

International Journal of Agriculture Extension and Social Development

Volume 8; Issue 12; December 2025; Page No. 925-928

Received: 13-10-2025
Accepted: 19-11-2025

Indexed Journal
Peer Reviewed Journal

Mapping of integrated farming system diversity and predominant farming models in Cooch Behar, West Bengal

¹Surkunta Kiran Reddy and ²Kausik Pradhan

¹Teaching Associate, Department of Agricultural Extension, Agricultural College, PJTAU, Adilabad, Telangana, India

²Professor, Department of Agricultural Extension, Uttar Banga Krishi Viswavidyalaya (UBKV), Cooch Behar, West Bengal, India

DOI: <https://www.doi.org/10.33545/26180723.2025.v8.i12l.2932>

Corresponding Author: Surkunta Kiran Reddy

Abstract

This study examined the different Integrated Farming Systems' (IFS) adoption and finding the predominant IFS models in selected blocks of Cooch Behar district, West Bengal. The study area was chosen purposively owing to the widespread practice of integrated farming systems aimed at improving livelihood outcomes. A multistage sampling approach combining purposive and random techniques were adopted to select the respondents. Primary data were collected from 175 farmers practicing Integrated Farming Systems using a pre-tested structured interview schedule through personal interviews. The data were analysed using statistical tools like frequency, percentage, mean, standard deviation, coefficient of variation and rankings. The findings revealed that majority of the farmers were following the IFS components Crop + fishery (26.29%) and Crop+ Dairy (26.29%) followed by Crop + Dairy + Poultry + Fishery (10.29%) and Crop + Dairy + Piggery + Goat farming (6.29%) and so on. Like this, 20 different models containing different components were identified in the study out of 175 farmers from 3 blocks of the Cooch Behar district.

Keywords: Integrated farming system, livelihood, Cooch Behar

Introduction

Agriculture continues to be the primary source of livelihood for a majority of rural households in India, particularly in eastern states like West Bengal. However, increasing land fragmentation, climate variability, market uncertainties, and declining farm profitability have made farming a risky enterprise, especially for small and marginal farmers. In this context, enhancing livelihood security—which encompasses food security, income stability, employment generation, and resilience to shocks—has emerged as a central goal of agricultural development (Chambers & Conway, 1992) [2]. The Integrated Farming System (IFS) approach has been widely recognized as an effective strategy to address these challenges by promoting diversification and optimal use of farm resources. IFS involves the integration of multiple interrelated farm enterprises such as crops, livestock, fisheries, poultry, horticulture, and agroforestry in a mutually reinforcing manner (Behera & France, 2016) [1]. By recycling resources within the farm and reducing dependency on external inputs, IFS enhances productivity, income, employment opportunities, and environmental sustainability (Jayanthi *et al.*, 2003) [4]. Several studies have demonstrated that greater farming system diversity contributes positively to livelihood security by spreading risk, ensuring year-round income, and improving nutritional security of farm households (Singh *et al.*, 2012; Rautaray *et al.*, 2019) [7, 6]. Diversified farming systems are particularly suitable for smallholders, as they enable efficient utilization

of limited land, labor, and capital resources while improving resilience against climatic and economic shocks (FAO, 2014) [3]. West Bengal, characterized by diverse agro-ecological situations, high population density, and predominance of small and marginal farmers, provides a conducive environment for the adoption of varied Integrated Farming System models. Farmers in the state practice a range of IFS combinations involving crops, livestock, fisheries, and allied enterprises based on resource availability, market access, and socio-economic conditions (Mondal *et al.*, 2018) [5]. However, the nature, composition, and extent of diversity among these IFS models vary widely across regions and households. Although numerous studies have highlighted the benefits of IFS, systematic documentation and analysis of the different IFS models followed by farmers and their linkage with livelihood security remain limited, particularly in the context of West Bengal. Understanding the existing IFS models is essential for identifying successful combinations, scaling up best practices, and designing location-specific interventions. Therefore, the present study was undertaken to identify and analyze the different Integrated Farming System models practiced by farmers in West Bengal and to examine their relationship with the level of livelihood security.

