





Farmer FIRST Programme

Empowering Farmers for Transforming Agriculture

ANNUAL REPORT 2025-26

Farmer FIRST

ICAR-Agricultural Technology Application Research Institute
Zone-I, PAU Campus, Ludhiana - 141 004, Punjab

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Empowering Farmers for Transforming Agriculture

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Preface

Agriculture in India is undergoing rapid transformation, demanding innovative, sustainable, and farmer-centric approaches to address emerging challenges. Improving farm productivity, conserving natural resources, strengthening rural livelihoods, and building resilience to climate variability require active collaboration among researchers, extension agencies, development organizations, and, most importantly, farmers. Recognizing this need, the Indian Council of Agricultural Research (ICAR) launched the Farmer FIRST (Farm, Innovations, Resources, Science and Technology) Programme, placing farmers at the centre of research and innovation.

Unlike conventional extension models, Farmer FIRST emphasizes participatory technology development, validation, refinement, and dissemination through continuous interaction between scientists and farming communities. The programme promotes mutual learning, integrates indigenous knowledge with scientific advancements, and encourages location-specific solutions that improve agricultural productivity, profitability, and sustainability. This consolidated report presents the achievements and experiences of the Farmer FIRST Programme during its implementation across participating centres. It highlights successful interventions in crop production, livestock management, natural resource management, value addition, protected cultivation, entrepreneurship development, and capacity building. The successful implementation of the programme has been possible through the dedicated efforts of scientists, technical staff, extension personnel, collaborating institutions, and progressive farmers, whose commitment and active participation transformed innovative ideas into field-level achievements. Their collective contributions have strengthened the programme's objective of developing sustainable, demand-driven, and farmer-led agricultural innovations.

We express our sincere gratitude to the leadership of the Indian Council of Agricultural Research (ICAR) for conceptualizing and supporting the Farmer FIRST Programme. We gratefully acknowledge the guidance and encouragement of Dr. M. L. Jat, Secretary, DARE & Director General, ICAR, whose vision continues to inspire agricultural transformation. We are deeply thankful to Dr. Rajbir Singh, Deputy Director General (Agricultural Extension), ICAR, for his constant guidance and encouragement.

Our sincere appreciation is extended to all Project Investigators, Co-Project Investigators, scientists, technical staff, field functionaries, partner organizations, and the participating farmers, whose enthusiasm, cooperation, and commitment have been instrumental in the success of the Farmer FIRST Programme. It is our hope that this report will serve as a valuable reference for researchers, extension professionals, policymakers, students, and other stakeholders committed to advancing sustainable, inclusive, and farmer-led agricultural development. The experiences documented herein reaffirm that meaningful partnerships between science and farming communities are fundamental to bulding a resilient and prosperous agricultural future.

Authors

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Introduction

Agriculture continues to be the backbone of the Indian economy and remains the primary source of livelihood for nearly half of the country's population. The sector not only provides food and nutritional security but also contributes significantly towards employment generation, rural development, poverty alleviation, and national economic growth. Besides crop production, allied sectors such as livestock, dairy, poultry, fisheries, horticulture, and agro-based enterprises have become integral components of the farming system, providing regular income and employment opportunities to farming households. However, the increasing pressure on natural resources, shrinking land holdings, rising cost of cultivation, climate variability, market uncertainties, labour shortages, and emerging disease challenges have made farming more complex than ever before.

India has made remarkable progress in agricultural and livestock research through the development of improved varieties, scientific production technologies, precision farming practices, livestock management interventions, disease control strategies, value addition technologies, mechanization, and information and communication technologies. Nevertheless, a substantial gap still exists between technologies generated by research institutions and their adoption in farmers' fields. In many situations, technologies developed under controlled experimental conditions do not fully address the diverse socio-economic conditions, resource availability, and farming realities of different regions. Consequently, adoption levels remain lower than expected, limiting the overall impact of scientific innovations on farm productivity and farmers' income.

The success of any agricultural technology depends not only on its scientific superiority but also on its suitability to local farming conditions, affordability, ease of adoption, and acceptability among farming communities. Farmers possess rich indigenous technical knowledge gained through years of practical experience under diverse agro-climatic conditions. Therefore, combining scientific innovations with farmers' traditional wisdom can lead to the development of more practical, location-specific, and sustainable technologies. Continuous interaction between farmers and scientists is essential for identifying field problems, refining technologies, validating research outputs, and generating meaningful feedback that can guide future research priorities.

Recognizing these challenges and opportunities, the Indian Council of Agricultural Research (ICAR) launched the Farmer FIRST (Farmer Farm, Innovations, Resources, Science and Technology) Programme in 2016. The programme represents a paradigm shift from the conventional top-down extension approach to a participatory and farmer-centric model of research and extension. Unlike traditional programmes where technologies are transferred from scientists to farmers, Farmer FIRST actively involves farmers throughout the research, development, validation, and dissemination process. Farmers are considered equal partners in technology generation rather than merely end-users of research outputs.

The Farmer FIRST Programme aims to strengthen the interface between scientists and farmers by promoting mutual learning, collaborative problem-solving, participatory experimentation, and technology refinement under real farming situations. The programme acknowledges that farmers possess valuable practical knowledge and field experience, which can significantly contribute towards improving research outcomes and developing technologies suited to local production systems. Through regular interaction with researchers, farmers participate in identifying production constraints, testing technological interventions, evaluating their performance, providing feedback, and recommending modifications for wider adoption.

The programme also emphasizes participatory research where technologies are evaluated under farmers' field conditions instead of research farms alone. This approach allows researchers to understand the influence of socio-economic conditions, resource availability, climatic variability, and farmers' management practices on technology performance. It also enables farmers to observe scientific interventions under real-life conditions, thereby increasing their confidence in adopting improved technologies. The continuous exchange of ideas between researchers and farmers facilitates refinement of technologies, improves research relevance, and accelerates technology dissemination.

The Farmer FIRST Programme integrates scientific research, extension education, capacity building, entrepreneurship development, institutional strengthening, and content mobilization into a single framework. It promotes multidisciplinary collaboration among scientists from agriculture, horticulture, animal husbandry, veterinary sciences, fisheries, engineering, food technology, social sciences, and extension education. Such convergence enables holistic development of farming systems by addressing multiple components of agriculture rather than focusing on individual enterprises alone.

A unique feature of Farmer FIRST is its emphasis on developing strong partnerships among research institutions, State Agricultural Universities, Krishi Vigyan Kendras (KVKs), line departments, Panchayati Raj Institutions, Farmer Producer Organizations (FPOs), Self Help Groups (SHGs), Non-Governmental Organizations (NGOs), progressive farmers, rural entrepreneurs, financial institutions, and private stakeholders. These partnerships facilitate effective technology dissemination, resource mobilization, capacity development, market linkages, and entrepreneurship promotion among rural communities.

Another important dimension of the programme is the systematic documentation of farmers' feedback. Farmers evaluate technological interventions based on parameters such as productivity, profitability, labour requirement, input availability, ease of adoption, compatibility with existing farming systems, environmental sustainability, and economic viability. Such feedback enables researchers to modify technologies according to local needs and provides valuable inputs for future research planning. Thus, the programme creates a continuous feedback mechanism between research laboratories and farming communities.

The programme also places considerable emphasis on strengthening farmers' capacities through need-based training programmes, demonstrations, field days, exposure visits, workshops, diagnostic camps, farmer-scientist interactions, digital advisory services, and knowledge-sharing platforms. These

interventions improve farmers' technical knowledge, decision-making ability, entrepreneurial skills, and confidence in adopting improved agricultural and livestock technologies. Special attention is given to women farmers, rural youth, progressive farmers, and vulnerable farming households to promote inclusive agricultural development.

Entrepreneurship development is another major objective of the Farmer FIRST Programme. Scientific interventions are complemented with value addition, processing, packaging, branding, quality assurance, market intelligence, and business management practices to enhance farm profitability. The programme encourages diversification into dairy processing, poultry, goat farming, mushroom cultivation, beekeeping, fisheries, nursery raising, fodder production, and other allied enterprises, thereby generating additional employment and income opportunities for rural households.

The programme also recognizes the importance of information and communication technologies (ICTs) in modern agricultural extension. Digital advisory services, mobile applications, WhatsApp groups, online training programmes, multimedia learning resources, social media platforms, digital databases, and knowledge repositories are increasingly utilized to ensure timely dissemination of scientific information among farmers. These digital tools supplement conventional extension approaches and enable continuous interaction between farmers and experts irrespective of geographical distance.

The project focuses on identifying production constraints through participatory rural appraisal, farmer consultations, field observations, and stakeholder interactions. Based on these findings, suitable technological interventions are assessed, demonstrated, refined, and promoted through continuous farmer-scientist interaction. Regular monitoring, field visits, capacity-building programmes, diagnostic services, entrepreneurship promotion, and impact assessment ensure effective implementation and wider adoption of scientific technologies.

OBJECTIVES OF THE PROJECT

The Farmer FIRST Programme seeks to reinforce the interface between farmers and scientists to facilitate the development and effective application of agricultural technologies. This goal is pursued through a focus on innovations, technological interventions, systematic feedback mechanisms, active participation of multiple stakeholders, recognition of diverse farming realities, utilization of varied methodologies, and implementation of interventions targeting vulnerability and livelihood enhancement. The programme's specific objectives are:

- To enhance the farmer-scientist interface, enrich knowledge, and facilitate continued feedback
- To identify and integrate economically viable and socially compatible technological options as adoptable models for different agro-ecological situations
- To develop modules for farm women to address drudgery reduction, income enhancement, and livelihood security
- To study the performance of technologies and perception of the farmers about agriculture as a profession in the rural settings

- To build a network of linkages of organizations around the farm households for improving access to information, technology, input, and market
- To institutionalize the Farmer FIRST process

COMPONENTS

The project is conceptualized to deal with the following:

I. Enhancing Farmer- Scientist Interface

Enabling involvement of researchers for continuous interaction with farm conditions, problem orientation, exchange of knowledge between farmers and other stakeholders, prioritization of problems, and setting up a research agenda

II. Technology Assemblage, Application, and Feedback

Integrating components of technology for application in different agro-ecosystems with a focus on innovations and feedback

III. Partnership and Institution Building

Building partnerships involving different stakeholders, development of rural-based institutions, agro-ecosystem, and stakeholder analysis and impact studies

IV. Content Mobilization

Using the platform of the project, having institutions as partners to develop specific content for e-enabled knowledge sharing

The ICAR-ATARI, Zone-I, Ludhiana, has established seven Farmer FIRST Programme (FFP) centers to empower farmers by providing real-time access to scientific technologies and expert guidance. These centers comprise two ICAR institutes and five State Agricultural/ Veterinary Universities. The initiative emphasizes enhancing farmers' decision-making capacities, strengthening resilience to climate and market uncertainties, and promoting sustainable agricultural development. During 2025-26, the project was implemented across 32 villages, benefiting more than 3299 households through seven FFP centres. These centres function as knowledge hubs, facilitating the exchange of information and enabling farmers





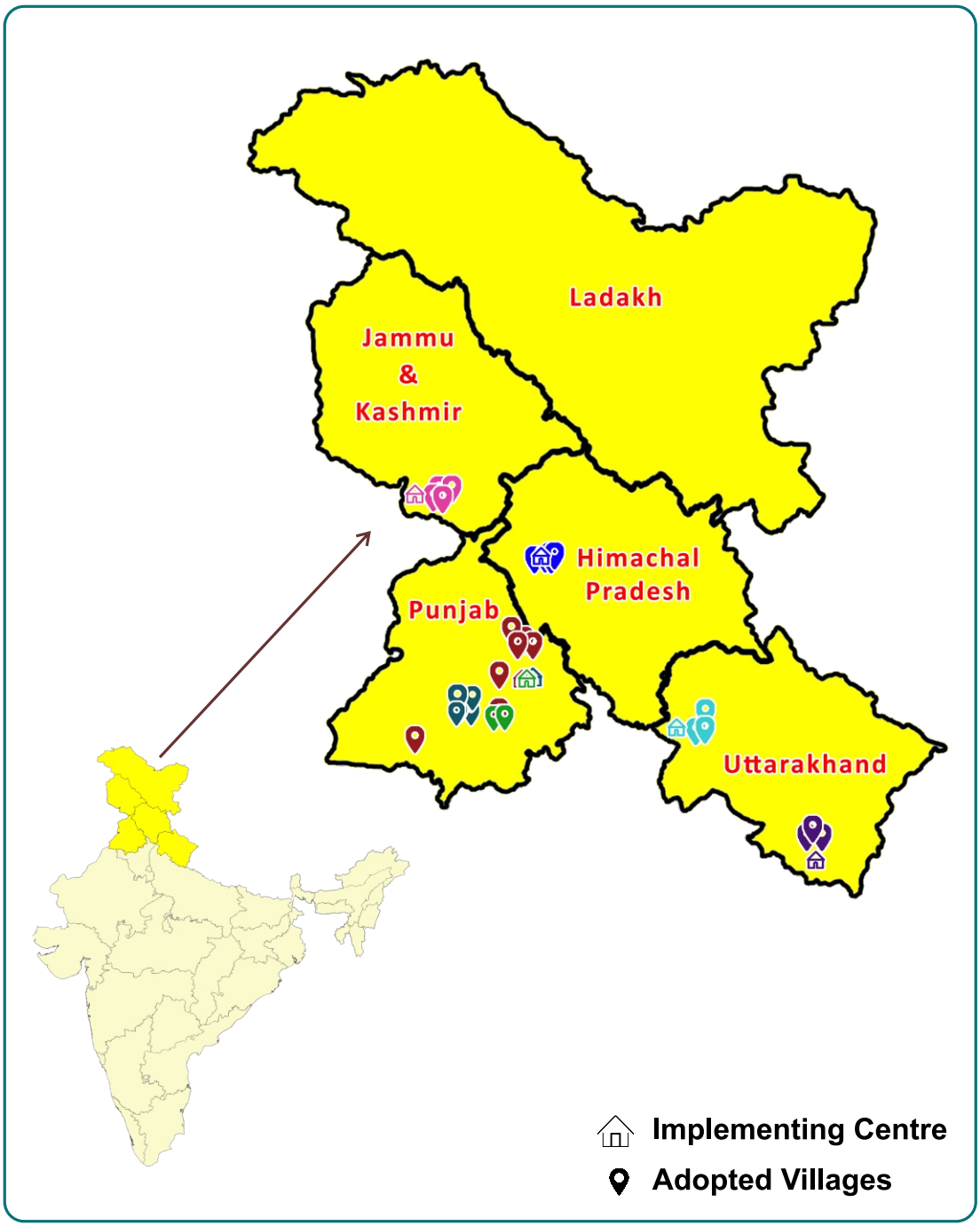
to adopt innovative practices that improve productivity. The locations of the FFP centers are illustrated in the accompanying map, while zone-wise details are presented in Table 1. This collaborative approach plays a pivotal role in bridging the gap between scientific advancements and farming communities, thereby fostering inclusive and sustainable agricultural growth.

Table 1: Titles of Projects in FFP centres under ICAR-ATARI, Ludhiana

S. No.	Name of Institute / University	Title of the project	No. of villages	No. of households
1	PAU, Ludhiana	Technology application and up-scaling for sustaining natural resources and augmenting farm income: farmers-led market-linked approach	3	350
2	GADVASU, Ludhiana	Integrated approaches for livestock development: farmers context	6	517
3	ICAR-CIPHET, Ludhiana	Processing and value addition of agricultural produce for enhancing farmers income and employment in production catchment	3	350
4	CSKHPKV, Palampur	Transfer of improved farm production technologies for enhancement of rural livelihood security amongst the farm households of Kangra district of Himachal Pradesh	8	500
5	SKAUST, Jammu	Exploring economic opportunities for farmers of Kandi villages through the application of proven rainfed technologies	6	465
6	GBPUAT, Pantnagar	Enhancing livelihood opportunities of farming community in the mid-hills of Uttarakhand	3	500
7	ICAR-IISWC, Dehradun	Farmer participatory technology application for sustainable resource management and livelihood security in North-Western Himalaya	3	617
		Total	**32**	**3299**



ICAR-ATARI, Zone-I, Ludhiana



Section 2.1

Punjab Agricultural University, Ludhiana

Technology Application and Up-scaling for Sustaining Natural Resources and Augmenting Farm Income: A Farmers-Led Market-Linked Approach

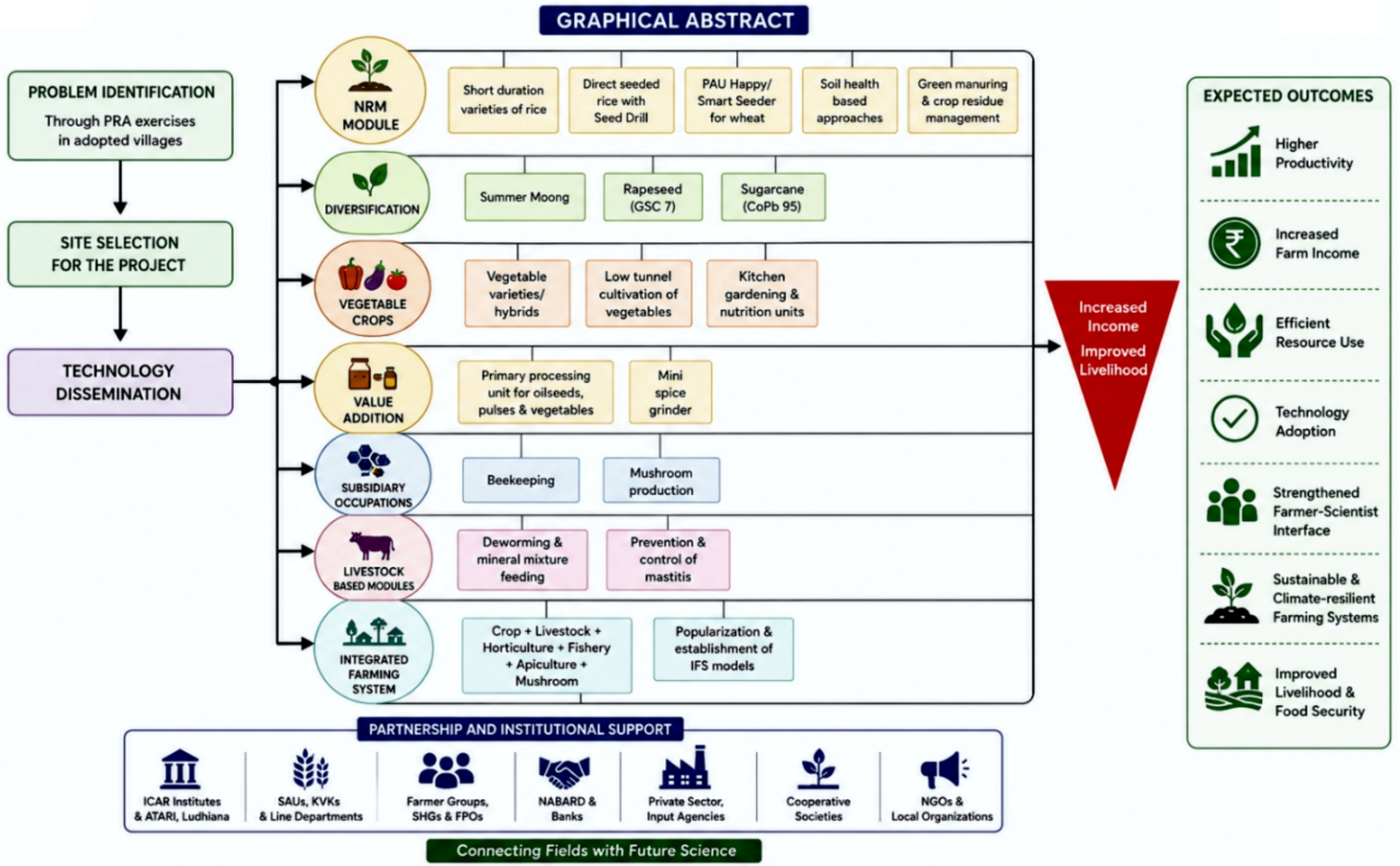
The Directorate of Extension Education, Punjab Agricultural University (PAU), Ludhiana, implemented the Farmer FIRST Programme (FFP) during 2025-26 under the project entitled **"Technology Application and Up-scaling for Sustaining Natural Resources and Augmenting Farm Income: Farmers-Led Market-Linked Approach."** The project interventions during the reporting year covered **Bhojowali and Bhadalwadh in Sangrur district and Kila Raipur in Ludhiana district.** The major interventions included short-duration rice varieties for efficient water management, PAU Happy Seeder/Super Seeder/Smart Seeder for in-situ paddy straw management, diversification through rapeseed (*Gobhi sarson*), summer moongbean and sugarcane, high-yielding vegetable varieties/hybrids and low-tunnel vegetable cultivation, primary processing and value addition, beekeeping, mushroom production, livestock-based interventions and integrated farming system models. The coverage during 2025-26 included 100 households under short-duration rice demonstrations and 100 households under in-situ paddy straw management, while other interventions covered farmers according to their respective demonstration and enterprise requirements.

Research problem identification and prioritization

During 2025-26, the project focused on addressing major challenges related to natural resource conservation, crop diversification, residue management, value addition, and farm income enhancement. Under natural resource management, short-duration rice variety PR 126 was promoted as an alternative to long-duration rice varieties to reduce the duration of the rice crop and improve water-use efficiency. A total of 100 on-farm trials of 0.4 ha each were conducted. PR 126 matured in about 93 days after transplanting and required fewer irrigations than the long-duration variety Pusa 44. The demonstrations recorded seven fewer irrigations and a reduction of about 450 mm in irrigation water use compared with Pusa 44. Paddy residue management was another major focus of the project. PAU Happy Seeder, Super Seeder and Smart Seeder technologies were promoted for in-situ management of paddy straw and wheat sowing. During the reporting year, about 80 per cent of the area was brought under in-situ paddy residue management technologies.

Crop diversification was promoted through rapeseed (*Gobhi sarson*), summer moongbean and sugarcane, while vegetable-based interventions included high-yielding varieties/hybrids and low-tunnel cultivation. Value addition was addressed through a primary processing unit for oilseeds, pulses, and vegetables, along with a mini spice grinder and processing and packaging activities for honey and mushrooms. Subsidiary enterprises such as beekeeping and mushroom production were also promoted to strengthen income diversification.

The project also emphasized livestock-based interventions and integrated farming systems. Mineral-mixture feeding was promoted among cattle and buffaloes, while integrated farming system models



Graphical abstract: PAU, Ludhiana

were popularized and established to improve resource utilization and diversify farm income. The report further records adoption of button mushroom cultivation by five farmers, initiation of Dhingri mushroom cultivation by ten families, nearly 80 per cent coverage of paddy area under short-duration varieties, a 40 per cent increase in vegetable cultivation area and adoption of low-tunnel vegetable technology by ten farmers.

COMPONENT-I:

Enhancing Farmer-Scientist Interface

Strengthening the farmer-scientist interface requires ongoing exchange of ideas, innovations, resources, and feedback to facilitate the development of suitable technologies and support human resource development. In 2023-24, a total of 63 programs were organized, benefiting 1,721 farmers, whereas in 2024-25, a total of 62 programs reached 1,480 farmers. Technology agents were also identified for each module and assigned the responsibility of disseminating the technology. The major programs conducted include:

Farmer Awareness & Capacity Building: Scientists-Farmers Interfaces, exposure visits to Kisan Melas, and ICT-based agricultural training.

Crop Production & Resource Management: Field days were conducted on pre-rabi crops, direct seeding of rice, protected vegetable cultivation, and oilseeds/pulses. Training on resource conservation technologies, crop residue management, and efficient urea use in paddy using LCC.

Sustainable Agriculture & Environment: Awareness and training sessions provided on paddy straw management, residue burning, soil testing, rodent control, water conservation, and sustainable agriculture.

Agro-processing & Value Addition: Training given on processing cereals, oilseeds, vegetables, honey, and turmeric. Exposure visits to food industries and craft melas.





Demo on short duration rice and wheat



Demo on Sugarcane



Demo on Sarson

Horticulture & Diversification: Training given on kitchen gardening, nutrition gardens, winter vegetable cultivation (chillies, onions), and mushroom farming. Exposure visits to mushroom farms and vegetable excellence centres.

Livestock & Dairy Farming: In this training, the mineral mixture used for dairy animals and improved management practices.

COMPONENT-II:

Technology Assemblage, Application, and Feedback

Considering the prevailing challenges in the adopted area, the FFP Centre at PAU, Ludhiana, concentrated on interventions aimed at addressing key concerns, including groundwater depletion, crop residue burning, and the promotion of sustainable farming practices.

Natural Resource Management:

To promote crop diversification and increase profitability, several interventions were introduced. These practices contribute to sustainability, improve resource use efficiency, and boost both farm productivity and farmers' incomes.

Short-duration Rice Varieties for Efficient Water Management: To promote water conservation, 100 on-farm demonstrations of the short-duration rice variety PR 126 were conducted in the project villages. Compared with the long-duration variety (Pusa 44), PR 126 matured 2-3 weeks earlier, required seven fewer irrigations, and reduced the water footprint by 844 litres/kg. The economic analysis (Table 1.1) showed that PR 126 recorded a lower cost of cultivation (₹46,576/ha) and a higher B: C ratio (2.58) than the check (2.34), demonstrating better economic efficiency despite a marginal reduction in grain yield. Short-duration rice varieties and residue management technologies such as Happy Seeder, Super Seeder and Smart Seeder were promoted for sustainable crop production and in-situ paddy straw management. These interventions reduced residue burning, improved soil health, and enhanced resource conservation. The technologies were demonstrated on 0.4 ha plots in the adopted villages covering 100 households.

Crop Diversification: Crop diversification interventions included rapeseed (*Gobhi Sarson*), summer moongbean, and sugarcane cultivation. Frontline demonstrations on summer moongbean variety SML 1827 recorded an average yield of 9.5 q/ha compared to 8.4 q/ha in local checks. Net returns increased from ₹31,595/ha in farmers' practice to ₹39,777/ha under demonstrations, while the B: C ratio improved from 1.08 to 1.38, demonstrating the economic viability of diversification in the rice-wheat system, as shown in Table 1.1.

Vegetable-Based Interventions: To promote crop diversification and enhance farm income, FLDs were conducted on improved vegetable production technologies, including high-yielding varieties of chilli, brinjal, tomato and low tunnel cultivation of cucumber. The demonstrations recorded higher productivity and profitability than the existing farmer practices. Among the interventions, tomato registered the highest benefit-cost ratio (4.39), followed by low tunnel cucumber (3.30), brinjal (3.04) and chilli (2.93), highlighting the economic potential of improved vegetable cultivation technologies for increasing farmers' income as shown in Table 1.2.

Value Addition and Processing: Primary processing units for oilseeds, pulses, vegetables, mushrooms and honey were established in the adopted villages. Mini spice grinders, turmeric processing units, jaggery units and oil expellers were provided to support value addition at the household level. These interventions enabled farmers to process and package agricultural produce, thereby increasing product value and generating additional income opportunities. About 20 households benefited directly from these value-addition enterprises. Table 1.3 presents the economic analysis of oil expeller and spice grinder demonstrations conducted with 15 households each. The oil expeller processed 6,000 kg of raw material and generated a profit of ₹ 93,000, while the spice grinder processed 200 kg of raw material and generated a profit of ₹28,575. The demonstrations enhanced value addition, product quality, and household-level entrepreneurship.

Subsidiary Enterprises

Deworming and Feeding with a Mineral Mixture: Table 1.4 presents the economic analysis of interventions in the dairy sector: Feeding with mineral mixture in dairy animals. The intervention, feeding with a mineral mixture, was conducted on 45 buffalo and crossbred cattle. The intervention resulted in an increase in milk production from 10.75 litres per animal per day in the check group to 11.6 litres per animal per day in the demo group. The economics of demos showed a gross return of ₹ 67.25/litre, gross cost of ₹ 30.15/litre, and net returns of ₹ 37.1 per litre of milk. The benefit-cost ratio was 1.23. In comparison, the check group had a lower net return of ₹32.23 per litre of milk, with a benefit-cost ratio of 1.07.

