Scaling Perception of Agriculture and Animal Husbandry Enterprise Owners about Climate Change

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A B S T R A C T

Perception in relation to climate change will provide an important foundation for government policy making as guideline. This study examines how changes in local climate will perceive by agriculture and animal husbandry enterprise owners of South Gujarat region about climate change. Hence to comprehend the perception a scale was developed. Considering the large numbers of items the scaling technique suggested by Likert (1932) was used. A schedule of statements was sent to 84 judges to found its appropriateness by assigning the score on each item. Based on the 't' value, 22 items were finally selected to get the perception of agriculture and animal husbandry enterprise owners regarding climate change. Reliability of the scale found to be 0.8778.

Introduction

Climate change is a long-term shift in weather patterns, and it can be assessed by analyzing temperature, wind flow, humidity, and precipitation data over long periods of time (Anonymous, 2013). The temperature, sunlight, water, relative humidity are the main drivers for crop growth and yield. The rate of crop production largely hampers due to adverse change in climate. It is essential to study people's perception of climate and environment in general to sustain by human beings. Researchers have discovered more evidence that perceptions positively predict people's support of climate change related policies, behavioral intensions and behaviors to address climate change (Arbuckle *et al.,* 2015; Lubell *et al.,* 2006; Semenza *et al.,* 2008).

Materials and Methods

Perception is an understanding and interpretation of changes in climate (rainfall, temperature) by farmers based on their prior experience. The Likert's scaling technique (1932) was used due to its large numbers of

statements for constructing the scale. The steps followed in construction of scale to comprehend the perception of agriculture and animal husbandry enterprise owners regarding climate change are discussed below.

Item collection

The items making up perception scale are known as statements. A statement may be defined as anything that is said about a psychological object (Edwards, 1957). Initially, 105 items were assessed from relevant literatures and converted them in context to present requirement. The statements, thus selected, were edited on basis of the criteria suggested by Edward and Kilpatrick (1948) to eliminate the ambiguity.

Item analysis

A schedule was prepared with 105 items was sent online through 'Google forms' as well as through personal contact for judging the relevancy to the personnel working as extension educationist, sociologist and psychologist were identified from various agricultural universities of India. The three continuum criterion was used to judge each statement on the degree of most relevant to

less relevant. It was also sent through post to retired eminent personalities of our fraternity judges. Out of total 97 judges had responded. The investigator has found that some of the judges have responded very carelessly, misunderstand the directions and not be aware about the concept under present study hence, 13 schedules were eliminated. Lastly, 84 schedules were kept for the construction of scale.

Selection of item

A three point rating method was followed as; 1 for less relevant, 2 for relevant and 3 for most relevant. The responses of 84 judges on 105 items were transferred into the master sheet. Under item analysis, the method of summated ratings was used to reject statements. Then considered the frequency distribution of scores based upon the responses to all statements. The 25 per cent of them with highest total scores (21 items) and 25 per cent lowest total scores (21 items) were considered. These two groups provide criterion groups in terms of which to evaluate the individual statements. The paired '*t*' test was applied to measure the extent to which a given statement differentiates between the high and low groups.

$$t = \frac{X_H - X_L}{\sqrt{\frac{\sum (X_H - X_H)^2 + (X_L - X_L)^2}{n(n-1)}}}$$

Where,

X_H	=	the mean score on given statement of the high group
X_L	=	the mean score on given statement of the low group
$\sum X_H{}^2$	=	Sum of squares of the individual score on a given statement for high group
$\sum X$	=	Sum of squares of the individual score on a given statement for low group
$\sum X_H$	=	Summation of scores on given statement for high group
$\sum X_L{}^2$	=	Summation of scores on given statement for low group
N	=	Number of respondents in each group
T	=	Extent to which a given statement differentiate between the high and low group

The paired 't' testwas applied to measure the extent to which a given statements differentiates the high and low groups. After computing the *'t'* value for all the items the statements having 't' value equal to or greater than 2.02 table value were selected. Out of them the first 22 statements with the largest value of 't' were selected as perception scale. The first 22 numbers of the statements having highest *'t' v*alue were 3, 6, 15, 19, 33, 36, 47, 59, 62, 69, 75, 80, 81, 82, 86, 87, 89, 91, 96, 99, 103, and 105 of schedule were finally used to comprehend the perception of agriculture and animal husbandry enterprise owners regarding climate change. The final statements are shown in table 1.

