

Capacity building of resource-poor farmers

in paddy-wheat cum dairy production systems through Farmer FIRST Programme under irrigated agro-eco region of Haryana

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Location and selection of area

Five villages of Karnal district of Haryana state.

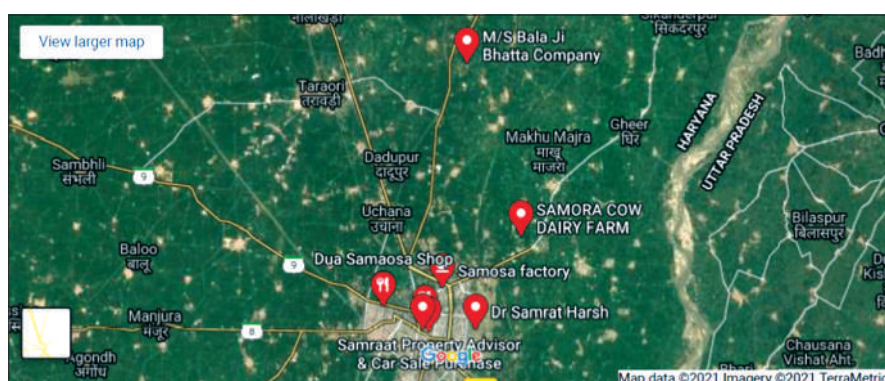
Number of farm families: 1156 households in the selected five villages.

A cluster of villages namely, Kamalpur Roran, Garhi Gujran, Nagala Roran, Churni, and Samoura from Karnal district were selected. More than 1000 farm families from different socio-economic groups which were practicing paddy-wheat cum dairy production system, were selected purposively as it is in the vicinity of ICAR-NDRI. The farmers of the project were resource-poor who are having operational land holding up to 2 ha and keeping up to 5 dairy animals.

OBJECTIVES

The Farmer FIRST Programme at ICAR-NDRI, Karnal aimed:

- To prioritize the identified problems faced by farmers in production, processing, and marketing.
- To develop extension strategy-oriented action plan through Participatory Learning and Action (PLA) with the stakeholders to formulate suitable research modules to lessen the intensity of identified problems.
- To evaluate, refine and disseminate resource conservation technologies for sustainable crop production and dairy farming.
- Capacity building of farmers for value chain development and management.



Map of cluster of villages

- Implementation of entrepreneurship modules in selected villages to generate income and employment.
- Development of SMS portal for speedy dissemination of technologies and information among the farmers.
- To assess the socio-economic impact of the technological interventions for different farm production system and identify the issues for futuristic research.

INTERVENTIONS

Interventions under this project were based on the enterprise based module.

Dairy enterprise-based module

Intervention and its rationale: Dairy based intervention was undertaken for the development of sustainable and viable scientific dairy farming units for employment and income generation among rural youth. The necessary input, information, technical help, and

capacity-building program were carried out under the Project.

Beneficiaries were provided training at ICAR-National Dairy Research Institute on scientific dairy farming (feeding, housing, health care, breeding, milling, etc.), milk and milk products processing, seed production, and marketing of milk and milch animals, to promote and assist stakeholders in the dairy value chain. Mr. Surender Singh is a beneficiary of the FFP project since 2018 and provides various inputs under FFP project intervention.

Training

Under the programme, ICAR-NDRI imparted various training programs to the participatory farmers on skill development aspects, viz. scientific cultivation of wheat, rice, vegetables, and other crops; Scientific dairy farming practices; Seed production technology; Value addition and post-harvesting technology related to milk.

Impact

Economic impact

Economic impact of the project is given in Table 1.

Social impact

There is a positive impact of FFP among the farmers of five villages of the project. Farmers of the project area, influenced their fellow farmers of their village and also their neighboring villages. Some perceived social impact of farmer are given in Table 2.

