

Resource specific and socially integrated interventions increased profitability of farmers in Varanasi

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ICAR-Indian Institute of Vegetable Research (ICAR-IIVR) implemented Farmer FIRST programme for last five years aiming to improve the profitability and livelihood of 961 farm families spread across five cluster of villages in Araziline block of Varanasi district. They had vegetable based farming systems and majority of them were small and medium farmers with limited resources. The experiences showed that the introduction of medium duration rice varieties allowed timely sowing of wheat as well as provided the opportunity to take vegetable crops having shorter duration such as pea and potato. Likewise, vegetable being high value, low volume crop farmers got increased yield and enhanced income like in case of carrot (Kashi Arun) with 75.16% increased income. The farming system became more productive by popularization of backyard poultry (CARI-Debedra, CARI-Nirbheek) which helped farmers to earn extra income through selling of eggs and birds.

Keywords: Farmer, Participatory Rural Appraisal (PRA), Varanasi

THE number of marginal farmers in India having less than 1 ha land holding was 100.25 million (68.5%), and small farmers having land holding between 1 and 2 ha was 25.8 million (17.6%), out of the total 146.5 million farm households in 2020. The Farmer FIRST as a concept of ICAR is developed focussing such farmers in a centric role for research problem identification, prioritization and conduct of experiments and its management in farmers' conditions. The focus is on Farmer's Farm, Innovations, Resources, Science and Technology (FIRST). Keeping in mind the above concepts, the project started in nearby villages of ICAR-Indian Institute of Vegetable Research (ICAR-IIVR) with the objective to improve the profitability and livelihood of the farmers with the available resources. The project was launched by adopting 961 farm families in the villages namely Paniyara, Dhanapur, Lashkariya, Upaddhaypur, Baburam Ka Pura and later adopted Rajapur in Araziline block of Varanasi district. Participatory Rural Appraisal (PRA) was conducted with the key informants in each village. The study revealed that, (Table 1) the farmers in the selected villages belonged to landless labour (5%), small farmers having 1–4 bigha (1 bigha = 2500 m² or 0.25 ha) land (40%), medium farmers having 4–8 bigha land (49%) and large farmers having more than 8 bigha land (6%). This categorization was done according to the minimum and maximum land available with the

farmers in the villages and the average land holding size was 2.576 bigha or 1.61 acre. Farmers in selected villages belonged to general category 37.50%, OBC 49.58% and SC 12.91% among which 66.95% were literate and 33.05% were illiterate. The selected villages were having agriculture based economy but the income from agriculture was meagerly ₹36801.00 per year per household. As a result 36.05% villagers belonged to BPL category.

The selected area is having rich natural resource base. The land is very fertile because of occurrence of floods in



Conducting Participatory Rural Appraisal to identify socio-economic status and available resources in the villages

Table 1. Social categories of the farmers in the selected villages

Category	Per cent households				
	Dhanapur	Laskariya	Baburam Ka Pura	Paniara and Upadhyaypur	Overall
Landless labour (no land)	10			10	5
Small (1-4 bigha)	25	80	30	25	40
Medium (4-8 bigha)	63	10	60	63	49
Large (more than 8 bigha)	2	10	10	2	6
Average annual income from agriculture (₹ /year/household)	25221	28927	56724	36335	36801
Education	Illiterate 38.90	Illiterate 33.30	Illiterate 26.70	Illiterate 33.33	Illiterate 33.05
	Literate 61.10	Literate 66.70	Literate 73.30	Literate 66.70	Literate 66.95
BPL households	46.11	38.10	3.33	56.67	36.05
Caste	General 0.00	General 0.00	General 100.00	General 50.00	General 37.50
	OBC 60.00	OBC 100.00	OBC 0.00	OBC 38.33	OBC 49.58
	SC 40.00	SC 0.00	SC 0.00	SC 11.66	SC 12.91
Average land holding (acre)	0.58	1.92	2.30	1.65	1.61

