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Research Article

IMPACT OF NICRA PROJECT THROUGH ANALYSIS OF DIFFERENT SUCCESS POINT

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Abstract- Cooch Behar KVK got NICRA (National Innovations on Climate Resilient Agriculture) project during 2010-11. Khagribari village under Cooch Behar-2 Block selected purposively (KVK Adopted Village) for implementation of the NICRA project. Several activities were done during 2010-11 to 2016-17. Majority of the farmers of Khagrabari village were marginal farmer. Flood, irrigation, water conservation, diseases infestation on plant and occupational migration were the major problem of the village. Some innovative and progressive farmers were developed and exposed their activity through different programme. In our study we discuss about the few success point of NICRA project in Cooch Behar District. The objective of the study was to show the impact of NICRA project in Cooch Behar District through analysis of different success point.

Keywords- NICRA, Success point, KVK, Flood, Innovative, Progressive, Impact

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INTRODUCTION

National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR). The Project was launched during February, 2011. The aims of the project were to enhance climate resilience agriculture through strategic research and technology demonstration which covers agricultural and horticultural crops, fisheries livestock and natural resource management. The NICRA project consists of four components: i) Strategic Research, ii) Technology Demonstration, iii) Capacity Building and iv) Sponsored/Competitive Grants [1]. Cooch Behar District is located in the Sub-Himalayan plains and belonging to the Tarai-Agro climatic zone of West Bengal. Out of 3345 sq. km geographical area of the district, 2353 sq km (70.3% of geographical area) was under cultivation. The district experiences a typical sub-tropical prehumid climate with high annual rainfall (higher than 3000 mm), high relative humidity (avg. max. & min. of 95% & 65 % respectively) and moderate temp. (avg. max. & min. of 38^0C and 5.5^0C respectively). High ground water table, residual soil moisture and the prolonged winter were found to be favourable factors contributing to successful raising of a good number of *Rabi* crops even under late sown condition during winter months with or without irrigation. Cooch Behar District was favourably exposed to high rainfall and occasional short dry spell which was significantly affects the yields of rainfed crops in *Kharif* season while occurrence of pre-monsoon showers with high intensity causing heavy yield loss of Pre-*Kharif* crops [2]. Cooch Behar KVK as converged in April 2004 from ZARS-KVK, was vested with the responsibilities to bring forth agricultural vis-a-vis rural development in the rural blocks of Cooch Behar district. As a basic pre-condition to work for the rural people, KVK has to analyses strength, weakness, opportunities and perceived threats of the adopted villages. Presently KVK is well-linked with district line departments and farmers' club of the district [3]. Coochbehar KVK got NICRA project during 2010-11. Khagribari Village under Cooch Behar-2 Block was selected purposively for implementation of NICRA project. Village was selected on the basis of climate vulnerability. Khagribari village was primarily flood prone area. Torsha is the nearest river of Khagribari village. Different type of activity was taken by the scientist of Cooch Behar Krishi Vigyan Kendra during the period of 2010-11 to 2016-17. The objective of the study was to identify the Impact of NICRA project in Cooch Behar District through analysis of different success point.

Solid Waste Management through Composting

Background information: Organic matter always plays pivotal role in minimizing the effect of global warming by way of reducing fluctuation in diurnal temperature variation and also minimizing the maximum soil temperature [4]. Further organic matter reduces the irrigation water requirement and thus reduces environmental pollution also [5]. Considering this Coochbehar KVK took initiative to popularize the use of organic manure by promoting the technology of compost preparation. Cowdung manure was the only organic manure used by the farmers of the village but the quality of the manure was very poor due to unscientific management. Moreover, availability of cowdung is very limited due to other uses and is decreasing further due to mechanization. Farmers of the villages were not at all aware about the recycling of rural farm waste, kitchen waste and other organic residues for preparation of organic manure.

Initiative: Cooch Behar Krishi Vigyan Kendra initiated demonstration programme for proper utilization of cowdung, rural farm waste, kitchen wastes, other locally available organic waste materials and organic residues through preparation of compost by NADEP [6] method to cut down the shortage of availability of organic manures [Fig-1 and 2].

Demonstration was also organized on low cost preparation of compost by heap method. Awareness was also developed to improve the quality of cowdung manure with minimum interference [7].

