Influence of Krishi Vigyan Kendras and socio-economic characteristics towards Adoption of Climate-resilient technologies

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ABSTRACT

Indian economy is mostly dependent on agriculture but climate change is the most threatening phenomena and addressing it as the biggest challenge now a days. 'In order to reduce the climate change adversities, Indian Council of Agricultural Research (ICAR) with the help of different Krishi vigyan Kendra (KVKs) operated a project called "National Innovations on Climate Resilient Agriculture". To know the impact of the project a study was conducted in KVKs (i.e., NICRA, KVKs) of two districts of North Bengal i.e., Cooch Behar and Malda. One adopted village and one non adopted village adjacent to adopted village (as control area) were selected for study from each KVK-area. From each village 30 respondents were selected randomly i.e., 60 respondents from adopted village and 60 respondents from non-adopted village. A total of 120 respondents were taken for the research work. The result from this study shows that in the level of awareness, adoption of water-saving technology, in-situ moisture conservation technology, water harvesting, recycling technology and other climate-resilient technologies the mean awareness and adoption score is more in the adopted village than in the non adopted village. The education of household head, total land holding, outside contact score, total yearly income of the family, extent of participation, exposure to interpersonal media, household power access status, level of awareness on climate resilient technology and extent of association with KVK are positively and significantly associated with adoption score. It is also found that in non-adopted villages the socio-economic variables are influencing more towards adoption of climate-resilient technology, whereas, in adopted villages it is due to the association with KVK.

Key words: Adoption, Climate resilient technologies, KVK, NICRA.

INTRODUCTION

Agriculture has been the backbone of the Indian economy for several thousand years. It is the main occupation for the people who are living in rural India. Nearly 49% population in India were involved in Agriculture and allied sectors (Sriharsha et al. 2021). Climate change is the most threatening phenomena and addressing it as the biggest challenge for civilized society now-a-days. India experiences hardest hit from it being an agriculturally dependent economy. The threat of climate change to agriculture is due to scanty and erratic rainfall pattern, shifting of seasons, more occurrences of climate extremies or increasing average daily temperature (Anonymous, 2011). Such phenomena will impact agriculture considerably through their direct and indirect effects on crops, livestock, and incidences of pest-disease-weeds, increasing deterioration of soil health and thereby threatening the food security like never before. Agriculture has now become extremely competitive. Practicing agriculture demands to be innovative, nature friendly, relying on farmers wisdom and make use of modern development of science. Use of science and technology, knowledge empowerment and capacity building can enable farmers to make them competitive and induce inclusive growth. Krishi Vigyan Kendra (KVKs) plays a vital role in the development of agriculture in our country. KVKs are expected to serve as a resource center for expending government initiatives to the local areas.

Dobariya et al. (2017) Observed that KVK had played an important role in increasing knowledge, the rate of adoption and yield of improved agricultural technologies of gram crop. There are many activities done through KVK for the development of rural areas and in agriculture. Bacchu et al. (2018) revealed that the training programme conducted by the KVK is one of the important tools for dissemination of knowledge and technical skills to the farmers. Meena and Bhati (2010) concluded that trainings conducted by ZARS-KVK were

helpful to trainees in gaining knowledge which ultimately increased the adoption level in cotton production technologies. Apart from the mandates, KVKs are also doing tremendous job towards dissemination of climate resilient technology through National Innovations on Climate Resilient Agriculture (NICRA) project. Following the launch of NICRA, the Central Research Institute for Dryland Agriculture (CRIDA) in Hyderabad was roped in to plan, coordinate and monitor the project. In this planning, KVKs were tagged for nationwide implementation of NICRA based on a climate vulnerability index and inputs from district level. Gorfad et al. (2018) reported that KVK scientists succeeded in arousing awareness, change in attitude, introduction of new varieties and increase in extent of adoption which increased the crop production and finally the income of the farmer. Savita and Lalita (2017) revealed that the Krishi Vigyan Kendra contributed positively in enhancing the adoption level of farmers in various aspects of agricultural production technologies. The present study focuses on the Influence of Krishi Vigyan Kendras and socio-economic characteristics towards adoption of Climate-resilient technologies

MATERIALS AND METHODS

This study covered Socio-Economic characteristics and influence of KVK's on both climate resilient technologies adopted farmers and Non-Adopted farmers present in Coochbehar district and Malda District of West Bengal. From each district one KVK was selected which were implementing NICRA project. Two villages were selected from each KVK zone. One is the adopted village of KVK and another is Non-adopted village which is adjacent to the adopted village. The villages were selected purposively. From each village 30 respondents were selected randomly. Total 120 respondents were taken for the research work.

In assessing the influence of KVKs on adoption of climate resilient technologies, direct influence (viz. influenced by undertaking training or demonstration of technology in

the field), indirect influence (viz. influenced by the KVK farmers or seeing the demonstration in others' plot) and No influence (viz. influenced by other agents like line department or NGOs or any other agent) were considered. For Adoption score scale composed with responses adopted the technology and not adopted the technology with corresponding score 1 and 0 respectively. The statistical methods such percentage, t-test, correlation, multiple regression were used for the analysis of the data per characteristics.

