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Mitigating distress migration through Agri-entrepreneurship: An economic analysis of integrated farming in Uttarakhand

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Abstract

The agricultural practices in the Himalayan regions harbour intense structural impediments as well as low economic viability, thereby being a major push factor for Distress Migration contributing to the "Ghost Villages" phenomenon. This study attempts to present the effectiveness of the Integrated Farming System (IFS) as a resilient strategy for intervention through a detailed Case Study of a progressive farming practitioner in the Bageshwar district, Uttarakhand. The study indicates the Economic Transition of the farming system from the initial Subsistence pattern of 2016-2017 to a Diversified Commercial system in 2024-25, based on the initiatives in Crop Diversification, Livestock Integration, and Value Addition. The findings exhibit an "Exponential Growth Pattern" with "Net Income" increasing from ₹ 13,300 to ₹ 5.55 Lakhs" and an Increase in the Benefit Cost (B:C) Ratio from 1.85 to 2.97. It concludes that the IFS strategy establishes a resilient high-value alternative to the mono cropping approach, successfully providing employment, reducing risk and enhancing both resource efficiency and farmer income.

Keywords: Agri-entrepreneurship, distress migration, Integrated Farming System (IFS), livelihood security

Introduction

The agricultural landscape in the Himalayan region represents a paradox of rich ecological resources with poor economic outcomes for the farmers. A review of recent literature underlines three critical themes, namely: structural constraints of hill agriculture, socio-economic drivers of distress migration, and efficacy of integrated farming systems (IFS) as a sustainable intervention.

a. Structural constraints and Drivers of distress migration

Agriculture in the hilly regions is depressed due to unique biophysical and institutional constraints. Joshi and Dwivedi 2025 ^[1], through the use of regression analysis and ANOVA in Pithoragarh district level data, were able to pinpoint that financial constraints and market-related issues were the major factors that result in negative significant impact on agricultural earnings. Their study pinpoints that though environmental risks are there, lack of market linkage and financial liquidity are major obstacles. Further, Raghav and Srivastava 2014 ^[2], in their study of tribal farms in the Tarai region Udham Singh Nagar, have listed fragmented landholdings, high cost of inputs, and poor linkage with extension agencies as the major constraints to the adoption of modern farming systems. They argue that the high cost of inputs discourages farmers from using essential plant protection measures, thus resulting in suboptimal yields.

The reduced viability of agriculture functionally represents a strong "push" factor that encourages the able-bodied

workforce to leave the hills. Mamgain & Reddy (2017) ^[3] refer to migration simply as a means of survival but instead emphasize the semi-permanent nature of the process, as 36% of households have abandoned their villages permanently, giving rise to the problem of the "Ghost Village". More important, the study attests that a failure within the 'remittance economy' has occurred, the primary use of remittances being consumption spending for survival, which lacks a local 'multiplier effect,' adding instead to productive agriculture investments. It also holds a deep significance for the people who remain in their homeland. According to Bhandari & Reddy (2015) ^[4], "the feminization of agriculture is observed in these regions, as women in migrant households work more compared to their non-migrant counterparts." It is ironic that Remittance-receiving migrant households, despite earning money, tend to have a substantial percentage of their lands fallow along with a smaller number of livestock compared to non-migrant families, thereby resulting in a further stagnation in agricultural growth. The studies conducted by Joshi & Dwivedi (2025) ^[5] tend to support this, stating that when the youths migrate, there is a substantial underutilization of agricultural lands along with a subsequent reliance on non-domestic income sources.

b. Integrated Farming System (IFS) as a Strategic Solution

In light of these challenges, recent research work has identified and confirmed the potential provided by the

Integrated Farming System (IFS) as a game-changer for small-scale farmers. Sati *et al.*, (2025) ^[6] clearly outline that "IFS provides a 'Closed Loop System' wherein crop residue is given as feed to livestock, and crop nutrients are provided by livestock's refuse, thereby lowering the cost of production considerably." The result of their case study clearly supports that "diversification in poultry and off-season vegetables raises income multi-fold, as against monoculture practices."

Thakur *et al.* (2025) ^[7] established that 1.0-hectare IFS units in the NW Himalayas gave a net profit of ₹3.05 lakhs and provided employment of 481 man-days per year, thus reducing the pressure to migrate. Again, a success story has been provided by Kushwaha *et al.* (2021) ^[8] on a Champawat model that is diverse, encompassing fish, milk, and mushrooms, achieving a Benefit-Cost ratio of 3.08 and guaranteeing the nutritive independence of the farmer family. To support this, Singh *et al.*, (2025) ^[10] noted that a Horticulture-based IFS in Bageshwar raised the income four times in seven years (*i.e.* from ₹ 1.15 lakh to ₹ 5.20 lakh) supporting that such models are resilient to climatic changes. Then again, with the economic disruption of the COVID-19 pandemic, Singh *et al.*, (2025) ^[10] showed how IFS exhibited resilience: while the B:C of standalone poultry units dropped to 1.87, the diversified IFS model buffered this disruption with a B:C ratio of 2.04. This optimized system yielded the highest net return of ₹ 3,97,590 by 2024-25 because of on-farm resource recycling and value addition.

