabular analysis: The analysis was used to compare the returns and cost of production (B:C Ratio) of different farm groups engage in different farming systems.

Average: the weighted average was used in the study related.

$$W.A. = \sum_{(i)}^{n} \frac{WI \times X_1}{W_1}$$

Where,

X = Value of an item

W = Weight of X

⬥ **Input-output ratio:** It is the ratio, which is worked out by dividing output by input.

$$Input – Output\ ratio = \frac{Output}{Input} \times 100$$

⬥ **Cost of production (₹/Q):** It refers to input divided by output and then multiplied it price/rate of produce per quintal.

$$Cost\ of\ production = \frac{Input \times Price\ (rate)}{Output}$$

⬥ **Cost of cultivation (₹/ha):** The expenditure incurred on all inputs and input services in raising a crop on an unit area, is referred to as cost of cultivation.

$$Cost\ of\ production = \frac{Input \times Price\ (rate)}{Area}$$

⬥ **Cost of cultivation (₹/farm):** The expenditure incurred on all input and input service in raising a crop and allied enterprises on categorized land farm such as marginal, small and large farm (Table 1).

RESULT FINDINGS

Cost incurred in crops cultivated in the study area (per ha)

The farmer adopted different crop as Paddy and wheat Onion crops in their farm business per hectare in different season according. The farmer incurred costs in adopting different crops in their business farm per hectare.

The table 1 showed the cost of cultivation of paddy, wheat, and onion crop in ₹ 51048.24, 61696.94, and 63909.42, respectively for average Farm land holding of marginal, small, and large farmers. Average cost of cultivation of three different crops was in ₹ 58884.87. The average operation cost and average overhead cost of paddy, wheat, and onion crop were in ₹ 35316.46 and 7568.41, respectively.

Table 1: Cost of cultivation of crops (Paddy, Wheat & Onion)

Sl. No.	Factors of input	Crops			Average
		Paddy	Wheat	Onion	
(A)	Operational Costs				
1	Human labour	11794.94	12731.86	13123.82	12550.20
(a)	Family labour	5592.18	5184.35	6569.89	5782.14
(b)	Hired labour	6202.75	7547.50	6553.93	6768.06
(2)	Tractor power	2936.14	8083.07	5491.11	5503.44
(3)	Seed	1673.56	4250.59	11165.29	5696.48
(4)	Manure and fertilizer	3413.60	3925.49	2171.40	3170.163
(5)	Irrigation	6217.56	7170.74	6372.95	6587.083
(6)	Plant protection	514.75	677.40	655.64	615.93
(7)	Interest on the working capital	929.26	1289.36	1360.80	1193.14
	Total operational cost	27479.83	38128.53	40341.01	35316.46
(B)	Rental value of land	16000.00	16000.00	16000.00	16000
(C)	Overhead cost				
1	Interest on fixed capital	3784.20	3784.20	3784.20	3784.2
2	Repairs of dead stock	2270.52	2270.52	2270.52	2270.52
3	Depreciation	1513.68	1513.68	1513.68	1513.68
	Total overhead cost	7568.41	7568.41	7568.41	7568.41
	Total cost	51048.24	61696.94	63909.42	58884.87

Returns generated from crops cultivated in study area in per ha

The farmer obtained income from adopting different crops in their farm business in per hectare of the area from different season crops (Table 2).

In the table 2 mentioned, the main product obtained from different crop means paddy, wheat and onion crops was in quintal 35.43, 40.73 and 192.34 respectively. The gross income of three different crops, paddy, wheat, and onion crop were ₹ 93035.38, 106189.34, and 148101.80, and the average gross income from that crop was ₹ 115775.50 (Table 3).

Income generated from the crops

In table 3 shows an input-output ratio of paddy, wheat, and onion was 1:1.82, 1:1.72, and 1:2.31, respectively. The average input-output ratio of that crop was 1:1.96.

