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Impact of tuber crops based integrated farming system on socio economic profile of rural farmers in Manipur

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Abstract

A study was conducted by AICRP on Tuber Crops at CAU, Imphal Center from 2022 to 2024 in Kakching Khunou village of Kakching District and Nongdam village of Imphal East District, Manipur, to investigate the impact of tuber crops based integrated farming systems on socio-economic profiles. Initially practising mono cropping system in Nongdam village, the farmer got a substantial increase in net income, rising from Rs. 23,000/- to Rs. 119,000/- in the first year and Rs. 124,390/- in the second year. Similarly, in Kakching Khunou village also, the net income of the farmers has increase from Rs. 17,500/- to Rs. 77,010/- in the first year and Rs. 115,195/- in the second year. These rise in the net income by the integration of tuber crops with piggery units. The benefit-cost ratio (B:C) was also improved, increasing from 1.04 to 2.41 in Nongdam village and from 1.59 to 2.51 in Kakching Khunou village in the first year. In the second year, the B:C ratio was increased to 2.28 in Nongdam village and 2.76 in Kakching Khunou village. Tuber crops based integrated farming system provides a more sustainable and productive approach compared to monoculture, increasing farmers' income and providing a year-round employment opportunities. This success has led to more farmers adopting this model.

Keywords: Tuber crops, integrated farming systems, socio-economic, income increase, benefit-cost ratio, sustainable

Introduction

Agriculture serves as the backbone of India's economy, with over 60% of the population reliant on it. Despite significant strides in food production, with the country currently producing 260 million metric tons, the rate of increase in food production surpasses that of population growth. However, as of 2012, approximately 20% of the Indian population was estimated to be undernourished, according to the Indian Planning Commission^[1].

Manipur, which is located in the north-eastern region of India, is characterized by its hilly terrain and is heavily dependent on agriculture and related activities, similar to many other northern states. With an area of 22,327 m², Manipur shares borders with Nagaland, Assam, Mizoram, and Myanmar. The state is rich biodiversity and abundant natural resources.

Integrated Farming Systems (IFS) have emerged as a crucial resource management strategy, aiming to achieve economic and sustained productivity while addressing the diverse needs of farm households and conserving resources. This approach integrates various components such as field and horticultural crops, livestock, aquaculture, poultry, and more, within the farm's ecological and socio-economic context, enhancing productivity and profitability in an environmentally friendly manner^[2, 3].

The IFS model demonstrates that horticultural crop like vegetables can yield 2-3 times more energy production as compared to cereal crops, ensuring nutritional security and income sustainability. Additionally, the model promotes recycling of farm residues, with crop residues serving as an animal feed for dairy and goat production, and the animal excreta are used as an organic fertilizer for biogas production. This sustainable approach not only enhances soil fertility but also reduces reliance on chemical fertilizers^[4].

The integration of tuber crops into farming systems has garnered increasing attention due to its potential to enhance agricultural sustainability and improve socio-economic conditions for rural farmers in Manipur. This study aims to explore the impact of tuber crops based integrated farming systems on the socio-economic profile of rural farmers in Manipur, India. The primary objectives of this research are to assess the changes in income levels, analyze the shift in farming practices from mono cropping to integrated farming, evaluate the benefit-cost ratio, and examine the overall socio-economic transformation experienced by farmers. By understanding these aspects, this study seeks to provide valuable insights into the effectiveness of integrated farming systems in improving the livelihoods of rural farmers in Manipur.

Materials and Methods

The All India Co-ordinated Research Project on Tuber Crops (AICRP-TC), CAU, Imphal Centre, conducted an experiment to demonstrate tuber crops based integrated farming systems in two different locations during 2022 to 2024. Following a baseline survey, one farmer from each Village of Kakching Khunou (Kakching district) and Nongdam Village (Imphal East district) were selected to implement the integrated farming system. Prior to intervention, these farmers were practicing mono cropping.

After receiving training on integrated farming systems, the farmers transitioned to integrated tuber crops based farming in their homesteads, which include a combination of agriculture, horticulture, and livestock rearing. Each farmer was provided with planting materials of tuber crops such as sweet potato, cassava, colocasia, and other vegetable seedlings, along with three piglets and fifty chicks. Additionally, a piggery sty and a poultry shed were constructed at each location.

