

INTEGRATED FARMING ENHANCED INCOME FOR RURAL FARMER IN CHANDEL DISTRICT OF MANIPUR

Asem Ameeta Devi*, Khumlo Levish, K Sonamani Singh, Ts Leenda Monsang, Ps Lavid Anal

ICAR KVK Chandel

*Corresponding author: Asem Ameeta Devi: E-mail-asemameeta2007@gmail.com

ABSTRACT

Mr. L. Kanlum of Lamphoupasna village under ICAR-KVK, Chandel, practiced subsistence farming for their livelihood, in order to maximize farm productivity, the technological interventions through Integrated Farming System were adopted in participatory mode by KVK Chandel, ICAR Research Complex for NEH Region, Manipur Centre, under TSP. he has adopted Integrated Farming System for enhancement of livelihood for 1.75 ha area of land. IFS-Agri-Vegetable-piggery-vermicomposting-Jalkund based integrated farming system (maize, rapeseed, field pea, broadbean, Cabbage, Citrus, piggery and fish in Jalkund). he could earned the net returned of Rs 2.72.902/ha/annum from different enterprises with the B:C ratio of 4.03:1. IFS has proven very successful, his success story has inspired and inculcated the surrounding active farmers as "Seeing is Believing."

KEYWORDS; Integrated farming, Income, Livelihood and Rural farmer

INTRODUCTION

Agriculture serves as the economic backbone of Chandel, a hilly, border district in southeastern Manipur characterized by a predominantly tribal population. Historically, rural livelihoods in this region have been anchored in a mix of traditional Jhum (shifting cultivation) on hill slopes and mono-cropped, rainfed wet-rice cultivation in the small valleys. While these traditional practices have sustained generations, they are increasingly failing to cope with modern socio-economic and environmental challenges. Small and marginal farmers in Chandel face severe income instability due to their heavy reliance on a single annual crop, which leaves them highly vulnerable to changing monsoon patterns, prolonged dry winter spells, and fluctuating market prices. This economic vulnerability is compounded by the topography of the region. Rugged terrains, steep slopes, and a lack of proper irrigation infrastructure make intensive, industrialized farming unfeasible. Consequently, a vast majority of farmers experience a long "lean season" during the dry winter months, during which food security dips and lack of farm employment forces youth migration. To transform rural livelihoods from subsistence-level survival to profitable entrepreneurship, a structural shift is required away from fragmented, climate-vulnerable mono-cropping and toward a more resilient, diversified approach. The **Integrated Farming System (IFS)** provides a sustainable framework for this transformation. IFS is an agricultural strategy that intentionally integrates multiple, mutually supportive farm components—such as field crops, horticulture, livestock, poultry, agroforestry, and fisheries—within a single land holding. Instead of managing each component in isolation, an integrated system creates a cyclical, waste-to-input resource loop. For example, crop residues are recycled into nutritious livestock feed, animal manure is routed to fertilize high-value vegetable plots or condition fish ponds, and farm ponds act as vital water reservoirs for dry-season irrigation. By optimizing spatial and temporal resource allocation, IFS addresses the specific geographical challenges of Chandel. It minimizes the farmer's dependence on expensive, chemical external inputs (such as synthetic fertilizers and commercial feeds), which are difficult and costly to transport into the remote, hilly pockets of Manipur. Concurrently, it creates a staggered, year-round production cycle. When a farmer manages pigs, poultry, fish, and winter vegetables alongside regular paddy, the failure of one component due to erratic weather does not spell financial ruin. Instead, the steady, weekly cash flows from livestock and vegetable sales cushion the household economy, insulate them against climate shocks, and significantly enhance the net annual income of rural households.

MATERIAL AND METHOD

This study documents a field-validated Integrated Farming System (IFS) model optimized for a 1.5-hectare (ha) undulating, rainfed hilly farm plot in Chandel district, Manipur. The framework is designed to transition smallholder tribal farmers from subsistence monoculture into year-round circular production.