The cost incurred in livestock production

During of research, farmers were growing crops as well as allied Enterprises in their business farms like as cow rearing, buffaloes rearing, goat rearing, and poultry in their business farm (Table 4).

In table 4 shows, the average total cost of different land holding of the marginal, small and large

Table 2: Cost and Returns generated from crops (Paddy, Wheat & Onion)

Particular	Crops			Average
	Paddy	Wheat	Onion	
Yield in (Q/ha.)				
Main product	35.43	40.73	192.34	89.5
By product	70.05	80.13	—	50.06
Rate of product in (₹/Q)				
Main product	1835.00	1820.00	770	1475
By product	400.00	400.00	—	266.6667
Gross income	93035.38	106189.34	148101.8	115775.5
Total input cost	51048.25	61696.94	63909.42	58884.87
Cost of production (₹/Q)				
(a) Main product	1450.10	1516.78	332.27	1099.71
(b) By product	733.43	772.01	—	501.8133

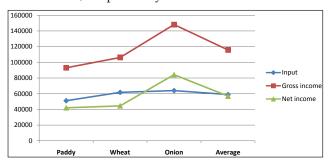**Table 3:** Income generated from the crops (Paddy, Wheat & Onion)

Particular	Crops			Average
	Paddy	Wheat	Onion	
Input	51048.24	61696.95	63909.42	58884.86
Gross income	93035.38	106189.34	148101.8	115775.5
Net income	41987.14	44492.38	84192.38	56890.63
Input-output ratio	1:1.82	1:1.72	1:2.31	1:1.96

Table 4: Cost incurred over different livestock enterprises

Sl. No.	Particular	Integrated enterprises				Average
		Cow	Buffalo	Goatary	Poultry	
1	Total fixed capital	30489.85	48647.16	9155.11	1303.34	22398.86
2	Interest on fixed capital@12%	3658.78	5837.65	1098.61	156.40	2687.86
3	Depreciation (enterprise, building & machinery)	5129.55	8791.02	1339.35	130.33	3847.56
4	Fixed on overhead cost	8788.34	14628.68	2437.95	286.73	6535.42
5	Total working cost (feed & fodder, labor, medicines, miscellaneous)	15930.43	20844.00	5663.62	1655.72	11023.44
	Total cost	24718.77	35472.68	8101.57	1942.45	17558.86

farmers of different enterprises like cow, buffalo, goat, and poultry, was ₹ 24718.77, 35472.68, 8101.57, and 1942.45, respectively.

Fig. 1: Income generated from the crops

Income generated from livestock production

The income is generated by farmers from their business farms from adopting different enterprises. The farmers were adopting different enterprises with different crops on their per hectare farm Table 5).

In the table 5 mentioned, the average gross income obtained from different enterprises like cow, buffaloes, goat, and poultry from average different categories farmers in ₹ was 52145.44, 73379.27, 17174.37, and 3299.00 respectively. The average gross income from different enterprises was ₹ 36499.52. The input-output ratio of average land holding different farmers means marginal, small, and ample of different enterprises like a cow, buffaloes, goat, and poultry was 1:2.10, 1:2.06, 1:2.11, and 1:1.69, respectively. The average input-output ratio of different enterprises was 1:2.07.

Cost incurred in a different model of integrated enterprises:

The total cost incurred by farmers for adopting integrated different enterprises in their farm per season per hectare crops (Table 6).

In the table 6 mentioned, the average cost of different enterprises with combination means Crop + veg + Dairy, Crop + veg + goatary, Crop

Table 5: Income generated from the livestock enterprises

Sl. No.	Particular	Different enterprises				Average
		Cow	**Buffalo**	**Goatary**	**Poultry**	
1	Total cost	**24718.77**	**35472.68**	**8101.57**	**1942.45**	**17558.86**
2	Gross Income	52145.44	73379.27	17174.37	3299.00	36499.52
3	Net income	27426.67	37906.59	9072.80	1356.55	18940.66
4	Input-output ratio	**1:2.10**	**1:2.06**	**1:2.11**	**1:1.69**	**1:2.07**

