

## International Journal of Agriculture Extension and Social Development

Volume 7; SP-Issue 8; August 2024; Page No. 23-28

Received: 04-06-2024  
Accepted: 14-07-2024

Indexed Journal  
Peer Reviewed Journal

### Development of scale to measure perception of farm women about climate change

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DOI: <https://doi.org/10.33545/26180723.2024.v7.i8Sa.895>

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#### Abstract

Climate change is now one of the biggest environmental challenges faced by countries in the world. Studies on climate change reveal that women are more susceptible to climate change than men, due to the existing inequalities and socially structured roles. It was therefore considered important to know how women perceive climate change and what shapes their perception. This perception is important in mitigating adversities of changing climate. In order to study this construct, a scale was developed to measure the perception of farm women regarding climate change. by adopting the Likert's summated rating method. Based on the review of literature and discussion with the expert's, 61 statements were initially listed. In order to know the relevancy of these statements, relevancy weightage scores (RWS) were calculated. Statements having relevancy percentage of more than 70 that is mean relevancy weightage of more than 0.70 and mean relevancy score of more than 2 were selected for the item analysis. A total of 55 statements qualified for the Item analysis. All statements with 't' values greater than 1.75 were included in the final scale. The final scale to measure the perception of farm women about climate change consisted of 29 statements. The 'r' value of the scale was found to be 0.98, which was significant at one per cent level, indicating high reliability. The scale developed was therefore found to be reliable and valid. The developed scale is relevant to Indian rural women and so this scale can be used by other researchers in the country to measure the perception of farm women about climate change.

**Keywords:** Climate change, farm women, perception, Likert scale, reliability

#### Introduction

Climate change is one of the biggest environmental challenges of all countries in the world. Climate change refers to any change in the climate over time whether due to natural variability and/or as a result of human activity. Climate change with expected long-term changes in rainfall pattern and shifting temperature cycles is expected to have significant negative effects on agriculture, food & water security and economic growth of the country. Raghuvanshi and Ansari (2016) <sup>[6]</sup> in their analysis interpreted that farmers' perception is the key to mitigating adverse impact of climate change on agriculture and recommended that specific interventions targeting the farming community as well as other stakeholders needs to be undertaken to improve their preparedness in dealing with climate change adversities. Misleading perceptions can cause inappropriate adjustment measures. Much research has indicated the importance of understanding how climate variability is perceived by farmers and what shapes their perception to elicit adaptive behaviours. Although women are more prone to the adverse impacts of climate change, because of the structured roles and responsibilities, they get sidelined in most researches and planning. In fact, the United Nation

reports that communities are more successful in resilience and capacity-building strategies, when women are part of the planning process. As step towards this and to examine the women's perceptions about climate change the study was designed with the objective to develop a scale to measure perception of farm women about climate change.

#### Methodology

A number of scaling techniques are used by social scientists/researchers to measure socio psychological constructs (such as attitude, perceptions, etc) in social sciences including extension education. In this study, a scale was developed by using the method of summated ratings as suggested by Likert (1932) <sup>[5]</sup>. A Summated rating scale consists of a set of statements, all of which are considered of approximately equal value, and to each of which the subjects respond with degree of agreement or disagreement, carrying different scores. This method was used for the study, because the use of single statement to represent a concept could be avoided and instead several statements representing different dimensions of the concept. The same procedure was followed by Channal *et al.* (2016) <sup>[1]</sup>, Jaishi *et al.* (2018) <sup>[3]</sup>, Raghuvanshi & Ansari (2019) <sup>[7]</sup> and Rajeshwari & Dolli

(2020)<sup>[8]</sup>.

### The following steps were followed for development of scale

**Item collection:** An exhaustive set of items and statements on climate change were collected from available literature in books, journals, magazines, newspaper, internet etc. A tentative list of 69 statements was prepared.

**Editing the statement:** The items (statements) were carefully edited through discussion and suggestion of experts in the field of extension and climate change. Out of 69 statements 61 statements were selected as they were found to be factual and unambiguous.