Materials and Methods

The study was carried out in Cooch Behar district of West Bengal, specifically in the Cooch Behar-I, Cooch Behar-II,

and Dinhata-II blocks. A multistage sampling design incorporating purposive and random sampling techniques was adopted for the selection of study areas and respondents. From the total of twelve blocks in the district, three blocks were selected through simple random sampling. Subsequently, two villages were randomly chosen from each selected block. Within each village, respondents were identified purposively based on insights obtained from a preliminary pilot survey, ensuring the inclusion of farmers practicing Integrated Farming Systems (IFS). In total, 175 IFS-adopting farmers from six villages across the three selected blocks constituted the sample for the study. Primary

data were collected using a structured interview schedule administered through personal interviews. An open-ended questionnaire was constructed to get the data from the IFS farmers. They were asked to indicate the incorporated components at their farm. The components should be from agriculture and allied sectors like poultry, dairy, fishery etc. The collected data were subjected to statistical analysis using tools such as frequency, percentage, mean, standard deviation and coefficient of variation analysis.

Results and Discussion

Table 1: Profile Characteristics of Respondents (N = 175)

Variable	Category	Frequency	%	Statistics
Socio-personal variables				
Age (X ₁)	Young	84	48.00	Mean = 41.31
	Middle aged	47	26.86	S.D. = 16.09
	Old	44	25.14	C.V. = 38.96
Education (X ₂)	Illiterate	0	0.00	Mean = 2.17
	Primary	43	24.60	S.D. = 0.79
	Higher secondary	59	33.70	C.V. = 36.75
	College and above	73	41.70	
Family size (X ₃)	Small	85	51.43	Mean = 4.77
	Medium	90	48.57	S.D. = 1.78
	Big	0	0.00	C.V. = 37.42
Dependency ratio (X ₄)	Low	78	44.60	Mean = 1.97
	Medium	25	14.30	S.D. = 0.92
	High	72	41.10	C.V. = 47.20
Family education status (X ₅)	Low	34	19.42	Mean = 2.74
	Medium	113	64.57	S.D. = 1.08
	High	28	16.01	C.V. = 39.71
Farming experience (X ₆)	Low	60	34.30	Mean = 2.02
	Medium	52	29.70	S.D. = 0.84
	High	63	36.00	C.V. = 41.67
Occupation (X ₇)	Farming + AH	31	17.10	Mean = 4.38
	Farming + AH + Service	82	46.90	S.D. = 1.41
	Farming + AH + Business	62	36.00	C.V. = 32.26
Socio-economic variables				
Annual family income (X ₈)	Low	20	11.40	Mean = 2.51
	Medium	45	25.70	S.D. = 0.69
	High	110	62.90	C.V. = 27.58
Annual expenditure (X ₉)	Low	25	14.28	Mean = 0.96
	Medium	69	39.42	S.D. = 0.32
	High	81	46.30	C.V. = 33.51
Land holding (X ₁₀)	Low	28	16.00	Mean = 4.15
	Medium	106	60.57	S.D. = 1.59
	High	41	23.43	C.V. = 38.42
Irrigation facilities (X ₁₁)	Low	24	13.70	Mean = 2.86
	Medium	90	61.40	S.D. = 1.13
	High	61	34.90	C.V. = 39.66
Material possession (X ₁₂)	Low	30	17.14	Mean = 19.02
	Medium	109	62.28	S.D. = 7.11
	High	36	20.57	C.V. = 37.43
Animal possession (X ₁₃)	Low	29	16.57	Mean = 5.78
	Medium	92	52.57	S.D. = 1.96
	High	54	30.85	C.V. = 33.97
Socio-psychological variables				
Credit seeking behaviour (X ₁₄)	Low	29	16.60	Mean = 7.18
	Medium	97	61.10	S.D. = 2.41