Study Site Context & Land Allocation

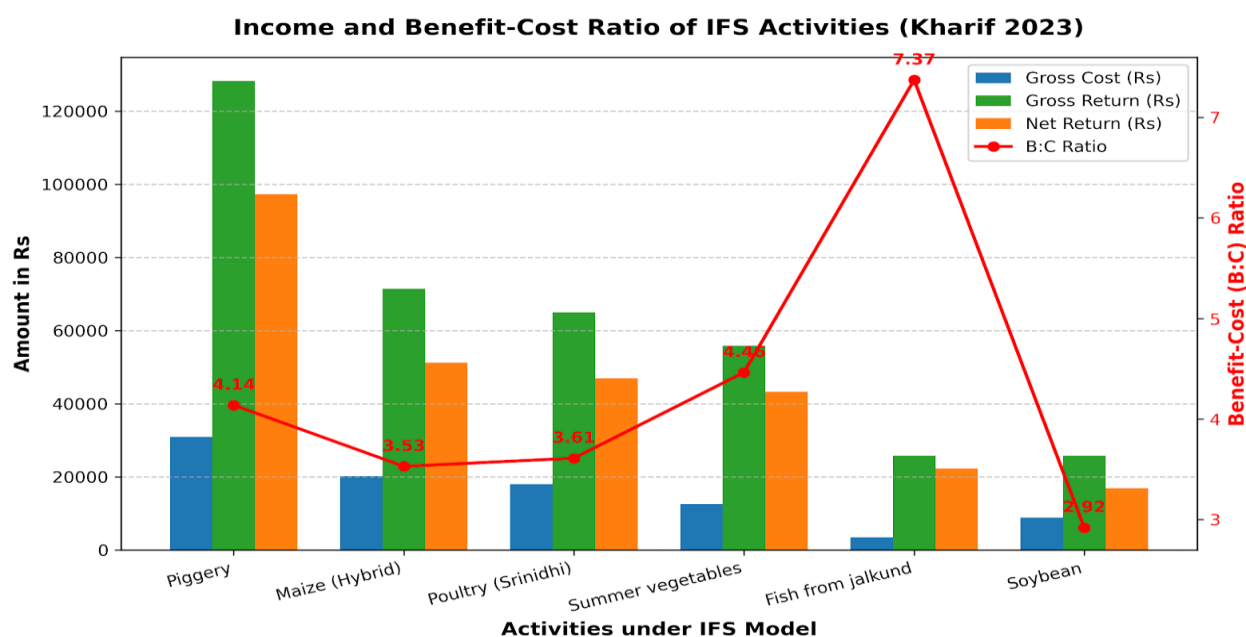
The system was established on sloping terrain characteristic of the Eastern Himalayan region, relying entirely on rainfed conditions during the monsoon and managed runoff during dry winter periods. The 1.5-hectare total area was structurally compartmentalized to optimize spatial and gravity-fed resource flow:

- **Agricultural Crop Area (0.60 ha):** Allocated for wet-rice cultivation on valley terraces and low-lying zones.

- **Horticulture & Agroforestry Zone (0.50 ha):** Positioned on middle to upper slopes to stabilize soil and harness slope drainage.
 - **Fishery Component (0.25 ha):** A multi-purpose pond dug at the lowest point of the farm plot to capture gravity-led nutrient runoff and wash-off from livestock sheds.
 - **Livestock Housing (0.05 ha):** Elevated animal sheds constructed on the banks or directly over hanging extensions of the pond to facilitate direct waste drop-down.
 - **Water Harvesting & Vermicomposting Infrastructure (0.10 ha):** Micro-reservoirs (Jalkunds) and organic manure processing units.
1. Name of the Farmer – L. Kanlun
 2. Marital Status- Married
 3. Date and place of birth- 01/09/1950, Chandel
 4. Postal address& Bank A/C.No with IFSC Code – Lamphoupsana village,
PO& dist. Chandel, Manipur state-795127
 5. Formal/informal education – Class VIII passed
 6. Resources owned by Farmer –
 - (i) Land (ha) -1.75 ha (1.00 ha under IFS, 0.50 paddy field and 0.25 orchard)
 - (ii) Water bodies with irrigation capacity- two Jalkund size 6m x 3.8m
 - (iii) Animal Resources including fish and Poultry – 100 nos., Piggery- 12 nos, Fishery- 250 nos in each in jalkund
 7. Area Under
 - (i) Field Crops-0.75 ha
 - (ii) Horticultural Crops- 0.25
 - (iii) Agroforestry/Apiculture/Sericulture -
 - (iv) Dairy/Poultry/Fisheries/Duckaries/Piggeries (specify unit) – Fish farming in Jalkund, Piggery under IFS- 2 female, 1 male and 9 piglets, Poultry as backyard- 100 nos
 8. New Technologies developed – Integrated Farming system
 9. New Technologies adopted in Farming (List only)- Maize/Soybean-Rapeseed/Fieldpea/Cabbage-Citrus-Piggery-fish in Jalkund based Integrated Farming System
 10. Technologies modified if any
 11. Activity wise income , cost-benefit ratio, gross and net income year-wise for previous five years
 - (i) Field crops
 - (ii) Horticulture crops
 - (iii) Livestock
 - (iv) Fisheries
 - (v) Any other