Enterprise-based module

Beekeeping and mushroom cultivation: Beekeeping and mushroom cultivation were promoted as supplementary livelihood activities. Beekeeping colonies were established among selected farmers, while button mushroom cultivation was adopted by five farmers and oyster mushroom cultivation by ten families for household consumption and income generation. These enterprises contributed to livelihood diversification

Table 1.1: Combined Economic Analysis of Front Line Demonstrations under Farmer FIRST Programme (2025-26)

Crop/Intervention	Variety		Total Cost (₹/ha)		Average Yield (q/ha)		Gross Return (₹/ha)		Net Return (₹/ha)		B: C Ratio	
	Demo	Check	Demo	Check	Demo	Check	Demo	Check	Demo	Check	Demo	Check
Short Duration Rice	PR 126	PUSA 44	46,576	53,547	70.37	75.45	166,706	178,741	120,131	125,194	2.58	2.34
Wheat (Happy Seeder/ Super Seeder/Smart Seeder)	PBW 826	PBW 826	40,190	42,370	58.75	57.87	142,469	140,335	102,278	97,965	2.55	2.31
Rapeseed in Rice-Wheat System	GSC 7	Local check	35,168	36,254	26.46	24.67	157,437	146,786	122,269	110,532	3.47	3.04
Sugarcane	CoPb 95	-	147,870	-	1,045	-	434,720	-	286,850	-	1.93	-
Summer Moongbean in Rice-Wheat System	SML 1827	Local check	28,870	29,103	9.50	8.40	68,647	60,698	39,777	31,595	1.38	1.08

Table 1.2: Combined Analysis of Vegetables under Farmer FIRST Programme

Crop/Intervention	Variety		Total Cost (₹/ha)		Average Yield (q/ha)		Gross Return (₹/ha)		Net Return (₹/ha)		B: C Ratio	
	Demo	Check	Demo	Check	Demo	Check	Demo	Check	Demo	Check	Demo	Check
Chilli	CH-27	Local Variety	80,700	78,760	245	220	317,200	281,320	236,500	202,560	2.93	2.57
Brinjal	Brinjal	-	131,250	-	282	-	531,460	-	400,210	-	3.04	-
Tomato	Tomato	-	88,300	-	625	-	476,750	-	388,450	-	4.39	-
Low Tunnel Cucumber	Low Tunnel Cultivation	Open Field Cultivation	133,595	106,323	347	249	574,020	271,651	440,425	165,103	3.30	1.55
Chilli	CH-27	Local Variety	80,700	78,760	245	220	317,200	281,320	236,500	202,560	2.93	2.57



Table 1.3: Economic analysis of the demonstration on primary processing unit for oilseeds, pulses and vegetables

Name of Demo	Households covered (no)	Cost of raw material (₹/kg)	Total quantity procured (kg)	Processed as (i.e., flour, dal, etc)	Quantity recovered after processing	Cost of processing/ value addition (₹/kg)	Selling price (₹/kg)	Profit (₹)	Profit (Rs./kg) over the raw product	Selling mode (Directly to the consumer or market)
Oil expeller	15	59	6000	Oil	1920	10	200	93000	8.03	Self-use and directly to consumer
				Oil cake	3900		30			Direct to consumer
Spice grinder	15	50	2000	Spice powder	193.5	50	700	28575	12.30	Directly to consumer

Table 1.4: Economic analysis of the FLDs on Deworming and feeding with mineral mixture and Prevention and control of mastitis in dairy animals

Name of intervention	Name of breed	Demos (No.)	Farmers (No.) benefitted	Animals treated (No.)	Milk production (ltr/animal/day)			Economics of Demos (₹/Ltr)				Economics of Check (₹/Ltr)			
					Demos	Check	% increase	GC	GR	NR	B: C ratio	GC	GR	NR	B: C ratio
Feeding of mineral mixture	Buffalo/Cross -bred cattle	20	20	45	11.60	10.75	7.9	30.15	67.25	37.1	1.23	30.12	62.35	32.23	1.07

GC= Gross cost; GR= Gross Return; NR= Net Returns



and nutritional security. Beekeeping recorded a gross return of ₹ 7,860 and a net return of ₹ 6,110 per colony, with a B: C ratio of 3.49. Button mushroom cultivation resulted in a gross return of ₹ 187 and a net return of ₹123 per 5 kg bag, with a B: C ratio of 2.88, while Dhingri mushroom cultivation recorded a gross return of ₹248 and a net return of ₹198 per bag, with the highest B: C ratio of 4.96 are provided in Figure 1.1. Overall, the demonstrations showed good economic potential and provided farmers with additional income opportunities through diversification into beekeeping and mushroom cultivation.

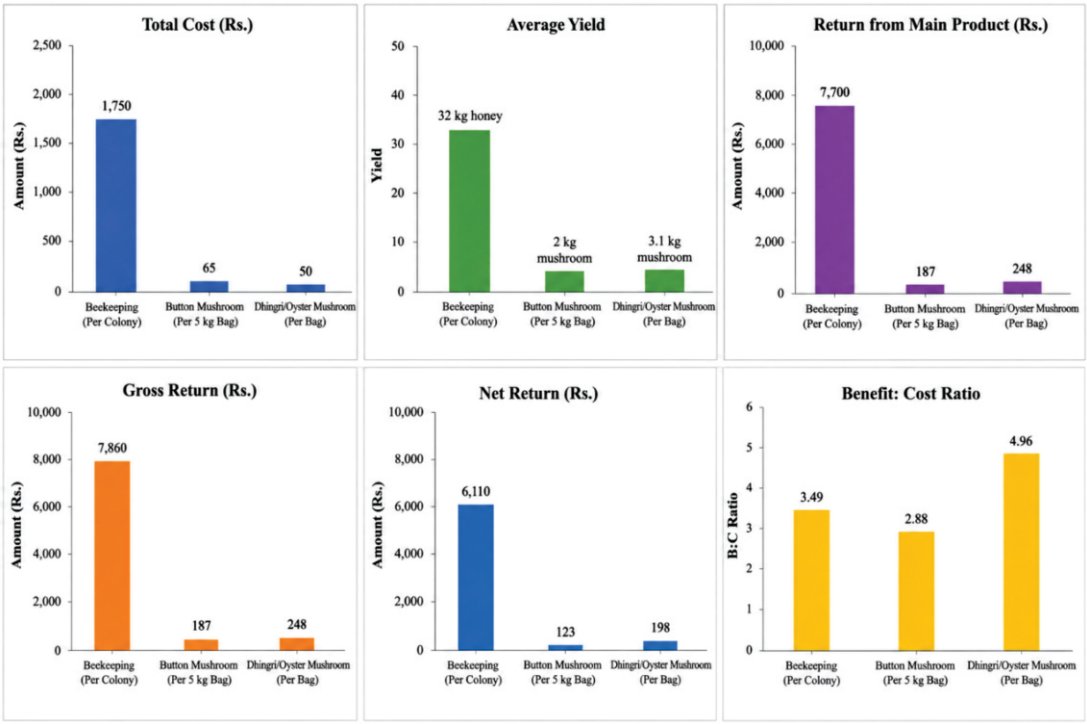


Figure 1.1: Economic Analysis of Demonstrated Beekeeping and Mushroom Production Enterprises

IFS-based module

Livestock-based Module

The feeding of mineral mixture was demonstrated on 45 buffaloes and crossbred cattle, covering 20 demonstrations and 20 farmers. Milk production increased from 10.75 to 11.60 litre/animal/day, representing a 7.9% increase. The demonstration recorded a net return of ₹37.10/litre and a B: C ratio of 1.23 compared with ₹32.23/litre and 1.07, respectively, under farmer practice. Farmers also reported improved animal health, growth and milk production.

Integrated Farming Systems

Integrated Farming System models were promoted among 63 farm households. The interventions integrated crops, vegetables, livestock and subsidiary enterprises, enabling better utilization of farm resources, enhancing

income stability and improving sustainability of farming systems (Table 1.5). The economic analysis of the six IFS models revealed that integrated farming with multiple enterprises generated substantial net returns ranging from ₹5.22 lakh to ₹9.39 lakh per farm per year. Farm 1 recorded the highest net return of ₹9.39 lakh, followed by Farm 4 (₹8.21 lakh) and Farm 2 (₹8.15 lakh). The results demonstrated that integration of cropping, livestock, kitchen gardening, aquaculture, apiculture, and mushroom production enhanced farm income through better resource utilization and enterprise diversification.

Table 1.5: Economic analysis of different IFS models

Enterprise	Farm	Area (ha)	Gross Returns (₹/yr)	Cost of cultivation (₹/yr)	Net returns (₹/yr)	Net returns (₹/yr/ ha)
Cropping Systems*	Farm 1	3.8 ha	633134	183383	449751	
Kitchen gardening		200 m^2	13517	4632	8885	
Livestock		5 Buffalo/cattle	446160	272876	173284	
Aquaculture		1 ha	318760	50765	267995	
Apiculture		6 colonies	47120	10860	36260	
Mushroom		20 bags	3832	1300	2532	
Total		**Total**	**1462523**	**523816**	**938707**	**488909**
Cropping Systems	Farm 2	3.2 ha	498754	129834	368920	
Kitchen gardening		200 m^2	12887	6845	6042	
Livestock		4 Buffalo	369968	198875	171093	
Aquaculture		1 ha	316877	50765	266112	
Mushroom		20 bags	3879	1350	2529	
Total		**Total**	**1202365**	**387669**	**814696**	**484938**
Cropping Systems	Farm 3	3.6 ha	341506	90987	250519	
Kitchen gardening		200 m^2	11210	5798	5412	
Livestock		8 Buffalo/cattle	714480	450198	264282	
Mushroom production		15 bags	3135	1350	1785	
Total		**Total**	**1070331**	**548333**	**521998**	**362498**
Cropping Systems	Farm 4	3.8 ha	1033846	375178	658668	
Kitchen gardening		200 m2	12900	6990	5910	
Livestock		4 cattle	399943	332145	67798	
Mushroom production		20 bags	4524	1350	3174	
Apiculture		14 colonies	109920	24150	85770	
Total		**Total**	**1561133**	**739813**	**821320**	**540342**
Cropping Systems	Farm 5	2.4 ha	439824	122365	317459	
Kitchen gardening		200 m2	12104	5585	6519	
Livestock		3 Buffalo	311100	171883	139217	
Mushroom production		20 bags	4300	1350	2950	
Apiculture		12 colonies	94967	21345	73622	
Total		**Total**	**862295**	**322528**	**539767**	**562247**
Cropping Systems	Farm 6	5.2 ha	1076094	364546	711548	
Kitchen gardening		200 m^2	12829	6352	6477	
Livestock		2 Buffalo	178887	111198	67689	
Mushroom production		20 bags	3565	1350	2215	
Total		**Total**	**1271375**	**483446**	**787929**	**378812**



Demonstration on Livestock related intervention



Beekeeping unit

Farmer 1 (Satwant Singh) adopts a comprehensive integrated model combining cropping systems, livestock, kitchen gardening, aquaculture, apiculture, and mushroom production. This farm exhibits a high cropping intensity of 211%, achieved by growing multiple crops on the same piece of land. It has a net sown area of 4.5 acres (1.8 ha) and a gross cropped area of 9.5 acres (3.8 ha). The farm utilizes 3.8 ha of land by adopting Paddy-Wheat, Maize-Gobhi Sarson-Summer Moong, and Basmati Rice-Wheat-Bajra fodder cropping systems, and also grows sugarcane, complemented by a 200 m² kitchen garden. It maintains 5 buffaloes/cattle, operates a 1 ha aquaculture pond, and grows fruit trees (guava, lemon, karonda, etc.) on the pond boundary for additional income. The farm also has 6 bee colonies and a small-scale mushroom production unit of 20 bags. The economic analysis shows a gross return of ₹14,62,523 with a total cultivation cost of ₹5,23,816, resulting in a net return of ₹9,38,707. The benefit-cost (B: C) ratio for Farm 1 is 1.79. The highest contributor to income is the cropping systems component, followed by livestock and aquaculture.

Farmer 2 (Balwinder Singh) follows a mixed farming approach with 1.82 ha under cropping, adopting Paddy-Wheat, Maize-Gobhi Sarson-Summer Moong, and Basmati Rice-Wheat, while allocating 7 kanals of land for fodder crops. A 200 m² kitchen garden is also maintained. The farm has 4 buffaloes/cattle, a 1 ha aquaculture pond, and grows fruit trees (guava, lemon, karonda, etc.) around the pond. A small-scale mushroom unit of 20 bags is also functional. This farm exhibits a high cropping intensity of 221%, achieved by growing multiple crops on the same piece of land. It has a net sown area of 3.7 acres (1.49 ha) and a gross cropped area of 8.2 acres (3.3 ha). Despite the relatively smaller area under crops, the farm achieves a gross return of ₹12,02,365, with a total cultivation cost of ₹3,87,669, resulting in a net return of ₹8,14,696. The B: C ratio is 2.10. Major income drivers are aquaculture and livestock.

Farmer 3 (Gurpreet Singh) is primarily a dairy-focused IFS, having a very high cropping intensity of 257%, with a net sown area of 1.4 ha and a gross cropped area of 3.6 ha, achieved by cultivating multiple crops on the same land. The farm focuses on the Paddy-Wheat-Summer Moong cropping system and allocates 1.5 acres specifically for fodder production. A 200 m² kitchen garden complements the system. The farm maintains a large herd of 8 buffaloes/cattle, emphasizing animal husbandry, and includes a mushroom unit of 15 bags. Financially, the farm records a gross return of ₹10,70,331 with a total cultivation cost of ₹5,48,333, resulting in a net return of ₹5,21,998. The B: C ratio for Farm 3 is 0.95.

Farmer 4 (Satwinder Singh) integrates multiple components over a gross cropped area of 3.8 ha, incorporating high-value crops in the cropping system such as Paddy-Potato-Spring Maize, Paddy-Gobhi Sarson/Wheat, along with 200 m² of kitchen gardening. It maintains 4 buffaloes and dedicates 0.2 ha for fodder production. A mushroom unit of 20 bags and 14 bee colonies provide additional income, which the farmer aims to double in the next year. This farm also grows flowers and flowering fruit trees on the farm boundary to increase pollen availability for apiculture. This farm exhibits a cropping intensity of 252%, with a net sown area of 3.8 acres (1.5 ha) and a gross cropped area of 9.6 acres (3.8 ha), achieved by growing multiple crops on the same piece of land. The economic analysis shows a gross return of ₹15,61,133 with a cost of cultivation of ₹7,39,813, resulting in a net return of ₹8,21,320. The B: C ratio is 1.11. This farm is highly diversified and earns notable income from apiculture (₹85,770 net return) and livestock.

Farmer 5 (Gurpreet Singh) focuses on a vegetable-based cropping system with a cropping intensity of 196%, with a net sown area of 1.25 ha and a gross cropped area of 2.46 ha, achieved by growing multiple crops on the same piece of land. The cropping plan includes field pea on 0.4 ha and bottle gourd (0.2 acre), along with paddy, wheat, and *kharif* maize, reducing the area under high water stress crops like paddy. This is supplemented by a 200 m² kitchen garden. It maintains 3 buffaloes/cattle, operates a mushroom unit of 20 bags, and maintains 12 bee colonies. The farm achieves a gross return of ₹8,62,295 with a cost of cultivation of ₹3,22,528, resulting in a net return of ₹5,39,767. The B: C ratio is 1.67. Although honey production is in early stages, the apiculture component contributes ₹73,622, and the farmer intends to scale up honey production. Livestock remains a key income contributor.

Farmer 6 (Malwinder Singh) emphasizes organic farming for home consumption and livestock. It utilizes 2.8 ha of cropping land to grow high-return crops like potato and spring maize on 0.8 ha, sugarcane on 0.4 ha, and traditional crops (paddy-wheat) on the remaining land. A 200 m² organic kitchen garden and an organic mushroom unit of 20 bags support sustainability goals. The farm maintains 8 buffaloes/cattle and also includes a fruit-based nutrition garden. This farm exhibits a high cropping intensity of 216%, with a net sown area of 2.42 ha and a gross cropped area of 5.26 ha, achieved by cultivating multiple crops on the same land. The farm records a gross return of ₹12,71,375, with a cost of cultivation of ₹4,83,446, resulting in a net return of ₹7,87,929. The B: C ratio is 1.63.



Section 2.2

Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana

Integrated Approaches for Livestock Development: Farmers' Context

To enhance farmers' participation in research and technology dissemination, Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana, continued the implementation of the Farmer FIRST Project (FFP) in the Mehal Kalan block of Barnala district, covering the villages Moom, Dhaner, Mehal Kalan, Channanwal, Kalala, and Hamidi. In addition, the project area was expanded to the Ludhiana district, including the villages of Pamal and Qila Raipur in the Ludhiana block, Punjab.

Research problem identification and prioritization

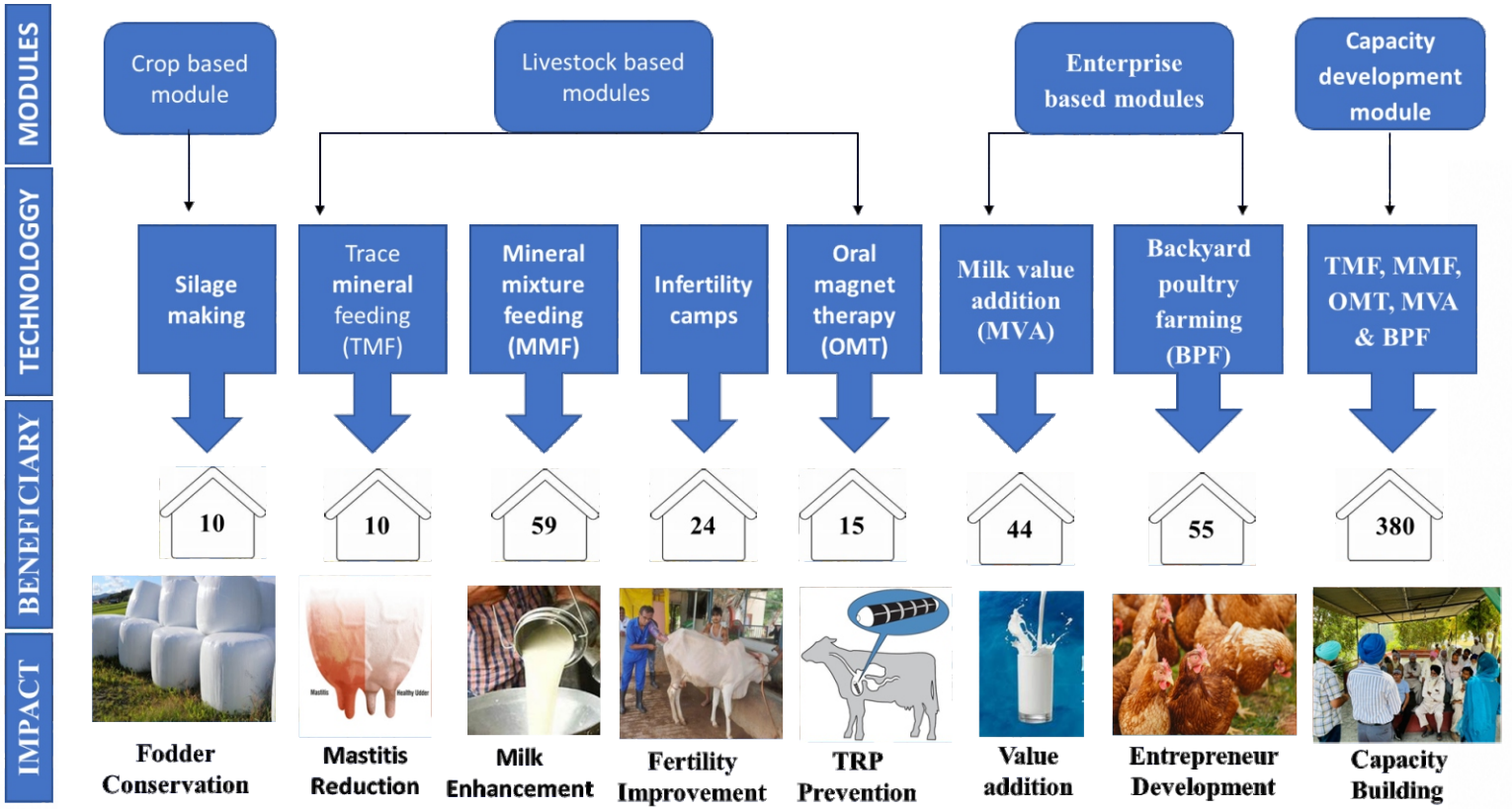
Integrating agriculture and animal husbandry is essential for enhancing rural livelihoods, income diversification, and ensuring sustainable farming systems. However, livestock farmers in the operational area continue to face multiple interlinked constraints that limit productivity, profitability, and overall farm efficiency. The field assessment under the Farmer FIRST Project identified key issues related to inadequate feeding and nutrient management, livestock health and reproductive disorders, and insufficient fodder conservation practices. In addition, gaps in knowledge and adoption of scientific livestock management practices, limited awareness of value addition opportunities, and weak capacity in improved animal husbandry techniques were observed across the operational villages.

To address these challenges, a need-based and location-specific strategic approach has been adopted, focusing on scientific livestock feeding practices, improved animal health management, and reproductive efficiency enhancement through targeted interventions. Emphasis has also been placed on strengthening fodder availability through silage-making practices, promoting capacity development through structured training, and encouraging entrepreneurship through milk value addition and backyard poultry farming. Alongside this, farmer-scientist interface mechanisms, institutional partnerships, and continuous advisory services have been strengthened to support technology dissemination and feedback. These integrated efforts aim to enhance the adoption of improved livestock technologies, improve resource use efficiency, and promote sustainable and profitable livestock-based farming systems in the region.

COMPONENT-I:

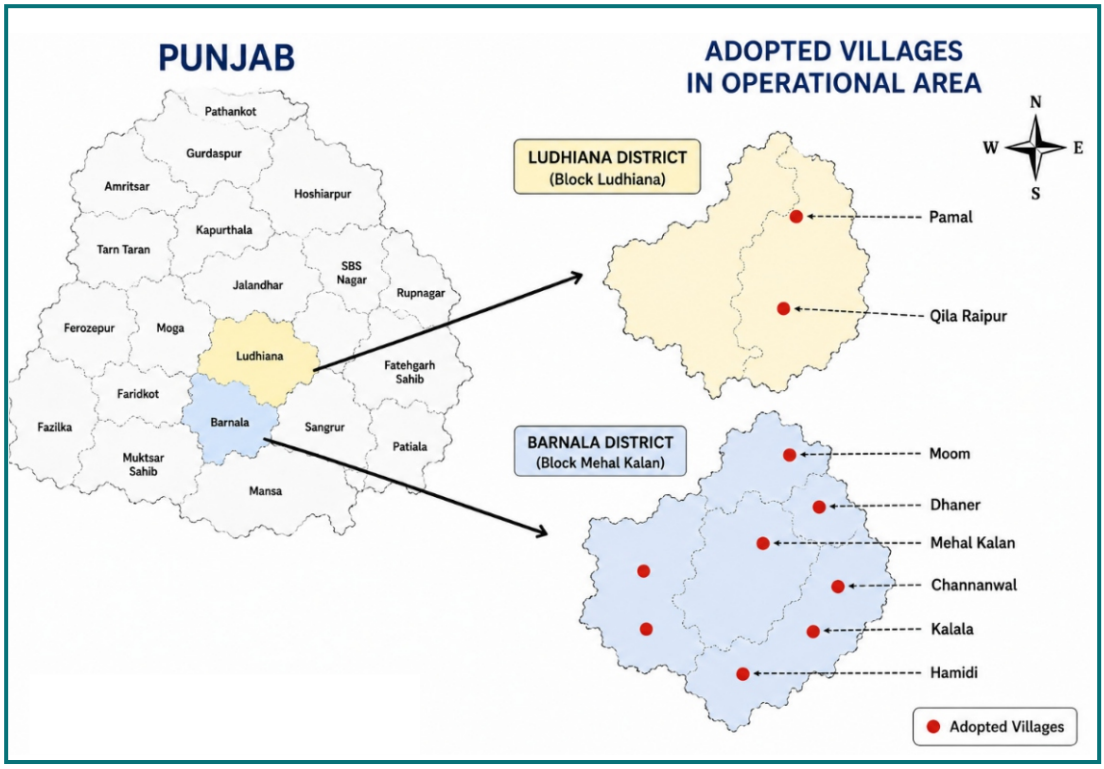
Enhancing Farmer-Scientist Interface

The project aims to strengthen farmer-scientist collaboration to promote technological advancements and sustainable livestock practices. During the year, 8 training-cum-demonstration and interface programmes were conducted in villages such as Qila Raipur, Mehal Kalan, and Hamidi, benefiting 239 farmers. These programmes focused on mineral feeding, silage making, backyard poultry farming, value addition of milk, and animal health interventions, including infertility and oral magnet therapy camps. In addition, 1 Kisan Goshti was organized on silage making. Continuous guidance and



Graphical abstract: GADVASU, Ludhiana

livestock consultancy services were provided through GADVASU clinics and regular farmer-scientist interactions. The project also identified and groomed 8 progressive farmers as technology agents for effective dissemination of innovations. A total of 15 field visits were conducted by the project team for monitoring and technical support. The multidisciplinary involvement of experts from the College of Veterinary Science and College of Dairy and Food Science Technology, GADVASU, Ludhiana, further strengthened knowledge exchange on clean milk production, value addition, and scientific livestock management practices.



Adopted villages

COMPONENT-II:

Technology Assemblage, Application, and Feedback

Crop-based modules:

Silage making was promoted as an effective method for conserving green fodder with minimal nutrient loss. In the operational area, particularly in Qila Raipur village, farmers were initially unaware of this technology. To address this, demonstrations were conducted, benefiting 10 farmers. Following the intervention, farmers adopted silage making using pit methods for large-scale fodder conservation. This initiative improved fodder availability during lean periods, enhanced livestock nutrition, and contributed to better farm sustainability.

Livestock-based module:

Livestock plays a crucial role in enhancing farmers' livelihoods by improving productivity, income, and resilience of farming systems. To strengthen livestock feeding and health management practices in the operational area, the following interventions (Table 2.1) were undertaken:

Trace mineral feeding: Trace minerals improve animal health, productivity, and disease resistance. Demonstrations were conducted among 10 farmers. The intervention increased milk production from 6.5 to 6.8 litres/animal/day (4.6% increase). The economic analysis showed a net return of Rs. 44.6/litre with a BC ratio of 1.29, compared to 1.28 under farmers' practice. Farmers reported reduced mastitis incidence and improved milk quality, leading to wider adoption.

Mineral mixture feeding: Mineral mixture supplementation enhances milk yield and reproductive performance. Demonstrations were conducted among 59 farmers. Milk yield increased from 6.53 to 6.6 litres/animal/day. The net return improved to ₹66.9/litre with a BC ratio of 1.44, compared to 1.30 in the control group. Farmers observed improvement in milk yield and fat percentage and started regular use of mineral mixtures, and details are provided in Table 2.1.

Table 2.1: Activities conducted under Livestock production during 2025-26

Name of intervention	Name of breed	Milk production (ltr/animal/day)			Economics of Demos (₹/ltr)				Economics of Check (₹/ltr)			
		Demos	Check	% increase	Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
Trace mineral feeding camp	HF, Murrah, Nili ravi	6.8	6.5	4.6	152.4	197	44.6	1.29	149.1	191.5	42.4	1.28
Infertility camp	HF, Murrah, Nili ravi	6	4.9	22.4	1200	9900	8700.0	7.25	0	0	0	0.00
Mineral mixture feeding camp	HF, Murrah, Nili ravi	6.6	6.53	0.07	147.3	214.2	66.9	1.44	146.2	190.5	44.3	1.30

Infertility camps: Infertility significantly affects dairy productivity. A total of 4 infertility camps were organized, benefiting 35 animals. Milk production increased from 4.9 to 6.0 litres/animal/day (22.4% increase). The intervention yielded a high net return of ₹8700 with a BC ratio of 7.25, indicating substantial economic benefit as shown in Figure 2.1. Farmers reported improved conception rates and reduced reproductive losses.

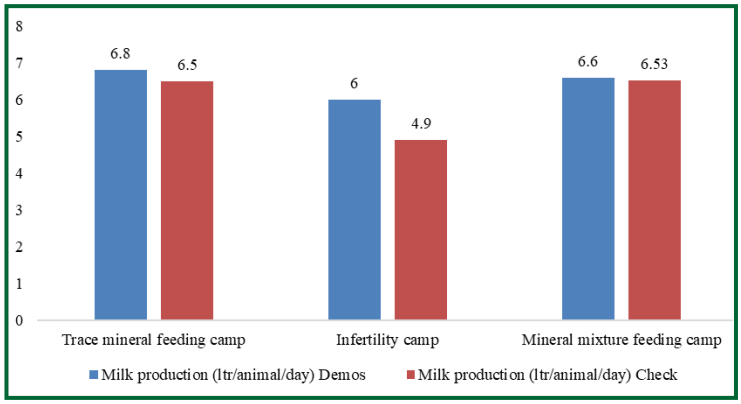


Fig 2.1: Effect of livestock interventions on milk production (Litres/animal/day)



Inaugration of Milk Plant under FFP



Value Addition Camp

Oral magnet therapy: Oral magnet technology is used to prevent ingestion of sharp metallic objects, thereby reducing the risk of Traumatic Reticulo-Pericarditis (TRP) and associated mortality. Initially, farmers were unaware of this preventive technology. The intervention was implemented among 15 beneficiary families. The magnets effectively trapped metallic objects in the rumen, preventing internal injuries and saving animal lives. Farmers recognized its long-term benefits and expressed satisfaction with the technology for safeguarding their livestock.

