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IMPACT OF NICRA PROJECT ON FARM INCOME AND FARM PRODUCTIVITY OF PARTICIPANT FARMERS

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ABSTRACT

National Innovations in Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) aiming to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. Various climate smart technologies has been diffused amongst tribal farmers to mitigate climate changes in terms of very heavy rainfall, frequent and long dry spells, high humidity etc. The present study was thus, undertaken to assess the impact of the interventions of the climate resilient technologies introduced under the NICRA Project on farm productivity and income of the farmers. The total sample size consists of 160 farmers comprising of 80 participants farmers and 80 non-participants farmers from non-project area. The mean rice productivity of participant farmers (3315.56 kg/ha) was higher than that of the non-participant farmers (2395.32 kg/ha). The difference between the mean level of farm income of participant and non-participant farmers was Rs.37419.80. Findings, therefore, indicated that the project interventions had a significant positive impact on the farm income of the participant farmers.

Keywords*: NICRA project, farm productivity, climate change, climate smart technologies, knowledge*

INTRODUCTION

The impact of climate change on agriculture and food security is now a major concern for UNO and considered as one of the important goal of millennium development goal. The impacts of climate change are global (Vinaya and Shivamurthy, 2021). Countries like India are more vulnerable to climate change where agriculture is the main source of livelihood for the majority of the population. Global warming which is a result of climate change affects the production of the farmers (Vinaya *et al.,* 2017a). Climate change poses a threat to food access for both rural and urban populations by reducing agricultural production and incomes, increasing risks and disrupting markets. Poor producers, the landless and marginalized ethnic groups are particularly vulnerable (Olsson, *et al.,* 2014; Vinaya *et al.,* 2017b).

National Innovations in Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February, 2011 aiming to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. More than 200 Krishi Vigyan Kendra s of the country are actively working on the climate smart technology demonstration especially in the areas of Natural resources management, livestock production and crop production technologies and establishment of custom hiring centers. KVK Valsad Gujarat is associated with this project since 2011-12. Various climate smart technologies has been diffused amongst tribal farmers to mitigate climate changes in terms of very heavy rainfall, frequent and long dry spells, high humidity etc. Many technologies have been widely accepted by the farmers. Despite various constraints while implementation of the project it left a significant impact on farmer's practices. The present study was thus, undertaken to assess the impact of the interventions of the climate resilient technologies introduced under the NICRA Project on Farm Productivity and annual income of the participant farmers in Valsad district of Gujarat.

OBJECTIVE

To measure the level of knowledge of farmers on climate smart technologies and impact of the interventions related to natural resources management (NRM), crop production and livestock on farm productivity and annual farm income of the participant and non- participants farmers

METHODOLOGY

The present study was undertaken in eight villages of Valsad district of Gujarat state. Eighty NICRA participant farmersand similar numbers of non-participant farmers were selected randomly from the eight selected villages. From

the NICRA Project area, a cluster of four villages, viz., Khuntli, Amdha, Panas and Ozarada in which climate smart technologies were demonstrated were selected purposively and from the non-project area four villages, viz., Kharedi, Jogvel, Nalimadhani and Motivahiyal were selected. From each of the selected villages, 20 respondents were selected randomly. The total sample size consists of 160 farmers comprising of 80 participants farmers and 80 non-participants farmers from non-project area. A knowledge test was used to assess the knowledge level of the farmers. Data were collected by personal interview using structured interview schedule. Statistical tools like per cent, frequency, mean, standard deviation (SD), coefficient of variation (CV) and t-test were used for the analysis of data. To assess the impact of NICRA Project interventions on farm productivity and annual farm income of the participant and non-participant farmers, the respondents were categorized in to three different categories based on mean, coefficient of variation and standard deviation.

RESULTS AND DISCUSSION

Knowledge regarding climate smart technologies

It is evident from the table that more than 60 per cent of the participant farmers possessed knowledge regarding climate smart technologies such as growing flood tolerant variety of paddy, short duration varieties of paddy, efficient use of fertilizer through soil testing, growing multi cut Perennial grass of fodder, use of conserved moisture, excavation of farm pond across the slope for rain water harvesting and composting farm waste through vermi compost. So far non- participants knowledge regarding climate smart technologies are concerned, it was observed. majority of non- participants farmers possessed poor knowledge regarding crop diversification, mixed cropping, inter cropping, mulching, excavation of farm pond across the slope for rain water harvesting, flood tolerant variety of paddy, land levelling, trench cum banding and heat stress mgt. in cattle. The findings are in line with the findings of Soleiman and Saeid (2015).

Table 1: Distribution of participant farmers and non- participant farmers according to their knowledge of climate smart technologies (n=160)

Sr. No.	Climate smart technology	Participant farmers		Rank	Non- participant farmers		Rank
		Frequency	Per cent		Frequency	Per cent	
A	**Crop production/ Livestock production**						
1	**Growing Flood tolerant variety of paddy**	72	90.00	I	13	16.25	VII
2	**Growing short duration variety of paddy**	68	85.00	II	23	28.75	III
3	**Crop diversification**	28	35.00	IX	09	11.25	X
4	**Mixed cropping**	13	16.25	XIV	07	08.75	XI
5	**Inter cropping**	18	22.50	XII	12	15.00	VIII
6	**Efficient use of fertilizer through soil testing /Reduction in use of chemical fertilizer**	59	73.75	III	36	45.00	I
7	**Plantation on field boundary as wind protector**	36	45.00	VIII	16	20.00	V
8	**Mulching**	17	21.25	XIII	03	3.75	XIV
9	**Growing multi cut Perennial grass of fodder**	49	61.25	VII	13	16.25	VI
10	**Heat stress mgt. in cattle**	23	28.75	XI	04	5.00	XIII
B	**Natural Resources Management**						
11	**Use of conserved moisture**	52	65.00	V	32	40.00	II
12	**Excavation of Farm pond across the slope for rain water harvesting**	50	62.50	VI	10	12.50	IX
13	**Land levelling**	14	17.50	XV	02	02.50	XV
14	**Trench cum banding**	27	33.75	X	05	06.25	XII
15	**Composting farm waste through Vermi compost**	53	66.25	IV	17	21.25	IV