Socio-economic profile before intervention

Kakching Khunou is an agricultural town in Kakching District, with agriculture being the primary source of livelihood. Rice accounts for over 90% of cultivated land, making Kakching a surplus district for rice production. Other crops grown in the district include sugarcane, oilseeds, maize, potatoes, pulses, and vegetables.

Nongdam village, located in Imphal East district, has a total population of 850 people, with agriculture also being a significant source of income. Literacy rates in Nongdam are moderate, with a focus on improving agricultural practices.

Intervention Details

The integrated farming system module was implemented in both villages for two consecutive years, aiming to maximize yield, rejuvenate productivity, reduce chemical fertilizer use, and conserve resources. Two farmers in each village adopted the

tuber crops based farming system, receiving poultry chicks, piglets, vegetable seeds, and planting materials for tuber crops. Yield data was collected and analyzed, along with calculations for gross and net returns, and cost of cultivation based on market prices.

The socio-economic profiles of the farmers were analyzed using descriptive statistics.

Results and Discussion

Nongdam, Imphal East

As per the data presented in Table 1, prior to intervention, the farmers grew potatoes as a monocrop on an area of 0.18 ha, resulting in a net income of Rs. 23,000/- with a benefit-cost ratio (B:C) of 1.04 and total employment generation of 32. However, following the intervention of a tuber crops-based integrated farming system, the farmers increased their net income from Rs. 23,000/- to Rs. 119,000/- during 2022-23 and to Rs. 124,390/- during 2023-24. Consequently, the B:C ratio was increased to 2.41 during 2022-23 and to 2.28 during 2023-24. This integrated farming intervention also led to a 200% increase in employment generation during 2022-23 and a 168.75% increase during 2023-24.

Kakching Khunou, Kakching District

In a similar trend as of Table 1 shown in Table 2, prior to intervention, farmers grew cabbage as a monocrop in 0.12 ha, resulting in a net income of Rs. 17,500/- with a B:C ratio of 1.59 and generating 25 employment opportunities. Following the adoption of the tuber crops-based integrated farming system, the net income was increased to Rs. 77,010/- in 2022-23 and Rs. 115,195/- in 2023-24. The B:C ratio also saw an uptick from 1.59 to 2.51 in 2022-23 and to 2.76 in 2023-24. Furthermore, employment generation surged by 160% in 2022-23 and by 164% in 2023-24 due to this intervention.

Overall it was observed that the adoption of integrated farming systems (IFS) has led to higher income generation due to the synergism among different components and the reduction of cultivation costs through resource recycling within the system. This aligns with the findings of Raghavendra and co-worker^[5]. Various researchers^[5, 6], had also reported that IFS adoption results in higher income across different enterprise combinations, depending on the number and type of farm enterprises and their effective integration. Similar results to the current study were reported by Shanker and co-worker^[7] and by Anantharaman and co-worker^[8], who observed that tuber crops-based integrated farming systems increased the land productivity, farmer income, balanced nutrition, employment, and sustainability in the Bastar and Kondagaon districts of Chhattisgarh and in Meghalaya, respectively.

Table 1: Socio economic profile of the farmer before and after intervention at Nongdam village, Imphal West

Crops/other components	Area (ha)	Yield (Kg)	Gross income (Rs.)	Expenditure (Rs.)	Net income (Rs.)	B:C	Employment generation
Socio economic profile of the farmer before intervention							
Potato	0.18	3000	45000	22000	23000	1.04	32
Socio economic profile of the farmer after intervention during 2022-23							
Sweet potato	0.03	420	14700	4000	10700	2.68	12
Cassava	0.07	1260	25200	6700	18500	2.76	15
Pea	0.04	240	14400	3900	10500	2.69	17
Onion	0.04	400	12000	3450	8550	2.48	17
Piggery	0.0006	2 pig + 3 piglets	78000	20000	58000	2.90	20
Poultry	0.0015	30 birds	26250	13500	12750	0.94	15
Total	0.1821	-	170550	51550	119000	2.41	96
Socio economic profile of the farmer after intervention during 2023-24							
Sweet potato	0.03	315	12600	4000	8600	2.15	10
Cassava	0.07	1412	28240	6700	21540	3.21	16
Soybean	0.04	540	10800	3900	6900	1.77	12
Cabbage	0.04	470	14100	3450	10650	3.09	12
Piggery	0.0006	3 pigs	60000	20000	40000	2.00	18
Poultry	0.0015	50 birds + 1200 eggs	62000	25300	36700	1.45	18
Total	0.1821	-	187740	63350	124390	2.28	86