Enterprise-based modules:

Value addition of milk: Value addition of milk was promoted to enhance farmers' income by converting raw milk into high-value products and improving marketability through better packaging. In the operational area, farmers were earlier selling raw milk at low prices due to a lack of technical knowledge and quality assurance. To address this, demonstrations, exposure visits, and awareness camps were organized, benefiting 44 farmers. Farmers were trained in the preparation and packaging of milk products using modern machinery. The intervention encouraged farmers to adopt entrepreneurial approaches, leading to improved product quality, better pricing, and enhanced income opportunities.

Backyard poultry farming: Backyard poultry farming was promoted as a viable enterprise to enhance the socioeconomic and nutritional status of farmers. Initially, very few farmers were engaged in this activity. To encourage adoption, inputs such as chicks, medicines, and feed supplements were provided to 55 household units, covering 600 birds, as mentioned in Table 2.2. The intervention resulted in improved

Table 2.2: Results under poultry production during 2025-26

Name of intervention	Name of breed	Egg Production (numbers/chicks)			Economics of Demos (₹/unit)				Economics of Check (₹/unit)			
		Demos	Check	% increase	Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
Backyard poultry farming	RIR	140 eggs / bird upto 72 weeks	90	41.66	11080	28000	16920	2.52	11080	18000	6920	1.62

egg production from 90 to 140 eggs per bird (41.66% increase). The economic analysis showed higher profitability with a net return of ₹16,920 and a BC ratio of 2.52, compared to ₹6,920 and 1.62 under existing practices. Farmers responded positively and started adopting backyard poultry farming as a sustainable and income-generating livelihood option.

Capacity development module: Capacity development plays a vital role in improving farmers' knowledge, skills, and adoption of improved livestock and agricultural practices. In the operational area, multiple technologies, including oral magnet therapy, trace mineral feeding, mineral mixture supplementation, value addition of milk, and backyard poultry farming, were promoted. Farmers showed a positive attitude and willingness to adopt these interventions. To strengthen their capacity, a total of 15 training and demonstration programmes were organized by GADVASU, covering various aspects of livestock management and allied activities. Overall, 380 farmers were trained under this module. These efforts enhanced farmers' technical awareness, improved their skills, and encouraged the adoption of scientific practices, ultimately contributing to better productivity and livelihood improvement.



Section 2.3

ICAR-Central Institute of Post-Harvest Engineering & Technology, Ludhiana

Processing and value addition of agricultural produce for enhancing farmers' income and employment in the production catchment

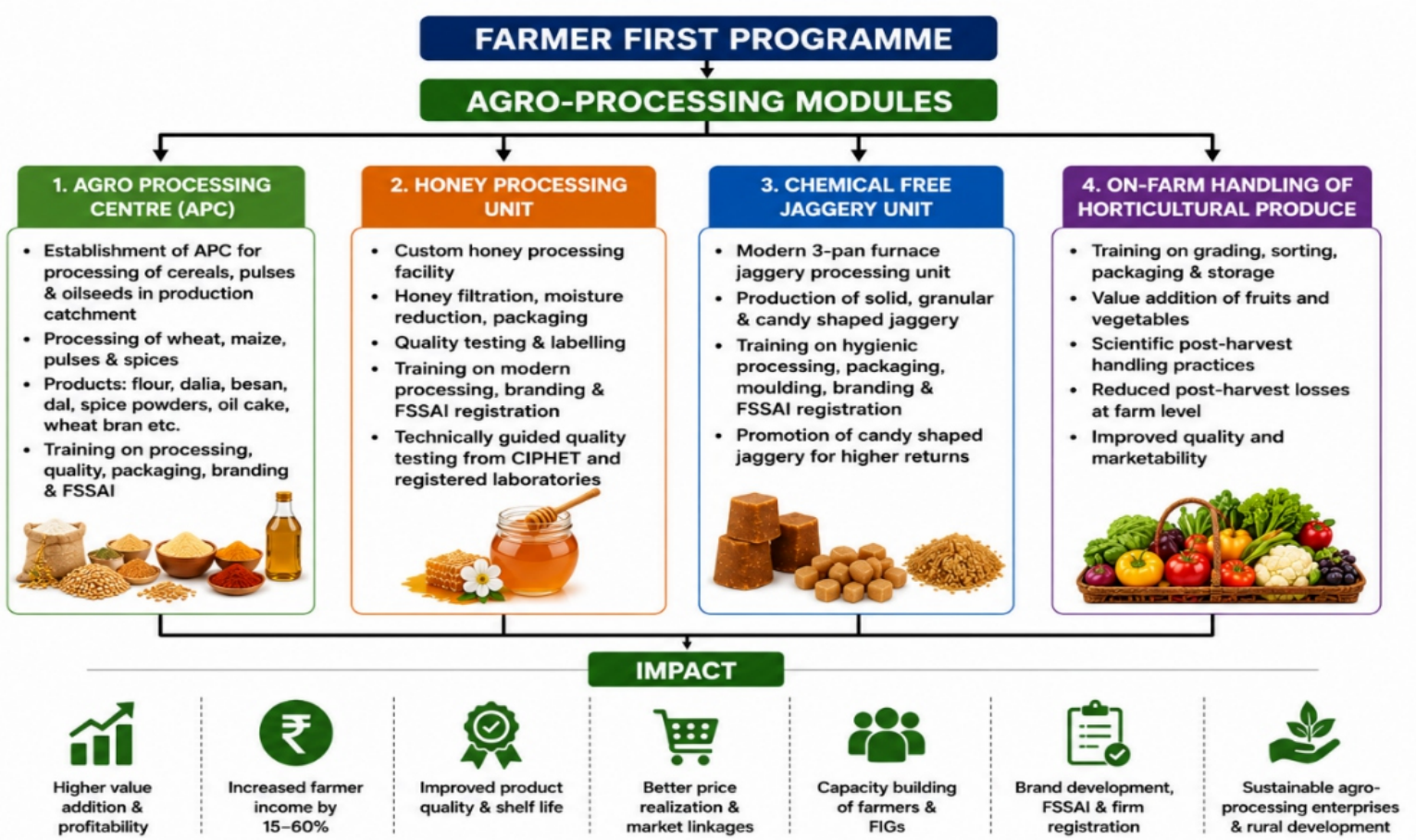
The Farmer FIRST Programme of ICAR-CIPHET, Ludhiana was implemented with the objective of enhancing farmers' income through post-harvest management, value addition, agro-processing and entrepreneurship development. The programme focused on promoting processing technologies for cereals, pulses, spices, honey, sugarcane and livestock feed so that farmers could obtain higher returns from their produce through value addition rather than selling it in raw form. Punjab is one of the leading agricultural states of India and produces substantial quantities of wheat, maize, pulses, sugarcane, oilseeds, and horticultural commodities. Despite high production levels, a considerable proportion of farm produce is sold without processing, resulting in reduced income opportunities for farmers. Limited access to processing infrastructure, inadequate awareness regarding value addition, and weak market linkages often restrict farmers from realizing the full economic potential of their produce. Considering these challenges, ICAR-CIPHET implemented various enterprise-based interventions under the Farmer FIRST Programme to demonstrate the economic viability of agro-processing technologies. The programme emphasized participatory technology assessment, farmer-scientist interaction, custom hiring processing facilities, and entrepreneurship development to strengthen rural livelihoods.

Description of Project Area

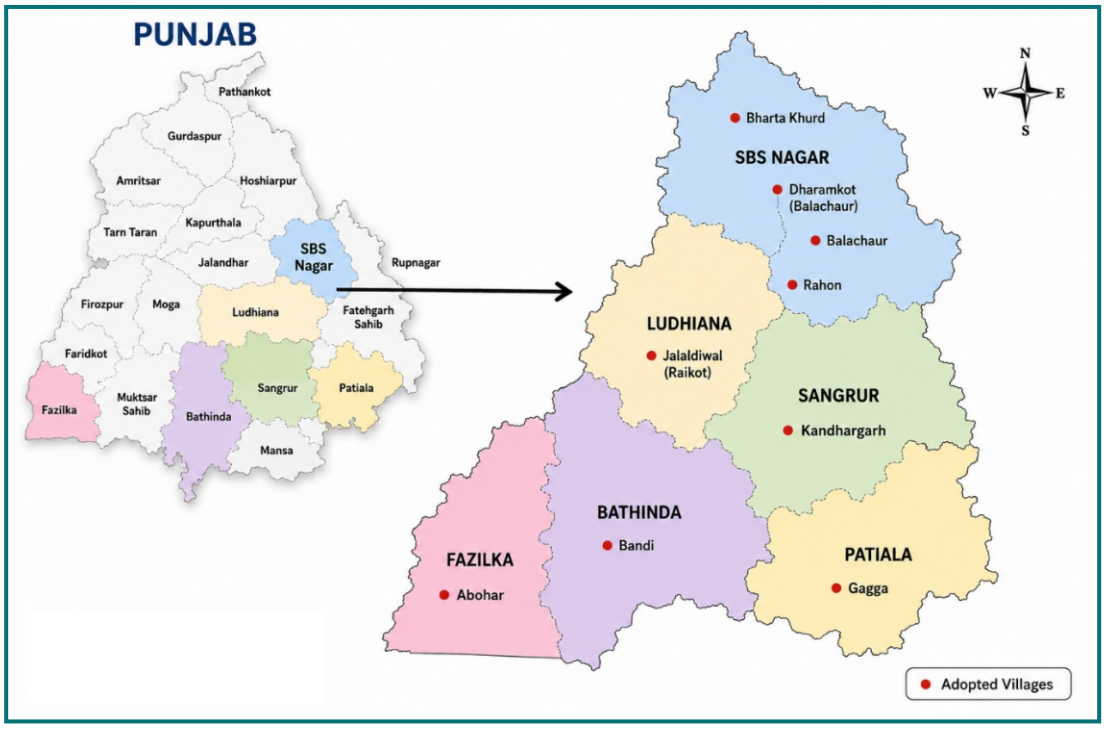
The programme interventions were implemented through custom hiring and farmer-led processing enterprises located in Punjab. The major intervention sites included Khalsa Farm, Balachaur (Nawanshahr), Pabla Brothers (Bharta Khurd, Nawanshahr), Padan Atta Chakki (Rahon), Cattle Feed Production Unit (Raikot, Ludhiana), Honey Processing Units operating at different locations, and Chemical-Free Jaggery Production Unit at Uppal Farm, Rahon. These enterprises served as demonstration and learning centres for farmers interested in agro-processing, value addition, and entrepreneurship development. The programme targeted farming households, beekeepers, livestock farmers, processors and rural entrepreneurs who were seeking opportunities to enhance income through value-added agricultural products.

Research problem identification and prioritization

A series of interactions with farmers, processors and entrepreneurs revealed several constraints affecting profitability of agricultural enterprises in the region. The majority of farmers were marketing their produce in raw form immediately after harvest and therefore receiving lower returns. Value addition at the farm and village level remained limited because of inadequate processing infrastructure, lack of technical knowledge, and limited exposure to successful processing enterprises. Post-harvest losses in cereals, pulses, and spices were another major concern. Farmers reported that fluctuations in market prices often



Graphical abstract: ICAR-Central Institute of Post-Harvest Engineering & Technology, Ludhiana



Adopted villages

reduced profitability, particularly when produce was sold without grading, processing, or packaging. Beekeepers highlighted challenges related to honey processing, quality maintenance, and marketing. Similarly, sugarcane growers faced limitations in obtaining premium prices for their produce due to inadequate value-addition opportunities. Livestock farmers also identified rising feed costs as a major constraint affecting profitability. Dependence on commercial feed suppliers increased production costs and reduced net returns from livestock enterprises. Based on these constraints, the Farmer FIRST Programme prioritized interventions focusing on agro-processing, honey processing, cattle feed production, chemical-free jaggery production and entrepreneurship development. The selected interventions were designed to increase value realization, reduce post-harvest losses, strengthen market linkages and promote farmer-led enterprises for sustainable income enhancement.

COMPONENT-I:

Enhancing Farmer-Scientist Interface

The Farmer FIRST Programme at ICAR-CIPHET, Ludhiana focused on strengthening farmer awareness regarding post-harvest management, value addition, agro-processing technologies and entrepreneurship development. Continuous interaction between scientists, entrepreneurs and farmers was maintained through field demonstrations and exposure visits organized at processing units and farmer enterprises. During 2025-26, a total of 9 extension activities were organized benefiting 175 farmers. These activities comprised three exposure visits involving 75 farmers and six field day programmes involving 100 farmers.

The programmes provided hands-on exposure to agro-processing technologies, custom hiring facilities, honey processing, cattle feed manufacturing, chemical-free jaggery production, and value-added food products.

The exposure visits enabled farmers to interact directly with successful entrepreneurs and observe the operation of processing units. Participants gained practical knowledge regarding processing technologies, product quality, packaging, branding, marketing channels, and enterprise management. Field day programmes were organized at processing units where scientists demonstrated the economic advantages of value addition over the sale of raw agricultural produce. Regular farmer-scientist interactions facilitated identification of constraints related to post-harvest losses, low market realization, lack of processing infrastructure, and limited value-addition opportunities. Farmers appreciated the practical orientation of the programme and expressed keen interest in adopting processing-based enterprises for improving household income.

COMPONENT-II:

Technology Assemblage, Application, and Feedback

Enterprise-based module:

The project is being carried out in the designated adopted area to strengthen agricultural processing and allied activities. To achieve this, a range of enterprise-based interventions has been introduced, aimed at both income generation and efficient resource utilization. Moreover, the project emphasizes the promotion of sustainable practices, the enhancement of farmers' skills, and the creation of effective market linkages. In this context, the following section highlights the key activities undertaken under each intervention along with their significant outcomes.

Agro-processing centre (APC):

To enhance farmers' income through value addition, agro-processing interventions were implemented by establishing custom hiring processing facilities at Khalsa Farm (Balachaur), Pabla Brothers (Nawanshahr) and Padan Atta Chakki (Rahon). Processing technologies for cereals, pulses and spices



Monitoring of Honey Processing Unit



Demonstration for production of chemical free jaggery

Table 3.1: Enterprise-based module: Activities conducted under Product processing during 2025-26

Name of FFP Centre	Intervention	Village/centre where the processing unit is established	Demo-nstration (No.)	House holds covered (No.)	Cost of raw material (₹/kg)	Total quantity procured (kg)	Proces-sed as (I. e., flour, dal, etc.)	Quantity recovered after processing	Cost of processing/ value addition (₹/kg)	Selling price (₹/kg)	Profit (₹)	Profit (₹/kg) over the raw product	Selling mode (Directly to the consumer or market)
Agro-Processing Module													
i) Khalsa Farm, Balachour, Nawanshahr (custom hiring)													
ICAR-CIPHET, Ludhiana	Wheat (own production)	Khalsa Farm, Balachour, Nawanshahr, Punjab	5	62	25.5	170650	Atta	162500	3	36	986475	6.07	Direct as well as through dealer
	Wheat (own production)				26	22500	Dalia	20250	4	46	256500	12.67	
							Wheat bran	7495	By-product	23	172385	23	
	Maize				25	15500	Atta	14850	3	40	160000	10.77	
	Chana Dal				68	44000	Besan	42800	4.5	87	533600	12.47	
	Turmeric (own production)				114	24000	Turmeric powder	23040	7	148	505920	21.86	
	Red chilli				241	5700	Red chilli powder	5598	5	266	86868	15.52	
	Coriander				121	8000	Coriander powder	7840	5	157	222880	28.43	
	Black pepper				592	4200	Black pepper powder	4032	5	671	198072	49.13	
	Green gram				86	6100	Dal	4880	4	131	90280	18.59	
	Black gram				82	4700	Dal	3860	4	116	43560	11.28	
	Lentil				83	4100	Dal	3310	4	121	43810	13.24	
	Pigeon Pea				76	3600	Dal	2880	4	112	34560	12	
	Bengal gram				61	4650	Whole	4577	3.5	73	34196	7.47	
	Bengal gram				63	5200	Dal	4470	4	83	22610	5.06	
							Gota	1220	By-product	44	53680	44	
	By-products						Husk/chuni	2290	By-product	25	57250	25	
ii) Pabla Brothers, Nawanshahr (custom hiring)													
ICAR-CIPHET, Ludhiana	Wheat	Pabla Brothers, Bharta Khurd, Rahon, Nawanshahr	2		26	86000	Atta	82700	3.2	36	466000	5.63	Direct as well as through dealer
							Wheat bran	3947	By-product	21	82887	21	
	Chana Dal				68	9500	Besan	9120	4	81.5	59280	6.5	
	Turmeric				114	14500	Turmeric powder	13980	6.8	142	233560	16.7	
	Red chilli				242	4200	Red chilli powder	4116	5	272	82152	19.95	

Name of FFP Centre	Intervention	Village/centre where the processing unit is established	Demo-nstration (No.)	House holds covered (No.)	Cost of raw material (₹/kg)	Total quantity procured (kg)	Proces-sed as (I. e., flour, dal, etc.)	Quantity recovered after processing	Cost of processing/ value addition (₹/kg)	Selling price (₹/kg)	Profit (₹)	Profit (₹/kg) over the raw product	Selling mode (Directly to the consumer ormarket)
Agro-Processing Module													
	Coriander				122	4600	Coriander powder	4462	4.5	156	114172	25.58	
iii) Padan Atta Chakki, Rahon (custom hiring)													
ICAR-CIPHET, Ludhiana	Wheat	Padan Atta Chakki, Rahon, Nawanshahr	3		26	150000	Flour	143000	3	36	798000	5.6	Direct as well as through dealer
							Wheat bran	3000	By-product	22	66000	22	
	Maize				25	19500	Flour	18025	3	40	175000	9.7	
	Chana Dal				67	10200	Besan	9770	4	82	76940	7.87	
	Turmeric				114	8000	Turmeric powder	7600	6.5	142	115200	15.1	
	Mustard				56	21000	Mustard Oil	7100	4.5	181	14600	2.05	
							Oil Cake	12335	By-product	28	345380	28	
iv) Cattle Feed Production Unit, Raikot, Ludhiana													
ICAR-CIPHET, Ludhiana	Wheat/ soybean	Cattle Feed Production Unit, Raikot	2		19.5	555000	Catlle feed	531800	1.6	24	1052700	1.9	Direct as well as through dealer
	Maize/ soybean				18	400000	Catlle feed	375800	1.6	24	1179200	3.1	
Honey processing plant (Custom hiring basis)													
ICAR-CIPHET, Ludhiana	Raw Honey	Honey Processing Unit, (Rahon) Nawanshahr, (Bandi) Bathinda, (Dhuri) Sangrur, ICAR-CIPHET (Abohar)	8	75	117	140500	Processed Honey	128975	39	275	13550125	105	Direct as well as through dealer and ICAR-CIPHET
							Wax	2258	By-product	340	767720	340	
Chemical-free jaggery production unit (custom hiring basis)													
ICAR-CIPHET, Ludhiana	Sugarcane	Uppal Farm, Rahon, Nawanshahr	1	84	4.6	655000	Solid jaggery	66650	1.55	82	1396050	22	Direct as well as through dealer and ICAR-CIPHET
	Sugarcane				4.6	520000	Granular jaggery	53700	1.85	92	1577200	30	

enabled farmers to convert raw produce into value-added products such as atta, dalia, besan, dal and spice powders, and details are provided in Table 3.1. More than 4 lakh kg of wheat was processed, generating additional income through products as well as wheat bran. Similarly, processing of pulses and spices improved market value and profitability, with black pepper powder recording the highest profit margin among the processed spices. The custom hiring model provided limited and marginal farmers access to modern processing facilities without the need for high capital investment, thereby improving price realization, reducing processing costs, and enhancing overall farm profitability.

Honey Processing Module: Under the Farmer FIRST Programme, beekeepers were provided technical guidance on honey quality analysis, processing, packaging, branding, firm registration, and FSSAI licensing to strengthen value addition and market access. Trainings and demonstrations were organized for Farmer Interest Groups (FIGs) on modern honey processing, quality testing, packaging and labelling, while quality analysis was facilitated through ICAR-CIPHET and other accredited laboratories. During 2025-26, about 1,405 quintals (140,500 kg) of raw honey were processed through the custom honey processing centre by 164 farmers, generating an additional profit of ₹1,35,50,125. Adoption of improved honey processing technologies increased the income of participating beekeepers by 50-60%, demonstrating the effectiveness of value addition in enhancing farm profitability.

Chemical-Free Jaggery Production Module: To promote value addition in sugarcane and improve farmers' income, a modern chemical-free jaggery processing unit was established at Uppal Farm, Rahon. Farmers were provided technical guidance on hygienic jaggery production, good manufacturing practices, packaging, branding, firm registration, and FSSAI registration. Demonstrations on modern three-pan furnace technology and production of candy-shaped jaggery were conducted, encouraging traditional roadside jaggery producers to adopt improved processing techniques. During 2025-26, a group of 32 farmers processed 655 quintals of solid jaggery and 520 quintals of granular jaggery, generating an estimated profit of ₹13,96,050. The adoption of improved processing technologies and value-added jaggery products increased farmers' income by 30-35%, while candy-shaped jaggery fetched nearly 100% higher market price than conventionally prepared jaggery, demonstrating the strong economic potential of value addition in sugarcane.

On-farm handling of fresh horticultural produce: To minimize post-harvest losses and improve the quality of horticultural produce, a training programme on on-farm handling of fresh fruits and vegetables was organized at Balachaur and Gagga. Farmers were trained on scientific post-harvest management practices, including grading, sorting, packaging, storage, and value addition of horticultural crops. The intervention enhanced farmers' awareness of proper post-harvest handling techniques, contributing to improved produce quality, reduced losses, and better marketability.



Section 2.4

Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya (CSKHPKV), Palampur

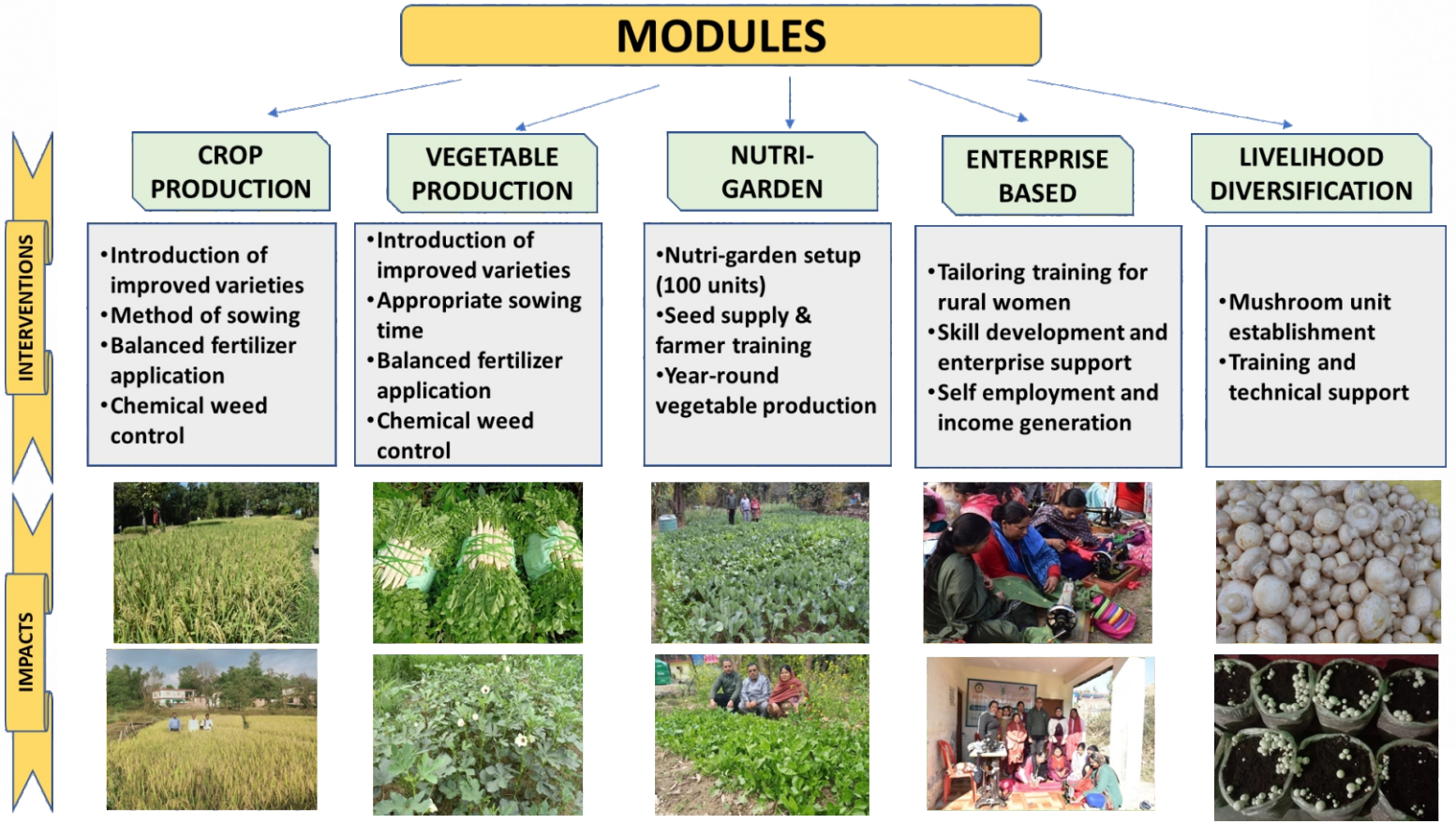
Transfer of Improved Farm Production Technologies for the Enhancement of Rural Livelihood Security Amongst the Farm Households of Kangra District of Himachal Pradesh

The Farmer FIRST Programme (FFP) during 2025-26 was implemented by CSKHPKV in a cluster of eight villages, covering an area of 79.2 hectares (1980 kanals) and benefiting around 500 households. The farming system in the adopted area is predominantly cereal-based, including major crops including maize, wheat, and paddy, with a maize-wheat cropping system under rainfed conditions. Paddy is grown in irrigated areas during the kharif season, while wheat dominates in rabi. In addition, there is also increasing emphasis on off-season vegetable cultivation. Livestock rearing also plays an important role in supporting rural livelihoods. The selected cluster of villages has a total population of 2,491 and a cultivated area of 117 ha. The study area is predominantly occupied by marginal farmers, with over 86% owning less than 0.5 ha of land, around 10% holding between 0.5 and 1.0 ha, and only 3% possessing more than 1.0 ha, emphasizing the prevalence of small landholders.

Research problem identification and prioritization

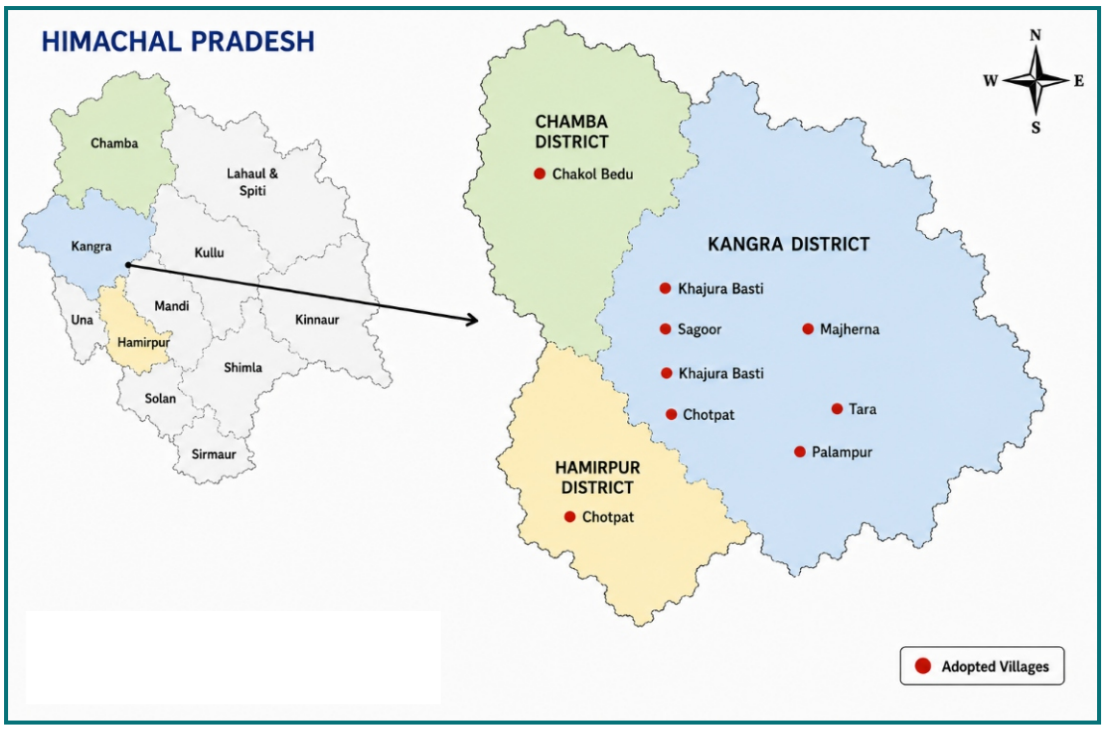
The baseline assessment and continuous farmer-scientist interactions identified several constraints affecting agricultural productivity, profitability, and livelihood security in the adopted villages. Farmers had limited access to improved crop varieties and relied largely on traditional practices, resulting in lower yields of major crops such as soybean, paddy, and wheat. There was inadequate knowledge regarding scientific crop management practices, including timely sowing, balanced fertilization, weed management, and pest control, particularly in vegetable crops. Nutritional insecurity at the household level, low diversification of farming systems, and limited income-generating opportunities were also observed. Livestock productivity remained low due to poor feeding practices and inadequate health management. In addition, weak adoption of improved technologies, lack of skill-based enterprises for rural women, and underutilization of available resources further constrained overall farm development. These issues reflect the need for participatory, location-specific interventions, as Farmer FIRST emphasizes farmer involvement in problem identification and technology adoption.