RESULTS AND DISCUSSION

1. Correlation between Socio-economic and Personal Character and Adoption Score in adopted and non adopted villages

The data from Table 1 represents the coefficient of correlation between the socio economic, personal characters and adoption score of the adopted village and non-adopted village. In case of adopted village outside contact score, extent of mass media participation, household physical status and house hold power access status were negatively significant with the adoption score. Most of the respondents in the adopted village were in close contact with the KVK. They are depending on KVK for any kind of agricultural information, and they have very less contact with other departments. In case of mass media participation, it is found that, the respondents were less interested in listening the radio, watching TV and reading newspaper for adoption of any climate resilient technology. Household physical status mainly related with housing condition and sanitation. Housing power access status mainly defined as the combination of power, house hold power for light and cooking power. These were the conditions which were not so much developed in the adopted village. So, the influences of these two were very less to adopt the climate resilient technologies. This was the plausible cause that household physical status and household power access status were negatively significant. But variables like level of awareness on climate resilient technology and Extent of association with KVK were positively significant with adoption score. **Table No-1 Data representing Correlation between Socio-economic and Personal Character and Adoption Score in adopted and non adopted villages.**

Sl. No.	Socio-economic and personal characters	r-value	
		Adopted village	Non-adopted village
1.	Age of the household head	-0.133	0.147
2.	Education of household head	0.052	0.263*
3.	Family size (Numbers of family members)	0.233	0.176
4.	Total land holding	0.047	0.402**
5.	Outside contact score	-0.334**	0.107
6.	Total yearly income of the family	-0.072	0.383**

7.	Extent of mass media participation	-0.285*	0.400**
8.	Exposure to inter-personal media	0.013	0.410**
9.	House hold physical status	-0.374**	0.153
10.	Household power access status	-0.306*	0.453**
11.	Level of awareness on climate-resilient technology	0.302*	0.506**
12	Extent of association with KVK	0.305*	0.451**

***Significant at 5%** ****Significant at 1%, (n=12)**

Where, in case of Non-adopted village education of household head, total land holding, total yearly income of the family, extent of mass media participation, exposure to inter-personal media, household power access status, level of awareness on climate-resilient technology and Extent of association with KVK were significantly and positively correlated with the adoption score. The change in these variables will be directly proportional with the change in adoption score. So this finding confirms that KVK-influence is a crucial cause of adoption of climate-resilient technologies.

2. Multiple regression analysis between the socio economic characters with the adoption score.

The data in the Table 2 shows the multiple regression analysis between the socio economic characters with the adoption score. It is observed that the exposure to interpersonal media and extent of association with KVK were positively and significantly contributing towards adoption of the technology. The result shows that one unit change of the variable exposure to interpersonal media and extent of association with KVK delineating to 0.499 and 1.177 unit change in the dependent variable adoption of the technologies respectively. But household physical status is significantly and negatively contributing towards adoption of the technologies.

R^2 value (75.7%) suggests that socioeconomic characters are very significant determinants of the adoption of technologies, because they jointly explain 75.7% of total variability of adoption of technologies.

Table No-2 Data representing multiple regression analysis between the socio economic characters with the adoption score.

Sl. No.	Independent Variable	Unstandardized Coefficients	Standardized Coefficients	t
1.	Age of the household head	-0.068	-0.134	2.158*
2.	Education of household head	0.059	0.047	0.752
3.	Family size (Numbers of family members)	0.275	0.087	1.434
4.	Total land holding	0.022	0.015	0.163
5.	Outside contact score	-0.417	-0.080	1.009
6.	Total yearly income of the family	0.000005	0.057	0.678
7.	Extent of mass media participation	-0.891	-0.202	1.918
8.	Exposure to inter-personal media	0.499	0.243	2.393*
9.	House hold physical status	-0.858	-0.147	-2.280*
10.	Household power access status	-0.512	-0.131	-1.280
11.	Level of awareness on climate-resilient technology	1.177	0.367	3.305**
12.	Extent of association with KVK	0.290	0.539	4.342**

Dependent variable = Level of adoption of climate-resilient technology; R^2=75.7%

3. Number of Farmers adopting climate-resilient technologies in KVK and non-KVK villages

The data from the Table-3 shows total number of adoption cases under different banners of climate-resilient technologies in both KVK-adopted and non-adopted villages and Fig.1 (A, B, C, D) depicts the percentage of technologies influenced by different agents towards their adoption in those villages. In case of water saving group (Fig. 1A), among 150 adoption cases in KVK-villages 94% of it were influenced directly and rest 6% were

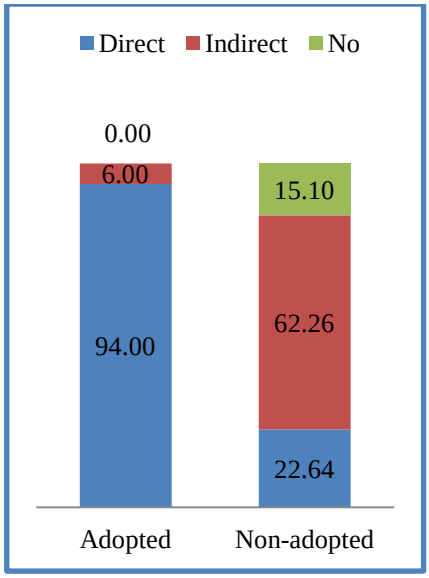
influenced indirectly by KVKs, whereas among a total of 53 adoption cases in non-KVK villages, 22.64% and 62.26% were influenced directly and indirectly respectively by KVKs. Only a meagre 15.10% were influenced by channels other than KVKs.