Table 1 Income for the year 2023 (only Kharif season) under IFS Model

Activities	Gross cost (Rs)	Gross return (Rs)	Net return (Rs)	Cost – benefit ratio
Field crops				
Maize (Hybrid) for 0.50 ha	20250	71475	51225	4.0
Soybean for 0.25 ha	8818	25750	16932	
Summer vegetables	12500	55800	43300	
Fish from jalkund	3500	25800	22300	
Piggery	31000	128300	97300	
Poultry-Srinidhi bird (as Backyard)	18000	65000	47000	
Total	94068	372125	278057	



Based on the data provided for the **Integrated Farming System (IFS) Model (Kharif 2023)**, showing through bar diagram comparing the Gross Cost, Gross Return, and Net Return for each activity.

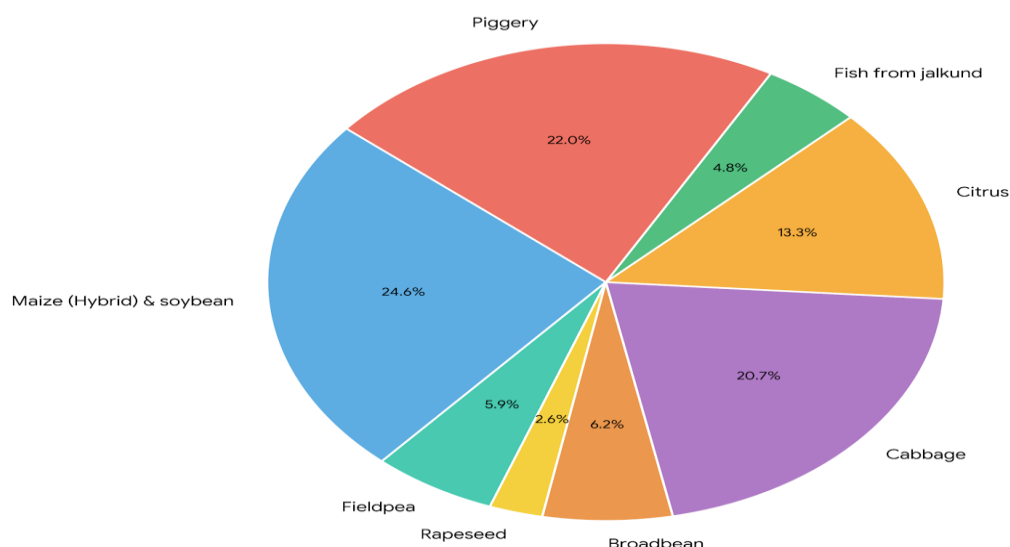
The diagram illustrates the financial performance of various components:

- **Highest Returns:** The **Piggery** unit yielded the highest income, with a Net Return of Rs. 97,300\$, followed by **Maize (Hybrid)** and **Poultry (Srinidhi)**.
- **Cost Efficiency:** **Fish from jalkund** shows a very low input cost (Rs. 3,500\$) relative to its Net Return (Rs. 22,300\$), indicating high profitability.
- **Total Performance:** The combined activities resulted in a total Net Return of Rs. 2,78,057for the Kharif season.

