

Economic, social and behavioral development of farmers through Farmer FIRST Programme in Punjab

Kuldeep Singh*, Pankaj Kumar, Vajinder Pal Kalra and Dalbeer Singh

Punjab Agricultural University, Ludhiana, Punjab 141 027

Unsustainable agricultural practices by the farmers are causing various environmental and economic challenges leads to plight of the farmers in Punjab. In this scenario, Farmer FIRST Programme, an initiative by ICAR became a foundation for revival. Scientists from Punjab Agricultural University, Ludhiana, Punjab introduced the farmers with various sustainable and income augmenting agricultural technologies in adopted villages. With the successful operation of the project in Sangrur (Punjab) since 2016–17, farmers have been oriented towards sustainable practices, viz. short-duration varieties of rice, direct seeded rice, in situ management of paddy stubbles, cultivation of chickpea, rapeseed, moong, mushroom, beekeeping, value-addition and livestock rearing. It resulted into the decrease in cost of cultivation and augmentation in income along with the natural resource management.

Keywords: Diversification, Impact, Sustainable, Technology upscaling

THE farming sector of Punjab is facing various challenges such as decline in total factor productivity, overuse of inputs, degradation of natural resources and decline in ground water table etc. It necessitated the introduction of a specific policy intervention to address various challenges through a grounded methodology. In this regard, Farmer FIRST Programme (FFP) entitled “Technology application and upscaling for sustaining natural resources and augmenting farm income: Farmers led market-linked approach” was initiated in Punjab (Chatha Nanhera and Tranji Khera villages of Sangrur) with the objectives to test and upscale suitable

technologies through farmer-scientist interface and building the capacity of farmers and farmwomen for income enhancement.

Pusa 44, a resource depleting variety of paddy was prevalent in the villages and 100% of the paddy residue was under burning practice. Most of the farmers were dependent on market for their home consumption food items such as rapeseed oil, vegetables and pulses. Non-farming families were dependent on labour work for subsistence and used to think labour work as the only option of livelihood.



Field Day on resource management, oilseed and pulses



Protected cultivation of vegetable under FFP

Table 1. Frontline demonstrations conducted under FFP from 2017–18 to 2021–22

Module	FLD	2017–18	2018–19	2019–20	2020–21	2021–22
Natural resource management	Short-duration varieties of rice	300	300	300	300	300
	Direct-seeded rice	50	50	50	100	50
	PAU Happy seeder for wheat sowing	200	200	200	300	100
	Soil test based nutrient application	400				
	Drip irrigated sugarcane with onion as intercrop	2	2	2	4	
	Green manuring			50	50	20
Diversification	Summer moongbean in rice-wheat system	100	100	100		
	Rapeseed (<i>gobhi sarson</i>)	70	70	70	75	50
	Chickpea	50	50	50	50	50
Vegetable crops	Vegetable varieties/hybrids	60	60	60	60	40
	Low tunnel cultivation of vegetables	40	40	40	40	40
Value-addition	Primary processing unit for oilseeds, pulses and vegetables; mini spice grinder	400	400	400	400	400
Subsidiary enterprise	Beekeeping	10	10	10	10	10
	Mushroom production	40	40	40	40	20
Livestock based modules	Deworming and feeding of mineral mixture	50	50	50	50	50
	Goat rearing	4	4	4	4	4
	Prevention and control of mastitis		50	50	50	50

Intervention

FFP team brainstormed and identified various technological, behavioural problems and planned various interventions as given in Table 1.

Technology upscaling under FFP

Natural Resource Management module: Scientists from Punjab Agricultural University introduced the short-duration varieties of rice, viz. PR 121, PR 122, PR 126 to the project villages and conducted 1500 demonstrations from 2017–18 to 2021–22 in the farmers' fields. Farmers were so much convinced with the benefits of the short-duration varieties that currently more than 80% area of the adopted villages is under cultivation of these varieties, which was earlier about zero. Cost of cultivation for paddy reduced up to ₹3000–6000/ha lead to increase in the net profit of about ₹6900–8700/ha along with huge amount of water saving with this intervention (Table 2). Further farmers were made aware about a novel technology, "Direct seeded Rice". In the case of direct seeded rice also, the efforts resulted into the significant adoption of this technology. Data showed that farmers saved about ₹7000–7800/ha with this technology, and earned ₹5600–8800/ha more than the transplanted rice.