Farm productivity of paddy

Table 2: Distribution of participant farmers and non-participant farmers according to their farm productivity of paddy (n=160)

Sr. No.	Category	Participant farmers		Non- participant farmers	
		Frequency	Per cent	Frequency	Per cent
1	**Low productivity** (up to 2978.46 kg/ha)	12	15.00	52	65.00
2	**Medium productivity** (Between 2950 to 3652.67 kg/ha)	49	61.25	21	26.25
3	**High productivity** (Above 3652.67 kg/ha)	19	23.75	07	8.75
	Mean	3315.56		2395.32	
	Standard Deviation (SD)	367.34		331.27	
	Coefficient of variance(CV)	11.07		13.82	
	t value	1.99 is significant at 0.05 level			

Since paddy is the major crop of the district grown in both summer and kharif season, the productivity of the paddy crop is taken in to consideration. The data in table 2 indicated that majority of the participants farmers 61.25 per cent had a medium level of paddy productivity followed by 15.00 per cent with low level of productivity. Only 23.75 per cent of the participants have had high level of productivity. The mean rice productivity of participant farmers (3315.56 kg/ha) was higher than that of the non-participant farmers (2395.32 kg/ha). The difference between the mean level of rice productivity of participant and non-participant farmers was 920.24 kg/ha. The 't' value was found to be significant at the 0.05 level.

So far concerned with non-participants farmers, majority of them 65 per cent had low level of productivity followed by 26.25 per cent with medium level of paddy productivity. Less than 10 per cent of them falls in the category of high productivity. The mean rice productivity of non -participant farmers (2395.32 kg/ha) was considerably lower as compared to the participant farmers (3315.56 kg/ha). The t value found to be significant at 0.05 level.

The findings indicated that incorporation of climate smart technological intervention such as growing flood tolerant variety of paddy, short duration variety of paddy, efficient use of fertilizer through soil testing, etc. had a significant impact on paddy productivity of the participants farmers. The findings is in conformity with that of Patel and Chauhan (2015).

Farm income of the farmers

Table 3: Distribution of participant farmers and non-participant farmers according to their level of annual farm income (n=160)

Sr. No.	Category	Participant farmers		Non- participant farmers	
		Frequency	Per cent	Frequency	Per cent
1	**Low** (gross annual farm income up to ₹ 85382/-)	11	13.75	57	71.25
2	**Medium** (gross annual farm income Between ₹ 85383 to ₹ 129756)	53	66.25	14	17.50
3	High (gross annual farm income Above ₹ 129756)	16	17.50	09	11.25
	Mean	107569.25		700149.52	
	Standard Deviation(SD)	19324.26		21265.45	
	Coefficient of variance(CV)	17.96		30.31	
	t value	2.43 is significant at 0.05 level			

It is evident from Table 3 that the majority of the participant farmers (66.25%) were in the medium farm income category followed by 17.50 percent in the high farm income category. Only 13.75 % of the participant farmers were found in the low annual farm income category. The coefficient of variation (17.96%) indicated that the participant farmer respondents were relatively homogenous concerning their annual farm income.

Majority of the non-participant farmers (71.25%) were in the low farm income category followed by 17.50% in the medium income category. Only 11.25 % of the non-participant farmers were found in the high farm income category. The mean annual farm farm income score of participant farmers (₹107569.25) was found higher than that of the non-participant farmers (₹ 700149.52). The difference between the mean level of annual farm income of participant and non-participant farmers was ₹ 37419.80. The finding is in line with the results of Munetsi, E. and Mucharedzeyi C. (2018) The 't' value was found to be significant at the 0.05 level. Hence the corresponding null hypothesis stating that there was no difference between the mean level of annual farm income of participant and non-participant farmers was rejected.

Findings, therefore, indicated that the project interventions had a significant positiveimpact on the farm income of the participant farmers. Tajpara et. al. (2018). This might be due to the higher extent of adoption of climate-resilient agro-technologies demonstrated by the KVK in project area (selected villages) by the participants farmers. It is worth mentioning that participant farmers followed from the use of harvested rainwater in the farm ponds, mass production and use of short duration, non-lodging, drought resistant varieties of crops leading to higher productivity than the non-participant farmers. The finding is similar to the findings of Yeragorla Venkata Harikrishna and Seema N. (2021).

CONCLUSION

The study concluded that interventions of the NICRA Project had significant positive impact on the productivity of the paddy and annual farm income of the participant farmers. Project interventions could exert a positive impact on the crop productivity of the participant farmers. The mean rice productivity and the mean annual farm income of the participant farmers was higher than that of the non-participant farmers.

IMPLICATIONS

The state government, Agricultural department, SAUs, KVKs, N.G.Os, must be made intensive efforts to popularize proven climate resilient technologies among farmers.

The proven NICRA village model concept may be replicated in other districts of the state to address climate vulnerability through strategic research and technology demonstration.

CONFLICT OF INTEREST

No conflict of interest among researchers.

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