Based on these findings, priority interventions were identified focusing on strengthening the farmer-scientist interface, promotion of improved crop varieties and scientific production technologies, and adoption of integrated nutrient and pest management practices. Emphasis was given to diversification through vegetable cultivation and off-season crops to enhance income. Nutri-gardens were prioritized to improve household nutritional security, while mushroom cultivation and skill-based activities such as tailoring were promoted for livelihood diversification, especially among rural women. Interventions also focused on improving livestock health and feeding practices, along with capacity building through training,



Graphical abstract: Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya (CSKHPKV), Palampur

exposure visits, and field demonstrations. These need-based, location-specific interventions aimed at bridging technological gaps, enhancing productivity and profitability, and improving the overall socio-economic status and resilience of farming households.



Adopted villages

COMPONENT-I:

Enhancing Farmer-Scientist Interface

During the year 2025-26, the farmer-scientist interface was strengthened through a series of training programmes, exposure visits, field days, and extension activities conducted across the adopted villages. A total of 21 off-campus programmes were organized, covering important aspects such as integrated





Farmer-scientist interaction




Veterinary clinical camp at Khajura Basti & Sagoor

agriculture, vegetable production, agroforestry, drone technologies, and beekeeping. Veterinary clinical camps and Kisan Goshthis were also conducted to address livestock health and field-level issues.

Regular visits of project scientists from different disciplines ensured continuous interaction with farmers, monitoring of activities, and timely technical guidance. The involvement of multiple stakeholders, including the Department of Agriculture, Horticulture, Forest Department, financial institutions, and JICA, further enhanced knowledge exchange and adoption of improved agricultural practices, contributing to improved skills and awareness among farmers.

COMPONENT-II:

Technology Assemblage, Application and Feedback

A set of location-specific, economically feasible, and socially acceptable technological interventions comprising crop, vegetable, livestock, and allied enterprises was undertaken during the year 2025-26 to enhance the productivity, profitability, and livelihood security of farmers. The demonstrations were conducted on selected farmers' fields covering 79.2 ha (1980 kanals), focusing on reducing yield gaps, improving input-use efficiency, and promoting diversification. Based on field-level constraints, different crop- and enterprise-based modules were identified and executed to address productivity and income-related issues.

Crop production module:

Farmers were found to have limited awareness regarding improved crop varieties, quality seeds, line sowing, balanced fertilization, and effective weed management in cereal crops. To overcome these gaps, high-yielding varieties of maize, paddy, and wheat were introduced, accompanied by the practice of line sowing to ensure uniform crop growth and higher productivity. At the same time, farmers were sensitized to the recommended use of basal fertilizer application in combination with farmyard manure for improving soil fertility. In addition, chemical methods of weed management practices were promoted to control infestations more effectively. Collectively, these interventions aimed to improve crop yields while fostering sustainable and efficient farming practices by replacing outdated seed varieties with high-yielding alternatives.

Crop production module:

Earlier, farmers in the adopted area relied mainly on traditional varieties and conventional practices, which resulted in lower productivity. To address this, improved varieties of soybean, paddy, and wheat were introduced along with scientific crop management practices. Demonstrations on these crops showed better performance as compared to local practices due to the adoption of improved seed, balanced fertilization, timely sowing, and proper crop management, as shown in Table 4.1. Farmers were also made aware of improved production technologies such as line sowing, use of quality seed, integrated nutrient management, and weed management practices. These interventions helped in improving crop growth, increasing productivity, and enhancing profitability.

Table 4.1: Comparative performance of major crop interventions

Intervention	Improved Variety/Hybrid	Demo Yield (q/ha)	Check Yield (q/ha)	Increase (%)	B: C Ratio
Soybean	Him Soya	58.80	47.20	24.57	3.01
	Harit Soya	58.90	47.20	24.78	3.98
Okra	Arka Anamika	66.10	58.64	12.72	3.07
	Palam Komal	66.59	58.64	13.55	3.03
French bean	OP Falguni	66.57	55.78	19.34	3.01
Cauliflower	F1 Him Palam Phoolgobhi Hybrid-1	149.40	115.80	29.01	4.20
Peas	GS-10	99.90	66.00	51.36	4.42
	PB-89	65.20	52.60	23.95	3.42
Radish	F1-22	171.20	116.40	47.07	4.60
	F1 Ivory White	153.20	109.40	40.03	2.70
Paddy	HPR 2143	26.24	20.00	31.13	2.68
	HPR 10	24.49	20.01	22.38	2.58
	HPR 2612	22.89	20.00	14.14	2.48
Wheat	HPW 373	23.30	19.10	21.98	2.38
	HPW 349	23.60	19.10	23.56	2.40
	HPW 368	24.20	19.10	26.70	2.48

Soybean: In the current year, soybean cultivation was strengthened by introducing improved varieties such as Him Soya and Harit Soya in the adopted villages. Earlier, farmers had limited access to high-yielding pulse varieties, which restricted productivity. To overcome this, quality seed distribution along with improved sowing techniques was demonstrated on farmers' fields covering 8.12 ha. The demonstrations showed a clear advantage over local practices, with average yields reaching about 58.8-58.9 q/ha compared to 47.2 q/ha under local varieties, reflecting an increase of nearly 24-25%. The economic analysis also indicated higher profitability, with the benefit-cost ratio ranging from 3.01 to 3.98, as against 1.70 under traditional practices. The results highlight the effectiveness of improved varieties and scientific crop management in enhancing pulse production.

Paddy: To improve paddy productivity, high-yielding varieties such as HPR 2143, HPR 1068, and HPR 2612 were promoted along with better agronomic practices, including line transplanting, balanced fertilizer



Demonstrations on soybeans

use, and weed control measures. These interventions were carried out over 36 ha involving a large number of farmers. The improved varieties performed better than the local checks, recording yield gains ranging from about 14% to 31%. Among them, HPR 2143 gave the highest yield (26.24 q/ha) and maximum increase over local varieties, as shown in Figure 4.1. The benefit-cost ratio also improved (2.48-2.68) compared to the local practice (1.65), indicating better economic returns. Farmers showed a positive response towards these varieties due to their higher productivity and profitability.

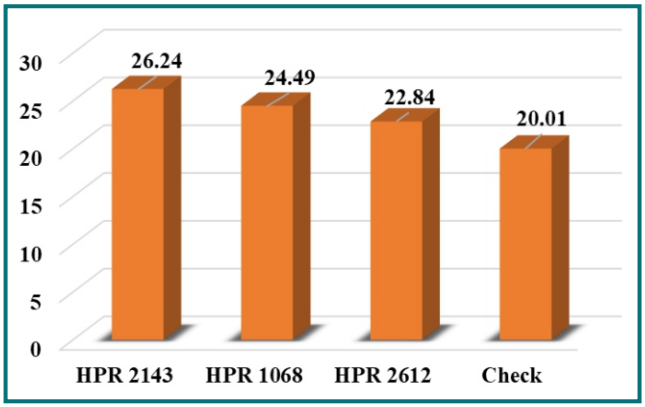


Fig 4.1: Average yield (q/ha) of improved varieties as compared with the check

Wheat: Under the wheat module, improved varieties, namely HPW 373, HPW 349, and HPW 368, were introduced with emphasis on timely sowing, balanced fertilization, and effective weed management. Demonstrations were conducted over 16.87 ha to evaluate their performance under farmers' field conditions.

Vegetable production module:

During the year 2025-26, emphasis was given to the promotion of off-season vegetable cultivation to enhance farmers' income through better market opportunities in nearby towns. Farmers earlier had limited knowledge regarding improved varieties, proper sowing time, nutrient management, and plant protection practices. To overcome these gaps, demonstrations were conducted using high-yielding varieties along with improved production technologies such as timely sowing, balanced fertilizer application, and effective weed management, and yield details are shown in Figure and; economic analysis is provided in Table 4.2.

Okra: Demonstrations were conducted on 293 farmers' fields covering 3.2 ha using improved varieties Arka Anamika and Palam Komal. These varieties recorded yields ranging from 66.10 to 66.59 q/ha as compared to 58.64 q/ha under local practices, showing an increase of 12.72% to 13.55%. The BC ratio





Demonstrations on paddy





Demonstrations on wheat

ranged from 3.03 to 3.07, as against 2.0 in the local check. The yield improvement was mainly due to the adoption of appropriate sowing time, balanced fertilizer application, and chemical weed control, along with the use of improved varieties, which enhanced crop growth and productivity.

French Bean: Demonstrations on the French bean variety OP Falguni were conducted on 0.20 ha, covering 261 farmers. The improved variety recorded an average yield of 66.57 q/ha, which was 19.34% higher than the local check (55.78 q/ha). The BC ratio of 3.01 was also significantly higher than the local check (1.82). The increase in yield and profitability was attributed to the use of improved varieties, timely sowing, balanced fertilizer application, and effective weed management practices, which are essential for improving vegetable productivity.

Cauliflower: The cauliflower hybrids F1 White Gold, F1 Megha, and F1 Him Palam Phoolgobhi Hybrid-1 were conducted on 1.55 ha covering 54 farmers. The improved hybrids recorded yields ranging from 142.2 to 149.4 q/ha, resulting in an increase of 22.79% to 29.01% over the local check (115.8 q/ha). The BC ratio ranged from 3.86 to 4.20 compared to 2.92 under local practices. The higher yield was mainly due to the adoption of improved hybrids, timely sowing, balanced nutrient management, and proper weed control, which improved crop establishment and curd development.

Peas: A total of demonstrations on pea varieties GS-10 and PB-89 were conducted on 2.12 ha, covering 318 farmers. The variety GS-10 recorded the highest yield of 99.9 q/ha, showing an increase of 51.36%

Table 4.2: Economics of vegetable production

Name of Demo Variety	Name of check Variety	Area (ha)	Economics of Demos (Rs/ha)				Economics of Check (Rs/ha)			
			Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
Frenchbean	Falguni	0.2	55290	166425	111211	3.01	45874	83678	37804	1.82
Okra	Arka Anamika	3	64592	198300	133708	3.07	58640	117280	58640	2.00
	Palam Komal	0.2	65872	199770	13389	3.03	58632	117280	58648	2.00
Radish	F1 22	3	130260	599200	468940	4.6	65393	174600	109207	2.67
	Ivory White	0.9	141851	383000	241149	2.7	110878	164100	53222	1.48
Cucumber	Malav	4	92158	367620	275462	3.98	71241	192500	121259	2.70
Bottle Gourd	Sharda	0.4	75841	290100	214259	3.82	72487	170800	98313	2.35
Bitter Gourd	Palee	0.4	68453	228375	159922	3.33	52142	107445	55303	2.06
Cauliflower	White Gold	0.2	110518	426600	316082	3.86	59486	173700	114214	2.92
	Megha	0.1	111548	439500	327952	3.94	59486	173700	114214	2.92
	Him Palam Phoolgobhi 1	1.25	106714	448200	341486	4.2	59486	173700	114214	2.92
Peas	PB-89	1.06	95258	326000	230742	3.42	95636	210400	114764	2.20
	GS-10	1.06	113009	499500	386491	4.42	73333	264000	190667	3.60
Turnip	PTWG	0.6	63389	172420	109031	2.72	64022	114600	50578	1.79
Coriander	Kargil	0.12	125470	293600	168130	2.34	77875	124600	46725	1.60
Palak	All Green	0.36	74328	199200	124872	2.68	52102	101600	49498	1.95
Cabbage	Bahar	0.06	22194	63475	41281	2.86	77575	153600	76025	1.98

over the local check, while PB-89 recorded 23.95% higher yield (65.2 q/ha). The BC ratio ranged from 3.42 to 4.42 compared to 2.20-3.60 under local practices. The increased productivity was due to the adoption of improved varieties, appropriate sowing time, balanced fertilizer application, and effective weed management, along with better crop management practices.



Demonstrations on cauliflower

Radish: Demonstrations on radish varieties F1-22 (summer) and F1 Ivory White were conducted on 3.9 ha covering 269 farmers. The improved varieties recorded yields of 171.2 q/ha and 153.2 q/ha, respectively, showing an increase of 47.07 per cent and 40.03 per cent over the local check. The BC ratio ranged from 2.70 to 4.60 compared to 1.48 to 2.67 under local practices. The higher yield was mainly due to the use of improved varieties, timely sowing, balanced fertilizer application, and proper weed management, which are critical for root development and yield.

Other off-season vegetables: Other off-season vegetables, such as cucumber (F1 Malav), bitter gourd (F1 Palee), bottle gourd (F1 Sharda), spinach (All Green), coriander (F1 Kargil), turnip (PTWG), and cabbage, were also demonstrated. These crops recorded yield increases as shown in Figure 4.2, with per cent increase ranging from 12.84 to 30.70 per cent as compared to the local check. The BC ratio was also higher under demonstrations compared to local practices. The improved performance was attributed to the adoption of hybrid varieties, balanced nutrient management, proper sowing time, and effective weed control practices. Crop diversification and the inclusion of off-season vegetables further helped farmers in increasing income and improving livelihood security.


Demonstrations on radish

Nutri-Garden Module:

To improve household nutritional security and ensure year-round availability of fresh vegetables, a total of 100 nutri-garden demonstrations were established during 2025-26, each covering approximately 150 m² in the vicinity of farmers' households. The intervention was designed to promote the cultivation of a diverse range of seasonal vegetables in small plots (10-50 m²), enabling continuous supply through proper planning and staggered sowing. Farmers were provided with quality seeds of improved varieties, along with technical guidance on crop planning, nursery raising, balanced nutrient management, irrigation scheduling, and plant protection measures. Special emphasis was given to multi-cropping, seasonal crop

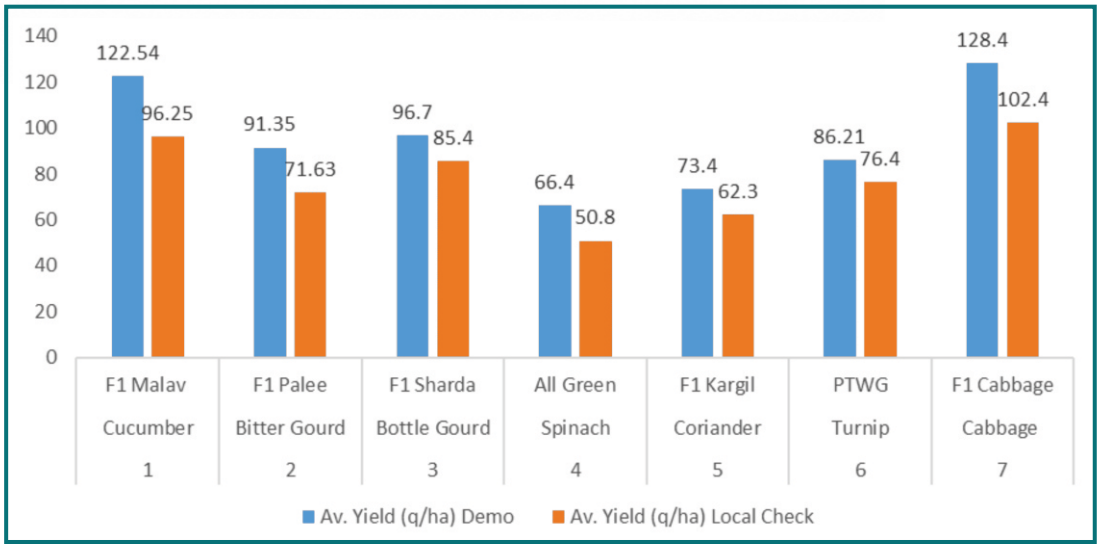


Fig 4.2: Average yield (q/ha) of improved off-season vegetable varieties as compared with the check

rotation, and efficient utilization of available space, so that different categories of vegetables, such as leafy, root, fruit, and leguminous crops, could be produced throughout the year. The intervention also focused on low-cost and sustainable practices, including the use of organic manures, household waste recycling, and need-based plant protection, making the model economically viable and environmentally safe. Nutri-gardens are widely recognized as an effective approach to enhancing dietary diversity and ensuring household-level access to essential micronutrients, thereby contributing significantly to food and nutritional security. The feedback obtained from the demonstrated nutri-gardens indicated that a total area of about 300 m² under different vegetables produced substantial yields, generating an estimated economic value of Rs. 4,875. The produce not only met the daily household consumption requirements but also reduced dependency on market purchases, resulting in considerable savings, and also details provide in Table 4.3. Overall, the nutri-garden intervention proved to be a cost-effective and sustainable model, contributing to improved nutritional intake, enhanced availability of fresh vegetables, and supplementary income generation. In addition, it promoted better utilization of homestead land, increased awareness regarding balanced diets, and active participation of farm families, particularly women, thereby strengthening livelihood security and resilience of rural households.

Enterprise-based module:

The enterprise-based intervention on the establishment of a cutting and tailoring unit was undertaken during 2025-26 to enhance the economic security of rural women and young girls, as the baseline survey indicated limited income opportunities. Among various options like mushroom cultivation, embroidery, and tailoring, this activity was selected due to its low investment and high self-employment potential, while mushroom cultivation was already being practiced in the area. Accordingly, a two-month vocational training programme was conducted at village Sagoor (Dec 15, 2025 to Feb 15, 2026), wherein 58 farm women were trained through hands-on practice in cutting, stitching, measurement, designing, and

Table 4.3: Output and Economic Value of Nutri-Garden Demonstrations

Vegetable	Area (m²)	Yield (kg)	Market rate (₹/kg)	Value (₹)
Tomato	30	20	20	400
Brinjal	20	15	15	225
Chilli	20	10	25	250
Okra	15	10	20	200
French bean	15	10	30	300
Radish	50	40	35	1,400
Palak	25	15	20	300
Turnip	20	10	20	200
Peas	50	20	30	600
Cauliflower	15	10	20	200
Coriander	15	20	20	400
Total	**300**	**-**	**-**	**4,875**



Glimpses of Nutri-Garden

garment preparation, including ladies' suits and sarees. The intervention focused on skill development, entrepreneurship, and income generation, enabling women to start their own enterprises. Similar skill-based training is known to improve self-reliance and income opportunities for rural women. The trainees expressed high satisfaction and confidence, showed interest in establishing tailoring units, and suggested extending the training duration up to one year for advanced skill development and setting up commercial centres.

Livelihood Diversification module:

In the adopted area, mushroom cultivation (Table 4.4) was promoted as a viable enterprise for enhancing farmers' income and livelihood security during 2025-26. A total of 800 small- to medium-sized mushroom units (10 kg capacity bags) were established among 60 selected farmers, with each unit consisting of 5 to 30 bags depending on available space. The intervention included short-duration training at the village level, along with continuous technical support through frequent visits of mushroom experts and project staff to monitor crop performance and address field-level issues. The average yield recorded was 2.65 kg





Training on cutting and tailoring

per bag, with a gross cost of ₹ 85 per bag and a market rate of ₹ 120 per kg, resulting in a gross return of ₹ 318 and net return of ₹ 233 per bag, with a benefit-cost ratio of 3.74, indicating high profitability. Mushroom cultivation is widely recognized as a low-cost, high-return enterprise suitable for small and marginal farmers, requiring minimal space and investment while generating regular income. The intervention not only enhanced farmers' income but also strengthened their skills in scientific mushroom production practices. Continuous guidance on crop management, quality spawn utilization, and environmental control ensured the successful establishment of units, making mushroom cultivation a sustainable and profitable agri-based enterprise in the project area.

Table 4.4: Economic Performance of Mushroom Cultivation Demonstrations

Particular	Result
No. of units	60
No. of farmers	60
Mushroom bags provided	800
Bag capacity	10 kg
Average yield	2.65 kg/bag
Gross cost	₹ 85/bag
Rate	₹ 120/kg
Gross return	₹ 318/bag
Net return	₹ 233/bag
B: C ratio	3.74

Section 2.5

Sher-e-Kashmir University of Agricultural Sciences & Technology, Jammu

Exploring economic opportunities for farmers of Kandi villages through the application of proven rainfed technologies

SKUAST-Jammu implemented the Farmer FIRST Project (FFP) in selected villages of Satoh, Balore, Darui, Anandpur, Sadral, Nagrota and Tund. The project, titled **"Empowering Farmers through Selective Interventions for Kandi Villages through the Application of Proven Rainfed Technologies"** is designed to tackle major agricultural constraints in the region. On average, about three-fourths of the farming households in these villages are marginal farmers, each owning less than one hectare of land. The area is largely dominated by sandy loam soils, which create considerable limitations due to poor water-holding capacity, high infiltration rates, and greater susceptibility to soil erosion, thereby constraining agricultural productivity and development. The Maize-Wheat cropping system forms the backbone of the local economy, with nearly 65-70% of the population dependent on agriculture for their livelihood. In addition, other important crops grown in the region include paddy, maize, jowar, wheat, barley, oats, and various vegetable crops. Agriculture in this region is entirely rainfed, with an average annual rainfall of about 832.5 mm recorded during 2017-2022. However, the effectiveness of farming is strongly influenced by highly variable and erratic rainfall patterns from year to year, making agricultural production uncertain and risk-prone.

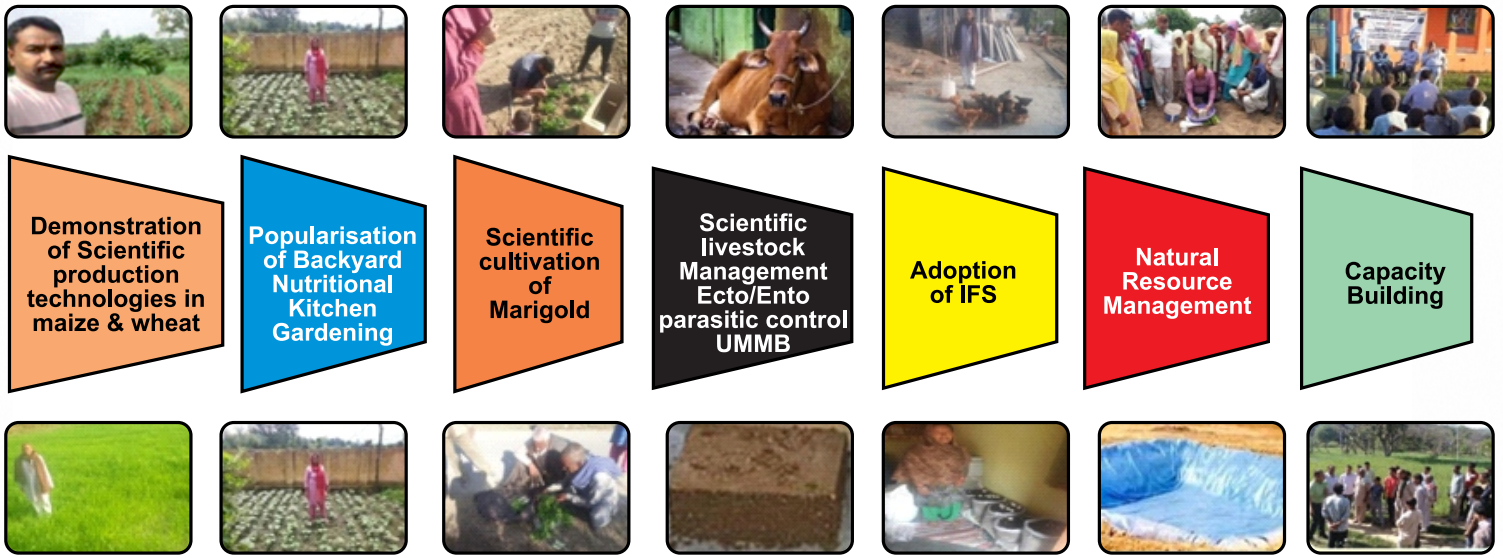
Research problem identification and prioritization

Based on continuous interactions with farmers through camps, trainings, exposure visits, field demonstrations, and other participatory activities, several key constraints affecting agricultural productivity and livelihood security in the adopted villages were identified. The farming system in the area is predominantly rainfed and characterized by small and fragmented landholdings, making agricultural production highly vulnerable to erratic rainfall and prolonged dry spells. Sandy loam soils with low organic matter content and poor water-holding capacity further limit crop productivity. Farmers also reported low yields of major crops such as wheat, maize, and oilseeds due to the use of traditional varieties, inadequate adoption of improved production technologies, and limited crop diversification. In addition, declining soil fertility, inadequate fodder availability, limited access to quality planting material, and insufficient integration of farm enterprises were identified as major constraints affecting farm income and sustainability.

In the horticulture sector, the need for improved vegetable and flower varieties, promotion of nutritional gardens, and expansion of fruit-based production systems emerged as important priorities for enhancing nutritional and economic security. Farmers also expressed interest in income-generating enterprises such as mushroom cultivation, backyard poultry, beekeeping, and vermicomposting to supplement farm income and reduce dependence on crop production alone. In the livestock sector, the demand for

Exploring economic opportunities for farmers of *kandi* villages through application of proven scientific technologies

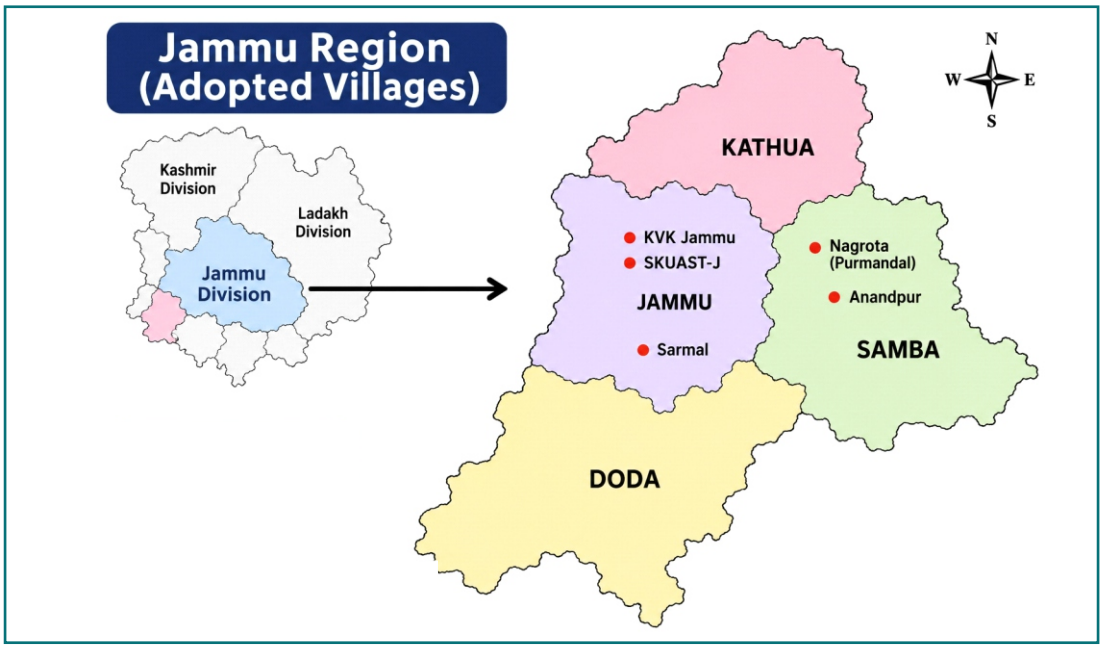
- To demonstrate and popularise proven scientific agricultural practices for kandi areas
- To augment nutritional and income sources through introduction of supplementary farm enterprises
- To promote scientific livestock management practices
- To promote recommended Integrated Farming system model



Graphical abstract: Sher-e-Kashmir University of Agricultural Sciences & Technology, Jammu

improved poultry breeds and better management practices was identified as a key requirement for enhancing household nutrition and livelihood opportunities.

To address these challenges, the Farmer FIRST Project focused on increasing the productivity of major crops through improved varieties and scientific management practices, promoting horticultural diversification, strengthening enterprise-based activities such as mushroom cultivation, backyard poultry, beekeeping, and vermicomposting, and demonstrating Integrated Farming System (IFS) models for efficient resource utilization. The project also emphasized enhancing farmer-scientist interactions, promoting climate-resilient and economically viable technologies, improving nutritional security, and creating sustainable livelihood opportunities for small and marginal farmers. These interventions contributed to higher productivity, increased farm income, improved resource-use efficiency, and greater resilience of farming systems in the rainfed areas of Samba district.



