Knowledge level of NICRA beneficiaries on climate resilient technologies and its relationship with their profile characteristics

Abstract

Present study was conducted during 2021-22 in four NICRA implementing districts of Madhya Pradesh. Main aim of the study was to know the knowledge level of NICRA beneficiaries regarding climate resilient technologies being advocated by the scientists implementing NICRA project in selected Villages. A survey was conducted among randomly selected 300 NICRA beneficiaries with the help of an interview schedule. The findings of the study conclude that knowledge level of respondents benefiting by NICRA has a significant relationship with selected profile characteristics and it also shows that majority of the NICRA farmers (63.0 %) had a medium level knowledge on climate resilient technologies followed by low (23.7 %) and high (13.3 %).Hence there is a need to strengthen capacity building activities targeted to improve the knowledge and skills of adopt climate resilient agricultural technologies for sustainable agriculture.

Keyword: Beneficiaries, Climate Resilient agriculture, Knowledge, sustainable agriculture, NICRA

Introduction:

Climate change is an astringent reality nowadays and it has affected the entire ecosystem on earth. While agriculture is predominantly a nature resilient activity, hence significantly affected by the climate change. Changes in weather parameters like rainfall pattern, temperature, drought, flood, wind intensity etc. are majorly hampering agricultural activities. In our country, about half of the farmers practicing agriculture in rainfed conditions, therefore, the crop losses due to drought, access rains, floods, temperature rise is a common feature of our agriculture system. In previous two decades, the researchers have revealed productivity losses of 4-6 percent for rice, 6% for wheat, 18 percent for maize, 2.5 percent for sorghum, 2 percent for mustard, and 2.5 percent for potato and this trend is likely to continue in the upcoming years. According to a research by the Parliamentary Standing Committee on Agriculture, climate change losses amount to 4-9 percent of the agricultural economy each year, resulting in a 1.5 percent reduction in overall GDP. The effects of climate change on agricultural productivity are perceptible, thus a programme like NICRA has been long overdue. Hence, to address the weather aberrations as a result of climate change and to combat its effect on agriculture, the Indian Council of Agricultural Research (ICAR) has launched a network project called National Innovations on Climate Resilient Agriculture (NICRA) in February 2011.

This is India's first but little-known central Government project to address the problem of climate change. This programme runs under the supervision of the ICAR, covers more than 100 districts across the country that are vulnerable to extreme weather. The major goals of the project is to promote climate resilience agriculture by conducting strategic research and technological demonstrations in areas such as agricultural and horticultural crops, fisheries, livestock, and natural resource management. The technology demonstration component of the NICRA focused on demonstrating proven methods for climate change adaptation in agricultural and livestock production systems. The project is being implemented through Krishi Vigyan Kendra and KVKs are conducting component wise location-specific interventions in a participatory manner in selected impoverished districts across the country. The programme, which is being implemented in 100 districts throughout the country, is involving over one lakh agricultural families.

In Madhya Pradesh, NICRA is being implemented in 09 districts since 2011 through KVKs under JNKVV, Jabalpur and RVSKVV, Gwalior. The performance of NICRA in the state had been recognized on several occasions by nodal agencies like ICAR-CRIDA, Hyderabad and ICAR-ATARI, Jabalpur, but there is barely any formal research study conducted to know the status of farmers' awareness and knowledge about various climate resilient agricultural technologies being practiced at NICRA villages. Thus, a research was planned to assess the knowledge level of NICRA beneficiaries on various climate resilient agricultural technologies and its association with their profile characteristics.

Research methodology:

The study was conducted in four NICRA implementing districts of M.P., namely Tikamgarh, Satana, Morena and Ratlam during 2021-22. Sampling of respondents for the study was done from 12 NICRA villages (3 from each selected district). A total of 20 % beneficiaries from each NICRA village were chosen as respondents by adopting simple random sampling without replacement technique. A structured interview schedule was utilized to gather data from the respondents through personal interviews. The interview schedule was designed with the help of experts from departments of agriculture extension, regional agriculture research stations, KVKs, and other associated organizations in light of specific objective of the study. The majority of the items on the interview agenda were structured questions that were simple to answer. Before finalizing interview schedule, it was thoroughly pretested with 50 randomly selected

respondents in the non-sample NICRA implementing area. The final interview schedule was adjusted and suitability phrased for simple interpretation by the respondents in light of the issues encountered during pre-testing.

The knowledge level has been defined as the beneficiary's response on awareness about technological interventions carried out under various NICRA modules. An exhaustive list of module wise interventions and activities were listed for response. Each component of interventions and activities allotted score '01' for correct and '0' for incorrect response. The total score obtained by a respondent from all components of knowledge test was added to calculate the knowledge index of each respondent. The knowledge level was computed making three categories i.e. low, medium and high based on mean and standard deviation of score obtained by all the respondents on knowledge test. The correlation coefficient value was calculated to establish relationship between profile variables and knowledge level of the respondents.