Table 2: Income for the year 2022 under IFS Model

Activities	Gross cost (Rs)	Gross return (Rs)	Net return (Rs)	Cost – befit ratio
Field crops				
Maize (Hybrid) & soybean for 0.75 ha	29068	96225	67157	4.03
Fieldpea for 0.25 ha	7875	24094	16219	
Rapeseed for 0.25 ha	4912	11875	6963	
Broadbean for o.25 ha	8000	24875	16875	
Cabbage for 0.25 ha	8500	65000	56500	
Citrus for 0.125 ha	6312	42500	36188	
Fish from jalkund	2500	15500	13000	
Piggery	23000	83000	60000	
Total	90167	363069	272902	

Contribution of Activities to Total Net Return (IFS Model 2022)



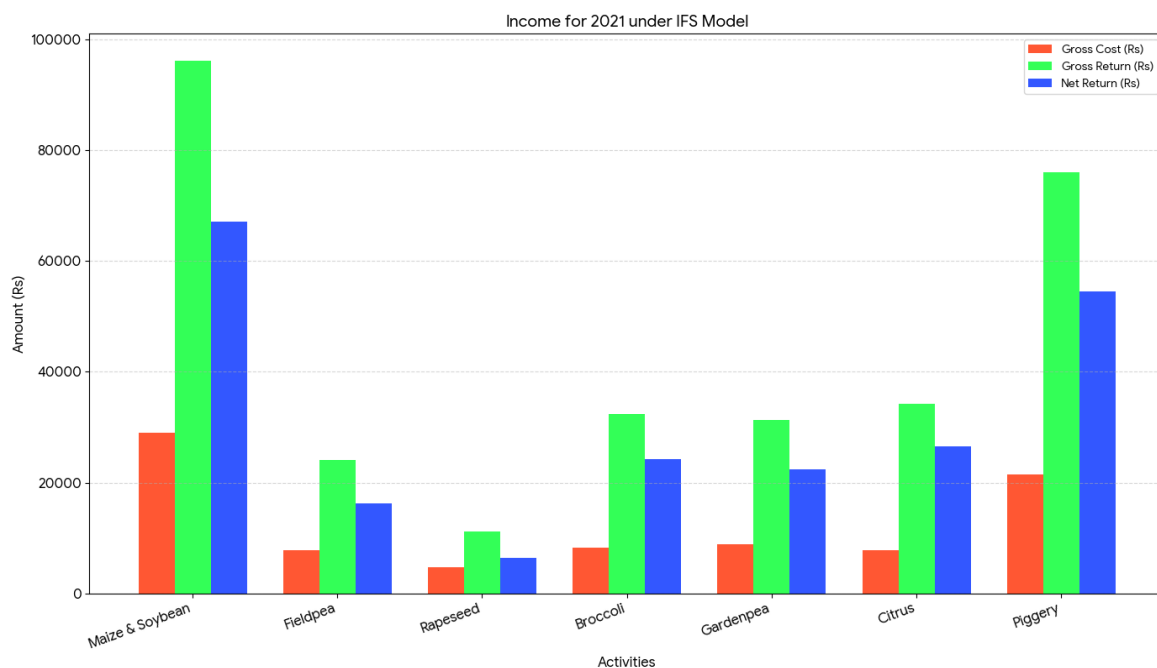
Based on the data for **Table 2: Income for the year 2022 under the IFS Model**, comparing the Gross Cost, Gross Return, and Net Return for each activity.

Key Observations from the 2022 Data:

- **Major Income Source:** The combination of **Maize & Soybean** (0.75\$ ha) provided the highest Gross Return (Rs. 96,225) and Net Return (Rs. 67,157).
- **High Profitability in Vegetables:** **Cabbage** cultivation showed a very high return relative to its cost, with a Net Return of Rs. 56,500\$ from a cost of only Rs. 8,500\$.
- **Livestock & Fisheries:** The **Piggery** unit contributed significantly with a Net Return of Rs. 60,000\$, while **Fish from jalkund** maintained a low-cost, high-return profile.
- **Total Performance:** The total Net Return for the year 2022 across all listed activities was Rs. 2,72,902.