As regards the details, a study carried out by Gangwar *et al.*, in 2013 ^[11] on poultry-based systems in the Kumaon area identified that even small-scale setups with 10-15 birds could provide considerable additional earnings and protein supplementation in poor families. Lastly, macro-level studies carried out by Prakash *et al.*, in 2019 ^[12] establish the relevance and need for such interventions. An SLIS (Sustainable Livelihood Security Index)-based study recently carried out established that there was an inverse correlation between "Ecology" and "Economy" in the hill regions of Uttarakhand, with districts having maximal forest area corresponding to lowest economic efficiency. As proposed in IFS, it was established that eco-friendly intensification was necessary to validate it as the only feasible alternative that could increase economic efficiency despite reduced ecological safety.

The current research highlights the success story of Mr. Manoj Singh Koranga, a progressive farmer from the district of Bageshwar, who was successful in shifting from

traditional farming practices to an Integrated Farming System of a much higher value. Unlike other traditional ways of farming, limited only to the main production, this specific success story examined the feasibility of a comprehensive approach towards the integration of protected cultivation, commercial poultry farming, and, most importantly, the value addition approach through the use of the "FSSAI spice and pickle processing unit." This paper will endeavour to provide a successful "Agri-Entrepreneurship Model" of averting distress migration and facilitating sustainable means of living, as practiced by the educated youth of village Banlekh, shifting towards IFS, thereby countering the drawbacks of traditional hill farming.

Socio-Economic Profile and Background of the Case Study

The current paper is a case study on Shri Manoj Singh Koranga (S/o Shri Khushal Singh Koranga), a 39-year-old progressive farmer from Village Banlekh, District Bageshwar, Uttarakhand. Though possessing higher-level educational qualifications (M.A. and B.Ed.), Shri Koranga encountered difficulties in acquiring suitable work. This motivated him to join the agricultural and allied sector to create a sustainable living out of his 1.0 acre marginal land. Presently, his main occupation includes a diverse Integrated Farming System involving horticulture, rearing, and processing.

It is worth noting that he upgraded his skills to become a "Quality Seed Grower" through training (2019-2020) at KVK Bageshwar and established "Om Food Processing Unit" with the marking of FSSAI. The system of farming being practiced in 2017, *i.e.* before technical interventions, was just subsistence-level farming with low profitability, largely restricted, due to unscientific management practices, and weak market connections.

Methodology and Interventions

Towards solving the limitations associated with the baseline subsistence model, an intervention strategy with multiple approaches was developed under technical mentorship from Krishi Vigyan Kendra (ICAR-VPKAS), Bageshwar, Uttarakhand. Technical assistance was obtained through convergence initiatives with the concerned state departments of Agriculture, Horticulture, Fishery, and the Zila Udyog Kendra (District Industry Centre). The change was achieved with the application of the four strategic pillars described in detail in Table 1.

Table 1: Strategic Intervention Matrix

S. No.	Intervention Pillar	Specific Actions & Implementation Details
1	Crop Diversification and Intensification	Change in the cropping pattern from low value crops to high value horticultural crops, with emphasis on off-season vegetable growing using protected structures (Polyhouses), with a fruit component to derive maximum unit return.
2	Livestock Integration	Diversification of farm resources to manage risk and guarantee a constant income stream by introducing cross-breed dairy cattle, a backyard broiler farm and fishery units.
3	Capacity Building	Up-skilling of the subject through specialized "Quality Seed Growers" training (2019-20) in KVK Bageshwar, which helps produce quality vegetable seeds and seedlings within the farm itself as an additional income avenue.
4	Value Addition and Processing	Reducing post-harvest losses with the launch of the 'FSSAI-certified Om Food Processing Unit' (2021), with a focus on processing local spices, Juices as well as pickles to gain a greater share of the overall consumer spend.

Economic Analysis

The economic viability of the transition from traditional subsistence farming to Integrated Farming System was studied by comparing cost of production, gross returns, and net income between baseline year (2016-17) and post-intervention maturity year (2024-25).

As evident from Table 2 and Table 3, the structural transformation in farm enterprises has fundamentally

changed the financial profile of the farm economy. During the baseline period, in 2016-17, the farm economy depended on traditional field crops such as Finger Millet, Paddy, and Wheat, supplemented with only one Desi cow, yielding a low Gross Income of ₹ 28,950 and a Net Income of ₹ 13,300. It was a low-input and low-output production system, predominantly for household consumption, with minimal market surplus.

