IMPACT OF CLIMATE RESILIENT TECHNOLOGY IN NICRA VILLAGE OF RAJKOT DISTRICT OF GUJARAT

M. M. Tajpara[1]; M. A. Vakaliya[2] and B. N. Kalsariya[3]

1 & 2 , Krishi Vigyan Kendra, JAU, Targhadia Dist.Rajkot - 360003
3 Associate Professor, Department of Agril. Extension, College of Agriculture, JAU, Junagadh - 362001
Email : tajpara1978@rediffmail.com

ABSTRACT

ICAR has launched major network project National Initiative on Climate Resilient Agriculture (NICRA) during Feb-2011 in 121 vulnerable districts across India. Project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through four module technological demonstration. Present study was conducted to assess impact of climate resilient technologies in adopted NICRA village. The Magharvada village of Rajkot district was purposively selected for the study with sample size 300 farmers due only one village was declared under NICRA project. The result of the study revealed that majority of farmer had high level of adoption in livestock (81.83 %) & crop production (77.25 %) related to climate resilient technologies. In case of NRM (43.70 %) & institutional intervention (51.77 %) medium level of adoption was found. After Deeping of pond & check dam, average ground water table has raised up to 3 to 4 meter as compare to previous year. In drought or uneven and erratic rainfall situation of Rajkot district, drought resistant variety of Groundnut (GJG-9) was demonstrated and yield was increased up to 20 percent. Demonstration of drought and disease resistance varieties of chickpea (GJG-3) and wilt resistance varieties of cumin (GC-4) result were indicated increased yield 16 percent and 8 percent respectively over local varieties. The milk production in the village has increased by 20-25 per cent due to adoption of livestock management interventions. In case of custom hiring medium level of adoption reason might be due to lack of technical knowledge to operate & repairing of instrument, transportation problem of heavy machinery.

Keywords : *impact, farmers, climate resilient technology*

INTRODUCTION

Climate change and global worming impacts all sectors of human life. Agriculture is particularly vulnerable to it. Higher temperatures and to reduce yields of many crops; and encourages proliferation of weeds and pests. The overall impact of climate change on agriculture is likely to be negative. Climate change will have a negative effect on yield of irrigated crops across regions, both due to increase in temperature and changes in availability of water. Rainfed agriculture will be primarily impacted due to rainfall variability and reduction in number of rainy days (Venkateshwarlu and Shanker, 2013). Impacts will be global, but much of the damage will be in developing countries, where, 11 percent of arable land could be affected by climate change, including a reduction of about 16 percent of agriculture GDP (Pathak *et al*. 2012).

National Initiative on Climate Resilient Agriculture is one of the pilot projects launched by Indian Council of Agricultural Research (ICAR), New Delhi during 2010-11, that correlate the climate variability and its impact on agricultural process and too aims at development in agricultural strategies based on variability of temperature, humidity, dry land and other adverse condition. National Initiative on Climate Resilient Agriculture (NICRA) is the brain child of Central Research Institute for Dry land Agriculture (CRIDA), Hyderabad. It is a network project of Indian Council of agricultural Research implemented in 121 vulnerable districts across the country. The project was implemented by Krishi Vigyan Kendra (KVK) in different agro climate zones. Based on this Rajkot, Amreli, Kutch, Valsad and Banaskatha district is selected for piloting the NICRA project in Gujarat. But Rajkot district is well known for its low, uneven and erratic rainfall. So present study was conducted in adopted NICRA village (Magharvada) of Rajkot district.

Farmer of selected village & nearby village under adverse climate situation such as early season drought (delayed onset), normal onset followed by 15-20 days dry spell, mid season drought (long dry spell) & early withdrawal of monsoon were faced during past years. Cotton and Groundnut crop is major crop during kharif and both crops are affected by drought/dry spell which generally occur

during mid July to August. During kharif 2011 nearly 600 hectare of cultivated land in villages was badly affected by drought. Extent of yield loss was about 50 - 80 percent in cotton and 80- 100 percent in groundnut (NICRA Annual report, 2012-2016).

OBJECTIVE

To know the impact of climate resilient technology in nicra village of Rajkot district of Gujarat

METHODOLOGY

The study was conducted at Magharwada village comes under North Saurashtra Agroclimatic, Zone VI. It is situated in the eastern part of the Rajkot district and 12 km away from Krishi Vigyan Kendra, Targhadia (Rajkot). The Magharvada village of Rajkot district was purposively selected for the study with sample size 300 farmers, due only one village was came under NICRA project. The main crops were growing *viz.* Cotton, Groundnut, Wheat, Gram, Cumin, Garlic & Onion in this village.

Project is working on four modules to address the climate vulnerability through suitable intervention in project village of magharvada.

(1) Natural Resources Management

This module consist of intervention related to in-situ moisture conservation, water harvesting and recycling for supplemental irrigation, improved drainage in flood prone area, conservation tillage, artificial ground water recharge and water saving irrigation methods.

(2) Crop Production

This module consist of introducing of drought/ temperature tolerance varieties, advancement of planting, date of rabi crops in area with terminal heat stress, high yield and diseases resistance varieties, location specific intercropping system, INM, IPM, custom hiring center of farm machinery for timely farm operation.

(3) Livestock management

Breed improvement of big and small ruminants, fodder production through improve planting materials, during drought/flood, improved fodder/feed storage methods, preventive vaccination, improved shelter for reducing heat stress, fodder enrichment, fodder bank.

