Climate Change Impact On Socio-Economic Status And Constraints Faced By Respondents For Adoption Of Climate Resilient Technologies In Amreli And Rajkot Districts

D. M. Bodsa

Department of Agriculture Extension, J.A.U., Junagadh, Gujarat, India

V. N. Chavda

Assosiate Professor, Dept. of Agricultural Extension, College of Agriculture J.A.U., Junagadh, Gujarat, India

Abstract: National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the ICAR launched on 2nd February, 2011 by the Honourable Union Minister for Agriculture and Food Processing Industries Shri Sharad Pawarji. Project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through four module technological demonstration. The study was conducted in Rajkot and Amreli districts of North Saurashtra Agro-climatic Zone of Gujarat state. The total of 120 respondents were selected randomly for the study. The study revealed that, more than half of the NICRA farmers and non-NICRA farmers were belonged to middle age group. Exactly one-third of the NICRA farmers were educated up to middle school and nearly two-fifth of the non-NICRA farmers were educated up to primary school. Majority of the NICRA farmers and non-NICRA farmers belonged to nuclear family type. Slightly more than two-fifth of the NICRA farmers and nearly two-fifth of the non-NICRA farmers had medium level of farming experience. Nearly one-third of the NICRA farmers had medium size of land holding and nearly half of the non-NICRA farmers had small size of land holding. Slightly more than two-fifth of the NICRA farmers had medium level of social participation and nearly half of the non-NICRA farmers had low level of social participation. Nearly half of the NICRA farmers had medium level of mass media exposure and more than two-fifth of the non-NICRA farmers had medium level of mass media exposure. Exactly half of the NICRA farmers had medium level of economic motivation and more than two-fifth of the non-NICRA farmers had medium level of economic motivation. Slightly more than half of the NICRA farmers had medium level of risk orientation and more than two-fifth of the non-NICRA farmers had low level of risk orientation. More than half of the NICRA farmers had medium level of innovativeness and nearly half of the non-NICRA farmers had low level of innovativeness. The major constraints faced by the respondents in adoption of climate resilient technologies; prevailing uneven rainfall distribution in the area ranked I, followed by lack of financial support from the government ranked II, farmers had lack of knowledge about climate resilient practices ranked III, farmers had lack of technical guidance regarding NICRA project ranked IV, lack of resources owned by farmers ranked V, lack of established structures for water harvesting (khet talavdi) in the area ranked VI, farmers received inadequate service through Custom Hiring Centres (CHCs) ranked VII, lack of support from line departments received by the farmers ranked VIII, poor availability of soil and water conservation practices in the area ranked IX and farmers had lack of infrastructure for livestock was rank X.

Keywords: Impact, NICRA, Climate resilient technologies

I. INTRODUCTION

Climate change has become an important area of concern for India to ensure food and nutritional security for growing population. The impact of climate change are global, but countries like India are more vulnerable in view of the high population depending on agriculture. In India, significant negative impacts have been implied with medium-term (2010-2039) climate change, predicted to reduce yields by 04.50 to 09.00 per cent, depending on the magnitude and distribution of

warming. Since agriculture makes up roughly 16.00 per cent of India's GDP, a 04.50 to 09.00 per cent negative impact on production implies a cost of climate change to be roughly up to 01.50 per cent of GDP per year (Anon., 2011).

The Government of India (GOI) has accorded high priority on research and development to deal with climate change in agriculture sector. The Prime Minister's National Action Plan on climate change has identified agriculture as one of the eight national missions. National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched on 2nd February, 2011 by the Honourable Union Minister for Agriculture and Food Processing Industries Shri Sharad Pawarji. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management.

II.   METHODOLOGY

The study was conducted in Rajkot and Amreli districts of North Saurashtra Agro-climatic Zone of Gujarat state. From Rajkot district Magharvada village was selected purposively where NICRA project was functioning. Besides this village, Kherdi village was selected where NICRA project was not functioning for comparison. From Amreli district Karjala village was selected purposively where NICRA project was functioning. Besides this village, Nesdi village was selected where NICRA project was not functioning for comparison. Thus, total four villages were selected. Thirty respondents were selected randomly from each of the NICRA villages and another thirty respondents were selected randomly from each of the non-NICRA villages. Thus, with sixty beneficiaries and sixty non-beneficiaries, a total of 120 respondents were selected randomly from four villages for the study. For the purpose of statistical analysis of the coded data, various statistical tools were also used *viz.*, Frequency, Percentage, Mean, Standard Deviation (σ), Coefficient of correlation (r) and 'Z' test.

