

Sustainable livelihood intervention

for enhancing small landholder's income in western Rajasthan

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Location and selection of area

The western arid Rajasthan represents the areas of low and erratic rainfall, limited irrigation facilities, sandy and loamy sand soils, and livestock based farming systems.

The project was initiated on 1st November 2016 at the three selected villages, viz. Rajwa, Popawas Sirodi and Ghantiyala, Jodhpur district of Rajasthan. Major cropping system included single cropping (*kharif*) of pearl millet, mung bean, moth bean, cluster bean, sesame rainfed (*kharif*) crops. In irrigated areas in *rabi* wheat, mustard and cumin are the major crops being grown besides

vegetables. In rainfed (*kharif*) mixed cropping of mung bean + sesame, moth bean + sesame and pearl millet + cluster bean is also prevalent.

Number of farm families: A total of 245 farm families including marginal (115), small (82) and large (48) participated in the project.

INTERVENTIONS

Improved agriculture technologies (Table 1) were applied in the locality in farmer participatory mode belonging to different modules like crop based module, horticulture based module, livestock based module, natural resource

management based module, IFS module and enterprise based module. Crop diversification in existing cropping systems of the locality was implemented through horticulture based module. In irrigated situation, crop diversification interventions through vegetables like round gourd, cluster bean, chilli, cucumber, okra etc. were made providing seeds of improved varieties and other critical inputs. In rainfed cropping systems of the region the diversification was made through rainfed snap melon cultivation and plantation of orchards of ber. Nutrient supplementation through multi-nutrient feed blocks

Table 1. Successful interventions for income enhancement

Name of the farmer	Village	Technology intervention	Income enhancement (₹)
Shri Oma Ram Bheel	Popawas	Improved pearl millet hybrid 'MPMH-17'	₹ 5680/ha
Shri Moti Ram Beniwal	Rajwa	Improved wheat variety 'Raj4083'	₹ 9331/ha
Shri Khangara Ram	Sirodi	Fruit orchard ber variety 'Gola'	₹ 28000/bigha*
Shri Takhat Singh	Ghantiyala	Feed supplementation through multi-nutrient feed blocks to milching livestock	₹ 9000/month
Shri Chavanda Ram	Popawas	Breed improvement through 'Marwari' sheep	₹ 95000/year
Shri Jabbardeen	Ghantiyala	Oyster mushroom production	₹ 14000 in 3 months
Shri Bhagirath Singh	Popawas	Seed production of mung bean	₹ 13000/ha

*1 Bigha = 1600 m² area



Ber variety 'Gola'



Multi-nutrient feed block feeding to lactating cow



Oyster mushroom production

Table 2. Performance of improved interventions in crop based module

Crops	2017-18				2018-19				2019-20			
	Farmers' practice		Improved practice		Farmers' practice		Improved practice		Farmers' practice		Improved practice	
	Yield (q/ha)	Net return (₹/ha)	Yield (q/ha)	Net return (₹/ha)	Yield (q/ha)	Net return (₹/ha)	Yield (q/ha)	Net return (₹/ha)	Yield (q/ha)	Net return (₹/ha)	Yield (q/ha)	Net return (₹/ha)
<i>Rainfed kharif crops</i>												
Pearl millet	10.7	13304	13.6	22120	6.2	10751	8.1	17724	13.4	20310	16.5	24511
Mung bean	4.7	11895	6.79	16928	3.0	5174	4.8	12410	7.1	29251	8.3	34470
Moth bean	3.3	4221	5.06	9915	2.3	2520	4.3	6328	4.3	12483	5.3	16894
Cluster bean	-	-	-	-	3.5	1896	5.0	2795	8.3	21030	10.3	24678
<i>Irrigated rabi crops</i>												
Wheat	30.9	55966	35.3	64624	31.04	57600	36.06	66530	48.6	52824	52.1	57533
Cumin	8.2	49750	9.2	68450	6.93	44230	8.3	50310	7.6	44750	8.2	50450
Mustard	-	-	-	-	-	-	-	-	12.8	35625	14.9	41879
Chickpea	9.3	32454	11.8	39678	-	-	-	-	-	-	-	-

and breed improvement in sheep were the improved interventions in livestock based module. In livestock module, interventions included feed supplementation through multi-nutrient feed blocks to cattle and

buffalo and sheep breed improvement by 'Marwari' sheep.

2016-17 (2); 2017-18 (5); 2018-19 (4); and 2019-20 (6) with 240, 400, 580 visitor respectively.

