

Adoption of Climate Resilient Practices under Nicra Project

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Received: 28.02.2020 | Revised: 30.03.2020 | Accepted: 8.04.2020

ABSTRACT

National Innovations on Climate Resilient Agriculture (NICRA) project run by Krishi Vigyan Kendra, Amreli since 2015. As per the requirement of the project, four modules were adopted and different activities were carried out at Karjala village which was selected for it. To know what farmers got from the NICRA project an adoption study was carried out. A total of 350 respondents were selected randomly for the study. The study revealed that respondents had 60.29 percent overall medium level adoption in the case of natural resource management practices. Whereas, 66.29 percent of the respondents had a medium level of adoption about crop production module and 63.71 percent of the respondents had a medium level of adoption about livestock interventions. Lastly, in a subject to institutional interventions, 80.00 percent of the respondents had a medium level of adoption.

Keywords: Adoption, Climate Change, NICRA, Innovation

INTRODUCTION

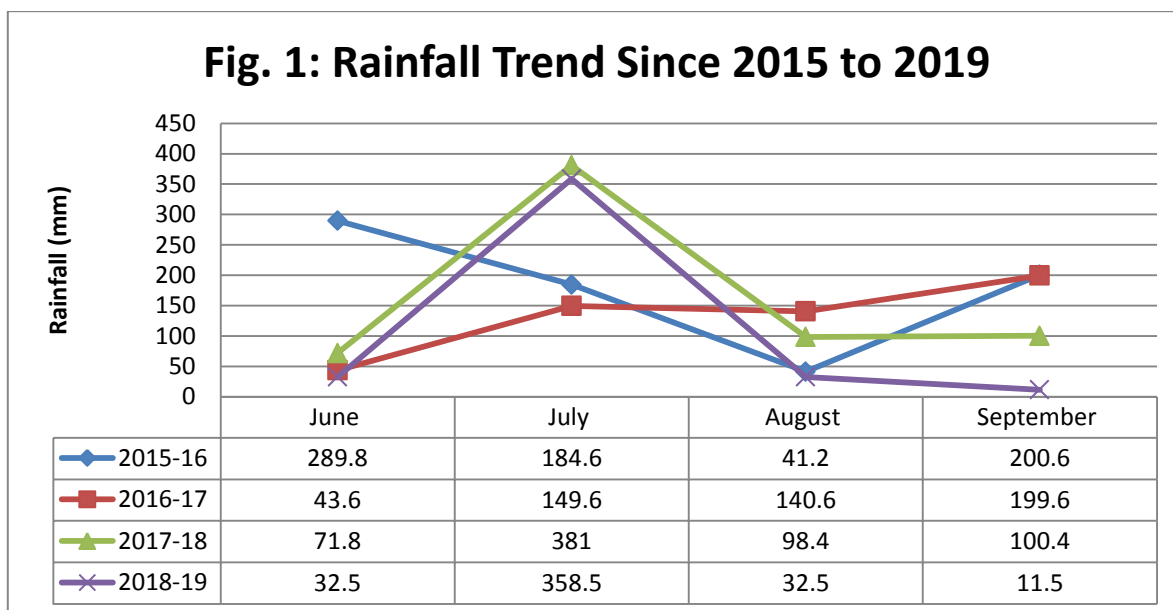
Agriculture is an important sector of the Indian economy and agriculture remains vulnerable to the vagaries of weather, and the looming threat of climate change may expose this vulnerability further. The impact of climate change on agriculture could result in the struggle of the mass population for their livelihood which directly and indirectly depends on agriculture. The climate change can also result in a change in cropping patterns; affect the irrigation methods and pest and diseases population.

National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February 2011.

The project aims to enhance the resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstrations. The research on adaptation and mitigation covers crops, livestock, fisheries, and natural resource management. The project consists of four components viz. Strategic Research, Technology Demonstration, Capacity Building and Sponsored/Competitive Grants.

Krishi Vigyan Kendra, Amreli selected karjala village to carry out project and different activities of following four modules like natural resources, crop production, livestock and fisheries and institutional interventions were done.