Adopted villages

COMPONENT-I:

Enhancing Farmer - Scientist Interface

To ensure effective multi-stakeholder engagement and strengthen the farmer-scientist interface, various extension activities such as camps, kisan goshties, exposure visits, trainings, field days, and other participatory programmes were conducted during the reporting period. These interventions facilitated continuous interaction among farmers, scientists, and stakeholders, thereby supporting the identification of field-level constraints, prioritization of local research needs, and promotion of location-specific agricultural technologies. A total of 16 camps were organized, benefiting 565 farmers. In addition, 2 kisan goshties were conducted with the participation of 158 farmers, while 4 exposure visits enabled 89 farmers



Sustainable kitchen gardening



Demonstration of turmeric

to gain firsthand experience from successful farming systems. Furthermore, 9 training programmes were organized, reaching 274 farmers, covering improved crop production practices, livestock management, and allied agricultural activities. A field day was also conducted with the participation of 44 farmers, demonstrating improved technologies directly in farmers' fields. Through these coordinated efforts, the programme effectively enhanced farmers' knowledge, promoted the adoption of improved technologies, and strengthened the overall farmer-scientist linkage for sustainable agricultural development.

COMPONENT-II:

Technology Assemblage, Application and Feedback

To improve crop productivity, minimize yield gaps, enhance animal health, and strengthen food and livelihood security in the adopted areas, economically viable and socially acceptable technological interventions were developed. Multiple modules covering crops, horticulture, enterprises, and livestock were formulated to address specific constraints, thereby providing a structured framework for promoting sustainable agricultural development.

Crop-based module

Enhancing Wheat Productivity under Rain-fed Conditions: To improve wheat productivity in the adopted area, frontline demonstrations were conducted on the high-yielding wheat variety DBW-187 against the farmer-preferred variety HD-2967. The intervention aimed to popularize improved varieties and recommended production practices among farmers. A total of 20 demonstrations were conducted covering 14.0 ha, benefiting 81 farmers. The demonstrated variety recorded an average grain yield of 20.8 q/ha compared to 19.1 q/ha under farmers' practice, resulting in an 8.9 per cent increase in yield. The results indicated the superiority of DBW-187 under rain-fed conditions and highlighted its potential to bridge the existing productivity gap. Although wheat yield was comparatively lower than the previous year due to low rainfall during the season and heavy winds at crop maturity, the demonstrated variety performed better than the existing practice and encouraged farmers towards its adoption. The yield comparison is made in Figure 5.1, and economic returns are mentioned in Table 5.1

Increasing Maize Productivity through Hybrid DKC-9144 : To enhance maize productivity and profitability, demonstrations were conducted on the hybrid DKC-9144 against the commonly cultivated variety Kanchan. A total of 20 demonstrations were organized over 10 ha, benefiting 71 farmers. The adoption of DKC-9144 along with recommended agronomic practices resulted in an average yield of 24.8 q/ha, compared to 21.9 q/ha under farmers' practice, registering a 13.5 per cent increase in productivity. The results (Figure 5.1; Table 5.1) demonstrated the effectiveness of improved hybrids in increasing maize production under local conditions.

Popularization of Improved Toria Variety RSPR-2: To increase oilseed productivity in the adopted villages, demonstrations were conducted on the improved toria variety RSPR-2 against the local cultivar. A total of 8 demonstrations covering 0.8 ha were conducted, benefiting 8 farmers. The demonstration plots recorded an average yield of 7.4 q/ha compared to 6.5 q/ha under the local variety, resulting in a 13.8 per cent increase in yield. The improved performance of RSPR-2 highlighted its suitability for cultivation in the region and demonstrated the benefits of adopting improved varieties along with recommended crop management practices. The intervention created awareness among farmers regarding improved oilseed production technologies and their potential for enhancing farm productivity.

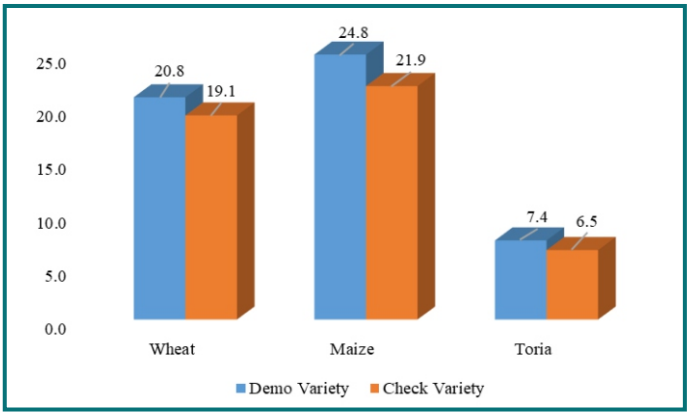


Fig 5.1: Comparison of Yield (q/ha) between Demonstration and Check Varieties in Wheat, Maize and Toria

Table 5.1: Economic returns from demonstrations of wheat, maize and toria

Crop	Variety	Gross Cost (₹/ha)	Gross Return (₹/ha)	Net Return (₹/ha)	B: C Ratio	Area (ha)
Wheat	DBW-187 (Demo)	26248	68390	42142	1.61	14
	HD-2967 (Check)	25050	60279	35229	1.41	
Maize	DKC-9144 (Demo)	22489	66560	44071	1.96	10
	Kanchan (Check)	21568	59070	37502	1.74	
Toria	RSPR 2 (Demo)	20200	43660	23460	1.16	0.8
	Local	19800	38350	18550	0.94	

Horticulture Based Module

Introduction of improved variety of Okra: To enhance vegetable productivity and farm income in the adopted area, demonstrations were conducted on the improved okra variety Jammu Okra-05 against the local cultivar, and data are also provided in Table 5.2. A total of 8 demonstrations were conducted covering 0.4 ha, benefiting 8 farmers. The demonstration plots recorded an average yield of 61.2 q/ha, compared to

53.8 q/ha under farmers' practice, resulting in a 13.8 per cent increase in yield. The improved variety generated a net return of ₹ 85,704/ha with a B: C ratio of 1.25, compared to ₹ 68,726/ha and 1.03, respectively, under the local variety, providing an additional income of ₹ 16,978/ha. The results demonstrated the superiority of Jammu Okra-05 in enhancing productivity and profitability. However, flash floods that occurred on 26 August 2025 in Samba district caused severe damage to standing okra crops, resulting in lower yields than the previous year. Despite these adverse conditions, the demonstrated variety performed better than the local cultivar and showed considerable potential for improving vegetable production in the region.

Table 5.2: Comparative Yield and Economic Performance of Okra

Name of Crop	Name of Demo Variety	Yield (q/ha)			Economics of Demos (₹/ha)				Economics of Check (₹/ha)			
		Demos	Check	% increase	Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
Okra	Jammu Okra 05	61.2	53.8	13.8	68520	154224	85704	1.25	66850	135576	68726	1.03

Introduction of improved varieties of marigold: To improve flower production and enhance farmers' income, demonstrations were conducted on the marigold variety EZ Ketki Yellow against the locally cultivated variety. A total of 6 demonstrations were conducted covering 0.05 ha, benefiting 6 farmers. The demonstration plots recorded an average flower yield of 62.85 q/ha, compared to 47.52 q/ha under farmers' practice, resulting in a 32.3 per cent increase in yield (Figure 5.2). The improved variety generated a net return of ₹ 2,99,460/ha with a BC ratio of 2.13, compared to ₹ 1,65,172/ha and 1.38, respectively, under the local variety, providing an additional income of ₹ 1,34,288/ha. The results clearly demonstrated the superiority of EZ Ketki Yellow in terms of productivity and profitability, highlighting its potential for increasing flower production and improving the livelihood of farmers in the adopted area.

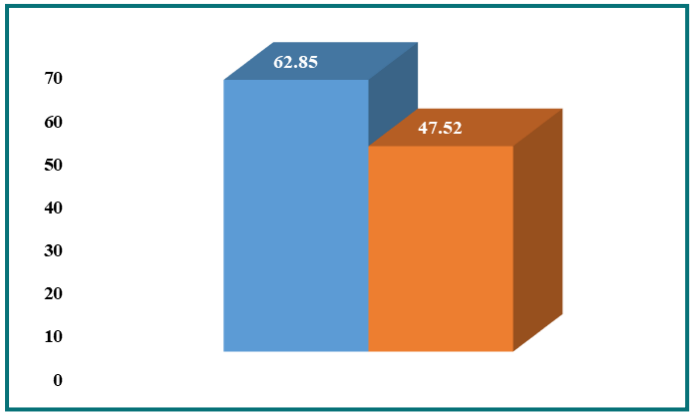


Fig 5.2: Marigold yield (q/ha) comparison b/w demo (EZ Ketki Yellow) and check variety

Promotion of nutri-garden: To enhance nutritional security and promote year-round availability of fresh vegetables, 21 nutri-gardens were established in the adopted villages, benefiting 21 farm families, and details are provided in Table 5.3. Farmers were provided with quality seeds of winter vegetables such as tomato, knol-khol, chilli, cauliflower, brinjal, methi, spinach, coriander, broccoli and radish, as well as summer vegetables including okra, brinjal, cucumber, bottle gourd, bitter gourd, sponge gourd, pumpkin,

Table 5.3: Crop-wise Performance of Nutritional Gardens during Winter and Summer Seasons

Name of Crops	No. of Demos	Number of nutritional gardens	Farmers benefitted (No.)	Yield (q/ha) under Demos	Value of produce (₹/ha)
Nutrigarden, Winter vegetables					
Tomato	10	21	21	237.10	501106
Knol khol	10	21	21	210.01	144701
Chilli	5	5	2	115.38	454188
Cauliflower	10	21	21	168.99	305002
Brinjal	10	21	21	111.98	97097
Methi	10	21	21	96.01	178299
Spinach	10	21	21	87.02	123398
Coriander	10	21	21	120.97	177903
Brocolli	10	21	21	173.96	313710
Radish	10	21	21	153.03	207000
Nutrigarden, Summer vegetables					
Okra	10	21	21	110.01	323301
Brinjal	10	21	21	123.00	164599
Cucumber	10	21	21	126.96	192696
Bottle Gourd	10	21	21	210.01	196899
Bitter Gourd	10	21	21	125.12	106198
Sponge Gourd	10	21	21	112.01	118201
Pumpkin	10	21	21	183.03	237798
Green Chilli	10	21	21	135.04	262564
Round Gourd	10	21	21	50.92	84493
Tomato	10	21	21	214.98	485207

green chilli, round gourd and tomato. Farmers were trained in improved vegetable production practices, resulting in higher productivity and better-quality produce. The nutri-gardens generated substantial quantities of vegetables for household consumption and surplus sale, thereby improving family nutrition, reducing expenditure on vegetables, and providing additional income opportunities. The intervention successfully promoted dietary diversification and strengthened nutritional security among the beneficiary households.

Promotion of Fruit-Based Horticulture for Nutritional and Economic Security: To promote diversification and improve nutritional as well as economic security of farm families, perennial fruit plants were distributed and established in the adopted villages. During 2025-26, a total of 883 fruit plants comprising Kagzi lime (800 plants), Dashehari mango (25 plants), and Allahabad-49 guava (58 plants) were planted, covering an area of 1.69 ha and benefiting 16 farm families. The intervention aimed at encouraging fruit cultivation at the household level, thereby ensuring the availability of fresh fruits, enhancing dietary diversity, and creating additional income opportunities in the long run. The perennial

horticultural plants established during July 2024 recorded a survival rate of 68.10 per cent by August 2025. Furthermore, apple plants exhibited flowering as well as fruiting for the first time during this season (Apple 2026), indicating the successful establishment of the orchards and their potential contribution to household nutrition and income generation.

Enterprise-based module

Promotion of backyard poultry for egg production: To strengthen livelihood opportunities and improve nutritional security among rural households, backyard poultry farming was promoted in the adopted villages through the introduction of the improved poultry breed Kroiler. During 2025-26, a total of 650 birds were distributed among 47 farmers under 10 poultry units. Farmers were provided with technical guidance on scientific poultry management, feeding, and healthcare practices to ensure better productivity. The intervention resulted in an average egg production of 21 eggs/hen/month, compared to 15 eggs/hen/month under the traditional system, registering a 40 per cent increase in productivity as shown in Figure 5.3. Economic analysis revealed a net return of ₹ 4,205 per unit per month with a B:C ratio of 3.40, compared to ₹ 3,630 and 3.10, respectively, under the existing practice. The programme not only enhanced household income through the sale of eggs and poultry products but also contributed to improved family nutrition and reduced dependence on crop-based income, thereby promoting sustainable livelihood security in the adopted villages.

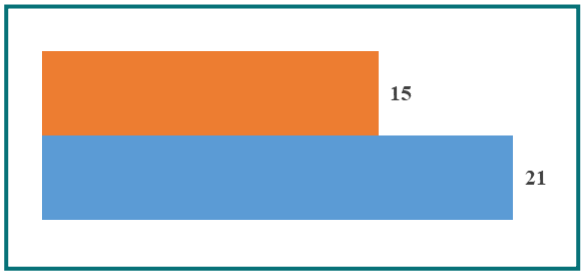


Fig 5.3: Egg production (eggs/hen/month) under demonstration and check poultry units during 2025–26

Promotion of backyard poultry for meat production: To enhance household income and nutritional security, backyard poultry farming was promoted in the adopted villages through the introduction of the improved poultry breed Kroiler. During 2025-26, a total of 650 birds were distributed among 47 farmers under 10 poultry units. Farmers were provided with technical guidance on scientific poultry management, feeding, and healthcare practices to improve productivity. The intervention primarily focused on enhancing meat production, with demonstration units recording an average meat yield of 18 kg per 15 chicks, compared to 12 kg under the traditional system, resulting in a 50 per cent increase. In addition, Kroiler birds also exhibited better egg production (105 eggs per unit) than the check (75 eggs per unit). The

Table 5.4. Economics of Backyard Poultry (Kroiler) Demonstrations during 2025–26

Particulars	Demonstration	Check
Gross Cost (₹/unit)	1,240	1,170
Gross Return (₹/unit)	5,445	4,800
Net Return (₹/unit)	4,205	3,630
B: C Ratio	3.39	3.10



Demonstration on backyard poultry



Post harvest grain handling

intervention demonstrated the potential of improved poultry breeds in increasing the availability of quality animal protein while providing an additional source of livelihood for rural households, and details are provided in Table 5.4.

Promotion of beekeeping for income diversification: To diversify farm income and enhance livelihood security, beekeeping was promoted among interested farmers in the adopted villages. During 2025-26, two beekeeping units comprising 50 bee boxes were maintained, benefiting two farmers. Farmers were provided with technical guidance on scientific bee colony management, honey extraction, and post-harvest handling practices. The intervention resulted in an average honey production of 9.09 kg per box, demonstrating the potential of beekeeping as a profitable supplementary enterprise. Economic analysis revealed a gross return of ₹ 2,590 per box against a gross cost of ₹ 725 per box, generating a net return of ₹ 1,865 per box with a B: C ratio of 2.57. The availability of diverse floral resources in and around the project area supported honey production and encouraged farmers to adopt beekeeping as an additional source of income while also enhancing pollination services for agricultural and horticultural crops in the region, and details are mentioned in Table 5.5.

Table 5.5: Performance and Economic Analysis of Beekeeping Units Demonstrated to Farmers

No. of beekeeping units	No. of boxes	Famers benefitted	Honey production (kg/box)	Economics of Demos (₹/box)			
				Gross cost	Gross return	Net return	B: C ratio
2	50	2	9.09	725	2590	1865	2.57

Promotion of Mushroom cultivation: Mushroom cultivation was promoted among small and marginal farmers in the adopted villages as a profitable enterprise for income diversification and livelihood enhancement. During 2025-26, 20 demonstrations on ready-to-fruit mushroom bags were conducted, benefiting 92 farmers. Farmers were provided with technical guidance on scientific mushroom production, crop management, and harvesting practices to improve productivity. The details are provided in Table 5.6. The demonstration units recorded an average yield of 2.5 kg per bag, compared to 2.3 kg per bag under farmers' practice, resulting in an 8.7 per cent increase in yield. Economic analysis revealed a gross return of ₹ 337.5 per bag against a gross cost of ₹ 123 per bag, generating a net return of ₹ 214.5 per bag with a



Demonstration on button mushroom



Demonstation on hybrid maize DKC-9144

B: C ratio of 2.74. The intervention encouraged farmers to adopt mushroom cultivation as a supplementary source of income and demonstrated its potential for enhancing profitability and employment opportunities, particularly among small and marginal farm households.

Table 5.6: Performance of Mushroom Cultivation Units

No. of Demo	Straw Processed (qtl)	Farmers benefitted	Yield (kg/bag)			Economics of demonstration (₹/bag)			
			Demos	Check	% increase	Gross cost	Gross return	Net return	B: C ratio
20	Ready to fruit mushroom bags	92	2.5	2.3	8.70	123	337.5	214.5	2.74

Promotion of Vermicomposting through HDPE Vermi-beds : To promote sustainable nutrient management and enhance soil health, vermicomposting using HDPE vermi-beds was demonstrated among farmers in the adopted villages. During 2025-26, 10 demonstrations were conducted benefiting 20 farmers. Farmers were trained in scientific vermicompost production techniques, including the preparation and maintenance of vermi-beds, efficient utilization of farm wastes, and management of earthworms for quality compost production. The demonstration units produced an average of 16.8 q of vermicompost per unit, compared to 15.2 q obtained through conventional farmyard manure preparation, resulting in a 10.5 per cent increase in output. The HDPE vermi-bed technology enabled farmers to obtain three batches of vermicompost annually, whereas only one batch of farmyard manure could be produced under traditional practices. Economic analysis revealed a gross return of ₹ 21,840 per unit against a gross cost of ₹ 6,610, generating a net return of ₹ 15,230 per unit with a B: C ratio of 2.30, compared to a net return of ₹ 2,553 per unit and a B: C ratio of 1.73 under conventional farmyard manure preparation, and details are provided in Table 5.7.

IFS-based module

Enhancing Agricultural Income and Livelihood Security through Integrated Farming Systems (IFS): Small and marginal farmers in the project area continue to face challenges such as limited

Table 5.7: Performance of Vermicomposting Units Demonstrated to Farmers

Inter-vention	No. of Demos	Farmers/ Villages benefitted	Yield (q/unit)			Economics of Demos (₹/unit)				Economics of Check (₹/unit)			
			Demos	Check	% increase	Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
HDPI Vermibeds	10	20	16.8	15.2	10.5	6610	21840	15230	2.3	1475	4028	2553	1.7

landholdings, dependence on rainfall, and fluctuating farm income. To improve resource utilization, diversify income sources, and enhance livelihood security, Integrated Farming System (IFS) models (Table 5.8) were promoted in the adopted villages. During 2025-26, three IFS models, namely Mushroom-Agriculture-Backyard Poultry, Agriculture-Backyard Poultry, and Agriculture-Floriculture-Mushroom, were demonstrated by integrating enterprises such as improved crop cultivation, dairy farming, mushroom production, floriculture, fodder cultivation, and backyard poultry. The integration of these complementary enterprises enabled efficient recycling of farm resources, reduced production risks, and generated year-round income and employment opportunities. Among the demonstrated models, the Mushroom-Agriculture-Backyard Poultry system recorded the highest net income of ₹ 85,709, followed by the Agriculture-Floriculture-Mushroom model with ₹ 85,523, while the Agriculture-Backyard Poultry model generated a net income of ₹ 56,292. The results clearly demonstrated that diversification through IFS enhanced farm profitability, strengthened nutritional security, and reduced dependence on conventional crop-based farming. The successful performance of these models highlighted their potential as a sustainable strategy for improving income resilience and ensuring long-term agricultural sustainability in the rainfed areas of Samba district.

Table 5.8: Gross and Net Income Generated from Different Integrated Farming System (IFS) Models during 2025–26

Name of IFS	Components of IFS	Gross income of produce (₹)	Net income (₹)
Mushroom-Agri.-Backyard	Maize (DKB-9144)	9984	6621
	Wheat (DBW-187)	10258	6321
	Fodder (Barseem and Bajra)	1700	1070
	Backyard poultry (Kroiler) 15 chicks per unit	5445	3475
	Mushroom (Button mushroom)130 bags	44772	29172
	Dairy (1) Jersey cow	70250	39050
Agriculture - Backyard poultry -dairy	Maize (DKB-9144)	9984	6621
	Wheat (DBW-187)	10258	6321
	Fodder (Barley and Bajra)	6500	4350
	Backyard poultry (Kroiler) 15 chicks per unit	5520	3500
	Dairy (1) Jersey cow	57000	35500
Agriculture-Floriculture - Mushroom	Wheat (DBW-187)	9753	6503
	Fodder (Barseen)	4500	3000
	Mushroom (Button mushroom) 175 bags	57600	36600
	Dairy (2) Jersey and Sahiwal cows	88550	65350
	Marigold ketki	14250	11470

Section 2.6

G.B. Pant University of Agriculture & Technology, Pantnagar

Enhancing Farm Productivity, Enterprise Development and Livelihood Security through Integrated Crop, Livestock and Value-Addition Intervention

The Farmer FIRST Programme at GB Pant University of Agriculture and Technology (GBPUA&T), Pantnagar was implemented with the objective of promoting farmer-led technological innovations, enhancing farm productivity and strengthening livelihood security through participatory approaches. The programme focused on integrating crop production, livestock enterprises, beekeeping, mushroom cultivation, value addition, and market-oriented interventions to address the challenges faced by small and marginal farmers in the hill regions of Uttarakhand. Emphasis was placed on strengthening the farmer-scientist interface, encouraging entrepreneurship development, and promoting sustainable farming systems through scientific interventions.

Description of Project Area

The programme was implemented in selected villages where agriculture and allied enterprises constitute the primary source of livelihood. Farming systems in the region are characterized by small landholdings, limited market access, low productivity, and dependence on traditional production practices. Farmers face challenges related to declining profitability, lack of value-addition facilities, and inadequate institutional support for marketing agricultural produce. To address these constraints, the Farmer FIRST Programme introduced integrated interventions focusing on crop improvement, livestock production, beekeeping, mushroom cultivation, and enterprise development.

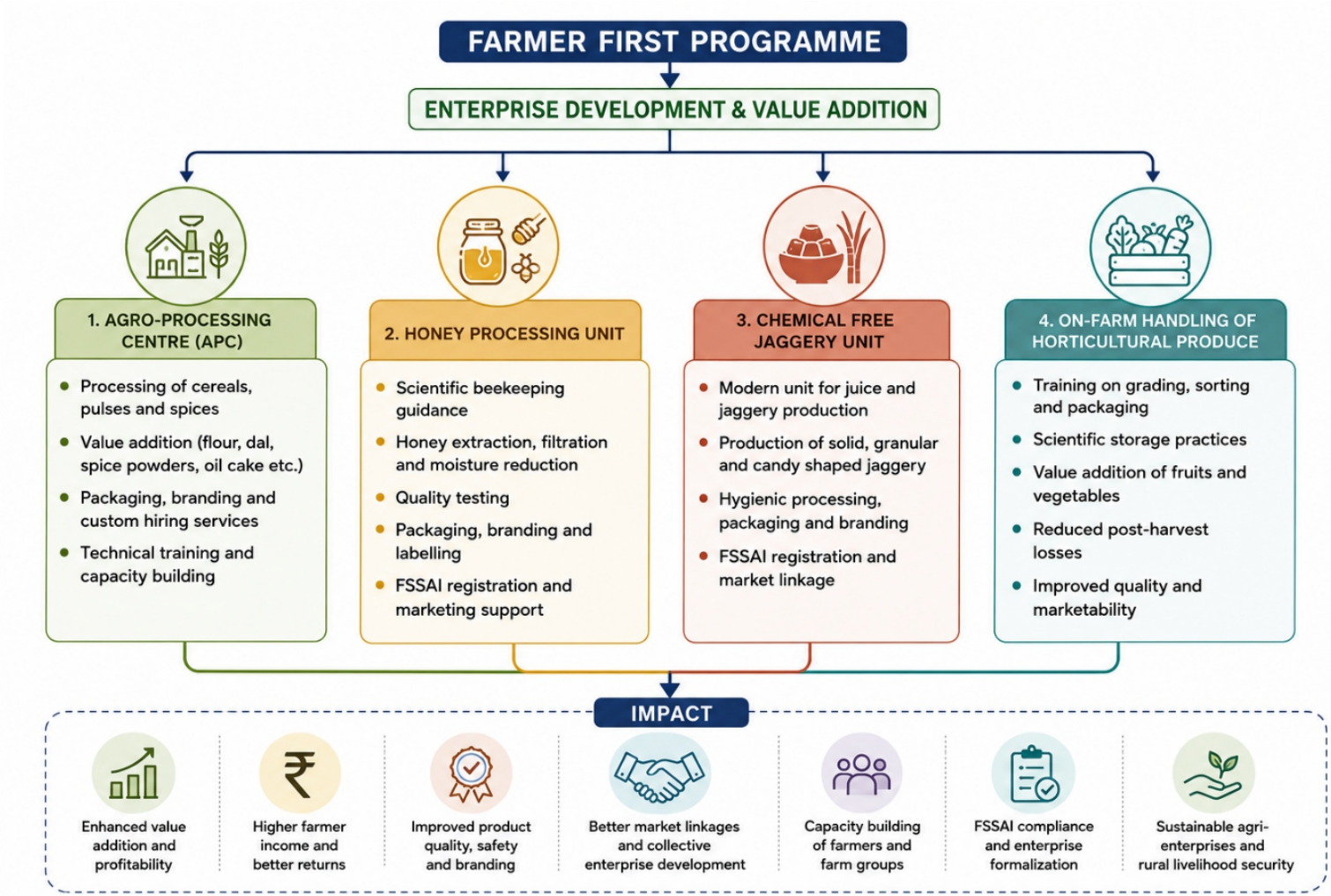
Research Problem Identification and Prioritization

Participatory rural appraisal, farmer interactions and field visits revealed several critical issues affecting agricultural productivity and farm income. Farmers were largely dependent on local crop varieties with comparatively lower yield potential. Backyard poultry production was constrained by poor-performing





Farmer-scientist interaction



Graphical abstract: G.B. Pant University of Agriculture & Technology, Pantnagar

local birds, resulting in lower meat and egg production. Beekeepers lacked access to scientific honey processing and value-addition technologies. Mushroom cultivation, despite having substantial income-generating potential, was not widely adopted due to limited technical knowledge and inadequate market support. Furthermore, farmers faced difficulties in processing and marketing their produce, leading to lower economic returns. Based on these constraints, interventions related to improved crop varieties, poultry production, beekeeping, mushroom cultivation, value addition, and collective marketing were prioritized under the programme.

COMPONENT I:

Enhancing Farmer-Scientist Interface

Strengthening the interaction between scientists and farmers remained a key focus of the programme during 2025-26. A total of twelve extension activities were conducted, benefiting 422 farmers from the project villages. These activities included one farmers' camp involving 32 farmers, one Kisan Goshthi attended by 36 farmers, one exposure visit involving 42 farmers, two training programmes benefiting 107 farmers, one field day attended by 40 farmers and six other extension activities reaching 165 farmers.

These programmes provided an effective platform for exchange of knowledge and experiences between farmers and scientists. Through regular interactions, farmers were exposed to improved agricultural technologies, scientific livestock management practices, beekeeping techniques, mushroom cultivation methods, and value-addition opportunities. Exposure visits enabled farmers to observe successful enterprises and interact with progressive farmers, thereby enhancing their confidence in adopting improved technologies. Feedback received from farmers during these interactions played an important role in refining technological interventions according to local requirements.