- Farmer was getting better price of milk which enhanced his annual dairy farming income due to technological advancement and improving his overall living standard.
- The total annual income of the farmer from agriculture increased.
- Availability of milk and milk products at the village level enhanced that improved the nutrition status of the farmer families.
- The level of education, house, food, and health security of farmer improved.
- Income and employment generation in dairy farming for the unemployed youth of the villages increased.
- Linkage with different institutes

Table 1. Economic impact of the FFP project (Before and after situation)

Particulars	Before joining the project	After joining the project
<i>Land (ha)</i>		
Own land	0.6070	1.2140
Leased land	0.4046	1.6187
<i>Crop yield (q/ha)</i>		
Wheat	20.5	26.7
Rice	18.5	22.1
Herd size (Number)	15 Milch animal	26 Milch animal
<i>Milk production (l/animal/day)</i>		
Cow	9.10	12.10
Buffalo	11 l	13.05
<i>Milk price (₹/l)</i>		
Cow	25	35-38
Buffalo	40	45-50
Income from dairy (₹)	55,000-65000	1.75
Agriculture (Lakh/year)	₹ 2.5	₹ 3.2
Total income (Lakh/year)	₹ 2.95	₹ 4.95

and dairy entrepreneurs was created which benefited the farmer.

- The social status of farmer also enhanced in project area.

Lessons learnt

- Lack of quality input availability and timely veterinary services at the village level.
- Inadequate marketing link and

lack of knowledge about value-added products and interest and poor technical knowledge about scientific dairy farming among farmers.

- Lack of adoption of scientific dairy farming practices and even it is not affordable/suitable for resource poor farmers.
- Low productivity of dairy animals.
- Repeat breeding and late maturity are the serious problems in dairy animals.
- Unremunerated price of raw milk at the market as middlemen take major advantages.
- Lack of knowledge to prepare a viable business plan for dairy enterprise establishment.
- High cost of inputs and inadequate availability of finance among farmers for the establishment of the commercial dairy farm especially for the resource poor farmers.

Way forward

- Training of scientific dairy farming practices to needed and interested farmers would be an important intervention.
- Collective action approaches like SHG, cooperative, and farmer producer companies would be a solution for solving problems like

Shri Surender Singh, 37-year-old, from Samora village, District Karnal undertook scientific dairy farming practices having 26 milch animals (cow, buffalo) and earned 1.5-2.00 lakh annually from dairy. He also had 1.21 ha land and growing wheat, rice, and fodder and earned around 3.4 lakh/annually (2017-18 and 2018-19).



Table 2. Perceived impact of the intervention by farmer

Particular	Perceived impact
Mineral mixture supplements	- Milk production of animals enhanced (500-750 ml/animal) - Reproductive and normal health of animals improved - Conception rate increase - Number of AI decreases (the problem of repeat breeding solved)
Bypass fat	- Milk production of animals enhanced (1-1.5 litres/animal) - Fat and SNF content in milk increased
Balance feeding ration	- Milk production of animals enhanced (200-250 ml/animals) - Cost of feeding reduced - Feed quality increased - Animal feed according to choice and available material at the household level - Added extra feed material like vitamins, minerals, etc. in feed during the manufacturing process of feed at home
Training on capacity building in dairy and crop production	- Knowledge of beneficiaries about scientific dairy farming practices enhanced - Change in attitude and skill of farmers regarding dairy farming - Training of seed production help farmer to produce their own seed and also help to share produced seed to other farmers on reasonable rate
Seed of wheat and fodder crop	- DBW-187 (high yielding) wheat variety given to farmer which enhanced the wheat production per hectare (5-7 q/ha) - Quality fodder seed was given to farmers which make availability of fodder round the year for the animals. It also enhanced the fodder production per hectare



eliminating middlemen from the value chain, marketing and value addition.