the Ganges that continually replenish the soil. Average annual rainfall 1000–1100 mm (Table 1), temperature ranges from 8°C in winter (*rabi*) season to 46°C in hot summer season with 50% relative humidity that facilitates to grow diverse kind of flora and fauna. The soil of the area belongs to the textural class sandy loam to sandy clay which is very much suitable for agriculture particularly vegetable cultivation. Plain topography of land and good irrigation facility through bore well, pond and tube well provide good agriculture facility. The major crops grown in the area were paddy and wheat with limited cultivation of seasonal vegetables such as sugarcane, red gram, turmeric, gram, pea, til, greengram, blackgram etc. The dominant cropping pattern followed was the rice-wheat cropping system by the farmers and mills were available for processing rice and wheat. Different agricultural implements like tractor, cultivator, rotavator, leveler, sprayer, thresher related to rice and wheat cultivation were available with the large farmers. Livestock sector was not organized in the selected villages. Farmers were having few buffalos and cows to meet the domestic milk requirements. Major trees available in the villages were mango, neem, moringa, guava, teak, mahua etc. Major problem in agriculture was blue bull menace. Disease and insect-pest load in the crops were very high which resulted in indiscriminate use of chemicals and pesticides by the farmers.

Resource attuned intervention for profitability

The interventions carried out in this project were target specific and as per felt need of different category (landless to large farmers category) of beneficiaries and as per available resources and working knowledge of the people. The interventions were categorized in following modules that have been explained here.

Crop based module

Seed replacement for better yield, more nutrition and enhanced income was the motto of this module. The dominant rice-wheat cropping system in villages

was not sustainable and led to serious economic, social and ecological problems such as deceleration in the productivity of ground water resources, decline in soil fertility and increase in environmental pollution. Need was felt to diversify the traditionally grown less remunerative cropping system through suitable interventions of vegetable crops to achieve sustainable productivity, profitability and resource use efficiency. Long duration rice varieties such as MTU-7029, Moti and Damini and other locally available cultivars which delayed the wheat sowing (December–January), due to which the yield realized in wheat was often very poor. Under Farmer FIRST Programme rice growers were provided with certified seeds of medium duration (120–25 days) and high-yielding rice variety HUR-917 and HUR-3022 developed from BHU which are aromatic in nature, resistant to lodging and neck blast disease with good grain quality. The improved high-yielding medium duration rice varieties HUR-917 and HUR-3022 fetched higher yield than other varieties grown by farmers of similar growth duration. The introduction of medium duration rice varieties not only allowed timely sowing of wheat and but also provided opportunity to take catch crop of vegetables having shorter duration such as pea (Kashi Nandani and Kashi Udai) and potato (Kufari Pukhraj and Kufri Khyati). The additional crop of pea and potato resulted in high productivity and enhanced income. Farmer growing catch crop of pea got an additional net income of ₹65,985/ha and those growing potato got an additional net income of ₹104,182/ha. The timely sowing of wheat resulted in increase of yield which otherwise due to delayed sowing resulted in availability of shorter growing period. Besides, early onset of high temperature during February–March often resulted in forced maturity and shrivelled grain in wheat leading to poor yield. The farmers were provided certified seeds of high yielding wheat variety, HD-2967 and also zinc fortified wheat variety WB-02 was introduced to combat Zn and Fe deficiency, particularly among women and children. The certified seeds of high yielding varieties improved the seed replacement

rate in the area that resulted in higher yield due to low incidence of disease and pest infestation. Increased yield and income were witnessed due to intervention, in case of paddy 15.3% increase in yield and 22.5% increase in income and in case of wheat 28.9% increase in yield and 39.6% increase in income was recorded.

Horticulture based module

In horticulture-based module of intervention, improved high yielding disease and pest resistant varieties of cowpea, pea, tomato, french bean, brinjal, chilli, etc were promoted in the area. Vegetables being high value low volume crop farmers got increased yield and enhanced income like in case of carrot (Kashi Arun) with 75.16% increased income (Table 2), french bean (Kashi Sampann) with 91.04% increased income and so on. The vegetable area was only 1.34% of the total cultivated area of the village. The major constraint for the area under vegetable was low yield and high cost of private company hybrid seeds, lack of knowledge of plant protection measures. The introduction of ICAR-IIVR varieties in the area and the increased knowledge and skill acquired by the farmers due to frequent training and exposure visit of farmers to the ICAR-IIVR Research Farm, resulted in more number of farmers taking up the vegetable cultivation as an enterprise and consequently the area of vegetable increased to 4.6% of the total cultivated area. The availability of good quality seeds played a major role in increasing the cropping intensity of the selected farmers from 185–275%. The inclusion of the vegetable in the cropping system increased the productivity system by 95–165% depending on the number of vegetables included in the

system. As a result the net income and benefit-cost ratio of the farmer increased by 57–83%.