III.   RESULTS AND DISCUSSION

Sr. No	Parameter	NICRA farmers		Non-NICRA farmers	
		F	%	F	%
1.	Age				
	Young age (18 to 35 years)	10	16.66	08	13.33
	Middle age (36 to 50 years)	34	56.67	32	53.34
	Old age (Above 50 years)	16	26.67	20	33.33
2.	Education				
	College/Post-graduate	06	10.00	03	05.00
	Higher school	09	15.00	08	13.33
	Middle school	20	33.33	09	15.00
	Primary school	13	21.67	23	38.33
	Functionally literate	07	11.67	10	16.67
	Illiterate	05	08.33	07	11.67
3.	Family Type				
	Nuclear	50	83.33	44	73.33
	Joint	10	16.67	16	26.67
4.	Farming Experience				
	Low farming experience	16	26.66	15	25.00
	Medium farming experience	25	41.67	23	38.33
	High farming experience	19	31.67	22	36.67
5.	Size of land holding				
	Big size of land holding	05	08.33	04	06.67
	Medium size of land holding	18	30.00	08	13.33
	Semi medium size of land holding	12	20.00	06	10.00
	Small size of land holding	16	26.67	28	46.67
	Marginal size of land holding	09	15.00	14	23.33
6.	Social participation				
	Low social participation	15	25.00	28	46.67
	Medium social participation	26	43.33	22	36.66
	High social participation	19	31.67	10	16.67
7.	Mass media exposure				
	Low mass media exposure	13	21.67	23	38.33
	Medium mass media exposure	29	48.33	26	43.34
	High mass media exposure	18	30.00	11	18.33
8.	Economic motivation				
	Low economic motivation	13	21.67	19	31.67
	Medium economic motivation	30	50.00	26	43.33
	High economic motivation	17	28.33	15	25.00
9.	Risk orientation				
	Low risk orientation	13	21.66	26	43.33
	Medium risk orientation	31	51.67	22	36.67
	High risk orientation	16	26.67	12	20.00
10.	Innovativeness				
	Low level of innovativeness	11	18.33	27	45.00
	Medium level of	35	58.34	20	33.33

	innovativeness				
	High level of innovativeness	14	23.33	13	21.67

Table 1: Distribution of the Respondents According to Their Socio-Economic Status

The data regarding age of the respondents are presented in Table 1 observed that more than half of the NICRA farmers (56.67 per cent) were found in middle age group, followed by 26.67 per cent were found in old age group and 16.66 per cent of the farmers were found in young age group, respectively.

In case of the non-NICRA farmers, more than half of the respondents (53.34 per cent) were found in middle age group, followed by 33.33 per cent were found in old age group and 13.33 per cent of the respondents were found in young age group, respectively.

The data presented in the Table 1 indicated that exactly one-third of the NICRA farmers (33.33 per cent) were educated up to middle school, followed by 21.67 per cent were up to primary school, 15.00 per cent were up to higher secondary school, 11.67 per cent were functionally literate, 10.00 per cent had college level education and 08.33 per cent were illiterate, respectively.

In case of the non-NICRA farmers, nearly two-fifth of the respondents (38.33 per cent) were educated up to primary school, followed by 16.67 per cent were functionally literate, 15.00 per cent were up to middle school, 13.33 per cent were up to higher secondary school, 11.67 per cent were illiterate and 05.00 per cent had college level education, respectively.

The data presented in Table 1 indicated that majority of the NICRA farmers (83.33 per cent) belonged to nuclear family type and 16.67 per cent belonged to joint family type. In case of the non-NICRA farmers, majority of the respondents (73.33 per cent) belonged to nuclear family type and 26.67 per cent belonged to joint family type.

The data presented in the Table 1 revealed that slightly more than two-fifth of the NICRA farmers (41.67 per cent) had medium level of farming experience, followed by 31.67 per cent had high and 26.66 per cent had low level of farming experience, respectively.

In case of the non-NICRA farmers, nearly two-fifth of the respondents (38.33 per cent) had medium level of farming experience, followed by 36.67 per cent had high and 25.00 per cent had low level of farming experience, respectively.

The data presented in the Table 1 revealed that nearly one-third of the NICRA farmers (30.00 per cent) had medium size of land holding, followed by 26.67 per cent had small, 20.00 per cent had semi medium, 15.00 per cent had marginal and 08.33 per cent had big size of land holding, respectively.

In case of the non-NICRA farmers, nearly half of the respondents (46.67 per cent) had small size of land holding, followed by 23.33 per cent had marginal, 13.33 per cent had medium, 10.00 per cent had semi medium and 06.67 per cent had big size of land holding, respectively.