Table 3 Income for the year 2021 under IFS Model

Activities	Gross cost (Rs)	Gross return (Rs)	Net return (Rs)	Cost – benefit ratio
Field crops				
Maize (Hybrid) & soybean	29068	96225	67157	3.47
Fieldpea	7875	24094	16219	
Rapeseed	4800	11250	6450	
Broccoli	8200	32405	24205	
Gardenpea	8900	31250	22350	
Citrus	7820	34300	26480	
Piggery	21500	76000	54500	
	88163	305524	217361	



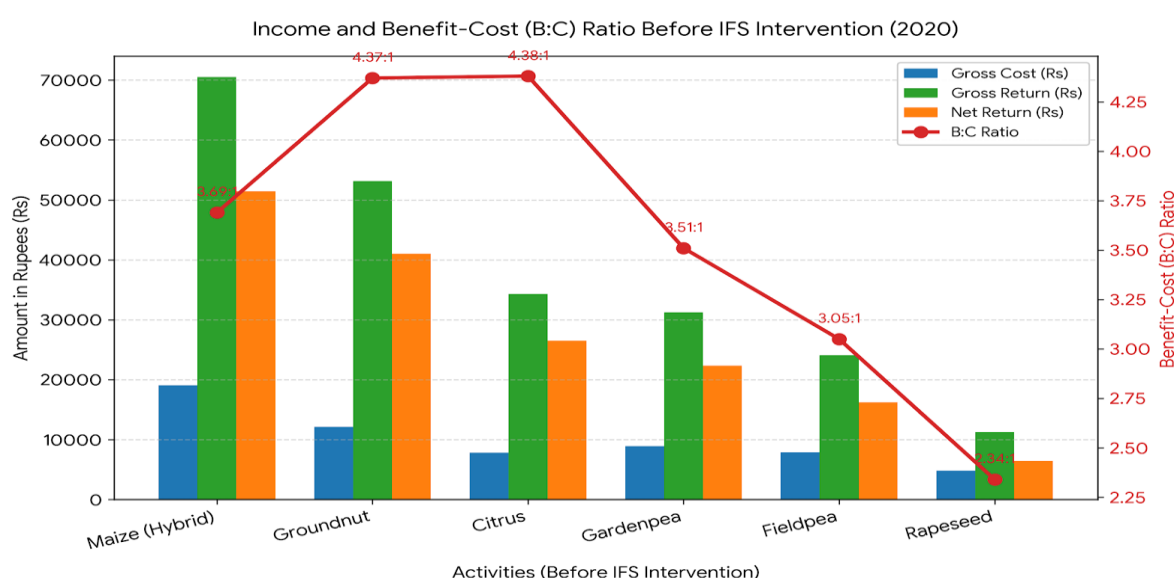
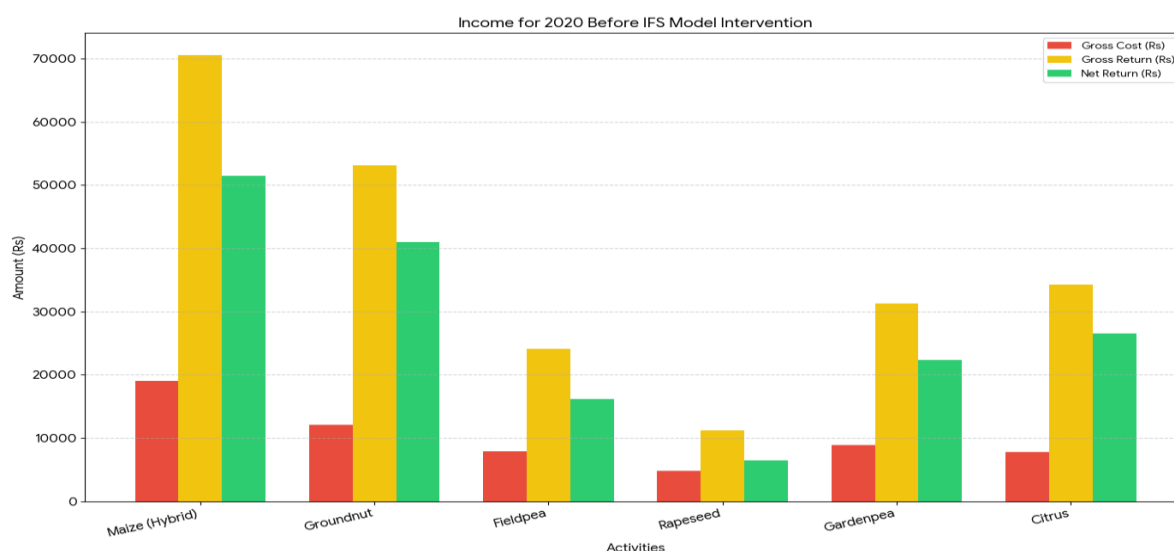
Based on the data for **Table 3: Income for the year 2021 under the IFS Model**, I have generated a colorful bar diagram comparing the Gross Cost, Gross Return, and Net Return for each activity.