COMPONENT II:

Technology Assemblage, Application and Feedback

Vegetable Production

The programme demonstrated a range of improved technologies under field conditions to evaluate their suitability and profitability. Demonstrations on improved vegetable varieties produced encouraging yield results, as shown in Figure 6.1 and the economic analysis in Table 6.1. Coriander variety Pant Haritima recorded a yield of 65.0 q/ha compared to 41.6 q/ha under farmers' practice, resulting in a

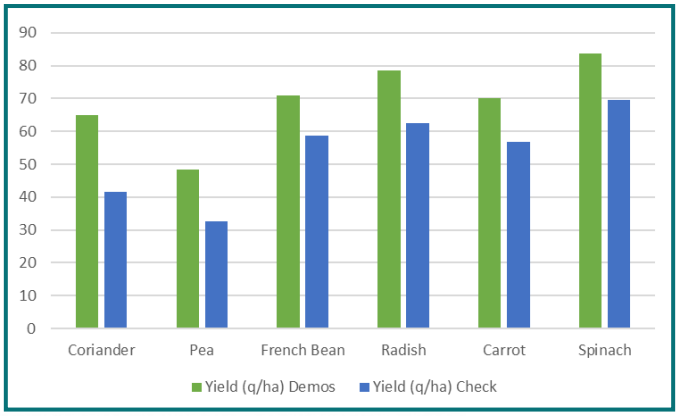


Fig 6.1: Yield results of different vegetable crops

Table 6.1: Performance and Economics of Vegetable Demonstrations under Farmer FIRST Programme

Name of Demo	Name of Demo Variety	Name of check Variety	Economics of Demos (₹/ha)				Economics of Check (₹/ha)			
			Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
Coriander	Pant Haritima	Multicut	61288	196172	134884	2.20	76288	185921	109633	1.44
Pea	Arkel	Local	36800	110920	74120	2.01	42980	98765	55785	1.30
French Bean	Pant Anupama	VL Bean-2	48920	158780	109860	2.25	54400	140890	86490	1.59
Radish	Japani Safed	Local	34540	98980	64440	1.87	38760	79980	41220	1.06
Carrot	Pusa Rudhira	Local	38760	116782	78022	2.01	48900	98654	49754	1.02
Spinach	All green	Local	56280	180940	124660	2.21	62450	167540	105090	1.68

yield increase of 56.3 percent. The demonstration generated a net return of ₹ 1,34,884 per hectare with a benefit-cost ratio of 2.20. Pea variety Arkel yielded 48.4 q/ha against 32.6 q/ha under the local variety, recording a yield advantage of 48.5 percent. French bean variety Pant Anupama produced 71.0 q/ha compared to 58.6 q/ha under the check variety, resulting in a 21.1 percent increase in productivity.

Similarly, radish variety Japani Safed produced 78.5 q/ha compared to 62.4 q/ha under farmers' practice, while carrot variety Pusa Rudhira yielded 70.2 q/ha against 56.8 q/ha under the local variety. Spinach variety All Green also performed significantly better than local cultivars, producing 83.8 q/ha and generating a net return of ₹1,24,660 per hectare. These demonstrations clearly established the superiority of improved varieties in terms of productivity and profitability. The highest B:C ratio was observed for frenchbean (2.25) and highest net return (₹1,34,884/ha) was observed for coriander.

Livestock-Based Intervention

Livestock-based interventions focused on promoting improved poultry breeds such as Kadaknath, Rhode Island Red, and Uttara Fowl are shown in Table 6.2. A total of 39 poultry units involving 330 birds were

Table 6.2: Performance of Livestock, Enterprise Development and Value-Addition Interventions

Intervention	Technology / Breed	Units/Demos	Key Result	Net Return
Poultry	Kadaknath, Rhode Island Red & Uttara Fowl	39 units	137 kg/unit vs 92 kg under local birds; 48.9% increase	₹1,321/unit
Beekeeping	Improved beekeeping	50 units	28.2 kg honey/box	₹6,214/box
Mushroom	Button mushroom	11 demos	2.8 vs 1.4 kg/bag; 100% increase	₹206/bag
Honey processing	Honey processing unit	1 unit	3,8778 kg processed	₹2,08,846 profit
Honeycomb wax	Wax processing unit	1 unit	432 kg processed	₹1,47,264 profit
Spice processing	Spice grinding & mixing	1 unit	3,592 kg processed	₹1,59,104 profit



Demonstration on beekeeping unit.



Training programme on livelihood opportunities

established, benefiting 39 farmers. The improved birds recorded a production level of 137 kg of meat and eggs per unit compared to 92 kg under local birds, representing an increase of nearly 49 percent. The intervention generated a net return of ₹1,321 per unit with a benefit-cost ratio of 1.67, demonstrating its economic viability under backyard farming conditions.

Beekeeping Enterprise

Beekeeping emerged as one of the most successful enterprise interventions under the programme. Fifty beekeeping units comprising 2,240 bee colonies were maintained by participating farmers. The average honey production reached 28.2 kg per box, generating a net return of ₹6,214 per box with a benefit-cost ratio of 1.55. The intervention significantly enhanced household income while contributing to improved pollination services in the farming ecosystem.

Mushroom Production

Mushroom cultivation was promoted as a high-value enterprise among farm families. Eleven demonstrations involving 56 farmers were conducted using button mushroom technology. The demonstrations recorded an average yield of 2.8 kg per bag compared to 1.4 kg under traditional methods, representing a 100 percent increase in productivity. The enterprise generated a net return of ₹206 per bag with a benefit-cost ratio of 1.58, highlighting its potential as a profitable livelihood option.

Value Addition and Processing

The programme also promoted value-addition enterprises. The honey processing unit established at Jeoli processed 3,879 kg of honey and generated a profit of ₹2,08,846. A honeycomb wax processing unit processed 432 kg of raw material and generated a profit of ₹1,47,264. Similarly, the spice grinding and mixing unit at Suryajala processed 3,592 kg of spices and generated a profit of ₹1,59,104. These interventions demonstrated the importance of processing and value addition in increasing farmers' income.

Section 2.7

ICAR-Indian Institute of Soil & Water Conservation, Dehradun

Farmer Participatory Technology Application for Sustainable Resource Management and Livelihood Security in North-Western Himalaya

The ICAR-IISWC, Dehradun, implemented a Farmer FIRST Programme (FFP) project titled **"Farmer Participatory Technology Application for Sustainable Resource Management and Livelihood Security in the North-Western Himalaya"** in the Raipur block of Dehradun district, Uttarakhand. The project was carried out across three major hamlet groups, Koti Gaon, Sindwal Gaon, and Badasi Gaon, comprising 617 farm families with a total population of 3,443. The baseline survey revealed a predominance of marginal and small landholders in the project area. Specifically, 59.96% of households were marginal farmers, 23.33% small farmers, 12.15% medium farmers, and only 2.10% large farmers, while 2.43% of the population was landless. This skewed landholding pattern indicates the economic vulnerability of the majority of farming households, reflecting their high dependence on natural resources and external support systems for improving agricultural productivity and ensuring livelihood security.

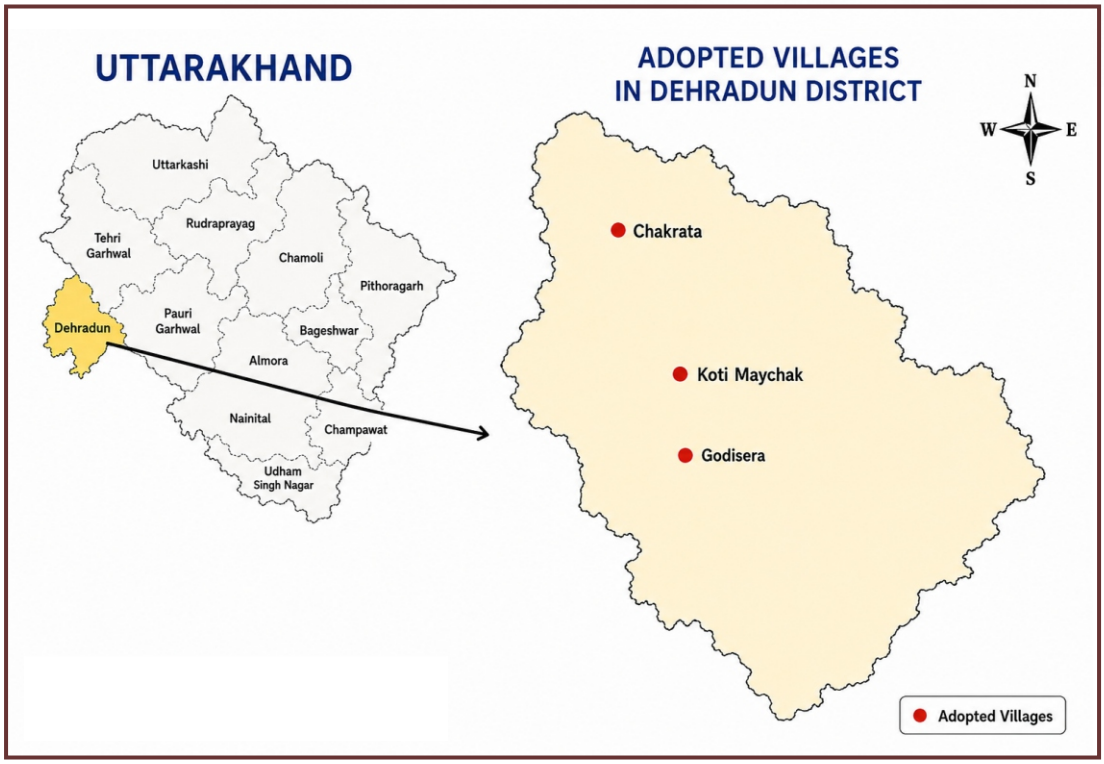
Research problem identification and prioritization

Agriculture and allied livelihood activities in the project area are increasingly being diversified towards entrepreneurship development; however, several socio-economic and institutional constraints continue to limit their full potential. Despite the abundant availability of traditional crops such as millets (ragi and maize), which are nutritionally rich and have high market value, their utilization remains low due to limited awareness of value addition and weak marketing systems. The capacity-building interventions revealed that rural entrepreneurs, particularly women and SHG members, face multiple challenges in adopting enterprise-based activities. The major constraint identified was lack of funds, as reported by most of the respondents, which restricts investment in small-scale enterprises. This was followed by a lack of unity among group members (70%), leading to conflicts in decision-making and affecting group performance, thereby highlighting the need for strong leadership and coordination. Other constraints such as lack of time (53%), family responsibilities (46%), and lack of family support (40%) further hindered active participation in entrepreneurial activities. These challenges were more prominent during the initial stages of group formation but gradually reduced with continuous guidance, training, and regular interaction with the project team. In addition, it was observed that the existing approach was largely production-oriented with limited focus on market linkages and profitability.

Therefore, the prioritization of research and development interventions during the present year focused on shifting towards a market- and profit-oriented approach. Emphasis was given to value addition of millet-based products, strengthening marketing chain management, and promoting diversified enterprises such

Micro-farming situations	Interventions	Photo	Result
Low wheat yield due to gravely & sandy loam Soils, Rain fed conditions	Introduction of wheat varieties VL-892 & 902, HS-507		Wheat variety VL-892 better (ave. yield 22 q/ha) in comparison to local variety RR-21 (ave. yield 18 q/ha)
Gravely & sandy loam Soils, Rain fed conditions, high infiltration rate lead to moisture stress during dry spells	Hydrogel in paddy crop for moisture conservation & to avoid moisture stress during dry spells		Grain wt., root wt. and root length was found to be more in comparison to without hydrogel conditions
Gravely soils, wastelands, Rain fed condition and Animal menace	Introduction of Jackfruit & Lemon plantation with proper pitting, manuring & timing of plantation		Introduction of Jackfruit & Lemon plantation with proper pitting, manuring & timing of plantation
Problem of unemployed . & migration	Introduction of dual purpose (Meat & Egg) poultry (Kuroiler)		Mortality in summer & winter season was recorded as 4% & 10% respectively. Average income was recorded as 10,000-12,000/- per unit of 50-60 birds.
Low production in Rabi crops due to scanty uneven rainfall during winters, high infiltration rate	Construction of silpaulin tanks for water harvesting from small springs		Sufficient for at least two life saving irrigation in 0.2-0.4 ha wheat & also in Kitchen garden.
Due to lack of knowledge & awareness, farmers do was participate in project activities	Meetings, Goshthies, Exposure visits & training were organized		Now most of the project activities are being implemented in participatory mode only.

Graphical abstract: ICAR-Indian Institute of Soil & Water Conservation, Dehradun



Adopted villages

as seed production (wheat, paddy, millets, pulses), horticultural crops (lemon, jackfruit, litchi), poultry, vermicomposting, and organic product development through SHGs. Strengthening access to financial resources, improving group cohesion, and enhancing entrepreneurial skills were identified as key areas to ensure sustainable livelihood development and income generation in the project area.

COMPONENT-I:

Enhancing Farmer - Scientist Interface

To strengthen the farmer-scientist interface, various need-based activities were organized in the adopted area during the year, covering 456 farmers through eight programmes. Kisan Gosthi conducted in Kotimachak and Godisera villages provided a platform to discuss issues related to Kharif and Rabi crops and receive technical guidance for improving livelihoods and nutritional security. In addition, "Know-how cum Do-how" trainings on cultivation of medicinal crops, processing of fruits & vegetables, and spices processing enhanced farmers' skills in value addition, packaging, quality control, and marketing. An exposure visit on agripreneurship development helped farmers gain practical insights into improved cultivation practices, seed production, cluster-based farming, and market-oriented approaches. Farmers also participated in a programme under PM Krishi Dhan Dhanya Yojana. These activities not only addressed field-level constraints but also improved farmers' knowledge, confidence, and adoption of innovative agricultural practices.





Farmer–Scientist Interface Activities in the Adopted Area

COMPONENT-II:

Technology Assemblage, Application and Feedback

Crop-based module

Crop-based interventions were undertaken during the year with the objective of improving crop productivity and profitability under marginal and degraded land conditions through the introduction of improved varieties and soil management practices. The details are provided in Table 7.1 (*Kharif* season) and Table 7.2 (*Rabi* season).

Kharif Season

Green Manuring through Sunhemp: Sunhemp was introduced as a green manure crop over an area of 1.6 ha, covering 7 farmers. This intervention was aimed at improving soil fertility in gravelly and degraded soils. Incorporation of sunhemp into the soil helped in increasing organic matter content, improving soil structure, and enhancing moisture retention capacity. The practice created a favourable environment for the succeeding crops and contributed towards sustainable soil health management.

Introduction of Improved Millet Variety: The improved millet variety VL-380 was demonstrated over 6.0 ha, covering 27 farmers. The variety recorded an average yield of 9.8 q/ha compared to 7 q/ha under local





Demonstrations on millet

Table 7.1: Details of demonstrations of millet, urd and paddy (*Kharif* season)

Crop	Demonstration variety	Check variety	Yield (q/ha)			Economics of Demos (₹/ha)				Economics of Check (₹/ha)			
			Demo	Check	% Increase	Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
Urd	T-9	Local	9	5	80	12000	108000	96000	9	12000	72000	60000	6
Millet	VL-380	Local	9.8	7	40	10000	49000	39000	4.9	10000	34600	23600	3.5
Paddy	Pusa Basmati-1509	Nagini/ Ramjawan	40	18	122	22000	1,80,000	1,58,000	8.2	20000	81000	61000	4

Table 7.2: Details of demonstrations of millet, urd and paddy (*Rabi* season)

Crop	Demonstration variety	Check variety	Yield (q/ha)			Economics of Demos (₹/ha)				Economics of Check (₹/ha)			
			Demo	Check	% Increase	Gross cost	Gross return	Net return	B: C ratio	Gross cost	Gross return	Net return	B: C ratio
Wheat	DBW-372	PR-21	32	17	94	18500	85800	67300	4.6	16500	42500	26000	2.5
	DBW-371	PR-21	34	17	106	19000	94000	75000	4.9	16500	44000	27500	2.6



varieties, reflecting a 40% increase. It performed well under rainfed and low fertility conditions and showed better adaptability compared to existing local cultivars.

Introduction of Improved Urd Variety: The improved variety T-9 was demonstrated over 15.4 ha covering 61 farmers. It recorded an average yield of 9 q/ha, which was significantly higher than the local variety (5 q/ha), indicating an increase of about 80%. The variety showed good performance under marginal conditions and was well accepted by farmers due to its higher productivity.

Introduction of Improved Paddy Variety: Pusa Basmati-1509 was introduced over 1.6 ha, benefiting 19 farmers. The variety recorded an average yield of 40 q/ha, which was considerably higher than local varieties (18 q/ha), showing an increase of about 122%. It performed well despite poor soil conditions and demonstrated its suitability for the region.



Demonstrations on urd



Demonstrations on paddy

Rabi Season

Introduction of Improved Wheat Varieties: During the Rabi season, improved wheat varieties DBW-372 and DBW-371 were introduced in the project area over 16.4 ha, covering 88 farmers. The intervention aimed to evaluate their performance under the agro-climatic conditions of the Doon Valley. Despite poor soil fertility and partial irrigation, both varieties performed significantly better than the local variety (RR-21), recording average yields of 33-35 q/ha compared to 17 q/ha under farmers' practices. The results clearly demonstrated the suitability and yield advantage of these improved varieties under marginal conditions.



Wheat crop (Var. DBW-372) in the farmer's field



Wheat crop (Var. DBW-371) in the farmer's field

Seed Replacement Rate (SRR)

The Seed Replacement Rate (SRR) for wheat was observed to be high in the project area, indicating good adoption of improved seeds by farmers. The SRR was calculated as 89.04% in irrigated and semi-irrigated conditions and 80.43% under rainfed conditions. This reflects increased awareness and acceptance of quality seed among farmers, contributing to improved productivity and sustainability of wheat cultivation in the region.

Horticulture-based module

Backyard Nutritional Gardens

Under this module, 314 demonstrations on seasonal vegetables were conducted using Pusa vegetable seed kits and locally procured seeds. The intervention led to a substantial increase in vegetable production, which rose from 1,148 quintals to 4,955 quintals, showing a remarkable improvement over the baseline. At the same time, dependence on market purchases reduced significantly from 849 quintals to 310 quintals. The initiative also enhanced dietary diversity, with increased consumption of green vegetables and a wider range of crops, ensuring year-round availability of nutritious vegetables at the household level.





Demonstrations on kitchen garden

Production and Sale of Onion Seedlings

Onion seedling production was taken up by 14 farmers across 5 villages covering 7.3 ha area. A total of 39.8 quintals of seedlings were produced and sold, generating substantial additional income. This intervention proved to be a profitable enterprise and ensured timely availability of quality planting material within the locality.

Introduction of Fruit Plantations

Improved fruit crops viz. Mango (Mallika, Amrapali, Dashari), Aonla (NA-7, Kanchan, Krishna), Guava (Allahabad Safeda, Sweta, Tiwan Pink) and Litchi (Rose Scented) were introduced in a 6.2 ha area covering 56 farmers across 18 villages. The intervention was mainly taken up for gap filling and strengthening of existing orchards under rainfed and degraded land conditions. Mango covered the maximum area (3.2 ha), followed by aonla (1.9 ha). The introduction of grafted varieties is expected to

improve fruit yield, quality, and long-term income compared to traditional orchards. Farmers reported that fruit plantations are more suitable for degraded and barren lands and will provide sustained benefits in the long run.

Production and Sale of Planting Materials

Farmer groups were promoted for production and marketing of planting materials such as grafted plants, air-layered plants, scions, and onion seedlings. A total of 24 farmers participated and collectively generated a profit of ₹ 3.78 lakh. The details are also provided in Table 7.3. The activity proved effective in generating additional income and ensuring local availability of quality planting materials. Farmers also expressed that these enterprises enhanced their income opportunities and reduced dependence on external sources for quality planting material.

NRM based module:

Spring Rejuvenation: Spring rejuvenation was undertaken in Koti Maychak Panchayat to address drinking water scarcity during summer months (April-June), affecting about 50-60 families. Monitoring of spring discharge showed a continuous decline from February onwards, with minimum flow in June (2.10 lit/min) and maximum in October (65.0 lit/min for Source I), while Source II showed similar trends. To augment water availability, 76 staggered trenches (2 m × 0.30 m × 0.45 m) were constructed in the



Grafting in Mango and seasoning of plants in the polyhouse



Guava plants in the polyhouse and fruiting in the farmer's field

Table 7.3: Production and Sale of Planting Materials

Name of the group	No. of members in the group	Name of products which are marketed by group	Specialization of marketed product	Total profit earned by the group (Rs.)
Lemon Production Group	2	Lemon Fruits and grafted saplings	var. Permalin, NA-7 and Balaji	Rs.1,73,000/-
Onion Nursery Group	8	Seedlings	var. Gulmohar	Rs. 86,250/-
Mango Grafting Group	4	Grafted saplings	var. Mallika	Rs.99,000/-
Litchi Grafting Group	4	Grafted saplings	var. Rose Scented	Rs. 36,000/-
Mango Scion Group	5	Scion of the improved fruit spp.	var. Mallika	Rs.14000/-

catchment area to capture runoff and improve groundwater recharge. Observations indicated a positive impact on Source II, where discharge increased from 10 to 20 lit/min, whereas Source I did not show improvement, possibly due to subsurface slope conditions. Efforts are being made to expand trenching in nearby reserve forest areas for better results. Farmers reported that drinking water shortage during summer has been almost resolved due to this intervention. They also expressed that it is a cost-effective approach, suitable for implementation under MNREGS, and can serve as a model for other water-scarce areas. Discharge variation before and after trenching is shown in Figures 7.1 and 7.2.

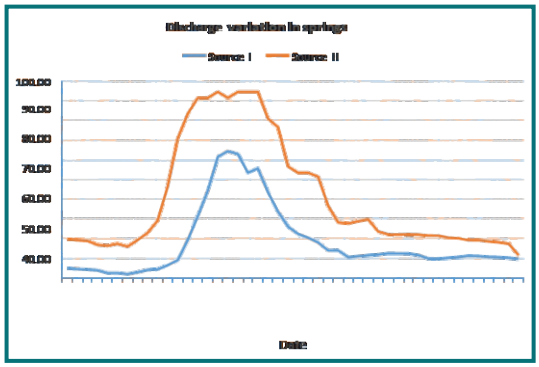


Fig 7.1: Discharge variation before trenching

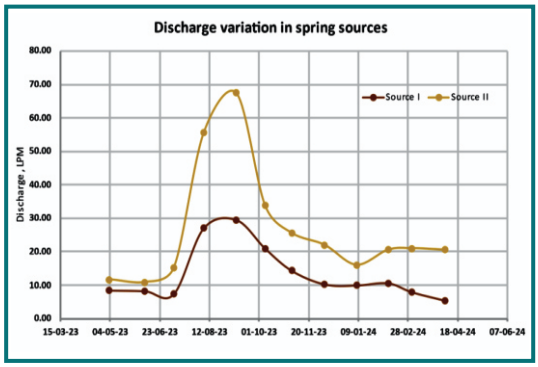


Fig 7.2: Discharge variation after trenching





Survey in reserve forest to increase the area under trenching for better results

Solid waste management through Aerobic Pucca and Portable Composting Units

Under NRM-based interventions, different composting methods (Table 7.4) were evaluated for efficient recycling of farm and animal waste. The results showed that aerobic composting in pucca pits and portable composting units performed better than the traditional heap method. The pucca pit method recorded the highest nitrogen content (1.60%), followed by portable units (1.13%), indicating better nutrient quality. Both improved methods had a low C: N ratio (11:1 to 15:1), which ensures faster decomposition and nutrient availability, whereas the traditional method had a high C: N ratio (40:1), which is not desirable. During 2025-26, compost production was carried out in 5 villages involving 19 farmers, producing 380 quintals of vermicompost. Farmers sold compost at ₹800 per quintal locally and up to ₹1500 per quintal in

Table 7.4: Comparison between compost prepared through different methods in the farmer's field

Sl. No.	Compost Preparation methods	Total C	Total N (%)	Total P (%)	Total K (%)	C: N Ratio	pH	EC (dS/m)
1.	Traditional heap method followed by the farmers	37.0	0.92	0.39	1.57	40:1	9.40	3.00
2.	Aerobic composting in Pucca compost pits	23.6	1.60	0.54	0.92	15:1	8.15	0.56
3.	Aerobic composting in portable composting units	11.8	1.134	0.357	0.91	11:1	6.2	0.790

exhibitions, generating substantial returns. Farmers reported that composting is easy to adopt, utilizes farm and household waste effectively, improves soil quality, and reduces termite problems in fields.

Green Manuring and Its Effect on Wheat Yield

Green manuring with sunhemp was introduced to improve soil fertility. The crop was sown with a seed rate of 60-65 kg/ha without irrigation and produced 15.5 t/ha biomass. Its incorporation into the soil improved crop growth parameters and yield of wheat. In wheat varieties DBW-372 and DBW-371, green manuring resulted in better plant height, ear length, number of grains per ear, and higher yield compared to fields without green manuring. Yield increased from 2.95 to 3.40 t/ha in DBW-372 and from 3.12 to 3.72 t/ha in DBW-371. Farmers observed improved soil condition, better crop growth, and found the practice beneficial and easy to adopt.

Livestock-based module

Backyard poultry farming: Backyard poultry farming was promoted as a key intervention for improving livelihood and nutritional security of rural households. During the pre-project period, only 1.6% of farm families practiced poultry rearing, mostly with low-productive local breeds, but after the intervention, adoption increased to 28% with improved breeds such as Vanaraja and Kroiler. In 2025-26, a total of 140 household poultry units were established, along with 12 additional units initiated by farmers themselves, indicating strong acceptance of the technology. Further, about 10-15% of beneficiaries expanded into larger units (100-200 birds) as a sustainable enterprise. The improved birds produced 200-300 eggs



Poultry in traditional conditions



Poultry in controlled conditions

Table 7.5 Economic returns under Poultry production (egg)

Name of breed	Units (No.)	Farmers benefitted	Birds (No.)	Egg Production (Nos./unit)			Economics of Demos (₹/unit)				Economics of Check (₹/unit)			
				Demos	Check	% increase	Gross cost	Gross return	Net return	B:C ratio	Gross cost	Gross return	Net return	B:C ratio
Kuroiler and Vanraja breeds	140	140	3500@ 25 per unit	3750 approx per unit	2200 per unit	70.45	175000	450000	275000	2.8	12000	26400	14400	2.2

Table 7.6 Economic returns under Poultry production (meat)

Name of breed	Units (No.)	Farmers bene-fitted	Birds (No.)	Meat (kg/10 chicks)			Egg Production (numbers/5chicks)			Economics of Demos (Rs/unit)				Economics of Check (Rs/unit)			
				Demos	Check	% increase	Demos	Check	% increase	Gross cost	Gross return	Net return	B:C ratio	Gross cost	Gross return	Net return	B:C ratio
Kuroiler and Vanraja breeds	140	140	3500 @25 per unit	25	18	38	750	440	70.45	3500	12750	9250	3.6	5800	8900	3100	1.5



annually and attained 2.0-2.5 kg body weight within 10-12 months, with egg laying starting after 6 months and continuing up to 18 months (up to 70% laying in Vanaraja and 60% in Kroiler). About 25-35% of eggs and meat were consumed at the household level, significantly improving family nutrition, while the remaining produce was sold in the market at ₹10-12 per egg and ₹200-250 per kg live weight, with higher demand during winter and festive seasons. The intervention resulted in increased demand and nearly doubled income in adopted villages. Farmers reported that poultry meat and eggs, once considered occasional or guest food, have now become part of the regular diet, with consumption increasing by about 300%. They also highlighted poultry farming as a highly suitable and profitable enterprise for marginal and landless farmers, though suggested that support in terms of subsidized feed and chicks would further enhance adoption.

Capacity development module

The efforts were made to strengthen community mobilization and promote entrepreneurship through training on value-added millet products and marketing chain management. Millets such as ragi and maize, which are abundantly available in the project area, were utilized for preparing nutritious products like laddoo, namkeen, and biscuits, thereby enhancing their value and income potential. Through group discussions, key constraints in group-based activities were identified, with lack of funds emerging as the most critical issue, followed by lack of unity among members (70%), which often led to conflicts due to differing interests and weak leadership. Other constraints included lack of time (53%), family responsibilities (46%), and lack of family support (40%). However, continuous support through regular visits and guidance by the project team helped in gradually overcoming these challenges as group members developed better understanding and coordination. In the later phase, the project approach shifted from production-oriented to market and profit-oriented activities, focusing on enterprise development such as production and sale of seeds (wheat, millet, paddy, urd, maize), horticultural products (lemon, jackfruit, litchi), poultry and eggs, onion seedlings, vermicompost, and organic products through SHGs, thereby strengthening livelihood opportunities and entrepreneurial skills among farmers.





Training for preparation of quality products

Section 3

Partnership and Institution Building

It is a key component of the Farmer FIRST Programme that focuses on creating strong collaborations among farmers, research organizations, government departments, private agencies, and other stakeholders. It emphasizes developing effective partnership models while strengthening farmer groups through capacity-building initiatives such as training programmes, demonstrations, workshops, exposure visits, and technical guidance. These collaborative efforts improve farmers' access to knowledge, technologies, inputs, financial services, and markets, ultimately enhancing their skills, promoting sustainable agricultural practices, increasing productivity, and improving rural livelihoods.

PAU, Ludhiana

The Farmer FIRST Programme strengthened institutional linkages by developing partnerships with various departments, organizations, and local institutions for effective implementation of project interventions. Collaboration with the Departments of Agronomy, Horticulture, Soil Science, Agricultural Extension, Plant Protection, Agricultural Engineering, Animal Husbandry, Punjab Forest Department, and Primary Credit Society facilitated technical guidance, quality input support and regular monitoring of demonstrations. The project also established close coordination with the Department of Agriculture, Gram Panchayats, Krishi Vigyan Kendras (KVKs), Self-Help Groups (SHGs), Farmer Producer Organizations (FPOs) and progressive farmers for dissemination of improved technologies. These partnerships ensured timely availability of quality seed, planting material, farm machinery, advisory services and capacity-building programmes, thereby improving technology adoption and strengthening farmers' confidence in scientific agriculture. Farmer groups, women Self-Help Groups and progressive farmers were mobilized in the adopted villages to enhance collective learning and technology dissemination. Regular farmer meetings, group discussions, training programmes, field demonstrations, and exposure visits were organized to strengthen their technical knowledge and



entrepreneurial skills. Special emphasis was given to women farmers through nutrigarden development, value addition, nursery raising, and income-generating activities. Farmer groups actively participated in crop demonstrations, integrated farming system interventions, residue management, bio-input production, and horticultural activities. Continuous interaction with scientists improved farmers' decision-making ability, encouraged collective action, and enhanced institutional linkage among farming communities.