**Relevancy test:** Among the collected statements it was possible that all statements are not equally relevant in measuring the perception of farm women about climate change. Hence, these statements were subjected to scrutiny by an expert panel of judges to determine the relevancy and their screening for final inclusion in the scale. The judges comprised of researchers and from +different State Agricultural Universities (SAUs), State Departments and Extension Institutes.

The items were sent to 150 judges through email with necessary instructions to critically evaluate each statement while responses from 8 experts were collected personally. The judges were requested to give their response on a 3-point continuum viz., most relevant, relevant and least relevant, respectively. Out of 158 only 60 responded in the given time span of two and half months. By summing up the scores given by 60 judges a total score of all the 69 statements was calculated. From this Relevancy Percentage (RP), Mean Relevancy Weightage (MRW) and Mean Relevancy Score (MRS) was calculated for all the 69 statements individually by using the following formulae:

**Relevancy Percentage (RP):** It is the number of respondents who scored the given statements as “most relevant” and “relevant”, which was converted into percentage.

$$\text{Relevancy Percentage (RP)} = \frac{\text{FS}}{\text{No. of Respondents}}$$

Where FS= Frequency score of most relevant and relevant

**Mean Relevancy Weightage (MRW):** It is the ratio of actual score obtained to the maximum possible scores (MPS) obtainable for each statement. It was calculated by using the following formula

$$\text{Mean Relevancy Weightage (MRW)} = \frac{\text{MRR} \times 3 + \text{RR} \times 2 + \text{LRR} \times 1}{\text{MPS}}$$

Where,

MRR= Most Relevant Response

RR= Relevant Response

LRR = Least Relevant Response

MPS= Maximum Possible Scores [ No. of judges responded \*3(60\*3=180)]

**Mean Relevancy Score (MRS):** It is the ratio of actual score obtained by each respondent to the number of judges who responded for the variable.

$$\text{Mean Relevancy Score (MRS)} = \frac{\text{MRR} \times 3 + \text{RR} \times 2 + \text{LRR} \times 1}{\text{No. of Judges}}$$

Where,

MRR= Most Relevant Response

RR= Relevant Response

LRR = Least Relevant Response

Using this criterion, the statements were screened for their relevancy. Statements having relevancy percentage >70, mean relevancy weightage >0.70 and mean relevancy score >2 were selected for final inclusion. By this process, statements were finally selected and later modified /rewritten as per the comments of the experts (Table 1).

**Item Analysis:** It is an important step in the construction of valid and reliable scale as per the Likert's technique of measurement. It was essential to differentiate the items based on the extent to which they can differentiate the respondent with high perception score than the respondent with low perception scores. For this purpose, item analysis was carried out on 55 statements selected in the first stage.

A schedule consisting of 55 statements was prepared and used for personally interviewing a sample of 32 farm women from non-sampled area. The responses for the statements were obtained on a five-point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2 and 1, respectively. For negative statements the scoring pattern was reversed. The perception score of the respondent was obtained by summing up the scores of all statements.

For item analysis, the respondents were arranged in ascending order based on perception score. Twenty five percent of the respondents with highest total scores and 25.00 per cent with lowest total scores were selected. These two groups provided the criterion groups in terms of evaluating the individual statements as suggested by Edwards (1957)<sup>[2]</sup>. Thus, out of 32 farm women to whom the items were administered for the item analysis, 08 farm women with highest or 08 with lowest scores were used as a criterion group to evaluate individual item.

The critical ratio was calculated by t-test. The 't' value is a measure of the extent to which a given statement differentiates the high group from the low group. The 't' value was calculated by using the formula suggested by Edwards (1957)<sup>[2]</sup>.