Summary of the 2021 Data:

- **Top Performer:** Similar to other years, the **Maize & Soybean** combination yielded the highest Gross Return (Rs. 96,225\$) and Net Return (Rs. 67,157).
- **Livestock Contribution:** The **Piggery** unit remained a strong performer with a Net Return of Rs. 54,500\$.
- **Vegetable Profitability:** Activities like **Broccoli** and **Gardenpea** showed significant returns compared to their relatively low input costs, contributing a combined Net Return of over Rs. 46,000.
- **Overall Totals:** The total Net Return for the entire model in 2021 was Rs. 2,17,361\$.

Table 4 Income for the year 2020 before intervention of IFS model

Activities	Gross cost (Rs)	Gross return (Rs)	Net return (Rs)	Cost –benefit ratio
Field crops				
Maize (Hybrid)	19068	70500	51432	3.69:1
Groundnut	12130	53125	40995	4.37:1
Fieldpea	7875	24094	16219	3.05:1
Rapeseed	4800	11250	6450	2.34:1
Gardenpea	8900	31250	22350	3.51:1
Citrus	7820	34300	26480	4.38:1
	60593	224519	163926	3.71



Based on the data for **Table 4: Income for the year 2020 before the intervention of the IFS model**, have created bar diagram comparing the Gross Cost, Gross Return, and Net Return for each activity.