Livestock based module

Under livestock-based module backyard poultry was promoted and 10,000 number of one day-old-chicks of CARI-Debedra, CARI-Nirbheek and Kadaknath were procured from ICAR-CARI, Izatnagar and demonstrated among 200 landless beneficiaries along with starter feed and water feeder. Vaccination of the backyard poultry was conducted in the villages for sustainability of the model. Trainings were provided on poultry nutrition and hygiene and master trainer on poultry vaccination were prepared among the village youths. The backyard poultry provided an opportunity to earn extra income through selling of egg and bird. The introduction of improved breeds like CARI-Debedra, CARI-Nirbheek fetched better income to the farmers in shorter time with less investment and recurring contingencies leading to better benefit-cost ratio.

Social inclusion bestow cosmopolitaness

Need based trainings were provided to the beneficiaries of the project for skill development, capacity building and promotion of entrepreneurship with extended support from Renew Power (solar power company), state departments and KVK. Beneficiaries were advised to open account in bank and post office to save the additional income from project interventions. They were also motivated to work together in SHGs and formulate Farmer Producer Company (FPC) for better marketing of the produces. A positive attitude towards scientific agriculture was observed among the farming



Demonstrations of resource attuned improved agricultural technologies for increasing profitability

Table 2. Change in yield and income of the farmers due to intervention of improved vegetable varieties

Demonstrated intervention	Average yield (q/ha)		Change in yield (%)	Average net income (₹)		Change in income (%)
	Control	Demo.		Control	Demo.	
Kashi Arun (Carrot)	90	145	61.11	56500	104000	84.07
Kashi Sampann (French bean)	103.4	136.5	32.01	92126	183304	98.97
Kashi Ageti (Pea)	73.41	104.23	41.98	86540	148839	71.99
All Green (Palak)	98.21	140.07	42.62	108472	155384	43.25
Kashi Kanchan (Cowpea)	94.74	132.14	39.48	70109	126044	79.78
Kashi Nidhi (Cowpea)	97	127	30.93	104940	174850	66.62
Kashi Aman (Tomato)	247.1	384.03	55.41	287660	359623	25.02
Kashi Sandesh (Brinjal)	310.32	423.21	36.38	279080	354695	27.09
Kashi Rakshita (Sponge gourd)	124.15	171.41	38.07	126087	197566	56.69

community. Beneficiaries were socially motivated to continue good agricultural practices as they observed profit and social recognition. With the excess income they got due to intervention under Farmer FIRST Programme, now their social status is being upscaled and their livelihood is becoming secure. Migration is being checked as rural youths are getting employment opportunity in the villages.

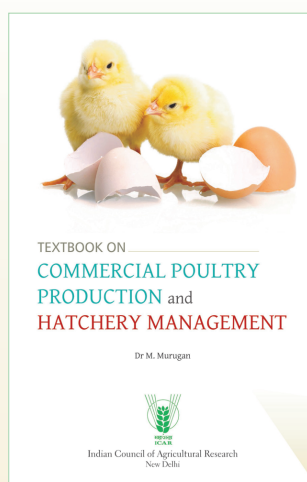
SUMMARY

Farmer FIRST programme has become a ray of hope for the farmers in the adopted villages. The unique concept of the project has directly benefitted the farmers which they did not experience earlier from any other extension agency. The farmers learnt to believe that they have strengths in their available resources and their

working knowledge is equally important like many others. Now time has come to spread the benefit of the project to the nearby villages through Carpet extension or Horizontal extension approach. Intervention is required towards value-addition of the raw materials like post-harvest processing of the vegetables and egg products which has tremendous market value. Branding and lucrative packaging of the products under Farmer FIRST is next target for capturing best market value. Advanced trainings are required for achieving such objectives and support is needed from government and policy makers.

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