In (Fig. 1 B) of in-situ moisture conservation technologies, a total of 274 cases of adoption happened by sampled farmers (182 in KVK-village and 92 in non-KVK village), among which all the 100% cases were influenced directly by the KVKs in adopted village and major cases of adoption (83.70%) in non-KVK village were influenced through indirect channels of KVKs. 10.87% of these were influenced by indirect channel and only 5.43% were influenced by non-KVK channels.

Table No-3 Data showing number of farmers adopting climate-resilient technologies in KVK and non-KVK villages

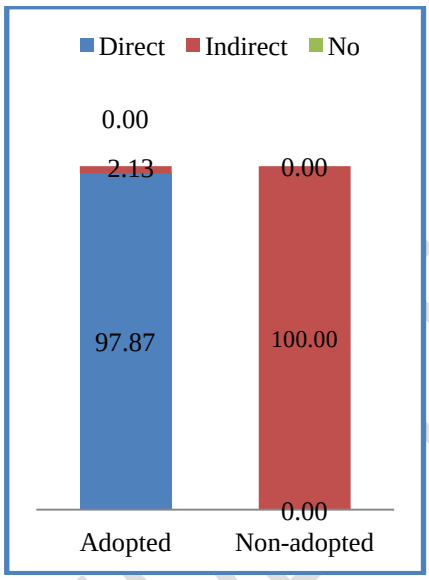
Sl. No.	Group of climate-resilient technologies	KVK-villages				Non-KVK-villages			
		Direct	Indirect	No	Total	Direct	Indirect	No	Total
1.	Water saving	141	9	0	150	12	33	8	53
2.	In-situ conservation	182	0	0	182	10	77	5	92
3.	Water harvesting	92	2	0	94	0	6	0	6
4.	Other resilient technology	925	10	29	964	43	261	85	389

In case (Fig. 1C) of water-harvesting technologies, only 100 cases were found adopted by the sampled farmers (in KVK-villages 94 and only 6 in non-KVK villages). Among these, in KVK-adopted villages, 97.87% directly and 2.13% indirectly were influenced by the KVKs, whereas entire 100% adoptions in non-KVK villages were influenced indirectly by the KVK-channels. More or less same trend was found in case of other climate resilient technologies (Fig. 1D).

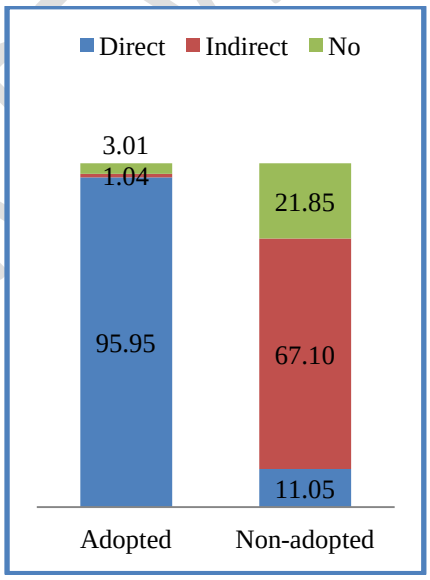


A: Water saving technology

B: In-situ moisture conservation technology



C: Water harvesting technology



D: Other resilient technology

Figure. 1. Percentage of farmers influenced by KVK for adoption of climate-resilient technologies (A to D)

Among altogether 964 and 389 adoption cases in KVK and non-KVK villages respectively, 95.95%, 1.04% and 3.01% adoptions in KVK-villages and 11.05%, 67.10% and 21.85% cases in non-KVK villages were influenced by direct, indirect and non-KVK channels respectively.

CONCLUSION:

From the above results it is inferred that the KVK's have huge influence on the adoption of climate-resilient technologies directly or indirectly, not only in their adopted villages but also in surrounding non-adopted villages. This influence occurs through training and demonstration of these climate resilient technologies in the adopted villages round the year. Training is also provided for the farmers of surrounding villages. Farmer-to-farmer network also create a trickle down and parallel dissemination of the technology. There is a very high level of impact of KVKs on adoption of climate resilient technology depicted from the adoption level of climate resilient technologies on community level as well as individual level. Even there is spill over effect of technology dissemination in the non KVK villages through KVK farmer or through seeing the technology demonstration or training. In non KVK villages the channels other than KVK (Direct or indirect) have lesser impact on adoption of climate resilient technology.

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