Cite this article: Hadiya, N.J., Parmar, V.S., Joshi, N.S., Kachhadiya, N.M., & Prajapati, P.J. (2020). Adoption of Climate Resilient Practices under Nicra Project, *Ind. J. Pure App. Biosci.* 8(3), 671-677. doi: <http://dx.doi.org/10.18782/2582-2845.7972>



The variability of rainfall of karjala village is shown in fig. 1. It was very erratic rainfall in this village in month of June followed by September, which affects critical stages of crops which was important for productivity. So, it is challenge for KVK to sustain the production with climate resilient practices. It also an important at farmers level how many practices were accepted.

Thus, to know the adoption level of farmers and also know at which level innovative extension approaches and strategies successful to improves adoption of farmers. Keeping this fact in view, it is necessary to carried out study on “Adoption of climate resilient practices under NICRA project”

MATERIALS AND METHODS

The present study was conducted in Amreli district of Saurashtra region. Karjala village was purposively selected and total 300 farmers from the village randomly selected where

NICRA project run last four year. *Ex-post-facto* research design was used in the present investigation. The interview schedule was developed keeping in view the specific objectives of the study and the data was collected by survey method during 2018-19.

Adoption of the respondents about climate resilient practices was measured by computing the adoption score. In all four different modules with their statements in respect to climate resilient practices were prepared with the help of experts from the JAU, Junagadh; KVK, Amreli and CoA, JAU, Motabhandariya. If respondent has given “fully adopted” answer to any sub-questions under the head, the “three” score was given likewise “two” score for “Partially adopted” and “ONE” score was given for those who had given “Not adopted” answer.

The respondents were grouped into three levels of adoption by using mean and standard deviation.

Sr. No.	Category	Range
1.	Low level of decision making	$\leq \bar{X} - S.D.$
2.	Medium level of decision making	In between $\bar{X} \pm S.D.$
3.	High level of decision making	$\geq \bar{X} + S.D.$

RESULT AND DISCUSSION**Natural resource management**

This module consists of interventions related to in-situ moisture conservation, water harvesting, supplemental irrigation, improved

drainage in flood prone areas, conservation tillage where appropriate, artificial ground water recharge and water saving irrigation methods.

Table 1: Module-1 Natural resource Management

Sr. No.	Resilient Practices	Not Adopted (%)	Partially Adopted (%)	Fully Adopted (%)
1	Summer ploughing	19.14 (67)	34.29 (120)	46.57 (163)
2	Summer deep ploughing (every 3rd year)	26.86 (94)	33.43 (117)	39.71 (139)
3	Enrich soil health through incorporate crop residues into soil	29.71 (104)	43.71 (153)	26.57 (93)
4	Use of mulching	88.29 (309)	8.86 (31)	2.86 (10)
5	Recycling of organic waste	54.57 (191)	35.43 (124)	10.00 (35)
6	Soil sample collection and testing	27.43 (96)	39.43 (138)	33.14 (116)
7	Farm pond for augmentation of ground water	84.00 (294)	10.29 (36)	5.71 (20)
8	Use of vermicompost	94.57 (331)	3.14 (11)	2.29 (8)

From the Table 1 show that in case of full adopted resilient practices that 46.57 per cent of the respondents had do summer ploughing followed by 39.71 per cent and 33.14 per cent of them had summer deep ploughing and soil sample collection and testing, respectively.

Moreover in case of partially adopted resilient practices, 43.71 per cent respondents had enriched soil health through incorporate crop residues into soil. While, 39.43 per cent had soil sample collection and testing and 35.43 per cent had recycling of organic waste, respectively.

Further, majority of the respondents 94.57 per cent had not adopted vermicompost

followed by 88.29 per cent and 84.00 per cent of the respondents had not adopted mulching and farm pond for augmentation of ground water, respectively.

The probable reason might be the summer ploughing and deep summer ploughing at every 3 year is common practices done by the farmers who had good farm mechanization and it is also due to custom hiring centre run under NICRA project. Use of mulching and vermicompost adoption is very poor due to laborious and care taking technology moreover mulching is very costly for cotton crops.