Impact: Laboratory analysis of samples collected shown in the [Table-1]. It is clearly indicated that quality of organic manures produced through NADEP or heap method was much better than that used by farmers of the village. It is also to noteworthy that use of organic manure has increased 94 ton from the Bench marks (when compared with status of organic manure use before inception of the project at the village). It was found that (2017) majority of the farmers of NICRA village were showing keen interest to produce organic manure from different organic wastes and residues other than cowdung also. Furthermore, much more precaution is now being taken by farmers while producing cowdung manure from cowdung. Patlakhawa Gram Panchayet was promoting organic manure production through composting under MGNREGA with technical support from Cooch Behar Krishi Vigyan Kendra.

Table-1 *Demonstration and training on quality and status of organic matter use*

No. of farmers	Measurable indicators of output*		Organic manure use	
	NADEP compost	Farmer made compost	Before NICRA (Ton)	After NICRA (Ton)
Demonstration on NADEP compost: 102	pH-6.9, OC-23.06%, Tot. N-1.06%, Tot. P_2O_5-1.12% Tot. K_2O-0.82%)	pH-5.9, OC-22.93%, Tot. N-0.42%, Tot. P_2O_5-0.18% Tot. K_2O-0.23%	1600	1683
	Heap compost			
Demonstration on heap method: 22	pH-6.6, OC-22.96%, Tot. N-0.73%, Tot. P_2O_5-0.63% Tot. K_2O-0.62%			11
Total				1694

Fig-1, 2 Farmers' Practice Composting through NADEP method

Use of Black Polythene Mulch in Winter Cucumber

Brief about the technology: Cucumber is profitable crop in the terai region of West Bengal. This crop is primarily grown in the summer months. But farmers of this village prefer to grow this crop during *rabi* season as price of this crop remain high during winter months. Problem arises when winter temperature comes below 12 °C which not only affect physiological growth but also hampers fruit set and development of cucumber [8]. More over low temperature causes chilling injury causing reduction in crop period. Black polythene mulch was used to increase soil temperature thereby getting rid of the problems associated with low temperature [9].

Comparative performance of technology

This technology performed well under stressful environment during winter and it out-yielded the traditional practice of growing cucumber without mulch [Table-2]. On an average, soil temperature under mulch was 1-1.5°C higher during day and 4.5-5 °C during night as compared to crop without mulch which increased fruiting period by 20 days, decreasing flower drop by 10% and advancement of fruiting 5 days under mulch. In addition to this, use of polythene mulch reduced weed growth in the field and saved irrigation water to the tune of 25.80 % [Fig-3 and 4].

It was shown in [Table-3] that Benefit Cost Ratio of demonstration unit was 2.63 which was more than normal cultivation practice (BCR 2.28).

Table-2 *Area covered and number of farmers involved*

Subject	No. of farmers	Area (ha)	Measurable indicators of output		% yield increase
			Demo	Local	
Black polythene mulch in cucumber	52	3.6	291 (q/ha)	262 (q/ha)	11.06

Fig-3, 4 Demonstration unit on Black Polythene Mulch in Winter Cucumber

Table-3 *Economics of the technology*

Economics of demonstration (Rs./ha)				Economics of Local (Rs./ha)			
Gross Cost	Gross Return	Net Return	*BCR	Gross Cost	Gross Return	Net Return	BCR
66500	174600	108100	2.63	62700	143400	80700	2.28

Horizontal spread of technology: Farmers were convinced to the performance of the new technology. Gradually more numbers of farmers were adopted this technique for successfully growing cucumber during winter months.

Renovation of existing pond for harvesting, storing and recycling of rain water

Brief about the technology: A large area of the NICRA adopted village remains uncultivated during *Rabi* seasons as only 32% of total cultivated area were irrigated using bore well by lifting ground water. Though there exist a number of small and large size ponds but most of them were seasonal and cannot be used as source of irrigation during critical stages of *Rabi* crops. The NICRA village (Khagribari) of Cooch Behar district experiences annual rainfall of about 3000 mm [10] received mostly during the period from April- August but most of the water bodies of the village are 5-7 ft deep and remain dry from December onwards. However, it was also observed that water bodies having depth of 9 ft or more can retain water throughout the year. Considering this average depth of renovated ponds was increased from 5.5-7.0 ft to up to 10.5-11 ft, so that water to be stored in the ponds and can be used for life saving irrigation during *Rabi* season.

