A knowledge Assessment Aimed at Gauging the Understanding of Forward-Thinking Farmers Regarding Strategies to Alleviate the Adverse Impacts of Climate Change.

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INTRODUCTION

Agriculture holds significant importance as it provides the essential food, feed, and fiber necessary for sustainable livelihoods, making it a vital sector for society. However, it is highly susceptible to the adverse impacts of climate change, posing a significant threat to food security. Changes in temperature, rainfall patterns, and intensity directly affect agricultural productivity. Consequently, climate change is widely recognized as a serious challenge to farmers' livelihoods. In light of this, the aim of this paper is to develop a knowledge assessment to evaluate farmers' understanding of strategies to mitigate the negative effects of climate change. This assessment considers farmers' comprehension of the causes and impacts of climate change, as well as their practical knowledge derived from experience. Drawing upon Bloom et al.'s (1956) definition, knowledge is defined as the ability to recall or recognize ideas, materials, or phenomena. By employing a scientific approach, the development of such a knowledge assessment can help identify knowledge gaps among farmers. Thus, this study was conducted in Rajasthan with the objective of creating a standardized knowledge assessment tool to measure farmers' understanding of strategies to mitigate the adverse effects of climate change.

METHODOLOGY

According to Webster's Dictionary, knowledge is the fact or condition of knowing something with familiarity gained through experience or association. It has been measured by an index developed for the purpose. The steps followed in the construction of knowledge test to measure the knowledge level of farmers about mitigating strategies for the adverse effects of climate change are discussed below:

Item collection and selection

The available literatures on knowledge of progressive farmers towards climate change and its mitigating strategies were reviewed and 6 indicators were resorted and it was circulated among the 40 extensionists of the university to know its appropriateness on its relevancy and non relevancy. The indicator wise opinion was taken and converted into frequencies and transferred into a master sheet. Total 70 items were selected for developing knowledge test after carefully editing and by subjecting them to expert scrutiny.

Item analysis

The item analysis used by Jha and Singh (1970) was carried out so as three kinds of information, *viz.*, "Index of item difficulty", "Index of item discrimination" and "Biserial correlation". The index of the item difficulty reveals how difficult an item is, whereas discrimination index indicates the extent to which an item discriminates the well-informed individual from the poorly informed. The point biserial correlation provides information on how well an item measures or discriminates with the rest of the test items. The collected items were numbered from 1 to 70 and administered to 60 respondents for item analysis The respondents for administering the items were randomly selected and were not included in the sample for final study. Each one of the respondents, to whom the test was administered, dichotomous choices was given in which 1 score for 'YES' and zero for 'No' response. Whereas, for the items with four choices, a score of 0.25 is allotted for the correct answer and for the items with three choices 0.33 score is allotted. Thus, total number of correct answers given by the respondent out of 70 items was the knowledge score of the individual. After calculating the score obtained by each of the 60 respondents on 70 items, the scores were arranged from highest to lowest in order of magnitude. These 60 respondents were then divided into 6 equal groups, arranged in descending order of total scores obtained by them. These groups labeled as G1, G2, G3, G4, G5 and G6 respectively with 10 respondents in each group. For the item analysis, the middle groups G3 and G4 were eliminated keeping only four extreme groups with high and low scores (Bloom *et al*., 1956)

Selection of item as final statement

The index of item difficulty for each of 70 items was worked out as the percentage of the respondents answering on items correctly. The assumption in this item index of difficulty was that the difficulty is linearly related to the level of respondents' knowledge about mitigating strategies for climate change. When a respondent answered an item, it was

assured that the item was less difficult than her ability to cope with it. In this study with this assumption, the items with P_i (Difficulty Index) values ranging from 20 to 80 and the items with $E^{1/3}$ values ranging above 0.20 considered for final selection. the biserial correlation (rbis) tested for their significance by using the following formula as given by Guilford (1965) for each of the item was calculated were considered for final selection of knowledge test.