Results and Discussion:

a. Knowledge Level

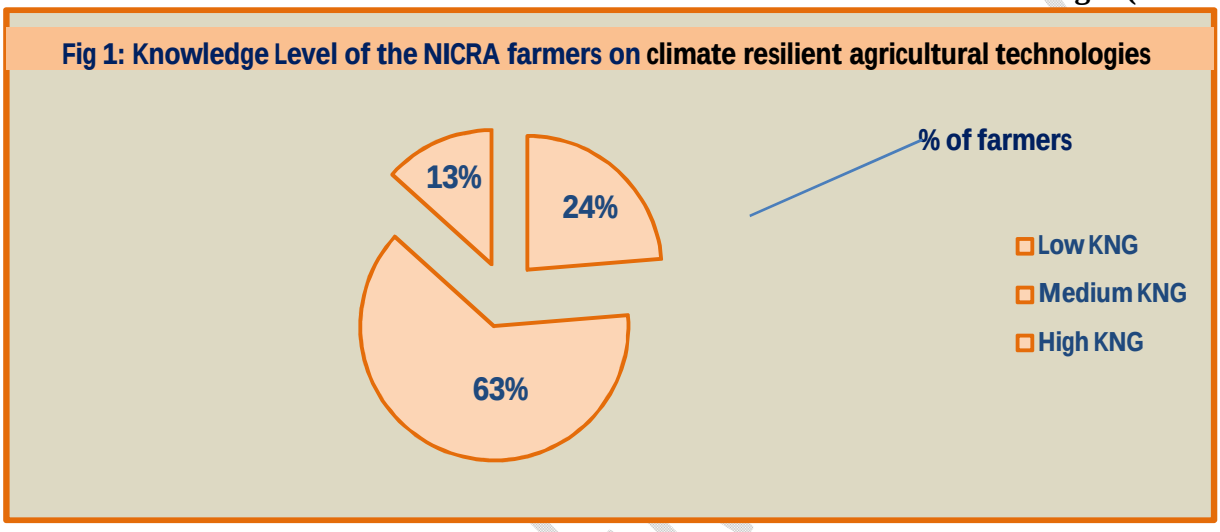
The cumulative responses of respondents on various items of knowledge test were computed to calculate overall knowledge level of respondents. the data given in Table 1 clearly shows that nearly two third of respondents (63.0 %) had a medium level of knowledge followed by low (23.7 %) and high (13.3 %) on various climate resilient technologies and activities being promoted through NICRA for sustainable and profit-making agriculture.

The findings can be rationalized as NICRA farmers were periodically trained on climate resilient technologies by KVK experts, who also visited NICRA communities to exhibit the technologies. The beneficiaries are well aware on climate resilient technologies as a result of frequent engagement with specialists during implementation of various interventions in their villages. The similar results were also reported by Bhandari et al. (2014) and Sujan et al (2018) in their respective studies.

Category	Score	Frequency	Percentage

Low knowledge level	< Mean –S.D.	71	23.7
Medium knowledge level	b/w Mean ± S.D.	189	63.0
High knowledge level	>Mean + S.D.	40	13.3

Table 1: Knowledge level of NICRA farmers on climate resilient agricultural technologies(n=300)



b. Relationship of profile characteristics with knowledge level of respondents

The correlation coefficient ('r' value) was calculated to examine relationship of various profile characteristics with knowledge level of respondents on climate resilient agricultural technologies and presented in Table 2.

Table 2: Relationship of profile characteristics of respondents with knowledge level of respondents on climate resilient agricultural technologies

Profile Characteristics	Correlation Coefficient ('r' value)
Age	0.157^{**}
Caste	0.278^{**}
Farming experience	0.081^{NS}
Education	0.174^{**}
Land Holding	0.095^{NS}
Cropping Intensity	0.096^{NS}

Crop Diversification	0.246**
Annual income	0.245**
Information Sources	0.149**
Extension Contact	0.176**
Social Participation	0.311**
Economic Motivation	0.533**
Risk Orientation	0.351**
Innovativeness	0.303**

****Significance at 0.01 level of probability**
NS =Non-Significance

The relationship of each profile characteristic of respondents with knowledge level of respondents on climate resilient agricultural technologies has been described separately with probable reasoning.

Age vs. Knowledge Level

According to the data shown in Table 2, age shows a positive and significant correlation with knowledge level (r = 0.157), at 1% level of significance which indicates that variation in knowledge had a significant impact on the respondents' age. The most likely reason for this may be that medium age group or youth are more interested in learning about new technology and thus gains more information.

The natural calamities are a regular feature in the study area and most of the respondents are engaged in farming from their young age and might have been exposed to drought and other problems on multiple occasions. Thereby, the NICRA beneficiaries may learn about climate resilient technologies from their own experience as well as through interactions with KVK scientists because they have been involved in farming for several years. As a result, a positive and significant correlation was found between the farmers' age and their knowledge of climate resilient technologies. This finding was in line with the findings of Praveen Babu at al. (2015).

Caste Vs Knowledge Level

Caste showed a positive and significant correlation with knowledge level (r = 0.278).at 1% level of significance. The results indicate that variation in knowledge had significantly associated with respondents' caste. It is observed during the survey that other backward caste respondents are more interested in learning about new technology and thus gains more knowledge as compared to rest of the respondents.

