

RESEARCH NOTE

A Scale to Measure Attitude of Research Scholars towards Climate Change Studying in Agricultural Universities

G. Netravathia¹ and N.B. Chauhan²

1. PhD Student, 2. Professor, Department of Agril. Ext., Anand Agriculture University, Anand, Gujarat,
Corresponding author e-mail: g.nethravathi@gmail.com

ABSTRACT

A scale was developed to measure the attitude of the research scholars studying in agricultural universities towards climate change based on Likert's technique. A tentative list of 29 statements was drafted keeping in view the applicability of statements suited to the area of study. The statements collected were edited in the light of the informal criteria suggested by Edward and Kilpatrick. These statements were framed in such a way that they expressed the positive or negative attitude of the research scholars. The score of each individual item on the scale was calculated by summing up the weights of the individual items. Scale and Q value was calculated by using Thurstone and Chave inter-quartile range. Finally the scale consisted of 12 statements (8 positive and 4 negative) whose median (scale) values were greater than Q values. However, when a few statements had the same scale values, statements having lowest Q value were selected by arranging the scale value in an order. Reliability was tested with 25 respondents and its value was 0.8134 and validity of the scale was cross checked with 200 respondent, and 't' was found significant at five percent.

Key words: Attitude; Research scholars; Reliability; Validity and Scale value;

Agricultural education is a professional education and it is also an instrument for bringing out desirable changes in Indian economy and every one depends on agriculture for their daily food. In modern days increased industrialization and urbanisation are gradually reducing the agricultural land. With this these days climate change adds up plenty of problems in agriculture sector to farmers as well as researchers. Feeding whole world by mitigation all these problems is a challenge task to the agricultural researchers. To mitigate these problems it's most important to study researcher's attitude towards climate change and its problems. Keeping this view, an attitude scale was developed to understand the climate change problems most effectively and to mitigate them efficiently. Attitude here is defined as the degree of positive or negative affect associated with some psychological object (Thurstone, 1946). Psychological object may be any symbol, phrase, slogan, person, institution, idea or ideal towards which people can differ with respect to positive or negative effect. In this study attitude towards climate change consists of attributes like favourable or unfavourable, desirable or undesirable, good or bad, likes or dislikes, pleasing or

displeasing and also associated with behaviour readiness of research scholars.

METHODOLOGY

Among the techniques available, researcher had selected 'Scale product method' which combines the "Thurstone's" of equal appearing interval scale (1928) for selection of items and Likert's technique (1932) for ascertaining the response of research scholars studying in agricultural universities.

Item collection: As a first step in developing the attitude scale towards climate change a number of statements about climate change and its mitigation practices were gathered from books, bulletins, magazines and by discussions with academicians, subject matter specialists, researchers, and scientists who were directly or indirectly exposed to such knowledge system. A tentative list of twenty nine statements was drafted keeping in view the applicability of statements suited to the area of study. These statements were finalised by editing Edward and Kilpatrick (1948) criteria.

Judges' rating on attitudinal statements: In order to judge the degree of "Unfavourableness" to

“Favourableness” of each statement on the five point equal appearing interval continuum, selected 29 statements slip was handed over to selected judges comprising extension experts, professors and teachers who are working in agricultural universities to collect their ratings. The response of the 50 judges who were replied truthfully was considered for analysis.

Determining statement value: The response of judges was obtained on the five point rating scale. The statements most favourable, favourable, undecided, and unfavourable and most unfavourable responses were given weightage of 5, 4, 3, 2 and 1 respectively. For negative statement the scoring system was reversed.

Calculation of scale and Q values: The data obtained from a large number of judges was then arranged. Data obtained for each statement was arranged in three rows. Frequency was arranged in the first row the way in which the statement was placed in each of the 5 categories. If the median of the distribution of the judgment for each statement is taken as the scale value of the statement, than the scale values can be found from the following formula.

$$S = L + \frac{0.5 - \sum P_b}{P_w} \times i$$

Where,

- S = median value
 P_w = the proportion within the interval in which the 50th centile falls
 i = the width of the interval and is assumed to be equal to 1.0
 $\sum P_b$ = the sum of the proportion below the interval in which the 50th centile falls
 L = the lower limit of the interval in which the 50th centile falls

Thurstone and Chave (Edwards, 1957) used the inter-quartile range Q as a means of the variation of the distribution of the judgments for a given statement. To determine value of Q, two other point were measured, the 75th centile and 25th centile. The 25th centile was obtained by the following formula

$$C_{25} = L + \frac{0.25 - \sum P_b}{P_w} \times i$$

Where,

- C₂₅ = the 25th centile value of the statement
 L = the lower limit of the interval in which the 25th centile falls
 $\sum P_b$ = the sum of the proportion below the interval in which the 25th centile falls

P_w = the proportion within the interval in which the 25th centile falls

i = the width of the interval and is assumed to be equal to 1.0 (one).

The 75th centile was obtained by the following formula.

$$C_{75} = L + \frac{0.75 - \sum P_b}{P_w} \times i$$

Where,

- C₇₅ = the 75th centile value of the statement
 L = the lower limit of the interval in which the 75th centile falls
 $\sum P_b$ = the sum of the proportion below the interval in which the 75th centile falls
 P_w = the proportion within the interval in which the 75th centile falls
 i = the width of the interval and is assumed to be equal to 1.0 (one).