Reliability of the scale

Reliability is defined as the probability that a product, system, or service will perform its intended function adequately for a specified period of time, or will operate in a defined environment without failure. The constructed scale on perception for measurement was tested for its reliability by using the split half method. It was introduced to 20 respondents of non-sample area. The coefficient of reliability between these two sets of scores was calculated by Rulon's formula as suggested by Guilford (1954).

$$\text{rtt} = 1 - \frac{\sigma^2 d}{\sigma^2 t}$$

Where,

      Rtt   = Coefficient of reliability
      σ^2d   = Variance of those differences
      σ^2t   = Variance of the total scores

The 0.8778 value found to be significant at 1 percent level. Thereby, testifying the reliability of the scale.

Validity of the scale

According to Kerlinger (1976), the content validity is the representativeness or sampling adequacy of the content of the substance, the matter and the topic of measuring instrument. Further, he stated that the content validation consists in judgment by one judge alone and / or with others, the representativeness of the items. In present study, indicators included in the scale were arriving at only wide and critical validation by the panel of judges.

Administering the scale

The selected 22 statements for the final format of the perception scale were randomly arranged to avoid the biases, which might contribute to low reliability and detraction from validity of the scale. Likert (1932) suggested five points' continuums to get responses from respondents. They were strongly agree, agree, undecided, disagree and strongly disagree with respective weights of 5, 4, 3, 2,and 1 for the favourable and with the respective weights of 1, 2, 3, 4 and 5 for the unfavourable items.

Application of research

It is applicable to measure the perception of agriculture and animal husbandry enterprise owners regarding climate change. It helps to comprehend the perception of agriculture and animal husbandry enterprise owners regarding climate change.

Table.1 Selected perception statements for present study

Sr.	Statement	t- value
Sensation about Rainfall		
1.	Heavy humidity.	2.48
Attention about Rainfall		
2.	Rain starts from southern and west side.	2.37
Understanding about Rainfall		
3.	Announcement of metrologiest.	2.95
Past experience of Rainfall		
4.	Changes in rainfall pattern needed more irrigation.	2.94
Sensation of Temperature		
5.	Temperature sensitizes the farmer for irrigation.	2.97
Attention about Temperature		
6.	Farmers found attentive while seed formation stage.	3.40
Understanding about Temperature		
7.	Vegetative growth hampered due to temperature fluxes.	2.80
Past experience of Temperature		
8.	Temperature motivates the farmers for crop loan.	3.47
Sensation of Wind		
9.	Wind speed sensitizes for boarder plantation.	3.21
Attention about Wind		
10.	Spraying/dusting should be avoided in high wind areas.	3.83
Understanding about Wind		
11.	Plant protection measures are hampered.	3.55
Past experience about Wind		
12.	Since last three years wind velocity is increased.	4.03
General Perception about Climate Change		
13.	Climatic events are notable.	2.68
14.	Cost of precautionary measures is high in Climate Change.	2.07
15.	Urbanization is responsible of climate change.	2.75
16.	Changing cropping patterns responsible for climatic events.	2.31
17.	Heat waves, frost, droughts and floods which effect crops and timing of farm operations.	2.66
18.	Mitigation to climate change is not an easy task.	2.86
19.	Hail storm events are changing.	2.51
20.	Depletion of ground water table.	2.21
21.	Every third year there is a problem of major drought in which mainly water problem is faced and after every eighth year there is a problem of food, fodder and water due to major drought.	2.02
22.	In *kharif*, the situation may early set or late set of monsoon, the production will remain same.	2.43

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