TRAINING

Under FFP project, total 17 trainings were conducted during

IMPACT

The impactful interventions in

SUCCESS STORY

Enhancement of farm income through vegetable cultivation

Mr. Sumeraram S/o Shri Shree Purkha Ram, 45 years old belonged to village Popawas in Mandore block of Jodhpur district. The farmer was growing grain crops such as pearl millet, moong, moth, guar etc. as an age-old practice but from this farming practice, he was getting very low income to sustain the family. The farmer was chosen as one of the beneficiaries under Farmer FIRST project and a farm plan was made according to available resources. In this plan, a part of his land was put under some vegetables, viz. brinjal, bhindi, chillies and some cucurbitaceous vegetables. Since his soil was less fertile, he was advised to go for vermicomposting to enrich the soil fertility and enhance the water retention capacity. Under the horticulture module, he was supplied with improved variety of chilli hybrid namely Farm Sona-1090 along with other required critical inputs. Besides the above, he along with other beneficiaries was also sent to ICAR-Central Institute for Arid Horticulture (CIAH), Bikaner to get acquainted with the recent developments in vegetable cultivation under capacity building programme of Farmer FIRST. Further he was also one of the participant to attend the National Workshop on Methodologies for Doubling Farmers Income at ICAR-National Academy of Agricultural Research Management (NAARM), Hyderabad.



Considering the potential and demand for chilli cultivation in the agroclimate and agro-economic condition of Rajasthan in general and Jodhpur district in particular, he found it as a viable and remunerative option to grow chillies in his farm. Since the Farmer FIRST project was already in operational in his panchayat, he expressed his desire to be as one of the beneficiary under the project. He was provided with the seeds of improved hybrid of chilli along with the technology support. The effort initiated by him yielded rich dividend from the sale of green and red chillies with a net returns of ₹ 13,015/bigha. By seeing the successful venture of Mr. Sumera Ram, the neighboring farmers and uneducated youths are being motivated to take up similar initiative in chilli and other vegetables by joining the Farmer FIRST Project.

Particular	Details
Cost of cultivation for one bigha	₹ 5,813
Marketing Expenses for one bigha	₹ 2,000
Total expenses incurred	₹ 7,813
Yield obtained/bigha	422 kg Green chillies + 107 kg Red chillies
Returns @ ₹ 24/kg green chillies	422 × 24 = ₹ 10,128
Returns @ ₹ 100/kg red chillies	107 × 100 = ₹ 10,700
Net profit/bigha	₹ 20,828 - 7,813 = ₹ 13,015/bigha

Table 3. Performance of improved interventions in horticulture based module

Crops	2016-17						2017-18						2018-19						2019-20							
	Farmers' practice			Improved practice			Farmers' practice			Improved practice			Farmers' practice			Improved practice			Farmers' practice			Improved practice				
	Yield (q/ha)	Net return (₹/ha)		Yield (q/ha)	Net return (₹/ha)		Yield (q/ha)	Net return (₹/ha)		Yield (q/ha)	Net return (₹/ha)		Yield (q/ha)	Net return (₹/ha)		Yield (q/ha)	Net return (₹/ha)		Yield (q/ha)	Net return (₹/ha)		Yield (q/ha)	Net return (₹/ha)			
Vegetable based interventions																										
Round gourd	45.5	41725		60.4	61565		-	-		-	-		-	-		52.3	47983		69.5	70799		51.8	29739			
Snap melon	35.5	16890		45.3	25860		-	-		-	-		-	-		40.3	19423		-	-		-	-			
Cluster bean	21.9	38200		28.1	58200		-	-		-	-		-	-		-	-		-	-		-	-			
Chilly (Green)	-	-		-	-		110.3	90480		145.2	132077		-	-		-	-		-	-		-	-			
Cucumber	-	-		-	-		-	-		-	-		-	-		-	-		-	-		-	-			
Okra	-	-		-	-		-	-		-	-		52.2	70950		63.5	112969		131	71276		145	92600			
Fruit based interventions																										
No. of plants			Yield (kg/plant)			No. of plants			Yield (kg/plant)			No. of plants			Yield (kg/plant)			No. of plants			Yield (kg/plant)			No. of plants		
2016-17			2019-20			2017-18			2019-20			2018-19			2019-20			2019-20			2019-20			2019-20		
320			5.2			400			4.8			800			2.5			400			-			-		
Ber																										

SUCCESS STORY

Vermicomposting: Sustainable technology for restoring soil fertility

Shri Hukma Ram S/o Shri Ganesa Ram, belongs to village Rajwa in Mandor block of Jodhpur district. He grew crops like pearl millet, mungbean, clusterbean, wheat, cumin and vegetables like chilli. Even after putting his best efforts, he always ends up with meagre farm income due to low soil fertility status. Further the soils in



arid regions are sandy as well as coarse textured coupled with low organic carbon. Application of conventional FYM without proper decomposition leads to more termite incidences in the field. In the quest to increase crop productivity, he applied chemical fertilizers too. But due to low fertilizer use efficiency in coarse sandy texture soil it only increases his cost of production without commensurate proper returns.