Cooch Behar KVK renovated 26 numbers of pond through NICRA project which increases 332929 cubic foot of pond volume and as result additional 46.50 ha of land irrigated during *rabi* season [Table-4], [Fig-5 and 6]. It was found from the demonstration that 1,24,444 cubic feet water was save due to use of rain water [Table-5].

Description of Farming Situation: The farmers of NICRA village were facing problems of irrigation in *Rabi* season crops (Potato, wheat, mustard, brinjal, garlic, cabbage *etc.*) due to limited irrigation sources.

Table-4 *Area Covered*

Renovation of pond	No. of ponds	Increase in volume (cubic feet) from ground level	Measurable indicators of output*
	26	332929	46.50 ha area irrigated

Table-5 *Economics of the technology*

No of farmers irrigated from renovated pond	Area covered (ha)	Saving ground water
109	64.5	1,24,444 cubic feet

Fig-5,6 Renovation of existing pond for harvesting, storing and recycling of rain water

Horizontal spread of technology: More than 5 of the pond owners of village were communicated to Cooch Behar KVK for renovation of their water bodies to store the rain water and solve the problems of irrigation to *rabi* crops with special emphasis on vegetables during mid-December to mid-February.

Introduction of stem rot resistant jute variety

Brief about the technology: Jute is a major cash crop of Cooch Behar district. In the NICRA adopted village poor productivity of jute crop (25q/h) was a major concern for the farmers. In this region soil acidity and occurrence of Macrophomina phaseolina pathogen was the major factors triggering poor productivity [11]. JBO-2003(H), is a stem rot resistant variety [12] was introduced by the KVK through NICRA project in the form of demonstration [Fig-7] in *kharif* season. Soil acidity, one of the major predisposing factors for the roting pathogen, was corrected through liming.

Fig-7 JRO-132

Fig-8 JRO 524

Table-6 *Area covered and number of farmers involved*

Critical Input	No. of farmers	Area (ha)	Measurable indicators of output (Yield)		% yield increase
			Demo	Local	
Seed (JBO2003H), lime, fertilizer etc.	165	28.5	37.00(q/ha)	25.5(q/ha)	29.41

Comparative performance of technology: The variety performed well in stressful environment and it out-yielding the traditional variety JRO-524 (figure 8) due to less incidence of stem rot pathogen [13]. On an average, there was 29.41% increase in fibre yield with 78.94% reduction in stem rot in demonstration plots against the untreated local checks [Table-6]. It was also found from the demonstration [Table-7] that Benefit Cost Ratio (BCR) of the demonstration unit was 2.95 which was more than normal cultivation practice (BCR 2.40).

Table-7 *Economics of the technology*

Economics of demonstration (Rs./ha)				Economics of Local (Rs./ha)			
Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
20150	59400	39250	2.95	19100	45900	26800	2.4

Conclusion

It may conclude from the above study that NICRA project was a successful project in Cooch Behar District. The major highlighting points of above study that horizontal impact of the Project and attachment with the different line department with this project. The project extended it is impact through different farmers club, SHGs and district line department. KVK scientists perceived that the motivation and interest level of farmers of NICRA adopted Village (Cooch Behar) on agriculture were high compared to other village (Distance more than 50 Km NICRA adopted Village, Cooch Behar). The first and foremost objectives of the project which was perceived by scientist and farmer that adoption of new technology with changing of agro climatic, agro-ecology and demographic condition and ultimate aim to established the resilience agriculture system. This type task was challenging both for scientist and farmers but it was an only project which can sustain Indian agricultural system with changing of global agricultural climate. This project will help the farmers' for adoption of site specific technology and enhancing the decision making powers among the scientist and policy makers on climate resilience agriculture.

Application of research: This type of research can be applying for organic farming, Jute cultivation, water and soil moisture management

Research Category: Climate Resilience Agriculture

Abbreviations: BCR: Benefit Cost Ratio; ICAR: Indian Council of Agricultural Research; KVK: Krishi Vigyan Kendra; NADEP: N.D. Pandharipande (According to farmers name); NICRA: National Innovations on Climate Resilient Agriculture ; ZARS-KVK: Zonal Adaptive Research Station- Krishi Vigyan Kendra;

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