(4) Institutional Intervention

This module consist of Institutional intervention either by strengthening existing one or initiating new one relating to seed bank, fodder bank, commodity group, custom hiring center, collective marketing, introduction of weather index based insurance and climate literacy through village level weather station.

RESULTS AND DISCUSSION

Whole climate resilient location specific technologies are demonstrated in NICRA village of Rajkot district of Gujarat since 2011. Out of 21 climate resilient technological intervention, 20 practices are accepted by farming community.

Table 1: Adoption of climate resilient technologies in details NICRA adopted village of Rajkot district in Gujarat

n=300

Sr. No.	Practices	No. farmers adopted *CRT	Percentage of adoption of CRT by farmers
NRM			
1	Summer ploughing (every year)	193	64.33
2	Summer deep ploughing (every 3rd year)	151	50.33
3	Enrich soil health through incorporate crop residues into soil	130	43.33
4	Rain gun, Sprinkler irrigation	30	10.00
5	Recycling of organic waste	161	53.67
6	Soil sample collection and testing	133	44.33
7	Soil test based fertilizer	121	40.33
8	Tree plantation	170	56.67
9	Use of vermicompost	91	30.33
Crop production			
10	Seed treatment	211	70.33
11	Drought/Short duration/diseases resistant varieties	263	87.67
12	INM/IPM in crop	245	81.67
13	Intercropping	208	69.33

Sr. No.	Practices	No. farmers adopted *CRT	Percentage of adoption of CRT by farmers
Livestock Management			
14	Breed Improvement	221	73.67
15	Mineral mixture	263	87.67
16	Vaccination & Deworming	265	88.33
17	Fodder production around the year	233	77.67
18	Urea treatment	191	63.67
Institutional Interventions			
19	Seed bank	140	46.67
20	Fodder bank	146	48.66
21	Custom hiring centre	180	60.33

*CRT= Climate Resilient Technology

The result revealed that after dipping of pond and check dam average ground water table has raised up to 3 to 4 meter as compare to previous year. To enrich the nutrient status of soil through recycling of farm residues 130 farmers in about 135 ha area were incorporated cotton stalk and wheat straw through use of Rotavator and mobile chopper. 161 farmers has prepared 430 ton rich compost from cotton stalk chopped by shredder and applied in the farm to increase organic material in soil which improve the soil fertility and sustainability. Similar finding have been reported by Sasanka *et al.* (2016).

In drought or uneven and erratic rainfall situation of Rajkot district Groundnut (GJG-9) was demonstrated and yield was increased up to 20 percent and heavy drought tolerant character. Demonstration of drought resistance varieties of chickpea (GJG-3) and wilt resistance varieties of cumin (GC-4) result were indicated increased yield 16 percent and 8 percent respectively over local varieties. Location specific intercropping system when demonstrated in farmer field. Pronounced achievement was reported from groundnut & Pigeon pea, Maize & Groundnut intercropping system with enhancement in yield by 9 percent. INM demonstration in cotton and groundnut were conducted and yield increased by 6.6 and 7.4 percent respectively. IPM in Bt cotton result indicated that most of sucking pest were controlled through IPM and yield increased by 5 to 10 percent compare to farmer practices. This finding is line with result reported by Sasanka *et al.* (2016).

Improved breed of Buffaloes and Cow were introduced for improving local breeds like as Jafrabadi, Bunny and Gir. Demonstration of green fodder round the year was conducted on farmer field. Further mineral mixture, deworming and vaccination were conducted during animal treatment camp. The milk production in village has increased by 20- 25 percent due to adaption of this intervention. Due to urea treatment protein content of fodder was increased from 0.5 to 4.5 percent. This finding was in line with finding of Jasna *et al*. (2014).

Small and marginal farmers are mainly using village level NICRA custom hiring center of farm implements during cultivation of crops and nominal amount deposited in the NICRA account for post project management and repair implements. Provision of farm machinery and argil implements assured timely planting and higher yield. Constraint in wider adaption of Custom Hiring Centre was observed in four different head, viz. technical, Financial, social and institutional. Similar finding have been reported by Nath and Dey (2015). Seed bank and fodder bank in NICRA villages are helping farmers to mitigate their seed and fodder demand. Under capacity building programmes 273 farmers and 161 farm women's were participate in training programmes like NRM, LPM, Crop production and Agri. Engineering etc.

Table 2: Summary of modules wise adoption of climate resilient technologies in NICRA adopted village of Rajkot district in Gujarat n=300

Modules	No. of farmers adopted *CRT	Percentage of adoption of CRT by farmers
NRM	131	43.70
Crop Production	232	77.25
Livestock Management	246	81.83
Institutional Intervention	155	51.89

*CRT= Climate Resilient Technology

In Table 2, the data revealed that majority of farmer had high level of adoption in livestock (81.83 %) & crop production (77.25 %) related to climate resilient technologies. In case of NRM (43.70 %) & institutional intervention

(51.77 %) medium level of adoption was found.

CONCLUSION

It can be concluded that the term adaptation in the study means adaptation regarding climate resilient technologies pertaining to location specific agriculture and animal husbandry practices.

The data reveals that majority of farmers had high level of adaptation in livestock and crop production related to climate resilient technology. In case of NRM and institutional intervention technologies medium level of adaption were found. In case of custom hiring medium level of adaption reason might be due to lack of technical knowledge to operate and repairing of instruments, lack of money to borrow instruments, difficulties in transport of heavy machineries..

So there is special attention and series of training programmes for increase farmer interest on climate related technologies on NRM and Institutional intervention.

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