Table 2: Baseline Economic Profile (2016-17) Before Technical Intervention

Component	Area / Unit	Production (Qtl)	Cost of Production (₹)	Gross Income (₹)	Net Income (₹)
Field Crop – Kharif (Finger Millet, Paddy, Soybean)	0.5 Acre	2	1,200	2,300	1,100
Field Crop – Rabi (Wheat, Barley, Lentil)	0.5 Acre	1.8	1,400	2,600	1,200
Hort. Crop – Fruits (Citrus, Peach)	0.2 Acre	3	900	1,700	800
Hort. Crop – Vegetables (Potato, Onion, Garlic)	0.3 Acre	3	800	1,600	800
Livestock (Dairy) (Desi Cow)	1 Unit	750 (Lit)	10,250	18,750	8,500
Backyard Poultry	25 Birds	0.1	1,100	2,000	900
Total Baseline	-	-	15,650	28,950	13,300

Table 3: Post-Intervention Economic Status (2024-25) After Implementation of Integrated Farming System (IFS)

Component	Area / Unit	Production (Qtl/Lit)	Cost of Production (₹)	Gross Income (₹)	Net Income (₹)
Field Crop – Kharif (Hybrid Rice, Soybean)	0.5 Acre	10	10,000	30,000	20,000
Field Crop – Rabi (HYV Wheat, Lentil)	0.3 Acre	3.5	5,000	18,000	13,000
Hort. Crop – Fruits (Citrus, Mango)	0.2 Acre	2.5	3,000	8,000	5,000
Hort. Crop – Vegetables (Polyhouse: Broccoli, Capsicum, etc.)	0.5 Acre	21	50,000	300,000	250,000
Fisheries	4 Ponds (0.08 ac)	4	43,000	120,000	77,000
Backyard Poultry	260 Birds	5	45,000	150,000	105,000
Value Addition (Spice, Pickle, Juice Processing)	1 Unit	8.5	125,000	210,000	85,000
Total post-intervention	-	-	2,81,000	8,36,000	5,55,000

On the other hand, the post-intervention scenario (2024-25) shows a commercial change. The addition of high-value elements like the cultivation of protected vegetables, commercial broiler farming, fisheries, and value-added processing contributed to the Gross Income of Rs. 8.36 Lakhs and Net Income of Rs. 5.55 Lakhs. The Cost of Production showed a marked rise from Rs. 15,650 to Rs. 2.81 Lakhs, marking the changeover from zero-budget

farming practices to an investment-based commercial farming approach, but the escalation in cost has been surpassed by the dramatic increase in income.

Key Economic Observations

A critical examination of the comparative data (presented in Table 4) highlights following points:

Table 4: Comparative Impact Analysis (Growth Statistics) Economic Growth: 2016-17 vs. 2024-25

Economic Parameter	Baseline (2016-17)	Post-Intervention (2024-25)	Net Increase (₹)
Gross Income	₹ 28,950	₹ 836,000	+ ₹ 807,050
Cost of Production	₹ 15,650	₹ 281,000	+ ₹ 265,350
Net Income	₹ 13,300	₹ 555,000	+ ₹ 541,700
B: C Ratio	1.85	2.97	-

- Exponential Income Growth:** The introduction of IFS set off an exponential growth in Net Income, from a paltry ₹13,300 to ₹5.55 Lakhs, thereby establishing the financial feasibility of high-value crop production on marginal lands.
- Horticultural Dominance:** The protected vegetable crop finally became the dominant source of profit, chipping in with ₹2.50 Lakhs (approx. 45% of total profit) against only ₹800 in the original period.
- Livestock Scaling:** The commercialization of the poultry enterprise involving scaling up the poultry size from 25 to 260 resulted in the net profits escalating over 100 times (₹900 to ₹1.05 Lakhs), while the additional fisheries enterprise created a new source of revenue of approximately ₹77,000.

- Value Addition Buffer:** The value addition cum processing unit (spices/pickles) has added Rs.85,000 to the bottom line, thereby eliminating losses in the post-harvest sector.
- Resource Efficiency:** The capital efficiency has been improved to a great extent, with an increase in B: C Ratio from 1.85 to 2.97.

Conclusion

The case study of Shri Manoj Singh Koranga proves that if there is an effective transition from traditional subsistence agriculture to a scientifically managed IFS, it is possible to combat both stagnation in terms of economy and distress migration, which is so prevalent in this Himalayan belt. By integrating protected cultivation, animal husbandry, and

value addition, there was a transformative increase of net income, and there was an improvement in the BCR, which was raised from 1.85 to 2.97. It proves that eco-friendly intensification, besides being economical on marginal soil, is scalable aggression in the form of an "Agri-Entrepreneurship Model," wherein it is possible to reverse the fate of Ghost Villages.

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