	High	39	22.30	C.V. = 33.69
Social participation (X_{15})	One organization	38	21.70	Mean = 2.21
	More than one organization	62	35.40	S.D. = 0.77
	Membership with position	75	42.90	C.V. = 35.15
Information seeking behaviour (X_{16})	Low	33	18.86	Mean = 18.84
	Medium	94	53.71	S.D. = 5.93
	High	48	27.43	C.V. = 31.49
Scientific orientation (X_{17})	Low	35	20.00	Mean = 28.85
	Medium	91	52.00	S.D. = 10.47
	High	49	28.00	C.V. = 36.31
Risk orientation (X_{18})	Low	41	23.43	Mean = 28.91
	Medium	98	56.00	S.D. = 8.71
	High	36	20.57	C.V. = 30.12
Economic orientation (X_{19})	Low	33	18.86	Mean = 29.52
	Medium	107	61.14	S.D. = 10.72
	High	35	20.00	C.V. = 36.32
Innovativeness (X_{20})	Low	56	32.00	Mean = 1.99
	Medium	65	37.10	S.D. = 0.79
	High	54	30.90	C.V. = 39.97
Management efficiency (X_{21})	Low	36	20.57	Mean = 60.87
	Medium	99	56.57	S.D. = 17.44
	High	40	22.86	C.V. = 28.65

Table 1 presents the profile characteristics of the respondents categorized under socio-personal, socio-economic, and socio-psychological variables. The socio-personal variables included age, education, family size, dependency ratio, family education status, farming experience, and occupation. The findings revealed that a majority of the respondents were young farmers, followed by middle-aged and old-aged categories, with a mean age of 41.31 years. With respect to education, the mean score was 2.17, indicating that most of the respondents had attained college-level education or above, followed by higher secondary and primary education. Family size showed a mean value of 4.77, with respondents almost equally distributed between small and medium-sized families, while none belonged to the large family category. The dependency ratio recorded a mean score of 1.97, with most respondents falling under the low dependency category, followed by high and medium levels. Regarding family education status, the majority of respondents belonged to the medium category, followed by low and high levels, with a mean score of 2.74. Farming experience was predominantly high among the respondents, followed by low and medium levels, with a mean score of 2.02. Occupational distribution showed a mean score of 4.38, revealing that most farmers were engaged in farming along with animal husbandry and service, followed by farming with animal husbandry and business, and farming combined with animal husbandry alone.

Socio-economic variables considered in the study included annual family income, annual family expenditure, landholding size, irrigation facilities, material possession, and animal possession. The mean score for annual family income was 2.51, with a majority of respondents belonging to the high-income category, followed by medium and low levels. The average landholding size was 4.15 acres, and most of the respondents were small farmers, followed by medium and marginal farmers. Annual family expenditure showed a mean score of 0.96, with a majority of

respondents falling under the high expenditure category, followed by medium and low levels. In terms of material possession, the mean score was 19.02, and most respondents belonged to the medium category, followed by high and low levels. Similarly, animal possession was predominantly at a medium level among more than half of the respondents, followed by high and low levels. The irrigation status had a mean score of 2.86, with the majority of farmers categorized under medium irrigation status, followed by high and low levels.

The socio-psychological characteristics studied included credit-seeking behaviour, social participation, information-seeking behaviour, scientific orientation, risk orientation, economic orientation, innovativeness, and management efficiency. Credit-seeking behaviour recorded a mean score of 7.18, with most respondents exhibiting a medium level, followed by high and low levels. Information-seeking behaviour had a mean score of 18.84, with the majority of farmers falling under the medium category, followed by high and low levels. Social participation showed a mean score of 2.21, indicating that most respondents held membership with position in organizations, followed by those with membership in more than one organization, while a few had membership in a single organization. Scientific orientation had a mean score of 28.85, with the majority of respondents categorized under the medium level, followed by high and low levels. Risk orientation recorded a mean score of 28.91, with most respondents belonging to the medium category, followed by low and high levels. Economic orientation showed a mean score of 29.52, with the majority of farmers falling under the medium category, followed by high and low levels. Innovativeness had a mean score of 1.99, indicating that most respondents belonged to the medium category, followed by low and high levels. Management efficiency recorded a mean score of 60.87, with the majority of respondents exhibiting a medium level, followed by high and low levels.