To curb the practice of residue burning, farmers were convinced to adopt Happy (Seeder/Super Seeder/Smart) Seeder technology for *in situ* management of paddy stubbles. A total of 1000 demonstration has been conducted in the adopted villages of this technology from 2017–18 to 2021–22. With the continuous efforts of project team, currently more than 75% of the area in these villages is burning free. Farmers quoted that they are saving about ₹4200–6500 of cost and fetching about ₹5400–8800 more net returns.

Table 2. Average B:C ratio of various interentions under FFP over the years (2017-22)

Intervention	Demonstration plot	Check plot
Short-duration varieties of rice	3.07	2.67
Direct-seeded rice	4.20	3.22
PAU Happy Seeder for wheat sowing	3.50	2.64
Drip irrigated sugarcane with onion as intercrop	4.84	-
Green manuring	3.35	3.24
Summer moongbean in rice-wheat system	2.02	1.63
Chickpea	2.50	1.97
Rapeseed (<i>gobhi sarson</i>)	3.64	2.60
Pea	2.47	2.12
Cucumber	3.16	6.05
Capsicum	2.26	1.95
Bottle guard	4.36	-
Tomato	3.83	3.76
Chilli	2.84	2.70
Muskmelon	3.15	2.13
Brinjal	3.11	1.74
Onion	3.49	2.72
Beekeeping	2.77	
Mushroom cultivation	1.71	
Deworming and feeding of mineral mixture	1.26	
Prevention and control of mastitis	1.09	



Farmers' Fair organized at adopted village Chatha Nanhera



A glimpse of village information center set up at project village

Diversification module: Rapeseed oil is the daily use commodity in the household and has a regular demand in the market, so from 2017–18 to 2021–22, cultivation of canola quality rapeseed (*Gobhi sarson*) variety GSC 7 was promoted through 335 demonstrations. The average yield of variety (GSC 7) was found to be 20.00–21.85 q/ha. Farmers revealed that it has given almost equal returns as compared with wheat. Further, in the span of 5 years, 500 demonstrations of high yielding varieties of pulses (moongbean and chickpea) were conducted in the farmers' field. Farmers earned a good amount (₹38000 and ₹94725 for moongbean and chickpea, respectively) from these crops along with the soil health benefits.

Vegetable crops module: The vegetable cultivation was identified as the potential solution for the farmers for generation of remunerative income along with the employment generation. Thus, 640 demonstrations of the high yielding varieties/hybrids and 200 demonstrations of low-tunnel cultivation of vegetables were conducted. Due to continuous efforts of project team, currently more than 40 farmers are doing vegetable cultivation successfully. From 1 ha vegetable cultivation area, farmers are earning about ₹2.33 lakh from chilli, 4 lakh from brinjal, 7.71 lakh from muskmelon, 3.59 lakh from peas, 2.83 lakh from onion and 3.84 lakh from tomato cultivation on an average. There are about 20 farmers in both of the villages that are practising early cultivation of vegetables under low-tunnel technology successfully. S. Hakam Singh of village Taranji Khera has also received "Innovative Farmer Award" from NAARM, Hyderabad for innovating intercropping of brinjal with cucumber under low-tunnel technology. Vinder Singh from Chatha Nanhera and his brothers have been honoured with the reputed Awards at the Kisan Melas and agricultural diversification award. Further 7 innovations of different vegetable growers were documented in the book "Inspire, Innovate and Change: Field Innovations of Farmer FIRST Project".

Value-addition module: Efforts were made to enhance the capacity of the farmers from the producer to processor and entrepreneur. So primary processing unit was set up in the project villages for oilseeds, pulses and vegetables for operations such as cleaning, grading,

grinding, oil expression and packaging of farm produce produced at the farm level within the village. A number of the farmers got benefited from the processing unit for household and market use.

Subsidiary occupations related module: Pluriactivity is continuously suggested by policymakers to enhance the income and uplift the livelihood of farmers. So, during 2016–17, 55 farmers and farm-women from both villages were trained in mushroom cultivation. At present, 20 farmers are fully engaged with the mushroom cultivation and out of them 10 farmers are practising this enterprise at commercial level. It was reported that farmers obtained an average yield of 2032 kg/unit of mushroom production and sold their produce in the nearby cities' markets lead to the gross returns of about ₹178800/unit during 2021–22. Further, farmers were appraised to adopt the beekeeping. The trainees were provided with hands-on practice on management of honey bee colonies during different seasons, management of bee diseases and enemies, extraction of honey and purification of bee-wax. As a result, 13 farmers adopted this enterprise for additional income. Most (87%) of the beekeepers were able to multiply their bee stock. Farmers obtained about 22.5 kg/box honey and fetched price as good as ₹300/kg of honey.