**Table 1:** Selection of statements based on judge's ratings: RP, MRW and MRS

| Sl. No      | Items for perception                                                                                      | Relevancy |       |      |
|-------------|-----------------------------------------------------------------------------------------------------------|-----------|-------|------|
|             |                                                                                                           | MRW       | MRP   | MRS  |
| <b>I.</b>   | <b>Change in temperature/summer season</b>                                                                |           |       |      |
| 1.          | There has been significant change in global temperature during summer season over the years*              | 0.91      | 90.56 | 2.72 |
| 2.          | There has been no change in global temperature during summer season over the years                        | 0.57      | 67.46 | 1.72 |
| 3.          | The global temperature has increased in the atmosphere considerably over a period of time*                | 0.88      | 90.23 | 2.65 |
| 4.          | The global temperature has decreased substantially over a period of time*                                 | 0.71      | 76.92 | 2.13 |
| 5.          | The intensity of heat has increased in the atmosphere over a time during summer period*                   | 0.87      | 87.57 | 2.60 |
| 6.          | The intensity of heat has decreased in the surroundings over a time*                                      | 0.73      | 76.36 | 2.18 |
| 7.          | The frequency of high temperature or heat waves have increased in the surrounding over the years *        | 0.85      | 85.88 | 2.55 |
| 8.          | The frequency of high temperature or heat waves have decreased in the atmosphere over the years*          | 0.70      | 75.64 | 2.10 |
| 9.          | The night temperature has increased substantially over the years*                                         | 0.79      | 86.93 | 2.37 |
| 10.         | The night temperature has decreased over the years*                                                       | 0.70      | 70.00 | 2.10 |
| <b>II.</b>  | <b>Change in rainfall pattern/ rainy season</b>                                                           |           |       |      |
| 11.         | There is a sizeable change in rainfall pattern over the years*                                            | 0.89      | 89.83 | 2.67 |
| 12.         | There is no change in rainfall pattern over the years                                                     | 0.52      | 70.00 | 1.55 |
| 13.         | The amount (quantity) of rainfall has increased significantly in recent times*                            | 0.88      | 87.78 | 2.63 |
| 14.         | The amount (quantity) of rainfall has decreased considerably in recent times*                             | 0.71      | 79.86 | 2.12 |
| 15.         | In recent times rainfall has become irregular or erratic*                                                 | 0.89      | 91.38 | 2.68 |
| 16.         | The total rainy days has increased substantially in recent years*                                         | 0.72      | 85.19 | 2.17 |
| 17.         | The total rainy days has decreased gradually in recent years*                                             | 0.72      | 84.06 | 2.17 |
| 18.         | The frequency of heavy rains has remarkably increased over the years*                                     | 0.77      | 83.97 | 2.32 |
| 19.         | The frequency of heavy rains has decreased considerably*                                                  | 0.73      | 77.16 | 2.18 |
| 20.         | The dry spells have increased over the years*                                                             | 0.79      | 86.54 | 2.38 |
| 21.         | The dry spells have decreased remarkably over the years*                                                  | 0.73      | 78.62 | 2.20 |
| <b>III.</b> | <b>Change in winter season</b>                                                                            |           |       |      |
| 22.         | There has been considerable change in winter season over the years *                                      | 0.81      | 83.04 | 2.42 |
| 23.         | There has been no change in winter season over the years                                                  | 0.44      | 68.52 | 1.32 |
| 24.         | The winter season during recent years has been shortened*                                                 | 0.76      | 86.11 | 2.27 |
| 25.         | The winter seasons during recent years have become longer *                                               | 0.72      | 80.27 | 2.15 |
| 26.         | The bitterness of cold has increased over time*                                                           | 0.75      | 84.35 | 2.25 |
| 27.         | The bitterness of cold has decreased over time*                                                           | 0.70      | 75.64 | 2.10 |