Table 2: Distribution of Farmers According to Integrated Farming System (IFS) Models Adopted

Sl. No.	Integrated Farming System	Number	Percentage (%)
1	Crop + Fishery	46	26.29
2	Crop + Dairy	46	26.29
3	Crop + Dairy + Poultry + Fishery	18	10.29
4	Crop + Dairy + Piggery + Goat farming	11	6.29
5	Crop + Dairy + Poultry	10	5.72
6	Crop + Dairy + Poultry + Goat farming	10	5.72
7	Crop + Poultry + Fishery	6	3.43
8	Crop + Fishery + Duck farming	5	2.86
9	Crop + Poultry + Mushroom	2	1.14
10	Crop + Fishery + Duck farming + Goat farming	2	1.14
11	Crop + Poultry + Fishery + Mushroom	2	1.14
12	Crop + Duck farming + Mushroom	2	1.14
13	Crop + Fishery + Goat farming	2	1.14
14	Crop + Dairy + Duck farming + Goat	2	1.14
15	Crop + Poultry	2	1.14
16	Crop + Dairy + Poultry + Goat farming + Rabbit farming	2	1.14
17	Crop + Dairy + Duck farming	2	1.14
18	Crop + Poultry + Goat farming	2	1.14
19	Crop + Duck farming	2	1.14
20	Crop + Dairy + Goat farming + Apiculture	1	0.57
Total		175	100.00

Table 2. shows that there are twenty number of integrated farming systems were found in the study area. Out of which majority (26.29%) of the farming systems were belongs to crop + fishery and crop + dairy respectively, followed by 10.29 percent of those were crop + dairy + goat farming, 6.29 percent were having crop + goat farming at their field, 5.72 percent each were in the category of crop + dairy + poultry and crop + dairy + poultry + goat farming. Crop + poultry + fishery farmers were 3.43 percent and crop + fishery + duck farming were 2.86 percent, followed by equal percentage of farmers (1.14%) were having eleven different type of enterprise combinations like crop + poultry + mushroom, crop + fishery + duck farming + goat farming, crop + poultry + fishery + mushroom, crop + duck farming + mushroom crop + fishery + goat farming crop + dairy + duck farming + goat farming, crop + poultry, crop + dairy + poultry + goat farming + rabbit farming, crop + dairy + duck farming, crop + poultry + goat farming and crop + duck farming. only 0.57 percent of farmers were having crop + dairy + goat farming + apiculture. It is indicated from the results that majority of the farmers are taking dairy, fishery and poultry as the components of integrated farming system along with the agriculture. The possible reason behind it might be that, the high demand for milk products and meat of fish and chicken.

Conclusion

From the above results it is concluded that the Crop-based IFS models with fishery and dairy were the most commonly adopted, while more complex combinations with poultry, goat, duck, mushroom, rabbit, and apiculture were less frequent. The diversity of IFS practices reflects farmers' strategies to optimize resources, increase income, and enhance livelihood security. Promoting location-specific and diversified IFS models can further strengthen farm resilience and sustainable rural livelihoods.

References

1. Behera UK, France J. Integrated farming systems and

livelihood security. *Indian Journal of Agronomy*. 2016;61(4):410-419.

2. Chambers R, Conway G. Sustainable rural livelihoods: practical concepts for the 21st century. IDS Discussion Paper No. 296. Brighton (UK): Institute of Development Studies; 1992.
3. FAO. Building resilience for sustainable agriculture. Rome (Italy): Food and Agriculture Organization of the United Nations; 2014.
4. Jayanthi C, Rangasamy A, Chinnusamy C. Water budgeting for components in lowland integrated farming systems. *Agricultural Systems*. 2003;76(3):785-799.
5. Mondal S, Ray GL, Ghosh S. Integrated farming system models for small and marginal farmers of eastern India. *Indian Research Journal of Extension Education*. 2018;18(2):23-28.
6. Rautaray SK, Behera D, Swain P. Farming system diversification and livelihood security of smallholders. *Journal of Farming Systems Research & Development*. 2019;25(1):1-8.
7. Singh KM, Singh RKP, Kumar A. Livelihood security of farmers under different farming systems. *Indian Journal of Extension Education*. 2012;48(3&4):55-60.