Table 6: Cost incurred over different enterprises in IFS

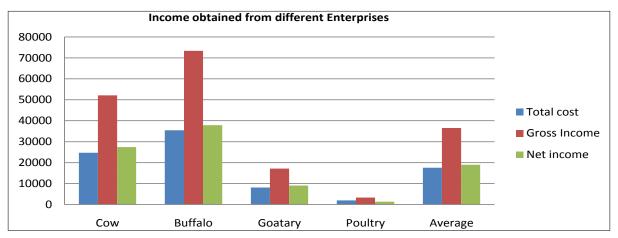| Sl. No.	Particular	Integrated of different enterprises			
		Crop + veg + Dairy	**Crop + veg + Goatary**	**Crop + veg + Poultry**	**Crop + goatary + Poultry**
1	Total Working Cost	142723.80	111612.99	107605.09	72927.70
2	Fixed on overhead cost	46122.25	25143.18	22991.96	17861.50
3	Total cost	188846.05	136756.17	130597.05	90789.20

Fig. 2: Income generated from the livestock enterprises

Table 7: Cost and Income from different enterprises in the IFS

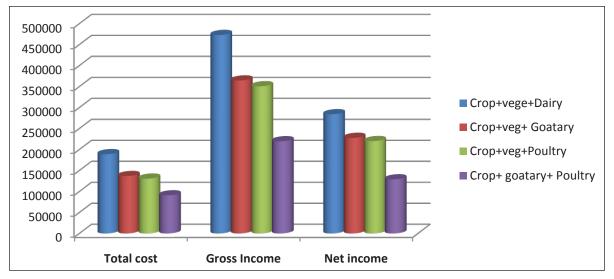| Sl. No.	Particular	Integrated of different enterprises				
		Crop + veg + Dairy	Crop + ve + Goatary	Crop + veg + Poultry	Crop + goatary + Poultry	Average
1	Total cost	188846.05	136756.17	130597.05	90789.20	136,747.12
2	Gross Income	472851.23	364500.89	350625.52	219698.09	351,918.93
3	Net income	284005.18	227744.72	220028.47	128908.89	**215171.82**
4	Input-output ratio	**2.50**	**2.66**	**2.68**	**2.41**	**2.56**

Fig. 3: Income generated from different IFS

+ veg + Poultry and Crop + goatary + Poultry of different land holding of farmer like marginal, small and large farmers was in ₹ 188846.05, 136756.17, 130597.05 and 90789.20 respectively.

Income generated in a different model of integrated enterprises

The farmer obtained income from a different models of farming systems (Table 7).

In the table 7 mentioned, the average gross income of different enterprises with combination means Crop + vegetable + Dairy, Crop + vegetable + goatary, Crop + vegetable + Poultry and Crop + goatary + Poultry of different land holding of farmers like marginal, small and large farmers was in ₹ 472851.23, 364500.89, 350625.52 and 219698.09 respectively. The I-O ratio was highest among the Crop + vegetable + Poultry combination, i.e., 2.68, following the Crop + vegetable + goatary integration, i.e., 2.66. The average net income upon integration of the enterprises along with the crops was ₹ 215171.82, and I-O ratio was found to be 2.56.

CONCLUSION

From the alone study, it can be concluded that the integration of farming systems (live-stock+crops) can be a better pathway to achieve the goal of doubling income. We can see income generated from the practice of crops alone generated an input-output ratio of 1:1.96 on average, and the live stocks gave an input-output ratio of 1:2.07. Still,it was observed that upon integrating the live-stock and crops in different combinations, it gave 1: 2.56. Input-output ratio, which was almost an intelligent return compared to earlier ones, was given alone. Also, IFS model ensures a healthy society along with food security. It also put forth a step toward the conservation of natural resources(like soil health) for the upcoming future generations. Hence, the target of doubling farmers' income can be seen achieved by the adoption of the IFS model in practice.

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