Then the interquartile range or Q value was obtained by taking the difference between C₇₅ and C₂₅, thus,

$$Q = C_{75} - C_{25}$$

Selection of statements: Only 12 statements were selected across 29 statements whose median (scale) values were greater than Q values. However, when a few statements had the same scale values, statements having lowest Q value were selected as shown in Table 1. These statements were then arranged in random order and presented to subjects with instructions to indicate those that they are willing to accept or agree with and those that they reject or disagree with. Taking only the statements with which the subject has agreed, an attitude score was obtained from the scale values of these statements that were regarded as an indication of the location of the subject on the psychological continuum on which the statements have been scaled. The attitude score is based upon the arithmetic mean or median of the scale values of the statements agreed with.

Method of scoring: The selected 12 statements for the final format of the attitude scale as shown in Table 2 were randomly arranged to avoid response biases, which might contribute to low reliability and detract from validity of the scale. Out of the 12 selected statements, four statements were the indicators of the unfavourable attitude and eight statements were the indicators of favourable attitude. Against these 12 statements there were five columns representing five points continuum of agreement and disagreement to the statements as followed by *Likert (1932)* in his summated rating technique of attitude measurement. The five points

Table 1: Selection of the statements for the scale, based on scale value and interquartile range

Statements	Q	S
I believe that climate change is universal phenomena	1.03	1.30
I think that conducting research on climate change phenomena is waste of money.	1.18	4.00
I feel that occurrence of climate change doesn't affect agriculture production.	2.57	4.00
I believe that a climate change phenomenon has affected agricultural productivity.	1.15	1.80
I trust that climate change has led to frequent outbreak of pests in agriculture.	1.04	2.00
I assume that climate change situation has created shortage of food.	1.66	2.70
I feel that because of climate change there is need to adopt innovative methods in farming.	0.97	1.80
I think that climate change phenomenon has made agriculture more problematic.	0.89	2.00
I feel that a climate change phenomenon has affected human health.	0.78	2.00
I think climate change situation has led to frequent outbreak of deceases in agriculture.	0.96	2.00
I believe that occurrence of climate change has reduced crop yields in long-term.	1.44	2.20
I feel study on climate change situation is the necessary for growth of agriculture.	1.34	1.60
I feel climate change phenomena can destroy agriculture in future days.	2.03	3.00
I believe that controlling climate change phenomena is difficult job.	1.37	2.20
I feel climate change is the natural phenomena so man has nothing to do with it.	0.57	3.50
I feel that a climate change phenomenon is only propaganda.	1.14	3.00
I think no need to waste resources on climate change issue.	0.96	4.00
I think climate change phenomena have increased natural calamities.	2.20	2.50
I feel climate change phenomena has affected large portion of human population.	1.34	2.20
I believe that remedies of climate change are worthwhile for future generations.	1.40	2.00
I feel that climate change is one of the reasons for rising mean temperature.	1.37	1.90
I feel that climate change situation creates drought problem.	1.63	2.20
I assume that a climate change phenomenon has shown bad effects on vegetation.	1.46	2.40
I feel that change in rainfall pattern is mainly due to climate change.	0.86	1.90
I think lack of sensitivity towards climate change creates vulnerability in agriculture.	1.30	2.40
I feel rise in mean sea level is due to occurrence of climate change phenomena.	1.23	2.20
I believe that ozone layer is affected due to climate change.	0.86	1.90
I think rising atmospheric concentrations of CO ₂ in due to climate change phenomena.	1.09	2.00
I think that occurrence of climate change has increased soil evaporation rate.	1.23	2.20

Table 2: Final format of scale to measure research scholars' attitude towards climate change

Statements	FA	A	N	D	FD
I believe that climate change is universal phenomena (+)					
I assume that climate change situation has created shortage of food. (+)					
I feel that a climate change phenomenon is only propaganda. (-)					
I feel that a climate change phenomenon has affected human health. (+)					
I feel study on climate change situation is the necessary for growth of agriculture. (+)					
I think that occurrence of climate change has increased soil evaporation rate. (+)					
I think no need to waste resources on climate change issue. (-)					
I think climate change phenomena have increased natural calamities. (+)					
I feel that change in rainfall pattern is mainly due to climate change. (+)					
I think lack of sensitivity towards climate change creates vulnerability in agriculture.(+)					
I feel that because of climate change there is need to adopt innovative methods in farming. (+)					
I feel climate change is the natural phenomena so man has nothing to do with it. (-)					

Key: FA=Fully Agree, A= Agree, N=Neutral, D= Disagree, FD= Fully Disagree

on continuum were strongly agree, agree, undecided, disagree and strongly disagree with respective weights of 5, 4, 3, 2, and 1 for the favourable statements and with the respective weights of 1, 2, 3, 4 and 5 for the unfavourable statements. The weights of Likert's technique and the scale value of Thurstone's technique were combined in the form of a product and the total score for an individual was the sum of the product.

Reliability of the scale: The split-half technique was used to measure the reliability of the scale. The 12 statements were divided into two halves with 8 odd numbered in one half and 4 even-numbered statements in the other. These were administered to 25 respondents. Each of the two sets of statements was treated as a separate scale and then these two sub-scales were correlated. The co-efficient of reliability was calculated

by the Rulon's formula (*Guilford, 1954*), which came to 0.8134. This value suggests that the scale is reliable so researcher can expect consistent and dependable results from the developed scale in different situations.

Validity of scale: The final scale was administered on 200 research scholars of four different agricultural collages for the validity of the scale. The value of "t" test was found to be significant at five percent.

CONCLUSION

The constructed scale will be useful for measurement of the attitude of research scholars studying in agricultural universities towards climate change.

Paper received on : August 01, 2013

Accepted on : September 23, 2013

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