The data presented in the Table 1 indicated that slightly more than two-fifth of the NICRA farmers (43.33 per cent) had medium level of social participation, followed by 31.67 per cent had high and 25.00 per cent had low level of social participation, respectively.

In case of the non-NICRA farmers, nearly half of the respondents (46.67 per cent) had low level of social participation, followed by 36.66 per cent had medium and 16.67 per cent had high level of social participation, respectively.

The data presented in the Table 1 indicated that nearly half of the NICRA farmers (48.33 per cent) had medium level of mass media exposure, followed by 30.00 per cent had high and 21.67 per cent had low level of mass media exposure, respectively.

In case of the non-NICRA farmers, more than two-fifth of the respondents (43.34 per cent) had medium level of mass media exposure, followed by 38.33 per cent had low and 18.33 per cent had high level of mass media exposure, respectively.

The data presented in the Table 1 revealed that exactly half of the NICRA farmers (50.00 per cent) had medium level of economic motivation, followed by 28.33 per cent had high and 21.67 per cent had low level of economic motivation, respectively.

In case of the non-NICRA farmers, more than two-fifth of the respondents (43.33 per cent) had medium level of economic motivation, followed by 31.67 per cent had low and 25.00 per cent had high level of economic motivation, respectively.

The data presented in the Table 1 revealed that slightly more than half of the NICRA farmers (51.67 per cent) had medium level of risk orientation, followed by 26.67 per cent had high and 21.66 per cent had low level of risk orientation, respectively.

In case of the non-NICRA farmers, more than two-fifth of the respondents (43.33 per cent) had low level of risk orientation, followed by 36.67 per cent had medium and 20.00 per cent had high level of risk orientation, respectively.

The data presented in the Table 1 indicated that more than half of the NICRA farmers (58.34 per cent) had medium level of innovativeness, followed by 23.33 per cent had high and 18.33 per cent had low level of innovativeness, respectively.

In case of the non-NICRA farmers, nearly half of the respondents (45.00 per cent) had low level of innovativeness, followed by 33.33 per cent had medium and 21.67 per cent had high level of innovativeness, respectively.

IV. CONSTRAINTS FACED BY RESPONDENTS FOR ADOPTION OF CLIMATE RESILIENT TECHNOLOGIES

The respondents were requested to express their constraints faced by them in adoption of the climate resilient technologies. Frequency and percentage for each constraint was calculated and constraints were ranked and presented in Table 2.

The major constraints faced by the respondents in adoption of climate resilient technologies; prevailing uneven rainfall distribution in the area ranked I (85.83 per cent), followed by lack of financial support from the government ranked II (78.33 per cent), farmers had lack of knowledge about climate resilient practices ranked III (75.83 per cent), farmers had lack of technical guidance regarding NICRA project ranked IV (73.33 per cent), lack of resources owned by farmers ranked V (68.33 per cent), lack of established structures for water harvesting (khet talavdi) in the area ranked

VI (62.50 per cent), farmers received inadequate service through Custom Hiring Centres (CHCs) ranked VII (59.67 per cent), lack of support from line departments received by the farmers ranked VIII (56.67 per cent), poor availability of soil and water conservation practices in the area ranked IX (51.67 per cent) and farmers had lack of infrastructure for livestock was rank X (46.67 per cent).

Sr. No.	Constraints	Frequency	Percentage	Rank
1.	Prevailing uneven rainfall distribution in the area	103	85.83	**I**
2.	Lack of financial support from the government	94	78.33	**II**
3.	Farmers had lack of knowledge about climate resilient practices	91	75.83	**III**
4.	Farmers had lack of technical guidance regarding NICRA project	88	73.33	**IV**
5.	Lack of resources owned by farmers	82	68.33	**V**
6.	Lack of established structures for water harvesting (khet talavdi) in the area	75	62.50	**VI**
7.	Farmers received inadequate service through Custom Hiring Centres (CHCs)	71	59.67	**VII**
8.	Lack of support from line departments received by the farmers	68	56.67	**VIII**
9.	Poor availability of soil and water conservation practices in the area	62	51.67	**IX**
10.	Farmers had lack of infrastructure for livestock	54	46.67	**X**

Table 2: Perceived constraints in adoption of climate resilient technologies

It can be concluded that to overcome the problems extension specialists need to educate the farmers about the climate resilient practices and should provide proper technical guidance and training to farmers to adopt soil and water conservation practices. Provision of critical inputs like high yielding, drought tolerant, early maturing variety seeds in time. Providing labour saving technologies in adopting the climate resilient practices. Providing critical inputs at subsidized rate and financial assistance in construction of soil and moisture conservation practices and infrastructure facilities for the livestock rearing.

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