GADVASU, Ludhiana

The Farmer FIRST Programme strengthened institutional linkages by promoting active collaboration among Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Punjab Agricultural University (PAU), village panchayats, progressive farmers and local stakeholders for effective implementation of livestock-based interventions. The multidisciplinary project team comprising experts from the Directorate of Extension Education, College of Veterinary Science and College of Dairy and Food Science Technology worked in close coordination to provide integrated technical support to the farming community. Partnerships with PAU facilitated convergence of agriculture and livestock technologies, particularly in fodder production, silage making and crop-based interventions. Village Panchayats actively supported the organization of training programmes, awareness camps, infertility camps, oral magnet therapy camps, value addition demonstrations and project meetings in the operational villages. Continuous interaction between scientists and farmers resulted in the identification of progressive farmers as technology agents who further motivated fellow farmers for adoption of improved livestock technologies. Institution-building activities focused on strengthening farmers' groups through regular capacity-building programmes, demonstrations and hands-on training. Training programmes and demonstrations covering farmers were organized on trace mineral supplementation, mineral mixture feeding, oral magnet therapy, infertility management, silage making, backyard poultry farming and value addition of milk. The programme also facilitated entrepreneurial development among rural youth and women by promoting milk processing, backyard poultry farming and scientific livestock management.



These collaborative efforts enhanced farmers' confidence, strengthened local institutions and created a sustainable mechanism for technology dissemination and farmer-to-farmer learning.

ICAR-CIPHET, Ludhiana

Under the Farmer FIRST Programme, ICAR-CIPHET, Ludhiana established strong partnerships with research institutions, extension agencies, village institutions and progressive farmers to promote technology dissemination, value addition and sustainable livelihood development. The institute collaborated with Punjab Agricultural University (PAU), Krishi Vigyan Kendras (KVKs), village Panchayats and local leaders to facilitate farmer mobilization, training programmes and technology demonstrations. Progressive farmers served as technology ambassadors, encouraging farmer-to-farmer learning and adoption of scientific practices. Linkages with experts provided technical guidance on post-harvest management, processing, value addition, quality improvement, entrepreneurship development, and market-oriented interventions. Regular project review meetings, field monitoring, and stakeholder consultations ensured effective planning, implementation, and feedback, thereby strengthening institutional support and enhancing technology adoption in the operational villages.

CSKHPKV, Palampur

The Farmer FIRST Programme at CSKHPKV, Palampur strengthened institutional partnerships and stakeholder linkages to promote sustainable livelihood security among farm households of Kangra district. The programme established effective collaboration with the Department of Agriculture, Government of Himachal Pradesh, Department of Horticulture, Forest Department, JICA, Punjab National Bank and Kangra Central Cooperative Bank. These partnerships facilitated technical support, input supply, financial assistance and dissemination of improved agricultural technologies among beneficiary farmers.

The programme promoted active participation of line departments, scientists and extension personnel in various farmer-oriented activities. Continuous interaction among farmers, researchers and development agencies helped strengthen the farmer-scientist interface and facilitated effective transfer of technologies



related to crop production, vegetable cultivation, mushroom production, beekeeping, agroforestry and animal husbandry. The collaborative efforts also enhanced farmers' access to developmental schemes, technical guidance and market-oriented opportunities for improving livelihood security. Farmer groups in the operational villages were mobilized and encouraged to participate in demonstrations, training programmes, exposure visits and field-day activities. These efforts contributed towards strengthening community participation, capacity building and adoption of improved farm production technologies in the project area.

SKUAST-Jammu

The Farmer FIRST Programme strengthened institutional partnerships and stakeholder linkages to promote sustainable livelihood opportunities among farming communities in the operational villages. A notable partnership model was developed with Lupin Pharmaceutical Pvt. Ltd. for promotion of mushroom cultivation, horticultural development and goat-based livelihood interventions. Building upon the successful collaboration initiated during earlier years, horticultural activities were further expanded during 2025-26 through the introduction of biochar-based orchard establishment in lemon, mango, guava and apple under field conditions. The intervention demonstrated encouraging results under moisture-stress situations and contributed to improved establishment of perennial horticultural crops. The programme facilitated the establishment of 562 fruit plants over 0.8 ha area, of which 401 plants survived successfully, resulting in an overall survival incidence of 71.35 percent.

The partnership also contributed significantly towards strengthening livelihood opportunities through goat-based farming systems. Beneficiary farmers received goat units under a cost-sharing mechanism, which encouraged ownership and long-term sustainability. The intervention generated additional income through the sale of goats and goat products while increasing livestock assets at the household level. The programme further facilitated market-oriented production systems by establishing linkages with Samta Mushroom Producers Limited, Nud. Through this institutional arrangement, mushroom growers marketed their produce directly through the Farmer Producer Organization (FPO), ensuring timely disposal of produce, reduction in post-harvest losses, and access to remunerative prices. During 2025-26, more than 61 farm families marketed about 85 quintals of button mushrooms through this mechanism,



Partnership model with Lupin Pharmaceutical Pvt. Ltd., SKUAST-Jammu



Partnership model for mushroom, SKUAST-Jammu

demonstrating the effectiveness of institutional partnerships in strengthening entrepreneurship and market access.

GBPUAT, Pantnagar

The programme emphasized strengthening farmer institutions and promoting collective action for enterprise development and market access. Farmer groups were organized around specific enterprises including honey production, mushroom cultivation, spice processing, vegetable production and poultry farming. These groups facilitated knowledge sharing, collective production planning, and market-oriented activities. The Jeoli Honey Group, comprising 28 members, successfully marketed honey produced from diverse floral sources and generated a profit of ₹3,10,700 during the reporting period. The Suryajala Spices Group, consisting of 20 members, marketed turmeric powder, coriander products, and chilli products and earned a profit of ₹1,68,345. The Suryajala Mahila Mushroom Sangathan generated ₹74,580 through collective mushroom marketing, while the Suryajala Sabzi Sangathan earned ₹1,20,566 through sale of fresh organic vegetables. The Syalikhet Mahila Poultry Group marketed eggs and poultry meat and generated a profit of ₹88,936. These institutional mechanisms strengthened farmers' bargaining power, improved access to markets and facilitated collective entrepreneurship. The groups also served as effective platforms for technology dissemination, peer learning and sustainable enterprise development.

ICAR-IISWC, Dehradun

The Farmer FIRST Programme emphasizes strengthening institutional linkages and fostering partnerships among research organizations, developmental agencies, line departments, financial institutions, and farming communities. During 2025-26, ICAR-IISWC, Dehradun successfully collaborated with several national and state-level organizations to facilitate technology dissemination, input support, capacity building, and entrepreneurship development in the project area. Technical and material support was received from organizations such as ICAR-IIWBR, Karnal; ICAR-IARI, New Delhi; Tarai Development Corporation (TDC); VPKAS, Almora; Krishi Vigyan Kendra, Dehradun; Uttarakhand Sheep and Wool Development Board; Horticulture Department; State Bank of India; KRIBHCO; Patanjali, Haridwar; KVIC; and various state line departments. These organizations contributed improved crop varieties, vegetable seed kits, fruit planting materials, poultry chicks, technical know-how, exposure opportunities, micronutrients, tree guards, and entrepreneurship training support. The collaborative approach enabled efficient delivery of technologies and strengthened convergence among different development programmes operating in the region. The institutional partnerships facilitated access to quality inputs, enhanced farmers' knowledge base, and created opportunities for scaling up successful interventions. Such partnerships also strengthened farmer confidence in adopting improved technologies and ensured long-term sustainability of project activities.

Section 4

Content Mobilization

Content mobilization under the Farmer FIRST Programme (FFP) focused on the systematic collection, development, validation, organization, and dissemination of scientific knowledge, proven technologies, and location-specific advisories for the benefit of farming communities. The component facilitated the conversion of scientific knowledge into accessible and practical information for farmers through technical literature, knowledge products, databases, advisories, demonstrations, digital platforms, and interpersonal communication.

The participating institutions identified and compiled transferable technologies developed by their own institutions and collaborating organizations and disseminated them according to the needs of the operational villages. Content covered crop production, horticulture, livestock, natural resource management, post-harvest management, food processing, value addition, entrepreneurship, and livelihood diversification.

A combination of offline and digital communication channels was used, including training programmes, Kisan Goshtis, field demonstrations, field days, exposure visits, farmer-scientist interactions, extension literature, WhatsApp groups, websites, social media, mass media and other institutional communication platforms. The approach strengthened access to reliable technical information, facilitated continuous advisory support and promoted wider adoption and replication of successful interventions.

PAU, Ludhiana

Content mobilization at PAU focused on the development and dissemination of need-based technical information to improve farmers' knowledge and adoption of scientific agricultural technologies. Technical literature, advisory notes, production technologies, and Packages of Practices covering crop production, horticulture, integrated farming systems, nutrient management, crop residue management, and value addition were compiled and disseminated among beneficiary farmers.

A comprehensive database of beneficiary farmers was maintained to support continuous technical guidance, monitoring, and follow-up. Regular advisories were provided through mobile phones, WhatsApp groups, field visits, and personal interactions. Seasonal and weather-based advisories, scientific recommendations and information on relevant government schemes were also disseminated to support timely decision-making.

Technologies developed and recommended by the university and other institutions were identified, validated and transferred through demonstrations, training programmes and field-level interactions. Printed extension literature, training manuals, technical folders and awareness materials were distributed to facilitate wider dissemination.

Successful technologies disseminated included crop residue management, Happy Seeder, Direct Seeded Rice (DSR), green manuring, low-tunnel vegetable cultivation and beekeeping, along with

technologies for value addition. Farmer-to-farmer interactions, field meetings, exposure visits, mass media, and digital platforms were used to strengthen outreach. Beneficiary farmers shared their experiences and demonstrated successful interventions, encouraging neighbouring farmers to adopt similar practices.

Farmers were also linked with Kheti Sandesh for regular access to agricultural information. Publications related to crop residue management and the Packages of Practices for Kharif, Rabi and vegetable crops were distributed among the farming community. The combined use of interpersonal communication, printed material and digital platforms strengthened technology dissemination and farmer-scientist interaction.

GADVASU, Ludhiana

GADVASU focused on mobilizing and disseminating knowledge related to agro-processing, honey processing, chemical-free jaggery production and post-harvest management of horticultural produce.

Technical information and knowledge resources developed by ICAR-CIPHET and other relevant institutions were transferred to farmers through training programmes, demonstrations, extension literature and on-site technical guidance. The content included standard production and processing protocols, quality standards, packaging, branding, FSSAI registration procedures and market-oriented advisory services.

Continuous technical backstopping, quality-testing support and feedback from farmers were used to improve the relevance of the interventions. Successful project outputs were disseminated through farmer-to-farmer interactions, project-site meetings, training programmes, Kisan Goshtis, field demonstrations, mass media and digital platforms.

A total of 15 offline training/interaction/field day/awareness camp/Kisan Goshti activities were organized in the operational area. Extension materials comprising 11 technical bulletins, 4 popular articles, and 1 research paper were developed and disseminated. Beneficiary farmers were also provided regular advisory support through WhatsApp groups, virtual meetings, and field visits and were subscribed to the university magazine for continued knowledge enhancement.

ICAR-CIPHET, Ludhiana

ICAR-CIPHET focused on mobilizing scientific information related to food processing, post-harvest management and value addition to support farmers and rural entrepreneurs.

Technical literature, pamphlets, advisories and bulletins were developed on honey processing, pulse processing, cereal processing, jaggery production, cattle-feed manufacturing and spice processing. The materials provided practical guidance on processing operations, quality improvement, packaging, branding and marketing of value-added products.

The information was disseminated through exposure visits, field-day programmes, demonstrations and farmer-scientist interactions. Content was made available in local languages to improve accessibility. Demonstrations at processing units enabled farmers to observe the technologies in practice and understand their potential economic benefits.

Successful project outputs were further disseminated through hands-on demonstrations, field visits, project-site meetings, training programmes and digital communication. Farmers received practical training in honey processing, cereal and pulse processing, spice processing and chemical-free jaggery production.

Technical bulletins, pamphlets and extension publications covering honey processing, pulse processing, turmeric processing and post-harvest management were distributed. Scientists provided continued technical guidance on processing, packaging, branding, AGMARK and FSSAI certification, marketing and enterprise development, thereby facilitating adoption of post-harvest and value-addition technologies.

CSKHPKV, Palampur

At CSKHPKV, Palampur, content mobilization focused on strengthening farmers' knowledge and skills in crop production, horticulture, livestock management and livelihood diversification.

Technical information on improved crop production technologies, off-season vegetable cultivation, mushroom production, nutri-gardens, beekeeping, agroforestry and animal health management was disseminated through training programmes, Kisan Goshtis, field days, exposure visits, demonstrations and veterinary clinical camps.

Transferable technologies developed by CSKHPKV and collaborating institutions were identified, pooled and promoted among farmers. These included improved varieties of soybean, paddy and wheat, technologies for vegetable cultivation and mushroom production, fruit-fly management in cucurbits, mineral supplementation, milk-ration balancing and livestock healthcare.

Field demonstrations allowed farmers to assess the suitability and performance of technologies under local conditions. Farmer-to-farmer extension, cross visits, field meetings, mass media and extension literature further strengthened knowledge dissemination. Continuous interaction between scientists and farmers facilitated timely advisory support and problem-solving.

Successful outputs were disseminated through demonstrations, Kisan Goshtis, exposure visits, project-site meetings and other extension activities. Technologies demonstrated included improved crop varieties, off-season vegetables, nutri-gardens, mushroom cultivation, integrated agriculture, drone technologies, agroforestry and animal health management. These activities supported wider adoption of improved agricultural and livestock practices in the operational villages.

SKUAST, Jammu

Content mobilization at SKUAST, Jammu, emphasized the systematic collection, organization, and dissemination of technical information to support technology transfer and decision-making among farmers.

A comprehensive database covering 651 farm families from the operational villages of Sarain, Tund, Satah, Balore, Darui, Anandpur, Sadral and Nagrota was developed. The database served as a resource for planning interventions, monitoring programme activities and assessing the impact of technological interventions.

Technical information on mushroom cultivation, vegetable production, backyard poultry, horticultural crop establishment, biochar application and goat rearing was disseminated through training programmes, demonstrations, exposure visits and farmer-scientist interactions. Exposure visits and capacity-building programmes enabled farmers to learn from successful enterprises and develop market-oriented production skills.

The programme also encouraged information exchange through farmer groups and community-based organizations. Training on scientific vegetable cultivation and backyard poultry management strengthened farmers' technical competence and supported wider adoption.

Successful project outputs were disseminated through farmer training, demonstrations, exposure visits, field days, diagnostic visits, and regular project-site meetings. Technologies related to vegetable cultivation, backyard poultry, mushroom production, orchard management, nutri-gardens, goat rearing, biochar application, and value-added crop production were demonstrated under farmers' field conditions.

WhatsApp groups, extension literature, village resource persons and continuous interaction with scientists were used for technical communication. Project achievements were also disseminated through press releases and institutional communication channels, increasing visibility and supporting wider replication of successful interventions.

GBPUAT, Uttarakhand

Content mobilization at GBPUAT focused on the dissemination of scientific knowledge and practical skills related to agriculture and allied enterprises, with emphasis on linking production technologies with value addition, entrepreneurship and market opportunities.

Information on improved crop varieties, scientific poultry management, beekeeping, mushroom cultivation and processing technologies was disseminated through training programmes, demonstrations, field days and farmer-scientist interactions.

The programme provided practical training in honey processing, beeswax processing, spice grinding, packaging, branding and quality management. These activities enabled farmers to move beyond primary production and participate in value chains through value addition and enterprise development.

Farmer groups played an important role in sharing knowledge and experiences within the community. Successful demonstrations and enterprise activities encouraged wider adoption of improved technologies within and beyond the project villages. The content mobilization efforts contributed to strengthening local capacities and promoting sustainable livelihood opportunities.

ICAR-IISWC, Dehradun

ICAR-IISWC emphasized effective dissemination of technologies and project outcomes during 2025-26 through multiple communication channels. Technologies developed by ICAR-IISWC and other ICAR institutes were consolidated and disseminated through demonstrations, training programmes, Kisan Goshtis, exposure visits, printed literature and digital platforms.

Major technologies disseminated included improved crop varieties, horticulture-based alternate land-use systems, scientific composting, backyard poultry, medicinal plant cultivation, food processing and value addition, moisture conservation practices and nutritional security interventions.

A dedicated WhatsApp group was used for location-specific advisories and technical messages. During the reporting period, 216 technical messages were circulated among 136 farmers, covering crop production, horticulture, livestock, natural resource management, agripreneurship, and weather-based advisories.

Short educational videos were developed, and the institute website, print media, and social media platforms were utilized to increase outreach. Technologies such as backyard nutri-gardens, improved composting methods, poultry farming, orchard development, and improved crop varieties received wider visibility and encouraged adoption beyond the project villages.

Successful interventions were further disseminated through farmer training, Kisan Goshtis, exposure visits, field demonstrations, Scientist-Farmer interactions and project-site meetings. Technical advisories and success stories were shared through WhatsApp groups, institutional websites, print media, and extension literature. Distribution of quality planting material and exposure to successful enterprises further encouraged replication of technologies beyond the operational villages.

Impact of Technological Interventions

The content mobilization and technology dissemination efforts under the Farmer FIRST Programme contributed to improvements in agricultural productivity, natural resource management, nutritional security and livelihood diversification.

Crop Productivity and Profitability

The introduction and dissemination of improved crop varieties resulted in substantial yield advantages over traditional cultivars. Pusa Basmati-1509 recorded yield increases of more than 120%, while improved wheat varieties DBW-371 and DBW-372 produced nearly double the yield of local cultivars. Improvements were also reported in crops such as urd and millet, contributing to enhanced profitability and greater farmer confidence in improved technologies.

Nutritional Security

The promotion of backyard nutri-gardens improved household access to vegetables and contributed to greater dietary diversity. Increased availability of fresh green vegetables throughout the year reduced dependence on market purchases and generated household savings.

Horticulture and Natural Resource Management

Horticulture-based interventions encouraged productive utilization of degraded and underutilized land. Fruit-based systems created opportunities for long-term income generation, particularly under rainfed conditions.

Natural resource management interventions, including spring rejuvenation and scientific composting, contributed to improved water availability, better soil health, efficient recycling of farm waste, and enhanced environmental sustainability. Farmers reported positive effects on water security and crop productivity.

Livelihood Diversification

Backyard poultry contributed to livelihood diversification and household nutrition through increased production of eggs and meat. Adoption of improved poultry breeds enhanced productivity and encouraged farmers to expand poultry-based enterprises.

Entrepreneurship-oriented interventions created opportunities in value addition, food processing, seed production, nursery raising, and marketing. These activities strengthened self-employment opportunities, particularly among women and youth, and supported the transition towards market-oriented farming systems.

Mechanisms for Dissemination of Successful Project Outputs

The successful outputs generated under the Farmer FIRST Programme were disseminated through a combination of demonstration-based, interpersonal, institutional, print and digital communication mechanisms.

Farmer-to-Farmer Learning

Beneficiary farmers who successfully adopted technologies served as local examples for neighbouring farmers. Farmer-to-farmer interactions, group discussions, field meetings and cross visits facilitated peer learning and encouraged replication of successful interventions.

Demonstrations and Field-Based Learning

Field demonstrations, hands-on training, field days and project-site meetings enabled farmers to observe technologies under actual production conditions. This approach provided opportunities to assess the practical performance and benefits of technologies before adoption.

Exposure Visits and Enterprise Learning

Exposure visits to successful farms, processing units and enterprises enabled farmers to observe complete production and value-addition processes. These activities were particularly relevant for agro-processing, honey processing, jaggery production, poultry, mushroom cultivation, horticulture and agripreneurship.

Technical Literature and Knowledge Products

Technical bulletins, pamphlets, folders, advisories, training manuals, extension publications and Packages of Practices were used to provide farmers with reference material for continued use after training and demonstrations.

Digital Communication

WhatsApp groups, virtual meetings, websites, social media and other digital platforms provided continuous access to advisories and technical information. These channels enabled project teams to communicate with farmers beyond physical meetings and provide timely information on crop management, livestock, weather, natural resource management and enterprise development.

Mass Media and Institutional Communication

Project achievements, successful interventions and farmer experiences were communicated through mass media, press releases, institutional websites and other communication channels. This helped extend the visibility of successful technologies beyond the project villages.

Overall Outcome

The Content Mobilization component provided an important link between scientific knowledge generation and its practical application at the farm and household level. The participating institutions mobilized technologies from their own research systems and collaborating organizations and adapted their dissemination approaches to the needs of farmers in different agro-ecological and socio-economic settings.

The integrated use of technical literature, databases, demonstrations, training, exposure visits, farmer-scientist interactions, farmer-to-farmer learning, and digital communication strengthened the flow of information to farming communities. The approach not only improved access to scientific knowledge but also supported technology adoption, livelihood diversification, value addition, entrepreneurship, and sustainable management of natural resources.

Overall, the content mobilization efforts under the Farmer FIRST Programme contributed to wider outreach and replication of successful technologies beyond the operational villages, thereby enhancing the potential for sustained impact on farm productivity, household nutrition, resource-use efficiency, and rural livelihoods.

Section 5

Other Achievements

The Farmer FIRST Programme (FFP) implemented by the participating institutions generated several significant achievements beyond routine technology demonstrations and capacity-building activities. These included technology adoption, farm mechanization, crop diversification, value addition, entrepreneurship development, livelihood diversification, natural resource management, nutritional security, and strengthening of farmer institutions.

The interventions were designed according to the needs and opportunities identified in the operational villages and resulted in measurable improvements in farm productivity, profitability, resource-use efficiency, and livelihood opportunities. Several successful enterprises and farmer-led initiatives also emerged, providing scope for wider replication and scaling.

PAU, Ludhiana

The Farmer FIRST Project at PAU, Ludhiana, made substantial progress in technology adoption, farm mechanization, crop diversification, value addition, and integrated farming.

Farmers adopted button and oyster mushroom cultivation, low-tunnel vegetable production, nursery raising, and seed production of paddy, wheat, and summer moong. Mechanization interventions resulted in nearly 85% of the wheat area in the project villages being brought under Happy Seeder, Super Seeder and Smart Seeder technologies.

The adoption of short-duration paddy varieties increased to more than 85% of the paddy area in the project villages and nearly 60% in adjoining villages. This contributed to a substantial reduction in paddy straw burning.

Crop diversification also progressed significantly. Vegetable cultivation increased by approximately 40%, while the area under sugarcane increased from 16 acres to 45 acres. Canola mustard variety GSC-7 was popularized over approximately 50 acres.

Value-addition activities were strengthened through the establishment of spice-grinding, jaggery-processing, turmeric-processing, and oil-expeller units, benefiting around 20 households. Farmers also initiated commercial seed production and developed horticulture-based enterprises.

Six Integrated Farming System (IFS) models were established by integrating crops with livestock, fisheries, beekeeping, mushroom cultivation, and kitchen gardening. These interventions contributed to greater income diversification, improved resource-use efficiency, and promotion of sustainable farming practices.

GADVASU, Ludhiana

GADVASU focused on scientific livestock management, value addition, livelihood diversification and rural entrepreneurship through need-based interventions in the operational villages.

Demonstrations on value addition of milk, including paneer preparation, whey beverage production and modern packaging, encouraged women farmers to take up dairy-based enterprises. Demonstrations on bag silage preparation improved awareness regarding scientific fodder conservation.

Backyard poultry units were established through the distribution of improved birds, feed supplements and medicines, creating additional livelihood opportunities for beneficiary households. Continuous agro-livestock advisory services, infertility management camps and oral magnet therapy were provided to address field-level livestock problems.

Awareness programmes on livestock waste management and crop residue management further strengthened farmers' knowledge of sustainable practices.

ICAR-CIPHET, Ludhiana

ICAR-CIPHET achieved significant progress in value addition, post-harvest management and rural entrepreneurship under the Farmer FIRST Programme.

Agro-processing centres established under the project processed cereals, pulses, oilseeds, spices and livestock feed. These activities generated an additional collective profit of ₹61.32 lakh and increased farmers' income by approximately 25-35%.

Honey-processing interventions covered 164 beekeepers, who processed 1,405 quintals of raw honey. The activity generated an additional profit of approximately ₹1.43 crore and increased the income of beneficiary beekeepers by around 50-60%.

Chemical-free jaggery-processing units processed 655 quintals of solid jaggery and 520 quintals of granular jaggery, generating an estimated profit of ₹29.73 lakh. Value-added jaggery products further improved farmers' returns by approximately 30-35%.

The Compact Moisture Reduction Unit for Honey, developed under the project, received ICAR Technology Certification during the reporting period. The project team also received the Best Oral Presentation Award for research on Agro-Processing Centres.

A beneficiary honey entrepreneur received the First Prize at the PAU Kisan Mela, Ludhiana, for producing high-quality machine-processed honey. In addition, farmer groups engaged in processing activities were registered under FSSAI and UDYAM (MSME), strengthening their formal enterprise status and improving opportunities for market access.

CSKHPKV, Palampur

The Farmer FIRST Programme at CSKHPKV, Palampur promoted integrated interventions aimed at improving farm productivity, profitability, livelihood diversification and resource-use efficiency.

The major interventions included improved crop production, vegetable cultivation, mushroom production, beekeeping, livestock-based activities, on-farm input production, residue management, biochar-based soil-moisture conservation and nutri-gardens. The programme also emphasized the development of farmer groups and collective approaches for production and marketing.

Technologies and enterprises were demonstrated under field conditions to enable farmers to assess their suitability and economic potential. The interventions contributed to improved adoption of scientific agricultural practices, diversification of farm-based livelihoods, and better utilization of locally available resources.

The programme also supported nutritional security and women's participation through nutri-garden interventions and other household-level enterprises. Collectively, these activities strengthened livelihood opportunities and promoted more sustainable and resilient farming systems in the project area.

SKUAST, Jammu

SKUAST, Jammu, promoted a range of innovative interventions aimed at improving farm productivity, profitability, resilience, and livelihood security.

Participatory on-farm input production activities included vegetable and marigold seedling production, compost preparation, and crop-residue management. These interventions enabled farmers to reduce dependence on external inputs, lower input costs, and improve recycling of farm resources.

Field studies on biochar application in orchard crops demonstrated its effectiveness in improving soil-moisture retention under moisture-stress conditions, thereby supporting sustainable fruit production.

The improved toria variety RSPT-2 was introduced as an economically viable option for farmers affected by wild-animal damage. Its adoption resulted in higher yields, increased net income, and an improved benefit-cost ratio.

Marigold cultivation emerged as a profitable enterprise because of strong local demand and generated substantial returns even from small landholdings.

Nutri-garden interventions implemented among farm women substantially increased vegetable production and contributed to improved household nutritional security, dietary diversity, and income generation.

Collectively, these interventions strengthened farm resilience, promoted sustainable agricultural practices, and expanded livelihood opportunities for rural households.

GBPUAT, Pantnagar

During 2025-26, the Farmer FIRST Programme at GBPUAT, Pantnagar achieved significant progress in improving agricultural productivity, farm profitability and livelihood security through integrated crop, livestock and enterprise-based interventions.

Improved vegetable varieties recorded yield advantages ranging from 20-56% over existing farmer practices. Improved poultry breeds increased meat and egg production by nearly 49%. Beekeeping interventions covering 50 units generated additional income through honey production, while mushroom cultivation demonstrations recorded a 100% increase in yield compared with traditional practices.

Value-addition enterprises, including honey processing, beeswax processing and spice grinding, generated additional income and strengthened local entrepreneurship. Farmer groups involved in honey, spices, vegetables, mushrooms and poultry marketing collectively generated significant returns, demonstrating the potential of collective action and improved market linkages.

Other important achievements included the promotion of on-farm input production, crop-residue management, biochar-based soil-moisture conservation, profitable toria and marigold cultivation, and nutri-garden interventions. These activities contributed to improved household nutrition, greater availability of vegetables, and enhanced participation of women in livelihood activities.

Overall, the interventions contributed to increased farm income, improved resource-use efficiency, strengthened farmer institutions, and greater adoption of climate-resilient and sustainable agricultural practices in the project area.