| 28.         | The density of fog has increased considerably*                                                            | 0.79      | 85.90 | 2.37 |
| 29.         | The density of fog has decreased in recent times*                                                         | 0.70      | 77.33 | 2.10 |
| 30.         | The morning dew drops have increased over the years*                                                      | 0.76      | 83.66 | 2.28 |
| 31.         | The morning dew drops have decreased over the years*                                                      | 0.72      | 73.68 | 2.15 |
| <b>IV.</b>  | <b>Occurrence of extreme events or disasters (earthquakes, floods, droughts, tsunami landslides etc.)</b> |           |       |      |
| 32.         | The occurrence of extreme events is now more noticeable*                                                  | 0.88      | 89.27 | 2.65 |
| 33.         | There has been no occurrence of extreme events                                                            | 0.41      | 66.67 | 1.23 |
| 34.         | Landslides have increased remarkably*                                                                     | 0.78      | 86.27 | 2.35 |
| 35.         | Landslides have decreased substantially*                                                                  | 0.70      | 73.33 | 2.10 |
| 36.         | Blizzards have increased considerably over the years*                                                     | 0.81      | 88.46 | 2.43 |
| 37.         | Blizzards have decreased over the time*                                                                   | 0.70      | 76.47 | 2.10 |
| 38.         | Wildfires have increased significantly*                                                                   | 0.75      | 82.35 | 2.25 |
| 39.         | Wildfires have decreased over the years                                                                   | 0.71      | 73.94 | 2.12 |
| 40.         | Earthquakes have increased over a time *                                                                  | 0.77      | 83.02 | 2.32 |
| 41.         | Earthquakes have decreased considerably in recent times*                                                  | 0.72      | 72.22 | 2.17 |
| 42.         | Dust storms are now more common occurrences*                                                              | 0.88      | 90.23 | 2.65 |
| 43.         | Dust storms have decreased noticeably*                                                                    | 0.72      | 73.68 | 2.15 |
| 44.         | Tornadoes have increased substantially over the years                                                     | 0.62      | 66.67 | 1.85 |
| 45.         | Tornadoes have decreased over the years*                                                                  | 0.62      | 70.29 | 1.85 |
| 46.         | Floods have increased significantly over the years*                                                       | 0.75      | 79.63 | 2.25 |
| 47.         | Floods have decreased over the time*                                                                      | 0.71      | 76.10 | 2.13 |
| 48.         | The incidence of tsunami has increased over the years considerably*                                       | 0.75      | 75.00 | 2.25 |
| 49.         | The incidence of tsunami has decreased over the years*                                                    | 0.72      | 71.67 | 2.15 |
| 50.         | The incidence of droughts has increased considerably over the time*                                       | 0.88      | 88.70 | 2.63 |
| 51.         | The incidence of droughts has decreased in recent times*                                                  | 0.70      | 71.26 | 2.10 |
| 52.         | The occurrence of hailstorms has increased substantially*                                                 | 0.78      | 86.27 | 2.35 |
| 53.         | The occurrence of hailstorms has decreased over the years*                                                | 0.71      | 73.10 | 2.13 |
| 54.         | Thunderstorms have increased considerably*                                                                | 0.87      | 90.06 | 2.62 |
| 55.         | Thunderstorms have decreased over time*                                                                   | 0.72      | 75.15 | 2.15 |
| <b>V</b>    | <b>General perception about climate change</b>                                                            |           |       |      |
| 56.         | Climate change is a natural phenomenon that occurs over a period of time*                                 | 0.87      | 60.06 | 2.62 |
| 57.         | Climate change is a curse of God*                                                                         | 0.72      | 75.75 | 2.15 |
| 58.         | Climate change is a result of peoples' Karma (sins) on the earth*                                         | 0.71      | 81.56 | 2.13 |
| 59.         | Climate change is due to changes in natural resources*                                                    | 0.81      | 87.42 | 2.43 |