- If the scientific dairy farming unit has become sustainable and viable; the percentage of the unemployment can reduce and the income of the farmers can be enhanced.
- Mineral mixture, anionic supplementation, bypass fat, etc. will be an important intervention for improvement of animal reproductive and milk production of animals.
- Indigenous cattle is more sustainable for dairy farming in Indian climatic conditions but the productivity of these animals is low. So, there is a need to improve local breeds through artificial insemination and the need to provide wide network to enhance the adoption rate of AI at the field level amongst farmers.

Custom hiring centre for natural resource management

Intervention: Establishment of Custom Hiring Centre under Farmer FIRST Programme, ICAR-NDRI Karnal at Kamalpur village.

Rationale of the intervention: Stable burning is one of the major problems in the rice-grown belt in Punjab and Haryana. The main reason for paddy (rice crop) stubble burning is the shortage of number of days between rice harvesting and sowing of wheat; a delay in sowing wheat adversely affects the production. As a result, farmers get less than 20-25 days between two crops. Hence they felt that quickest

and easiest solution is to burn the crop residue in the field. This is unlikely to contain stubble burning in both the states. Adoption of various techniques and equipment to avoid stubble burning like direct seeding of wheat without removing paddy stubble, by using happy seeders and cutting and mixing paddy stubble with soil using rotavators and mulchers, etc. could be a possible solution of stable burning. In this case, there is always a shortage of equipment, especially for small and marginal farmers. Most of the small and marginal farmers were not able to afford these farm machinery or other equipment; this leads to many problems in farming to the adoption of advanced technology for avoiding stable burning. After analyzing all the problems faced by the farmers, the

Shri Anil Kumar, 39-year-old, from Kamalpur village, District Karnal establish custom hiring centre earned ₹ 2-2.50 lakh annually from the centre. He also has 1-hectare land and growing wheat, rice, and fodder and earned around ₹ 4.4 lakh per annum (2017-18 and 2018-19).



project team identified the need and requirements of the farmers. For this, the FFP established an office cum Custom Hiring Centre in 2018 and rendered different types of equipment and farm machinery. The Custom Hiring Centre is run by the FFP farmers themselves by appointing the office bearers. Through this, the farmer can hire a power tiller, water pump, etc. for use at their field by paying some amount fixed by the farmers themselves. Earlier, they hired and used from another source which they spent more hiring cost. Now, farmers are using farm machinery and other equipment on minimum charges.

Motivational factor behind establishment of CHC: Shri Anil Kumar of Kamalpur village, Karnal district established a society with 10 members and opened a custom hiring business centre in May 2018 with an investment of ₹ 15.18 lakh. Custom hiring centres (CHCs) for farm implements successfully empower farmers to tide over the shortage of labour and improve the efficiency of agricultural operations as well as solve the stable burning problem in cluster of villages. Society and its associated members are responsible to manage the custom hiring centre at the village level. The rates for hiring the implements are decided by the society and the society uses the revenue generated from hiring charges for repair and maintenance of the implements and the remaining amount goes to society members as benefit and they also use this money to purchase new implements for increasing the size of CHC. Presently,

there are 27 different types of farm machinery stocked in CHC, the number of implements and hiring rates are given in Table 3.

Outcome

- The custom hiring centre besides working in 5 cluster villages also covered surrounding villages and supplied implements on rent to farmers.
- The custom hiring centre is now employing 15 youth directly in the village.
- The farmer of the village opted for conservation agriculture and avoid stable burning in CHC cluster areas. The farmers become aware of the drawbacks of stable burning and the adoption rate of conservation agriculture practices is enhanced. Farmers reported that due to the establishment of CHC in village, farm operation become easier, timely availability of implements and able to complete

Table 3. Farm machinery and equipment procured by Society at Kamalpur Village, Karnal.

Item	Quantity (nos.)	Rate (₹/hr)
Combine harvester (wheat)	1	1,200
Combine harvester with sms (paddy)	1	3,000
Happy seeder	3	1,000
Mulcher	2	1,900
Reversible plough	6	1,900
Rotavator	4	1,300
Straw slasher	4	1,000
Straw chopper	3	2,000
Zero drill	5	700
Disc harrow	7	500
Straw baler	2	2,000
Straw reaper	2	1,500
Laser land leveler	3	800
Cultivator	6	500
Tractor mounted spray pump	7	400

time bound farm operation activities.