ICAR-IISWC, Dehradun

During 2025-26, the Farmer FIRST Programme at ICAR-IISWC, Dehradun, contributed significantly to sustainable agriculture, natural resource management, livelihood enhancement and nutritional security in the North-Western Himalayan region.

Improved crop varieties of wheat (DBW-371 and DBW-372), paddy (Pusa Basmati-1509), urd (T-9) and millet (VL-380) were successfully demonstrated, resulting in substantial yield and income gains compared with local practices.

A total of 314 backyard nutri-gardens were established. These interventions increased vegetable production by 331.6%, reduced household purchases of vegetables by 63.5%, and improved dietary diversity.

Horticultural interventions covering 6.2 ha promoted the establishment of mango, amla, guava, and litchi plantations on degraded lands. Farmer groups generated ₹3.78 lakh through the production and sale of planting material.

Natural resource management interventions, including spring rejuvenation and improved composting technologies, contributed to improved water availability and soil health. Vermicompost production generated net returns of up to ₹4.89 lakh.

Backyard poultry interventions strengthened livelihood and nutritional security through greater adoption of improved breeds and doubling of farmers' income from poultry enterprises.

Capacity-building activities benefited 456 farmers through Kisan Goshtis, training programmes, exposure visits and entrepreneurship-development programmes. Technology dissemination was further supported through WhatsApp-based advisory services, circulation of 216 technical messages, educational videos, institutional websites, print media and farmer networks.

The project also received recognition through scientific publications, conference presentations and awards, along with visits by senior policymakers and agricultural leaders. These achievements demonstrated the contribution of the programme towards sustainable rural development in the Himalayan region.

Major Outcomes of the Farmer FIRST Programme

The achievements reported by the participating institutions demonstrate that the Farmer FIRST Programme progressed beyond technology demonstration towards farmer-led adoption, enterprise development and livelihood transformation.

The major outcomes can be summarized as follows:

1. **Enhanced technology adoption:** Improved crop varieties, mechanization, residue-management practices, horticultural technologies, livestock technologies and integrated farming systems were adopted under field conditions.
2. **Improved farm productivity:** Significant yield improvements were recorded in crops, vegetables, mushrooms, poultry and other enterprises compared with existing farmer practices.
3. **Crop diversification:** Farmers diversified towards vegetables, mustard, sugarcane, horticultural crops, mushrooms and other alternative enterprises.

4. **Promotion of value addition:** Processing of honey, milk, cereals, pulses, spices, jaggery and other agricultural products created additional income opportunities.
5. **Entrepreneurship development:** Farmer groups and individual farmers established processing and other commercial enterprises, with several beneficiaries receiving recognition for their entrepreneurial achievements.
6. **Livelihood diversification:** Beekeeping, backyard poultry, mushroom production, nursery raising, seed production, food processing, and integrated farming provided additional sources of household income.
7. **Natural resource management:** Crop-residue management, biochar application, composting, spring rejuvenation, and integrated farming contributed to improved resource-use efficiency and environmental sustainability.
8. **Nutritional security:** Nutri-gardens and backyard poultry improved household availability of vegetables, eggs and meat and contributed to dietary diversification.
9. **Women and youth participation:** Dairy processing, nutri-gardens, poultry, value addition and enterprise-based activities created opportunities for greater participation of women and rural youth.
10. **Strengthening of farmer institutions and market linkages:** Formation and registration of farmer groups and linkages with FSSAI, UDYAM and markets strengthened the institutional and commercial dimensions of the interventions.
11. **Recognition and wider visibility:** Successful technologies, enterprises and project teams received awards and certifications, while project outcomes were disseminated through scientific and institutional platforms.

Overall Assessment

The achievements under the Farmer FIRST Programme indicate a progressive shift from technology dissemination to integrated livelihood-oriented interventions. The programme facilitated the adoption of improved technologies while simultaneously addressing productivity, profitability, nutrition, resource management, value addition and entrepreneurship.

The emergence of farmer-led enterprises, measurable productivity gains, diversification of income sources and recognition of successful beneficiaries indicate the potential of the interventions for replication and wider scaling in similar agro-ecological and socio-economic settings.

Section 6

Publications

Research publications

1. Rekha Chawla, Gopika Talwar, Amandeep Singh, Arunbeer Singh, Gurpreet Kaur Tulla, Parminder Singh (2025). Assessment of technology intervention for preparation of paneer and characterization employing Principal Component analysis (PCA). Agricultural Mechanization in Asia, Africa and Latin America, 56 (05).
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3. Chaudhary, D R, S S Rana, Lav Bhushan, Surash Kumar, Pawan Sharma, Parvesh Kumar, K D Sharma, Y P Thakur, Arvind Kumar, Rajbir Singh, Parvender Sheoran, A K Sarial, R R Burman and U S Gautam (2024). Farming system diversification: An insight on strengthening the livelihood in a hilly ecosystem. Indian Journal of Agricultural Sciences 94 (3-S1): 34-40 https://doi.org/10.56093/ijas.v94i3.148583
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5. Krishnender Dinesh, Varun Sankhyan, D R Chaudhary, Lab Bhushan, Parvesh Kumar, Ankaj Thakur, Narinder Singh, Ashish S Murari and Parvinder Sheoran. 2024. Backyard poultry production system for improving livelihood and nutritional security in rural areas. Indian Farming 74(10): 31-33.
6. Gupta, Shiwani, Ravinder Singh and Desh Raj Chaudhary (2024). Sheetkalin sabji faslon mein kharpatwar niyantran. Parvatiya Khetibadi. Varsh 44 Ank 3 pp 15-16 (July to Sept, 2024).
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2. Muruganandam M, Bankey Bihari, Trisha Roy, Indu Rawat, SS Srimali,Matber Singh, Abimanyu Jhajharia, UK Maurya, and Anil Mallik (2025). Improved Backyard Poultry Rearing for Diversification: Experiences of Farmer FIRST Project in Indian Himalayan Region. Abts: Ist International Farming Systems Conference on "Transforming Food Land and Water Systems under Global Climate Change" organized by Farming Systems Research and Development Association (FSRDA) at ICAR-IIFSR, Modipuram, Meerut, UP, March 7-9,2025, pp.75

3. Indu Rawat, Bankey Bihari, Abimanyu Jhajhria and Anil Malik (2025). Agripreneurship Development through SHGs. Abts: Ist International Farming Systems Conference on "Transforming Food Land and Water Systems under Global Climate Change" organized by Farming Systems Research and Development Association (FSRDA) at ICAR-IIFSR, Modipuram, Meerut, UP, March 7-9,2025, pp.408

4. Vikash Yadav, Bankey Bihari (2025). The Role of Self-Help Groups in Financial Inclusion and Women's Empowerment in Uttarakhand: Challenges and Strategies for Overcoming Constraints. Abts: Ist International Farming Systems Conference on "Transforming Food Land and Water Systems under Global Climate Change" organized by Farming Systems Research and Development Association (FSRDA) at ICAR-IIFSR, Modipuram, Meerut, UP, March 7-9,2025, pp.387.

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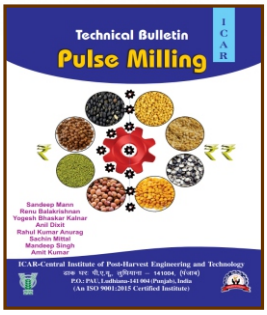
7. V.K. Rampal and Sukhjinder Singh (2026) Evaluation of Training Programmes on Mushroom Cultivation and Their Economic Impact on Entrepreneurial Development. Abts: National Conference on Integrating Indian Knowledge Systems with Modern Science for Viksit Bharat organised by Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu, April 15-17, 2026, pp.511

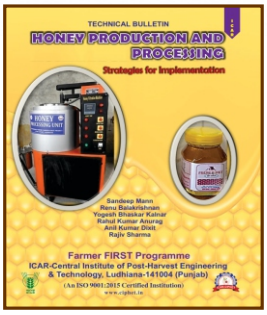
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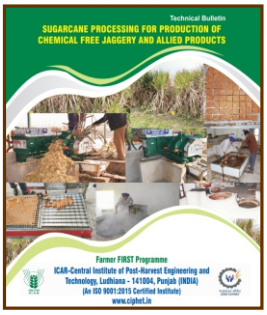
1. Amandeep Singh, Parminder Singh, Gurpreet Kour Tulla and R.S.Grewal (2025).Trace mineral supplementation in cattle reduces somatic cell count: Evidence from farmer FIRST Programme. Indian Farming, 75(10): 73

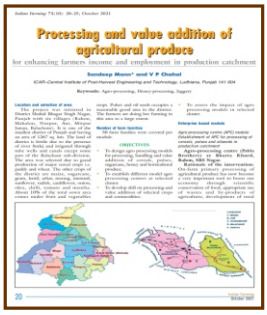
2. Gopika Talwar and Rekha Chawla (2025). From Dairy farming to dairy processing: A story of rural entrepreneurship. Indian Farming, 75(10): 79

Glimpses of Publications under the FFP













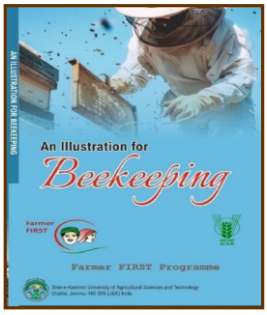






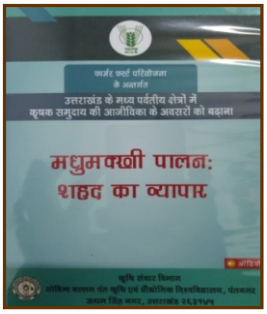














Media Coverage under the FFP



Section 6

Meeting on Farmers FIRST Programme (FFP) 2025–26

A meeting on the allocation and utilization of funds under the Farmers FIRST Programme (FFP) for the year 2025-26 was held on 16 October 2025 through e-mode (Zoom).

Proceedings and Action Points

During the session, the committee reviewed the operational guidelines and explicitly directed all participating centres to continue implementing their approved interventions. Emphasis was heavily placed on maximizing efficiency and maintaining a strict orientation toward concrete outcomes. Furthermore, the administration highlighted the necessity of financial discipline, ordering all centres to ensure the judicious use and 100% utilization of allocated funds in strict accordance with prescribed norms.

On the administrative and human resources front, a firm directive was issued regarding the staffing structure. To maintain fiscal control, all centres are mandated to freeze their existing workforce numbers, with no staff expansion permitted during the 2025-26 period. Personnel structures must strictly conform to one of two approved configurations: either one Field Assistant combined with one Senior Research Fellow (SRF), or two Field Assistants. Additionally, the committee stressed compliance with administrative timelines, requiring all centres to adhere strictly to scheduled reporting and documentation deadlines. A specific administrative note was directed at GBPUA&T, Pantnagar, which was instructed to significantly improve its reporting quality, guarantee timely submissions, and ensure that all future activities are clearly and distinctly marked within their official reports.

Budget Estimates and Reallocation Analysis for 2025-26

The committee also finalized the centre-wise Budget Estimates (BE) alongside the reallocated funds requested by the various institutions for the 2025-26 fiscal year. While the standard initial Budget Estimate was set uniformly at Rs. 9.00 Lakh for nearly all locations, several centres required upward financial adjustments to meet their operational demands. Specifically, GADVASU, Ludhiana received an increased reallocation of Rs. 9.40 Lakh against its original Rs. 9.00 Lakh estimate. Similarly, PAU, Ludhiana saw its budget adjusted slightly upward to Rs. 9.15 Lakh, and GBPUA&T, Pantnagar, which held a lower initial baseline estimate of Rs. 8.00 Lakh, was granted an increased reallocation of Rs. 8.40 Lakh. In contrast, the remaining institutions maintained flat funding with no changes between their initial estimates and final reallocations. CSKHPKV, Palampur, CIPHET, Ludhiana, and ICAR-IIS&WC, Dehradun all remained steadily fixed at their initial Rs. 9.00 Lakh allocations. SKUAST, Jammu similarly experienced no variance, with its financial plan holding firm at Rs. 9.00 Lakh for both the initial estimate and the final reallocated fund total.

The centre-wise Budget Estimates (BE) for 2025-26 and Reallocation of funds demanded by the centres are presented below:

S. No.	Component	BE 2025-26 (₹ Lakh)	Reallocation of funds (₹ Lakh)
1	GADVASU, Ludhiana	9.00	9.40
2	CSKHPKV, Palampur	9.00	9.00
3	PAU, Ludhiana	9.00	9.15
4	CIPHET, Ludhiana	9.00	9.00
5	GBPUA&T, Pantnagar	8.00	8.40
6	ICAR-IIS&WC, Dehradun	9.00	9.00
7	SKUAST, Jammu	9.00	9.00

Section 4

Annexures

Annexure - I

Center-wise details of FFP adopted villages

Name of FFP centre	Title of FFP project	Name of selected villages (District)	No. of farm adopted families	Location	
				Latitude (°N)	Longitude (°E)
GADVASU Ludhiana	Integrated approaches for livestock development: farmer's context	1. Mehal Kalan (Barnala)	354	30.5271	75.5684
		2. Hamidi (Barnala)	144	30.4665	75.6063
		3. Kalala (Barnala)	63	30.4952	75.5233
		4. Dhaner (Barnala)	64	30.5671	75.5117
		5. Chananwal (Barnala)	215	30.5050	75.4854
		6. Moom (Barnala)	122	30.5536	75.4913
		7. Pamal (Ludhiana)	12	30.8377	75.7390
		8. Qila Raipur (Ludhiana)	191	30.7620	75.8228
CSKHPKV, Palampur	Transfer of improved farm production technologies for enhancement of rural livelihood security amongst the farm households of Kangra district of Himachal Pradesh	1. Sagoor (Kangra)	95	32.0805	76.5255
		2. Khajura Basti (Kangra)	75	32.1109	76.5363
		3. Majherna (Kangra)	65	32.0411	76.6134
		4. Chakol Bedu (Kangra)	65	32.1000	76.5500
		5. Palampur (Kangra)	65	32.1109	76.5363
		6. Tara (Kangra)	75	32.0611	76.5200
		7. Chotpat (Kangra)	60	32.0900	76.2691
ICAR-CIPHET, Ludhiana	Processing and value addition of agricultural produce for enhancing farmers income and employment in production catchment	1. Bharta Khurd (SBS Nagar)	50	31.0653	76.0433
		2. Rahom (SBS Nagar)	25	31.0521	76.0703
		3. Dharamkot (SBS Nagar)	20	31.0904	76.0868
		4. Balachour (SBS Nagar)	25	31.0579	76.3000
		5. Raikot (Ludhiana)	50	30.6535	75.5917
		6. Bandi (Bathinda)	20	30.0409	74.8251
		7. Dhuri (Sangrur)	20	30.3751	75.8730
		8. Kandhargarh (Sangrur)	20	30.3850	75.8810
		9. Abohar	20	30.1470	74.1944
		10. Gagga (Patiala)	20	30.1066	76.1368
PAU, Ludhiana	Technology application and upscaling for sustaining natural resources and augmenting farm income: farmers led market linked approach	1. Bhojowali (Sangrur)	310	30.0709	75.8830
		2. Bhadalwadh (Sangrur)	310	30.1079	75.9156
		3. Kila Raipur (Ludhiana)	310	30.7620	75.8228
SKUAST, Jammu	Exploring economic opportunities for farmers of kandi villages through application of proven rainfed technologies	1. Nagrota	105	32.6220	75.0869
		2. KVK Jammu	36	32.6467	75.1316
		3. Anandpur	135	32.5873	75.1243
		4. Sarmal	87	32.5774	75.1181
		5. SKUAST-J	29	32.7477	75.0390

Name of FFP centre	Title of FFP project	Name of selected villages (District)	No. of farm adopted families	Location	
				Latitude (°N)	Longitude (°E)
ICAR-IISWC, Dehradun	Farmer participatory technology application for sustainable resource management and livelihood security in North-Western Himalaya	1. Godisera (Dehradun) 2. Koti Machyak (Dehradun) 3 Chakrta (Dehradun)	167 175 275	30.6083 30.2577 30.2512	77.7810 78.2391 78.1687
GBPUA&T, Pantnagar	Enhancing livelihood opportunities of farming community in mid-hills of Uttarakhand	1. Jeoli (Nainital) 2. Syalikhet (Nainital) 3. Dogra (Nainital)	230 87 183	29.3344 29.5565 29.3226	79.5164 79.4562 79.5217

Annexure - II

Centre-wise details of Principal Investigators under FFP

Sl. No.	FFP Centre	Name of PI	Contact No.	E-mail Id
1.	GADVASU, Ludhiana	Dr. Parminder Singh	98728-21140	pmschawla@gmail.com
2.	CSKHPKV, Palampur	Dr. D R Chaudhary	82194-52084 94598-34160	drc_dee@rediffmail.com
3.	ICAR-CIPHET, Ludhiana	Dr. Sandeep Mann	94630-43396	sandeep_mann76@yahoo.com
4.	PAU, Ludhiana	Dr. Kuldeep Singh	98889-00329	pandhu-65@pau.edu
5.	SKUAST, Jammu	Dr. Rakesh Sharma	70062-16962	sharmar1975@gmail.com
6.	ICAR-IISWC, Dehradun	Dr. Bankey Bihari	94589-75199	biharibankey_bankey@yahoo.co.in
7.	GBPUA&T, Pantnagar	Dr. M.A. Ansari	94111-95410	maansari.aac@gbpuat.ac.in

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
कृषि अनुसन्धान भवन -1, पूसा, नई दिल्ली-110 012
Krishi Anusandhan Bhawan-I, Pusa, New Delhi-110012

F.No. A.Extn. 9/24/2022-AE-II Dated 21st November 2025

ORDER

In supersession to the earlier order of even number dated 23 October 2025, the Revised Estimate for the year 2025-26 for "Farmers FIRST Programme (FFP)" & break-up of funds to eleven ICAR-ATARIs for this project under the Head GIA-General under the Scheme component for the year 2025-26 as per the break up given here under:

Name of ATARI	Other than NEH, TSP, SCSP			NEH			TSP			Grand total		
	Capital	General	Total	Capital	General	Total	Capital	General	Total	Capital	General	Total
ATARI, Zone I	0.00	73.00	73.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73.00	73.00
ATARI, Zone II	0.00	68.00	68.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	68.00	68.00
ATARI, Zone III	0.00	80.00	80.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.00	80.00
ATARI, Zone IV	0.00	35.00	35.00	0.00	0.00	0.00	3.00	3.00	6.00	3.00	38.00	41.00
ATARI, Zone V	0.00	48.00	48.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.00	48.00
ATARI, Zone VI	0.00	5.00	5.00	11.00	7.00	18.00	0.00	0.00	0.00	11.00	12.00	23.00
ATARI, Zone VII	0.00	0.00	0.00	22.00	13.00	35.00	0.00	18.00	18.00	22.00	31.00	53.00
ATARI, Zone VIII	0.00	26.00	26.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.00	26.00
ATARI, Zone IX	0.00	49.00	49.00	0.00	0.00	0.00	13.00	12.00	25.00	13.00	61.00	74.00
ATARI, Zone X	0.00	70.00	70.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.00	70.00
ATARI, Zone XI	0.00	48.00	48.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.00	48.00
Total	**0.00**	**502.00**	**502.00**	**33.00**	**20.00**	**53.00**	**16.00**	**33.00**	**49.00**	**49.00**	**555.00**	**604.00**

(Rs. in lakhs)

The expenditure of **Rs. 6,04,00,000/-** (Rupees Six Crores Four Lakhs Only) in r/o ATARIs is debitable to the Farmers FIRST component of KVK Scheme for the financial year 2025-26.

This issues with the approval of Competent Authority, ICAR.

21.11.25

(Vijay Kumar)
Under Secretary (AE-I)

Distribution:

1. Budget Section, ICAR, Krishi Bhawan, New Delhi with a request to release the funds as indicated above to 11 ATARIs
2. Directors, All ATARIs (Zone I to Zone XI) for their kind information
3. PS to DDG (AE) for kind information of DDG (AE)
4. Dr. Rajarshi Roy Burman, ADG (AE)
5. PS to Director (AE)/ Deputy Secretary (AE)
6. Director (Finance), ICAR, Krishi Bhavan, New Delhi
7. Deputy Director (Budget), ICAR, Krishi Bhavan, New Delhi
8. Section AE-II/AE-III/Guard File

भारतीय कृषि अनुसंधान परिषद
कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान
क्षेत्र-१ पं. कृ. वि. परिसर, लुधियाना-१४१००४
Indian Council of Agricultural Research
Agricultural Technology Application Research Institute
Zone-I, PAU Campus, Ludhiana- 141004
Tel. : (O) 2401092, 2401018; Fax : 0161-2412719
Email: zcu1ldh@gmail.com; Website: www.zpdzone1.org

F. No. 6(145)/ATARI/FFP/2025/ 5759-5781 **Date: 18.12.2025**

To

The FFP Centres
Directors: ICAR-IISWC, Dehradun; ICAR-CIPHET, Ludhiana
Director of Extension Education: PAU, Ludhiana; GADVASU, Ludhiana; CSKHPKV, Palampur; SKUAST-Jammu; GBPUAT, Pantnagar

Subject: Revised Estimate (RE) for 2025-26 under the Farmer FIRST Programme (FFP) – reg.

Sir,

The competent authority has been pleased to approve the sanction of the Revised Estimates (RE) for the Farmer FIRST Programme (FFP) projects, as demanded by the respective centres. The budget under the General Head includes expenditure on TA, HRD, R&O, and Administrative Expenses. The centre-wise Revised Estimates (RE) for the year 2025-26 is presented below:

(Amount in Rs. Lakh)

S. No.	FFP centres	RE (General Head) 2025-26
1	GADVASU, Ludhiana	9.40
2	CSKHPKV, Palampur	9.00
3	PAU, Ludhiana	9.15
4	CIPHET Ludhiana	9.00
5	GBPUA&T Pantnagar	8.40
6	ICAR-IIS&WC, Dehradun	9.00
7	SKUAST, Jammu	9.00
	ICAR-ATARI, Ludhiana	10.05
	Total	**73.00**

(Ashish Santosh Murai)
Sr. Scientist & Nodal Officer (FFP)

Copy to:

1. AF&AO, ICAR-ATARI, Ludhiana
2. AAO, ICAR-ATARI, Ludhiana
3. The PI (FFP), PAU, Ludhiana; GADVASU, Ludhiana; CSKHPKV, Palampur SKUAST-Jammu; GBPUAT, Pantnagar, ICAR-IISWC, Dehradun; ICAR-CIPHET, Ludhiana
4. The Comptroller, PAU, Ludhiana; GADVASU, Ludhiana; CSKHPKV, Palampur SKUAST-Jammu; GBPUAT, Pantnagar
5. The F&AO, ICAR-IISWC, Dehradun; ICAR-CIPHET, Ludhiana

GFR 12-A

[(See Rule 238 (1)]

FORM OF UTILIZATION CERTIFICATE
FOR AUTONOMOUS BODIES OF THE GRANTEE ORGANISATION

AUDIT UTILIZATION CERTIFIATE FOR THE YEAR 2025-26 in respect of recurring/non-recurring GRANTS-IN-AID/SALARIES/CREATION OF CAPITAL ASSETS

1. Name of the scheme: **Farmer FIRST Programme (FFP) in respect of ICAR-ATARI, Zone-I, Ludhiana**
2. Whether recurring or non-recurring grants : Both
3. Grants position at the beginning of the Financial year :
   - (i) Cash in Bank **Rs. 53143**
   - (ii) Unadjusted advances -
   - (iii) Total **Rs. 53143**
4. Details of grants received , expenditure incurred and closing balances:(Actuals)

Unspent Balances of Grants received years [figure as at Sl. No. 3 (iii)]	Interest Earned thereon	Interest deposited back to the Government	Grant received during the year			Total Available funds (1+2-3+4)	Expenditure incurred	Refund to the council	Closing Balances (5-6-7)
1	2	3	4			5	6	7	8
-	-	-	Sanction No.(i)	Date (ii)	Amount (iii)	-	-	-	-
53143	-	-	A.Extn.9/24/2022-AE-II	21.11.2025	7300000	7353143	7299500	53143	500 -67(lapsed in TSA) =433

So the closing balance as on 31.03.2026 is Rs. 433/- lying with the Host Institutions.

Component wise utilization of grants:

Grant-in-General	Grant-in-aid-salary	Grant-in-aid-creation of capital assets	Total
7299500	--	--	**7299500**

Details of grants position at the end of the year

i. Cash in Bank **Rs. 433/-** lying with Host Institutions
ii. Unadjusted Advances -
iii. Total **Rs. 433/-**

23/06/2026
ASHISH SANTOSH MURAI
Scientist (AE)
Indian Council of Agricultural Research
Agricultural Technology Application
Research Institute, Zone-1
PAU Campus, Ludhiana-141004

25/6/26
प्रमोद शर्मा / PERMOD SHARMA
वित्त एवं लेखा अधिकारी
Finance & Accounts Officer
भारतीय कृषि अनुसंधान परिषद
Indian Council of Agricultural Research
कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान
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Zone-1, PAU Campus, Ludhiana-141004

23.6.26
निदेशक / Director
भा.कृ.अनु.प.-कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान
ICAR-Agricultural Technology Application Research Institute
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Zone-1, PAU Campus, Ludhiana-141004, Punjab

Certified that I have satisfied myself that the conditions on which grants were sanctioned have been duly fulfilled/are being fulfilled and that I have exercised following checks to see that the money has been actually utilized for the purpose for which it was sanctioned:

i. The main accounts and other subsidiary accounts and registers (including assets registers) are maintained as prescribed in the relevant Act/Rules/Standing instructions (mention the Act/Rules) and have been duly audited by designated auditors. The figures depicted above tally with the audited figures mentioned in financial statements/accounts.

ii. There exist internal controls for safeguarding public funds/assets, watching outcomes and achievements of physical targets against the financial inputs, ensuring quality in asset creation etc. & the periodic evaluation of internal controls is exercised to ensure their effectiveness.

iii. To the best of our knowledge and belief, no transactions have been entered that are in violations of relevant Act/Rules/Standing instructions and scheme guidelines.

iv. The responsibilities among the key functionaries for execution of the scheme have been assigned in clear terms and are not general in nature.

v. The benefits were extended to the intended beneficiaries and only such areas/districts were covered where the scheme was intended to operate.

vi. The expenditure on various components of the scheme was in the proportions authorized as per the scheme guidelines and terms and conditions of the grants-in-aid.

vii. It has been ensured that the physical and financial performance under **Farmer FIRST Programme (FFP) for the year 2025-26** (as per submitted by FFP centers) has been according to the requirements, as prescribed in the guidelines issued by Govt. of India and the performance/targets achieved statement for the year to which the utilization of the fund resulted in outcomes given at Annexure-I duly enclosed.

viii. The utilization of the fund resulted in outcomes given at Annexure-II duly enclosed (to be formulated by the Ministry/Department concerned as per their requirements/specifications.)

ix. Details of various schemes executed by the agency through grants-in-aid received from the same Ministry or from other Ministries are enclosed at Annexure-II (to be formulated by the Ministry/Department concerned as per their requirements/specifications).

On the basis of AUCs submitted by the Host Institutions.

23/06/2026

Nodal Officer FFP

ASHISH SANTOSH MURAI
Scientist (AE)
Indian Council of Agricultural Research
Agricultural Technology Application
Research Institute, Zone-1
PAU Campus, Ludhiana-141004

23/6/26

Finance & Accounts Officer

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23.6.26

Director

निदेशक/Director
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Zone-1, PAU Campus, Ludhiana-141004, Punjab

Details of FFP centre wise budget utilisation under Farmer FIRST Programme for the year 2025-26 in respect of Zone-I

Amount in Rupees

S. No.	Institute/ University	Opening balance as on 01.04.2025	Revised Estimate 2025-26	Funds received during 2025-26	Expenditure during 2025-26	Closing Balance as on 31.03.2026	Lapsed	Net Balance
1	GADVASU Ludhiana	0	940000	940000	940000	0	0	0
2	CSK HPKV Palampur	50	900000	899950	900000	0	0	0
3	PAU Ludhiana	19085	915000	895915	914989	11	0	11
4	ICAR-CIPHET Ludhiana	0	900000	900000	899933	67	67	0
5	GBPUA&T Pantnagar	29331	840000	810669	840000	0	0	0
6	ICAR-IIS&WC Dehradun	3011	900000	896989	900000	0	0	0
7	SKUAST Jammu	1666	900000	898334	899578	422	0	422
	ICAR-ATARI, Ludhiana	0	1005000	1005000	1005000	0	0	0
	Total	**53143**	**7300000**	**7246857**	**7299500**	**500**	**67**	**433**

The closing balance as on 31.03.2026 is Rs. 433/- lying with the Host Institutions.

23/07/2026

Nodal Officer FFP

ASHISH SANTOSH MURAI
Scientist (AE)
Indian Council of Agricultural Research
Agricultural Technology Application
Research Institute, Zone-1
PAU Campus, Ludhiana-141004

23/6/26

Finance & Accounts Officer

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Director

निदेशक/Director
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NOTES

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