Livestock-based module: In the project, farmers were trained regarding the deworming of animals and feeding with mineral mixture to increase the milk productivity of the animals and resulted into an increase up to 9.25–10.0% in milk production. The post teat dip solution was used to prevent the mastitis in the dairy animals. It was found that milk production of the animals increased up to 20.83% after the treatment. With the intention of income enhancement and nutritional security, 4 landless families were identified and provided with 5 goat kids each during 2017–18. At present three units are working very successfully and average number of animals is increased to 25 goats/unit resulted into improved economic status of the families.

Farmer-scientist interface

The farmer FIRST Programme is planned with the focus of enabling involvement of researchers for

continuous interaction with farm conditions, problem orientation, and exchange of knowledge between farmers and other stakeholders. With this agenda in priority, various extension activities have been conducted for the capacity building of the farmers and farm-women in the project. In total about, 104 training programmes, 293 field visits, 181 group meetings, 14 campaigns, 97 method demonstrations were conducted in the project areas regarding as per the need of farmers. Farmers' Fairs were organized during each season to facilitate the interaction of farmers with scientists and other successful farmers and village information centers has been set up in the villages to make them a knowledge hub.

Farmer-led extension

Capacity building of farmers has been carried out for imparting leadership development at regular intervals to develop the farmer-to-farmer extension model, resulted in the form of opinion leaders from the project villages for different enterprises. Vinder Singh of the village Chatha Nanhera and Hakam Singh of village Tranji Khera convinced various farmers to opt vegetable cultivation using scientific and advanced practices. They said that providing guidance to other farmers regarding vegetable cultivation became a part of their daily routine. Another farmer, Dara Singh exhibited that he received about 200 phone calls from the other farmers to enquire about the mushroom cultivation during 2021–22. He visited 25 mushroom farmers to guide them regarding mushroom cultivation and guided various other farmers through social media platforms. Nirbhai Singh, who owns more than 100 honey bee boxes adopted the migratory practices and guides other farmers regarding migratory practices and sometime migrate the bee-boxes of other farmers to suitable places. Thus, these farmers are popularizing these enterprises through the farmer-to-farmer extension model.

SUMMARY

Farmer FIRST Programme was initiated by ICAR to uplift the farmers' livelihood as a novel grassroots methodology. In Punjab, it was started in the Chatha Nanhera and Taranji Khera villages of Sangrur to tackle the various farming issues through natural resource management, diversification, introduction of high yielding vegetable varieties, value-addition, subsidiary occupations and livestock-based modules. Benchmark surveys had revealed that farmers in the adopted villages indulged in resource-depleting farming practices so FFP team brainstormed and identified various technological, behavioural problems and planned interventions accordingly. For technology upscaling in the project villages, scientist from Punjab Agricultural University laid various frontline demonstrations resulted into better natural resource management, diversification and income enhancement of the farmers. The continuous farmer-scientist interface through trainings, group meeting, campaigns, field visits, and farmers' fairs was maintained to popularize these technologies/practices among the farmers. Further, farmer-to-farmers extension model has been developed in the villages through behavioural training of the farmers and these opinion leaders are extending the knowledge to other large number of farmers. To summarize, it can be said that FFP worked as a path breaking programme in Sangrur (Punjab) to uplift the livelihood of farmers through its novel methodology. It enabled the farmers to think and do beyond the conventional practices and changed the perspective of farming in their minds.

*Corresponding author's e-mail: hodee@pau.edu

Impact assessment of “Low Tunnel Technology” of vegetable cultivation during off season

An intensive survey was conducted in Jaipur bypass, Pemasar village, Jaipur road, Narangdesar, Sagar, Raysar, Ridmalsar, Napasar, Gardwala, Kilchu, Kalyansar, Gigasar, Ambasar, Sujasar, Palana, Swarupsar, Kolsar, Bachhasar, Meghasar, Naiyo ki Bast, Jaisalmer bypass, Ganganagr Highway, Khara, Sarahkunjiya villages and surrounding areas of Bikaner in Bikaner district to collect basic data/information about the impact of adoption of “Low Tunnel Technologies” for cultivation of vegetables during off season (winter). The study revealed that the local farmers grow various vegetables (specially cucurbits) under “Low Tunnel Technologies (LTT)” during the winter for advance production to fetch more price and earning from the vegetable market/*Mandies*. “Low Tunnel Technologies (LTT)” for vegetable production has spread over 1,200 ha in Bikaner, Rajasthan and farmers get/earn ₹ 2–3 lakh net profit from one ha of land per season depending on type of vegetable, seed quality, climatic conditions, marketing demand etc.

Source : ICAR Annual Report 2021-22