|     |                                                                                              |      |       |      |
|-----|----------------------------------------------------------------------------------------------|------|-------|------|
| 60. | Climate change is due to destruction of natural resources (forest area, water bodies etc.) * | 0.91 | 93.57 | 2.72 |
| 61. | Climate change is due to interference of human beings with nature*                           | 0.82 | 89.74 | 2.47 |

\*Denotes selection of statements for item analysis

**Table 2:** List of statements subjected to Item analysis

| Sl. No     | Items for perception                                                                                      | t -value |
|------------|-----------------------------------------------------------------------------------------------------------|----------|
| <b>I.</b>  | <b>Change in temperature/summer season</b>                                                                |          |
| 1.         | There has been significant change in global temperature during summer season over the years*              | 1.87     |
| 2.         | The global temperature has increased in the atmosphere considerably over a period of time*                | 1.94     |
| 3.         | The global temperature has decreased substantially over a period of time                                  | 0.41     |
| 4.         | The intensity of heat has increased in the atmosphere over a time during summer period*                   | 1.85     |
| 5.         | The intensity of heat has decreased in the surroundings over a time                                       | 1.64     |
| 6.         | The frequency of high temperature or heat waves have increased in the surrounding over the years *        | 1.84     |
| 7.         | The frequency of high temperature or heat waves have decreased in the atmosphere over the years           | 0.84     |
| 8.         | The night temperature has increased substantially over the years*                                         | 1.95     |
| 9.         | The night temperature has decreased over the years                                                        | 0.76     |
| <b>II.</b> | <b>Change in rainfall pattern/ rainy season</b>                                                           |          |
| 10         | There is a sizeable change in rainfall pattern over the years*                                            | 1.87     |
| 11         | The amount (quantity) of rainfall has increased significantly in recent times                             | 0.77     |
| 12         | The amount (quantity) of rainfall has decreased considerably in recent times*                             | 1.83     |
| 13         | In recent times rainfall has become irregular or erratic*                                                 | 1.90     |
| 14         | The total rainy days has increased substantially in recent years                                          | 1.44     |
| 15         | The total rainy days has decreased gradually in recent years*                                             | 2.03     |
| 16         | The frequency of heavy rains has remarkably increased over the years*                                     | 2.16     |
| 17         | The frequency of heavy rains has decreased considerably                                                   | 1.24     |
| 18         | The dry spells have increased over the years*                                                             | 2.05     |
| 19         | The dry spells have decreased remarkably over the years                                                   | 0.24     |
| <b>III</b> | <b>Change in winter season</b>                                                                            |          |
| 20         | There has been considerable change in winter season over the years *                                      | 1.93     |
| 21         | The winter season during recent years has been shortened*                                                 | 1.86     |
| 22         | The winter seasons during recent years have become longer                                                 | 1.17     |
| 23         | The bitterness of cold has increased over time                                                            | 0.55     |
| 24         | The bitterness of cold has decreased over time*                                                           | 1.81     |
| 25         | The density of fog has increased considerably                                                             | 1.31     |
| 26         | The density of fog has decreased in recent times*                                                         | 1.93     |
| 27         | The morning dew drops have increased over the years                                                       | 0.28     |
| 28         | The morning dew drops have decreased over the years*                                                      | 2.16     |
| <b>IV</b>  | <b>Occurrence of extreme events or disasters (earthquakes, floods, droughts, tsunami landslides etc.)</b> |          |
| 29         | The occurrence of extreme events is now more noticeable*                                                  | 2.44     |
| 30         | Landslides have increased remarkably over the years*                                                      | 1.93     |
| 31         | Landslides have decreased substantially                                                                   | 0.78     |
| 32         | Blizzards have increased considerably over the years                                                      | 0.87     |
| 33         | Blizzards have decreased over the time                                                                    | 0.78     |
| 34         | Wildfires have increased significantly over the years*                                                    | 1.93     |
| 35         | Wildfires have decreased over the years                                                                   | 0.78     |
| 36         | Earthquakes have increased over a time *                                                                  | 1.93     |
| 37         | Earthquakes have decreased considerably in recent times                                                   | 1.37     |
| 38         | Dust storms are now more common occurrences                                                               | 1.57     |
| 39         | Dust storms have decreased noticeably*                                                                    | 1.95     |
| 40         | Floods have increased significantly over the years*                                                       | 1.93     |
| 41         | Floods have decreased over the time                                                                       | 1.18     |
| 42         | The incidence of tsunami has increased over the years considerably                                        | 0.93     |
| 43         | The incidence of tsunami has decreased over the years                                                     | 0.51     |
| 44         | The incidence of droughts has increased considerably over the time*                                       | 1.75     |
| 45         | The incidence of droughts has decreased in recent times                                                   | 1.65     |
| 46         | The occurrence of hailstorms has increased substantially                                                  | 0.93     |
| 47         | The occurrence of hailstorms has decreased over the years*                                                | 2.00     |
| 48         | Thunderstorms have increased considerably*                                                                | 2.13     |
| 49         | Thunderstorms have decreased over time                                                                    | 1.69     |
| <b>V</b>   | <b>General perception about climate change</b>                                                            |          |
| 50         | Climate change is a natural phenomenon that occurs over a period of time*                                 | 2.13     |
| 51         | Climate change is a curse of God*                                                                         | 1.93     |
| 52         | Climate change is a result of peoples' Karma (sins) on the earth *                                        | 1.83     |
| 53         | Climate change is due to changes in natural resources                                                     | 0.82     |
| 54         | Climate change is due to destruction of natural resources (forest area, water bodies etc.) *              | 1.83     |
| 55         | Climate change is due to interference of human beings with nature                                         | 1.33     |