*B:C – Benefit cost ratio

Table 2: Socio economic profile of the farmer before and after intervention at Kakching Khunou, Kakching District

Crops/other components	Area (ha)	Yield (Kg)	Gross income (Rs.)	Expenditure (Rs.)	Net income (Rs.)	B:C	Employment generation
Socio economic profile of the farmer before intervention							
Cabbage	0.12	1900	28500	11000	17500	1.59	25
Socio economic profile of the farmer after intervention during 2022-23							
Sweet potato	0.02	293	11720	2500	9220	3.69	8
Cassava	0.04	520	10400	2900	7500	2.59	12
Maize	0.02	182	3640	1200	2440	2.03	8
Cabbage	0.03	320	9600	2500	7100	2.84	10
Piggery	0.0006	3 pigs	51000	18000	33000	1.83	14
Poultry	0.0015	25 nos. of Giriraja breed	26250	8500	17750	2.09	13
Total	0.1121	-	112610	35600	77010	2.51	65
Socio economic profile of the farmer after intervention during 2023-24							
Sweet potato	0.02	280	9800	2500	7300	2.92	9
Cassava	0.04	640	11520	2900	8620	2.97	14
Turmeric	0.02	260	5200	1400	3800	2.71	8
Cabbage	0.03	300	9000	2500	6500	2.60	8
Piggery	0.0006	2 pig+6 piglets	96000	18000	78000	4.33	17
Poultry	0.0015	20 birds	21875	10900	10975	1.01	10
Total	0.1121	-	153395	38200	115195	2.76	66

*B:C – Benefit cost ratio

Conclusion

The tuber crops-based integrated farming system represents a more holistic approach to agriculture compared to monoculture. A two-year study indicated that incorporating components like piggery into the tuber crops-based farming system could significantly increase productivity, income, and employment generation for farmers. Consequently, this integrated farming system has the potential to transform the livelihoods of rural people in Manipur.

Reference

- Nayar NM. The contribution of tropical tuber crops towards food security. *Journal of Root Crops*. 2014;40(1):3-14.
- Behera UK, Jha KP, Mahapatra IC. Integrated management of available resources of the small and marginal farmers for generation of income and employment in eastern India. *Crop Research*. 2004;27(1):83-89.
- Rautaray SK, Das PC, Sinhababu DP. Increasing farm income through a rice-fish based integrated farming system in rainfed lowlands of Assam. *Indian Journal of Agricultural Sciences*. 2005;75(2):79-82.
- Lal R, Miller FP. Sustainable farming system for the tropics. In: *Sustainable Agriculture: Issues and Perspectives*, Vol. 1. (Eds. Singh RP.), Indian Society of Agronomy, IARI, New Delhi; c1990, p. 69-89.
- Raghavendra KJ, John J, Jacob D, Rajendran T, Prusty AK, Ansari MA, *et al.* Unraveling determinants of integrated farming systems adoption for sustainable livelihood and dietary diversity. *Frontiers in Nutrition*. 2024;11:1-12.
- Patel KM, Patel PK, Desai LJ, Patel KN, Patel SA, Chaudhary HL. Integrated farming systems for livelihood security of small and marginal farmers. *Multilogic in Science*. 2020;10:600-603
- Shankar D, Banjare C, Sahu MK. Tuber Crops Based Integrated Farming System Studies in Bastar and Kondagaon Districts of Chhattisgarh. *International Journal of Current Microbiology and Applied Sciences*. 2018;7(09):1650-1658.
- Anantharaman M, Mantri V, Shanpru E, Sohliya BK, Rathore NS, Suting A, *et al.* Roots and Tubers for

Livelihood Enhancement in Meghalaya, India Results of a Scoping Study. Food START +, Food Resilience through Root and Tuber Crops in Upland and Coastal Communities of the Asia-Pacific; c2016.
<https://cgspace.cgiar.org/server/api/core/bitstreams/1048ae10-6c5f-4146-8f3e-735176180c94/content>