- The gross income of the centre was ₹ 250,000 (Rupees two lakh

fifty thousand only) with a net income of ₹ 150,000 (Rupees one lakh fifty thousand) after deducting all the expenses.

- To date, approximately 1256 farm families of nearby areas have been benefitted directly or indirectly from the CHC and the stable burning incidents continuously decreasing in these areas.

Farmers are very much happy with the CHC because after the establishment of the centre, they can do the farm activities timely i.e. sowing, weeding, intercultural operation, threshing and harvesting operation, etc. CHC established in FFP adopted villages have provided many opportunities in dealing with various weather and agricultural problems.

Impact

The perceived economic impact of custom hiring centre by farmers

- Custom hiring centres enabled



Major implements at custom hiring centres

small and marginal farmers to access high-cost implements, provides timely access to costly and limited farm machinery for avoiding stubble burning and timely cultivation of land.

- In recent years, delays in the onset of monsoon, land preparation, and timely unavailability of canal irrigation water adversely affect the transplanting of paddy in Haryana. Happy seeders help farmers avoid stubble burning, reducing the cost of cultivation and increasing grain yield.
- The use of advanced machinery helps farmers to go for crop diversification in Haryana with other crops like pulses and oilseed crops. It helps to decrease the rice-wheat area in Haryana which saves groundwater, natural resources and reducing pollution.
- In CHC cluster villages, the incidents of stubble burning reduced by 95% and most all farmers adopting zero tillage practices in the wheat-rice cropping system.
- This also helped improve fertilizer use efficiency, as fertilizer placement particularly urea, DAP was appropriate. This implies reducing nitrous oxide emissions.
- Zero till drills helped save time, water, fuel and escape terminal heat

stress besides enabling farmers to make the early harvest of *rabi* crops.

- Due to the availability of modern implements in the CHC, there is a remarkable addition in the land use by the owners as well as users of the CHCs.
- Due to more efficient operations in existing fields, the beneficiaries reported a hike in income generation from agriculture on an average of 16%.
- Facilitates timeliness in farm operations and efficient use of inputs and implements at farmer fields.
- Promotes adoption of conservation agriculture practices and technologies by farmers because of availability of appropriate machines at reasonable hiring charges.
- Reduces labour and decrease the total cost of cultivation.
- CHC help in enhancing the cropping intensity wherever feasible due to the mechanization of agriculture.
- Provides employment and work opportunities to skilled labour and small artisans.

Social impact

There is a positive impact of FFP among the farmers of five villages of the project. Some beneficiaries of

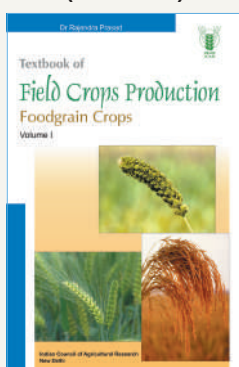
FFP, ICAR-NDRI Karnal influenced their fellow farmers of their village and their neighbouring villages. Perceived social impact by farmer are given below:

- The accessibility of implements for agricultural practices was enhanced in rural areas so the farmer can get timely implements at a reasonable price.
- The total annual income of the farmers from agriculture was increased because of mechanization and availability of implements at low cost. The cost of cultivation is reduced due to this, the overall living standard of the farmer improved.
- The educational, house, food, and health security of farmers improved.
- Income and employment generation for the unemployed youth of the area was increased.
- Linkage with different institutes and enterprises was created which benefited the farmer.
- The social status of farmers enhanced in villages.
- Finally, due to society and collective use of resources, the cohesiveness among villagers were also increased.

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TECHNICAL SPECIFICATIONS

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