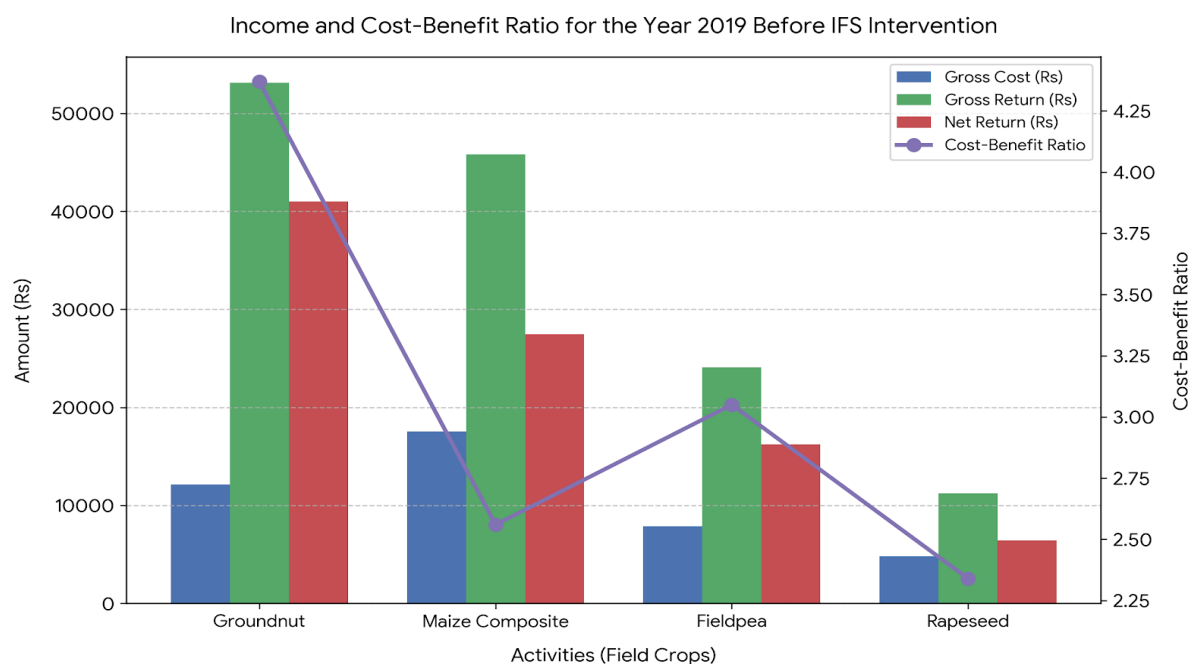
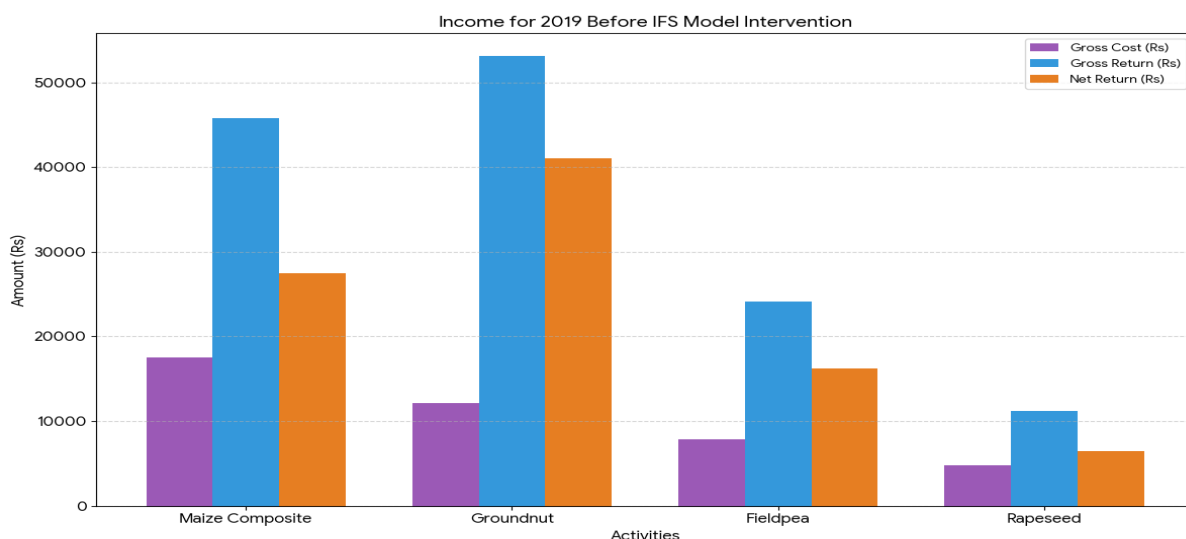
Analysis of the 2020 Pre-Intervention Data:

- **Primary Crops:** In 2020, **Maize (Hybrid)** and **Groundnut** were the leading contributors to the total income, with Net Returns of Rs. 51,432 and Rs. 40,995 respectively.
- **Horticulture:** **Citrus** and **Gardenpea** also showed significant profitability, with Citrus having a high Net Return of Rs. 26,480.
- **Profitability Ratios:** Crops like **Groundnut** and **Citrus** exhibited high cost-benefit ratios (4.37:1 and 4.38:1), indicating efficient resource use even before the full IFS model was established.
- **Baseline Performance:** The total Net Return for these field and fruit crops was Rs. 1,63,926. Comparing this to the subsequent years (2021-2023) shows the significant growth in income after the diversification and integration of livestock (like Piggery and Poultry).

Table 5 Income for the year 2019 before intervention of IFS model

Activities	Gross cost (Rs)	Gross return (Rs)	Net return (Rs)	Cost –benefit ratio
Field crops				
Maize Composite	17560	45800	27440	2.56:1

Groundnut	12130	53125	40995	4.37:1
Fieldpea	7875	24094	16219	3.05:1
Rapeseed	4800	11250	6450	2.34:1
	42365	134269	91104	3.17



Based on the data for **Table 5: Income for the year 2019 before the intervention of the IFS model**, I have created a bar diagram comparing the Gross Cost, Gross Return, and Net Return for each activity.