\*Selection of items in final scale

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\left(\sum \bar{X}_H^2 - \frac{(\sum \bar{X}_H)^2}{n}\right) \times \left(\sum \bar{X}_L^2 - \frac{(\sum \bar{X}_L)^2}{n}\right)}} \times \frac{1}{n(n-1)}$$

Where,

$\bar{X}_H$  = The mean score on given statement of the high group

$\bar{X}_L$  = The mean score on given statement of the low group  
 $\sum \bar{X}_H^2$  = Sum of squares of the individual score on a given statement for high group

$\sum \bar{X}_L^2$  = Sum of squares of the individual score on a given statement for low group

$n$  = Number of respondents in each group

$t$  = The extent to which a given statement differentiate between the high and low group.

**Selection of Statements for final scale:** After computing “t” value for all the items, 29 statements with highest “t” value equal to or greater than 1.75 were selected (Appendix II). The rule of rejecting items with ‘t’ value less than 1.75 was followed (Edwards, 1957) [2]. As per the rule selection of items to be retained in the scale, apart from eliminating those with poor discriminating ability and questionable validity, was a matter of including those with highest discriminating values. Thus 29 statements were retained in the final scale based on the following criteria:

1. The ‘t’ value is more than 1.75
2. The statement should present a new idea i.e., the idea not overlapping with that
3. expressed other
4. The statement should be simple in words and brief.

**Standardization of the scale:** The validity and reliability were ascertained for standardization of the scale. As validity literally means truthfulness, which refers to “the degree to which a test measures, what it claims to measure” by Kerlinger (1973) [4], the content validity was used to measure the validity of the scale. Reliability is the accuracy or precision of measuring instrument. To know the reliability of the perception Split-Half method was followed.

**Content validity of the scale:** Content validity is the representativeness or sampling adequacy of the content of a measuring instrument. The scale satisfies both these criteria as the clause of universe of statements that could be made about *Perception of farm women about climate change* is formulated from the standards and also in consultation with experts who had knowledge about the psychological object. This ensures high content validity of perception and acceptance scale. The scale was constructed in accordance with the steps followed in summated rating scale given by Edward (1957). Therefore, it was assumed that the scores obtained by administering this scale measured nothing other than the perception of farm women about climate change. While selecting perception, due care was taken for obtaining a fair degree of content validity. The calculated “t” value being significant for all the finalized statements of the score

indicated that the perception statements of the scale have discriminating values. Hence, it seems reasonable to accept the scale as a valid measure of the perception (Table 2).

**Testing reliability of the scale:** The reliability of the scale was determined by ‘Split-Half’ method. The split-half method was regarded by many as the best of the methods for measuring reliability.

**Split-Half methodology:** The 29 selected perception items were divided into two halves by odd-even method. The two halves were administered separately to 30 farm women in a non-sample area. The scores were subjected to product moment correlation test in order to find out the reliability of the half-test. The half-test reliability coefficient (r) was 0.98, which was significant at one per cent level of probability. Further, the reliability coefficient of the whole test was computed using the Spearman-Brown prophecy formula given below.

$$r_{1/2} = \sqrt{\frac{n(\sum XY - (\sum X)(\sum Y))}{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}}$$

Where,

$\sum X$  = Sum of the scores of the odd number items

$\sum Y$  = Sum of the scores of the even number items

$\sum X^2$  = Sum of the squares of the odd number items

$\sum Y^2$  = Sum of the squares of the even number items

$N$  = Number of respondents

The whole test of the scale was 0.99, which was highly significant at one per cent level indicating the high reliability of the scale.