Farming experience Vs Knowledge Level

It can be observed in Table 2 that farming experience has a positive and non-significant relationship with level of knowledge (r = 0.081) which denotes that farming experience has nothing to do with knowledge about climate resilient agricultural technologies.

Education Vs Knowledge Level

The correlation co-efficient value of education(r = 0.174), showing positive and significant relationship with knowledge level at 1% level of significance. Therefore, it can be inferred that respondents' education had significantly positive association with their level of knowledge as it is well established that education is aiming for improving an individual's intellectual abilities as well as assisting them in gaining knowledge and making wise decisions. Thus, educated farmers are more likely to seek out information from a variety of farm information sources, such as farm magazines and agricultural extension publications etc. They also approach extension officers and scientists in order to improve their farming knowledge. Farmers who are illiterate or undereducated are less adept in using media to learn about NICRA and other technologies.

Land Holding Vs Knowledge Level

Land holding (r = 0.095) shown a positive and non-significant association with level of knowledge (r = 0.095) as it is an individual's personal attribute that is acquired through learning and has nothing to do with the size of land holding. Frequent interactions with KVK experts, including field visits and demonstrations may have benefited NICRA farmers in gaining sufficient knowledge of NICRA technologies and adopting them, irrespective of farm size.

Cropping Intensity Vs Knowledge Level

Data shown in table 2 indicates that cropping intensity had a positive and non-significant correlation with level of knowledge (r = 0.096) on climate resilient technologies.

Crop Diversification Vs Knowledge Level

The diversification in farming showing a positive and significant relationship with level of knowledge (r = 0.246) at 1% level of significance. This may be because the more knowledgeable farmers adopt more diversification in their farming to gain more profit in relatively low risk.

Annual income Vs Knowledge Level

According to the data depicted in Table 2, annual income showed a positive and significant correlation with knowledge level (r = 0.245) at 1% level of significance. As a result, it is possible to deduce more annual income with high level of knowledge, hence had a positive and significant relationship. Farmers who are financially secure have access to a variety of information sources in order to learn about climate resilient technologies and to adopt them to protect their crops from the negative effects of the weather, as compared to the farmers who are loss secure financially.

Information Sources Vs Knowledge Level

Information sources had a positive and significant correlation with knowledge level (r = 0.149).As a consequence, it can be said that majority of the farmers in the study area had medium level interaction with electronic media such as radio and television or adequate mass media exposure to gather knowledge on NICRA technologies, which resulted in respondents' degree of knowledge and the sources of information had a positive and significant relationship.

Extension Contact Vs Knowledge Level

Extension contact also had a positive and significant correlation with knowledge level (r = 0.176). At 1% level of significance which indicates that knowledge level and information seeking behavior through extension contact associated in a positive and significant manner.

Social participation Vs Knowledge Level

The data depicted in table 2 shows that correlation co-efficient of knowledge level (r = 0.311) had positive and significant relationship at 1% level of significance with respect to social

participation. It is clear from the study that farmers those joined one or more organizations try to interact and exchange ideas with each other on various climate resilient technologies in order to improve their knowledge. The data revealed that the majority of the respondents were members of one or more organization, hence they had an opportunity to connect with other members of the society or to learn about NICRA technology from informal sources too.

Economic Motivation Vs Knowledge Level

Economic motivation shows positive and significant association with the knowledge level (r=0.533) at the 1% level of significance. Farmers with sufficient economic resources are interested in learning about climate resilient technology in order to adopt them to avoid crop losses. On the other hand, farmers who are financially challenged do have limited access to information and are hesitant to contact extension officers. As a result, they exhibit little interest in learning about climate-resilient technologies.

Risk orientation Vs Knowledge Level

The findings of the study conclude a positive and significant correlation of risk orientation with level of knowledge at the 1% level of significance (r = 0.351). Risk-taking is characterized as the capacity to make the best judgment possible in the face of uncertainty. Farmers who are willing to take chances in challenging conditions have better outcomes. As a result, those prepared to take a chance, seek information from a variety of sources, get better understanding of climate resilient technologies and prevent crop losses.

Innovativeness Vs Knowledge Level

Risk orientation was found to have a positive and significant correlation with level of knowledge (r = 0.303)at the 1% level of significance as innovative farmers do experiment with new knowledge available to combat challenges due to climate change.

Conclusion

The study concludes that majority of NICRA beneficiaries possessed medium level of knowledge followed by low and high on climate resilient technologies being implemented

through various interventions identified under technology demonstration components of NICRA. The knowledge level of respondents on climate resilient technologies is significantly associated with profile characteristics like age, caste, education, crop diversification, annual income, information sources, extension contact, social participation, economic motivation, risk orientation and innovativeness whereas farming experience, land holding and cropping intensity showed positive but non-significant relationship with knowledge level of the respondents.

The study also highlighted prominent reasons for increased knowledge level of farmers on climate resilient technologies as scientific technological demonstrations in the field, regular capacity building programmes, frequent scientist-farmer interaction in face-to-face situation and through social media platforms, exposure visits of successful farmers and motivational incentives for successful farmers.

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