Table 1 Calculation of difficulty and discrimination indices and biserial correlation of knowledge items

Item No.	Frequencies of correct answer given by group G1, G2, G5 & G6				Total frequencies of correct answers S1+S2+S5+S	P_i	$E^{1/3}$	r bis	t value	Remark
	S1	S2	S3	S4	6					
2	10	7	7	7	31	77.50	0.2250	0.7085	5.0653	Selected
3	10	9	2	5	26	65.00	0.9000	1.7811	-5.9738	Rejected

Table 2 Selected Knowledge Test statements to measure Knowledge about mitigating strategies for the adverse effect of the climate change

Sr. No.	Statement	Response
1	Have you heard about climate change? If Yes, what is the source of your knowledge about the climate change? a) Television b) Internet c) Newspapers d) Govt. agencies e) All of the above	
2	Do you believe that climate change will have harmful effects on the future generations of people?	Yes/No
3	Are you aware that flooding in your field is due effect of climate change?	Yes/No
4	Do you know that incidents of drought are more all over the region due to the impact of the climate change ?	Yes/No
5	Do you know that wind pattern is getting warmer and causing storm due to the climate change?	Yes/No
6	Do you know that frequency of forest fire is increasing due to the climate change?	Yes/No.
7	Are you aware about crop rotation practices to reduce the effect of the climate change?	Yes/No
8	Do you know about the use of laser land leveller technology for smoothly irrigation and water saving in your area?	Yes/No
9	Which of the following climate practice would help the crop to withstand water scarcity in monsoon? (A.) Mono-cropping (b.) Fallowing (c.) Intercropping (d.) None	
10	Do you know that integration of scientific and indigenous method is suitable to address the effect of the climate change?	Yes/No
11	Do you know that storing of crop residues for livestock is useful during the effect of the climate change?	Yes/No
12	Do you believe that government should do more to help farmers due to the effect of the climate change?	Yes/No
13	Do you believe that government should provide credit facility to the farmers in adverse climatic condition?	Yes/No
14	Are you aware about any of the following climate change mitigation policies of the government? (a.)CO2 reduction by urban and rural area (b.)CO2 reduction in transport vehicle (c.)CO2 reduction in owned by local companies (d.) All of the above	

RESULTS

Table 1 and Table 2 indicated that significant values of the biserial 'r bis', difficulty index and discrimination values, finally total 14 items out of 70 items were selected to measure the knowledge level of progressive farmers about mitigating strategies for the adverse effects of climate change.

Reliability of the scale

A scale is reliable when it gives consistently same results when it applied to same sample. In the present study split-half method was used to find out the reliability of the knowledge test. It was administered to 30 respondents separately who were not included in the final sample. Having obtained the two sets of scores for each of the 30 respondents, reliability coefficient between the two sets of scores was calculated by Rulon's formula used by Guilford (1954)., which was found to be 0.79 at 1 per cent level. The reliability coefficient thus obtained indicated that internal consistency of the knowledge test developed for the study was very high.

Validity of the Scale

Validity is the accuracy with which it measures that which is intended to measure or as the degree to which it approaches infallibility in measuring, what it intended to measure. The biserial correlation (r bis) was consider as a measure of test items validity. Highly significant biserial correlation coefficient (r bis) values proved the construct validity of the items included in knowledge test. Thus, knowledge test was ready for administering to the actual respondents.

Administrating the scale

The selected 14 statements for final format of the knowledge scale were randomly arrange to avoid the response biases, which might contribute to low reliability and detraction from validity of scale. Out of 14 selected statements The finaly knowledge test was administered on the sample of progressive farmers engaged in agriculture management in mitigating practices for combating the adverse effects of climate change. They were asked to express their answer in yes or no type questions. The correct answers were tick marked. Knowledge regarding climate change was measured through 14 dichotomous questions. The maximum score was 14 and minimum was zero. An arbitrary method was used for categories as low, medium and high level knowledge of progressive farmers about mitigating strategies for the adverse effects of climate change.

References

1. Bloom, B. S.; Engolhardt, M.; Frust, E.; Hill, W. and Krathwal, D. R. (1956). Taxonomy of Educational Objectives. The Cognite Domain, Orient Logmans, New York.
2. Guilford, J. P. (1954). "Psychometric methods". Tata McGraw Hill Publication Co. Ltd., Bombay : 378-382.
3. Guilford, J. P. (1965). "Fundamental Statistics in Psychology and Education". New York: McGraw Hill Book Co. Inc., 317-319.
4. Jha, P. N. and Singh, K. N. (1970). A test to measure farmer's knowledge about high yielding variety programme. Inter discipline, 7 (1) : 65- 78.
5. Dhodia A.J, Gardhariya K.V and Timbadia C. K.(2019). Scale to measure knowledge of rural women about the agrobased enterprises., *International Journal of Chemical Studies* ; **7**(6): 2471-2473.