Table 2: Overall adoptions of natural resource management resilient practices

Sr. No.	Level of Adoption	Frequency	Percentage
1	Low level of Adoption (Up to 10 Score)	81	23.14
2	Medium level of Adoption (10 to 16 Score)	211	60.29
3	High Level of Adoption (More than 16 Score)	58	16.57
Total		350	100
Mean =13.42		SD. = 3.21	

The analysis of data presented in table -2 revealed that majority 60.29 per cent of the respondents had medium level of adoption about natural resource management practices while, 23.14 per cent of respondents had low level and 16.57 per cent of respondents had high level of adoption about natural resource management practices, respectively.

Crop production interventions

This module consists of introducing drought/temperature/flood tolerant varieties,

advancement of planting dates of *rabi* crops in areas with terminal heat stress, water saving paddy cultivation methods (SRI, aerobic, direct seeding), frost management in horticulture through trash burning, community nurseries for delayed monsoon, custom hiring centers for timely planting, location specific intercropping systems with high sustainable yield index.

Table 3: Module-2: Crop production interventions

Sr. No.	Resilient Practices	Not Adopted (%)	Partially Adopted (%)	Fully Adopted (%)
1	Sowing of Short duration/ late sowing/ Drought resistance/ wilt resistance varieties	2.57 (9)	6.00 (21)	91.43 (320)
2	Seed treatment	4.29 (15)	20.00 (70)	75.71 (265)
3	Integrated pest and Disease management in crop	6.29 (22)	39.14 (137)	54.57 (191)
4	Intercropping	12.29 (43)	35.43 (124)	52.29 (183)
5	Integrated Nutrient and Integrated Crop management	10.86 (38)	41.43 (145)	47.71 (167)
6	Crop Diversification	42.00 (147)	27.14 (95)	30.86 (108)
7	Sowing of Latest released varieties	45.71 (160)	28.86 (101)	25.43 (89)

From the Table 2 show that in case of full adopted resilient practices that majority 91.43 per cent of the respondents sowing Short duration/ late sowing/ Drought resistance/ wilt resistance varieties followed by 75.71 per cent, 54.57 per cent and 52.29 per cent of them had doing seed treatment and integrated management of pests and diseases and intercropping, respectively. The probable reason might be short duration variety like GW-173 given extra income to farmers if they timely harvest cotton. Full Adoption of seed treatment, IPM, IDM and intercropping were high due to regular training and field day.

In case of partially adopted resilient practices, 41.43 per cent respondents had enriched integrated nutrient and integrated

crop management. While, 39.14 per cent respondents had integrated pest and disease management in crop, respectively. The probable reason might be availability of poor quality manure/compost due to failed to manage cow/buffalo dung with less livestock possession and in case of integrated crop management farmers had faced difficulty to do inter culturing operation especially in cotton.

Crop diversification and Sowing of latest varieties are not adopted by 42 percent and 45.71 per cent respondents, might be due to demonstration of dragon fruit has been failed caused by high summer temperature in month of May and farmers who were stuck to the cotton crop where now show interest in groundnut and pulses crop.

Table 4: Overall adoptions of Crop production interventions

Sr. No.	Level of Adoption	Frequency	Percentage
1	Low level of Adoption (Up to 14 Score)	81	23.14
2	Medium level of Adoption (14 to 19 Score)	232	66.29
3	High Level of Adoption (More than 19 Score)	37	10.57
Total		350	100
Mean =16.54		SD = 2.63	

The analysis of data show that 66.29 per cent of the beneficiary respondents had medium level of adoption about crop production module while, 23.14 per cent of respondents had low level and 10.57 per cent of respondents had high level of adoption about crop production module, respectively.

Livestock Interventions

Use of community lands for fodder production during droughts/floods, improved fodder/feed storage methods, preventive vaccination, improved shelters for reducing heat stress in livestock, management of fish ponds/tanks during water scarcity and excess water, etc.