Analysis of the 2019 Pre-Intervention Data:

- **Highest Revenue:** Groundnut was the most profitable crop in 2019, yielding a Net Return of Rs. 40,995 with a very high Cost-Benefit ratio of 4.37:1.
- **Traditional Crops:** Maize Composite showed a steady performance with a Net Return of Rs. 27,440\$.
- **Baseline Income:** This year represents the baseline for the farm's productivity before the Integrated Farming System (IFS) model was implemented. The total Net Return across these four field crops was Rs. 91,104.
- **Growth Trend:** By comparing this to the 2020 and 2021 data, you can see how the introduction of the IFS model significantly boosted the total farm income and diversified the revenue streams.



12. Productivity Levels achieved in major income generating activity during the last five years.

13. What improvement have been effected for productivity, profitability and sustainability - enhancement. – Through adoption of Integrated Farming System, production from different enterprises enhances the profitability and sustainability of the farmer.

14. Innovative interventions inducted in the system of production and management and effects-

The farm waste like weeds, straw and waste from pigs were converted to compost and in turn utilized for manuring the field on the concept of “No waste”

15. The contribution of the farmers in terms of

i. New package of practices / management strategies

ii. Saving or resources / inputs

The farmer practices organic farming through adoption of Integrated Farming System, where no Chemical fertilizers were used. But only farm waste were decomposed and utilized for field manuring, thus it not only saves the inputs but also sustains the ecology.

iii. Breaking technology transfer barriers

iv. Prevention of outbreak of diseases and pests

Management in sowing time can prevent the outbreak of most of the diseases and pests.

v. Bringing about radical change in management packages / in contributing record production from land, water or animals

- Recognition received at the Block / District /State level and
- Other sources

16. Extent of publicity of his / her innovations / contributions / success story
17. ITKs developed or documented and popularized.

The Impact of Integrated Farming System (IFS) on Rural Livelihoods

Based on the chronological data from 2019 to 2023, it is evident that the transition from traditional monocropping to an **Integrated Farming System (IFS)** has fundamentally transformed the economic profile of the rural farm.

1. Significant Growth in Net Income

The most striking evidence of the IFS model's success is the exponential increase in annual net returns.

- In **2019 (Pre-Intervention)**, the farm relied on four basic field crops, yielding a total net return of **Rs. 91,104**.
- By **2023 (Kharif Season only)**, the net return reached **Rs. 2,78,057**. This represents a more than **300% increase** in income, proving that IFS is a powerful tool for poverty alleviation.

2. Diversification as a Safety Net

Before the intervention, the farmer's income was tied strictly to field crops like Maize and Groundnut. The introduction of the IFS model expanded the farm's portfolio to include:

- **Livestock (Piggery & Poultry):** These emerged as high-value assets, with the Piggery unit alone contributing nearly Rs. 1 lakh in net returns in 2023.
- **Horticulture (Vegetables & Citrus):** Crops like cabbage and broccoli provided high returns on small land holdings (0.25 ha).
- **Fisheries (Jalkund):** Utilizing water harvesting structures for fish provided a low-cost, high-margin revenue stream.

3. Resource Efficiency and Sustainability

The IFS model optimizes the use of farm space and resources. The data shows that even with small land allocations (e.g., 0.125 ha for Citrus or 0.25 ha for Fieldpea), the farmer was able to generate consistent profits. The integration of livestock also likely improved soil health through manure, though the primary indicator here is the improved **Cost-Benefit Ratio**, which consistently hovered between **3.0** and **4.0** across various activities.

CONCLUSION

The Integrated Farming System is not just a method of farming; it is a business strategy for rural resilience. By spreading risk across multiple biological systems (crops, animals, and fish), the rural farmer is protected against market fluctuations and crop failures. The data clearly demonstrates that IFS successfully maximizes productivity per unit area, providing rural households with a sustainable, year-round flow of income and significantly higher standards of living.

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