Under Farmer FIRST project, Shri Hukma Ram along with another 25 farmers were imparted training on vermicompost preparation using cow dung and organic waste from his farm through participatory technology development. Under this participatory approach, the selected partner farmers were provided with plastic vermi-beds and *Eisenia foetida* species of earthworms along with technical know-how of vermicompost preparation. After learning the process of vermicomposting, the trained farmers were producing vermicompost by using part of cow dung and crop residues produced at their farm and converting the cow dung and crop wastes into nutrient rich manure. Sh. Hukma Ram is also one among the trained farmer who applies vermicompost in his chilli field, ber plants and remaining amount in field crops like wheat, cumin etc. Finally as the application of vermicompost in soil not only provides sufficient quantities of major and micro-nutrients to the crops but also make the soil environment favourable for plant growth by adding beneficial micro-flora. Hence not only Mr. Hukma Ram, but all the trained farmers were very happy with this technology along with income enhancement by saving the cost of chemical fertilizers and increase in crop productivity and soil fertility.

Technology of vermicompost preparation

Particular	Price/Quantity
Plastic vermi bed (Dimension 6' × 4' × 1.5')	₹ 2000/bed
Quantity of earthworms/bed	2 kg
Price of earthworms	₹ 200/kg
Moisture to be maintained in the vermin beds	45-50%
Optimum temperature of vermi beds	20-30°C
Recommended quantity of vermicompost for different crops	
Crop Quantity	
Food grain crops	5.0-6.0 tonnes/ha
Vegetables	10-12 tonnes/ha
Fruit trees	1.0-10.0 kg/tree
Pots of kitchen garden	100 g/pot

Table 4. Performance of improved interventions in livestock based module

Interventions		Animals	Average daily milk yield of first 10 days (Litre/day)	Average daily milk yield after 12 weeks of supplementation (Litre/day)	Daily milk yield increase (%)	B:C ratio
Feed supplementation	Multi-nutrient feed blocks	Buffalo	10.5	10.9	4.1	4.43
		Cow	8.17	8.77	7.4	4.89
	Multi-nutrient mixture	Goat	0.533	0.575	7.9	2.66
Community oriented breed improvement		Breed of sheep	Body weight of year old lambs (kg)	Price of one year old lambs (₹)	Gross return (₹/lamb)	Net return (₹/lamb)
		Local	25	3500	6500	3000
		Marwari	32	3900	8320	4420

different modules were assessed in terms of income enhancement of partner farmers (Table 1).

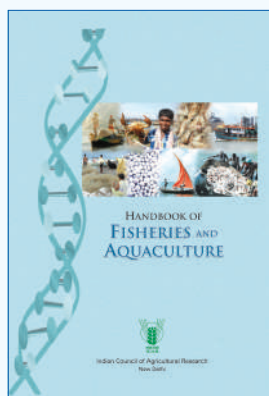
- Intervention of improved varieties of different crops provided income enhancement to the tune of ₹ 5680/ha in pearl millet and ₹ 9331/ha in wheat.
- Gain in net returns were more in rabi crops as compared to *kharif* crops. However, the percent gain was more in *kharif* crops (Table 2).

- Crop diversification through arid fruit like ber variety 'Gola' in intercropping with field crops provided an additional income of ₹ 28,000 three years after planting.
- The snap melon intercropped with pearl millet generated an additional return of ₹ 25860/ha without compromising the yield of pearl millet (Table 3).
- Daily feeding multi-nutrient

mixture to lactation cow, buffalo and goat for 12 weeks resulted in to daily milk yield increased ranged from 4.1 to 7.9% with B:C ration of 2.66 in goat to 4.89 in buffalo (Table 4).

- The lambs of 'Marwari' breed of sheep gained more weight on same ration in a year and fetched higher market price as compared to local non-descript breed of sheep.

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TECHNICAL SPECIFICATIONS

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