**Final Administration:** The finally selected statements of the scale were randomly arranged and incorporated in the final format of the interview schedule. Each of the statement was provided with five-point continuum, from ‘Strongly agree’ to ‘strongly disagree’ with a score of 5, 4, 3, 2, and 1 respectively for positive statements and vice versa for negative statements.

## Results

The final scale consisted of 29 statements and categorised under different dimensions like change in summer season/ temperature, change in rainy season/ rainfall pattern, change in winter season, occurrence of extreme events and general perception. The responses had to be recorded on a five-point continuum representing strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2, and 1, respectively for positive statements and vice versa for negative. The perception score of each respondent can be calculated by adding up the scores obtained by him/her on all the items. Based on their scores respondents were divided into three categories viz. high, medium and low. The higher score indicates that the respondent had more perception about climate change and vice versa (Table 3).

**Table 3:** Scale to measure perception of farm women about climate change

| Sl. No     | Statements                                                                                                |
|------------|-----------------------------------------------------------------------------------------------------------|
| <b>I.</b>  | <b>Change in temperature/summer season</b>                                                                |
| 1          | There has been significant change in global temperature during summer season over the years               |
| 2          | The global temperature has increased in the atmosphere considerably over a period of time                 |
| 3          | The intensity of heat has increased in the atmosphere over a time during summer period                    |
| 4          | The frequency of high temperature or heat waves have increased in the surrounding over the years          |
| 5          | The night temperature has increased substantially over the years                                          |
| <b>II.</b> | <b>Change in rainfall pattern/ rainy season</b>                                                           |
| 6          | There is a sizeable change in rainfall pattern over the years                                             |
| 7          | The amount (quantity) of rainfall has decreased considerably in recent times                              |
| 8          | In recent times rainfall has become irregular or erratic                                                  |
| 9          | The total rainy days has decreased gradually in recent years                                              |
| 10         | The frequency of heavy rains has remarkably increased over the years                                      |
| 11         | The dry spells have increased over the years                                                              |
| <b>III</b> | <b>Change in winter season</b>                                                                            |
| 12         | There has been considerable change in winter season over the years                                        |
| 13         | The winter season during recent years has been shortened                                                  |
| 14         | The bitterness of cold has decreased over time                                                            |
| 15         | The density of fog has decreased in recent times                                                          |
| 16         | The morning dew drops have decreased over the years                                                       |
| <b>IV</b>  | <b>Occurrence of extreme events or disasters (earthquakes, floods, droughts, tsunami landslides etc.)</b> |
| 17         | The occurrence of extreme events is now more noticeable                                                   |
| 18         | Landslides have increased remarkably over the years                                                       |
| 19         | Wildfires have increased significantly over the years                                                     |
| 20         | Earthquakes have increased over a time                                                                    |
| 21         | Dust storms have decreased noticeably                                                                     |
| 22         | Floods have increased significantly over the years                                                        |
| 23         | The incidence of droughts has increased considerably over the time                                        |
| 24         | The occurrence of hailstorms has decreased over the years                                                 |
| 25         | Thunderstorms have increased considerably                                                                 |
| <b>V</b>   | <b>General perception about climate change</b>                                                            |
| 26         | Climate change is a natural phenomenon that occurs over a period of time                                  |
| 27         | Climate change is a curse of God                                                                          |
| 28         | Climate change is a result of peoples' Karma (sins) on the earth                                          |
| 29         | Climate change is due to destruction of natural resources (forest area, water bodies etc.)                |

## Conclusion

In conclusion, climate change presents a profound challenge impacting agriculture, food and water security, and economic stability globally. The study highlighted the importance of accurately assessing farmers' perceptions of climate change, as these perceptions directly influence their adaptive behaviors. By developing and standardizing a scale to measure farm women's perceptions, the study aims to better understand and address the specific needs of this critical group. The rigorous methodology employed—spanning item collection, editing, and analysis—ensures the scale's validity and reliability. This tool is essential for designing targeted interventions that enhance resilience and adaptability in agriculture, particularly in vulnerable communities.

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