Table 5: Module-3: Livestock Interventions

Sr. No.	Resilient Practices	Not Adopted (%)	Partially Adopted (%)	Fully Adopted (%)
1	Mineral mixture	10.00 (35)	30.57 (107)	59.43 (208)
2	Vaccination & Deworming	50.00 (175)	29.43 (103)	20.57 (72)
3	Fodder production around the year	11.43 (40)	16.00 (56)	72.57 (254)
4	Silage making	79.14 (277)	11.14 (39)	9.71 (34)
5	Urea treatment	82.86 (290)	9.71 (34)	7.43 (26)

Table 5 indicated the adoption made for livestock in NICRA village. From this table there were huge fully adoption made by 72.57 per cent for fodder production around year followed mineral mixture as feed supplementary by 59.43 per cent. The probable reason might be it directly affect milk production and easy to

adopt farmers. Silage making, vaccination and treatment of urea are not adopted by majority of the respondents. The probable reason might be farmers giving less importance to the livestock in this village than crop production. There is very less farmer in village that produce milk for economic purpose.

Table 6: Overall adoptions of livestock interventions

Sr. No.	Level of Adoption	Frequency	Percentage
1	Low level of Adoption (Up to 8 Score)	94	26.86
2	Medium level of Adoption (8 to 11 Score)	223	63.71
3	High Level of Adoption (More than 11 Score)	33	09.43
Total		350	100
Mean = 9.36		SD. = 1.71	

The analysis of data show that 63.71 per cent of the beneficiary respondents had medium level of adoption about Livestock Interventions while, 26.86 per cent of respondents had low level and 9.43 per cent of respondents had high level of adoption about Livestock Interventions, respectively.

Institutional Interventions

This module consist of institutional interventions either by strengthening the existing ones or initiating new ones relating to seed bank, fodder bank, commodity groups, custom hiring centre, collective marketing, introduction of weather index based insurance and climate literacy through a village level weather station.

Table 7: Module-4: Institutional Interventions

Sr. No.	Resilient Practices	Not Adopted (%)	Partially Adopted (%)	Fully Adopted (%)
1	Custom hiring centre	0.00 (0)	15.43 (54)	84.57 (296)
2	Fodder bank	75.71 (265)	14.57 (51)	09.71 (34)
3	Seed bank	68.86 (241)	17.71 (62)	13.43 (47)
4	Agriculture operation according to agro advisory	66.00 (231)	13.71 (48)	20.29 (71)

The Institutional interventions are made up by farmers of village by making a committee for timely farm operations, livestock feed resources and sowing material. Table 7 indicated that the custom hiring centre is fully adopted by 84.57 per cent respondents and partially adopted by 15.43 per cent respondents, there are all the respondents fully either partially adopted the custom hiring centre and using implements for doing timely farm operations. The probable reason may be very nominal charges were paid by farmers for it.

Seed banks and fodder banks had not adopted by 75.71 per cent and 68.86 per cent respondents, respectively. The probable reason may be the respondents are mostly using his production for Household consumption. The climate literacy is less due to conventional farming in village and many times weather forecast is not accurate in drought years, so there are 66 per cent of respondents not adopted this interventions.

Table 8: Overall adoptions of Institutional Interventions

Sr. No.	Level of Adoption	Frequency	Percentage
1	Low level of Adoption (Up to 13 Score)	30	08.57
2	Medium level of Adoption (13 to 20 Score)	280	80.00
3	High Level of Adoption (More than 20 Score)	40	11.43
Total		350	100
Mean = 16.54		SD. = 3.05	

The analysis of data show that 80.00 per cent of the beneficiary respondents had medium level of adoption about institutional Interventions while, 11.43 per cent of respondents had high level and 8.57 per cent of respondents had low level of adoption about Livestock Interventions, respectively.

CONCLUSION

Enhancing agricultural productivity is critical for ensuring food and nutritional security for nation, particularly the resource poor small and marginal farmers who would be affected most by their livelihood. It can be concluded that the major fully adopted resilient practices were sowing short duration/ late sowing/

Drought resistance/ wilt resistance variety, custom hiring centre, seed treatment, fodder production around year and mineral mixture as feed supplementary by the respondents.

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