

SCALE TO MEASURE THE PERCEPTION OF FARMERS AND RESEARCHERS ABOUT CROP CRISIS AND ITS MANAGEMENT IN CROPS

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ABSTRACT

Perception is the organization, identification, and interpretation of sensory information to represent and understand the presented information. Perception also includes how we respond to the information. Keeping this in view a standardized scale has been developed to measure the perception of crop crisis and its management. A 'Scale Product method' technique was chosen to construct the perception scale which is a combination of the Thurstone's technique of equal appearing interval scale and Likert's technique of summated rating for ascertaining the response on the scale. The process started with identifying the dimension, and collection of items followed by, relevancy and item analysis and checking the reliability and validity for precision and consistency of the results. A total of 113 statements were selected for judgment and sent to 180 judges with a request to analyse the relevancy of items on the five-point continuum, ranging from, most unfavourable to most favourable. Out of them, 70 schedules were kept for the analysis. Based on the scale S (median) and Q values, 18 statements were finally selected to measure the perception of crop crisis and its management. The developed scale was found to be reliable and valid.

Keywords: Perception, crisis and its management practices, scale

INTRODUCTION

The crisis in Indian agriculture, which has been building up for decades, is not one of declining profitability but of the non-viability of the bulk for landholdings. The number of these holdings is fast increasing, and even the extent of non-viable land in the total cultivable area is expanding. Merely boosting the productivity of smallholdings is not sufficient, and their non-viability hinders capital formation in agriculture. It is argued that the consequence of the agricultural crisis in India is very vast and likely to hit all the other sectors and the national economy in several ways. In specific, it has adverse effects on food supply, prices of food grains, cost of living, health and nutrition, poverty, employment, labour market, land loss from agriculture and foreign exchange earnings. In sum, it revealed that the agricultural crisis would be affecting a majority of the people in India and the economy as a whole in the long run; therefore, it can be argued that the crisis in agriculture is a crisis of the country. The only remedy to the crisis is to do all that is possible to make agriculture a profitable enterprise and attract the farmers to continue the crop production activities.

The success or failure of many social reforms would mainly depend upon the people's attitude. Thurstone (1946) defined an attitude as the degree of positive or negative effect associated with some psychological object. To understand

the feelings of the farmers and researchers towards crisis and its management, there was no well-developed scale on Perception of Crisis and its Management. Hence considering this, the present study was planned.

OBJECTIVE

To development of scale to measure the perception of farmers and researchers of South Gujarat about crop crisis and its management in crops

METHODOLOGY

The proposed study is unique in its kind and considering these facts, the investigator has decided to develop a scale for measuring perception about crisis and its management in crops. The collective perception of farmers and concern experts regarding crops cultivation may be imperative in the construction of a scale. Among the techniques available for the construction of the scale, Thurstone's Equal Appearing Interval Scale (1928) and the Likert's Summated Rating Scale (1932) was found appropriate. Both the method have such limitations, first have discriminating response and second has in the selection of items therefore, a 'Scale Product method' technique was chosen to construct the perception scale which is combination of the Thurstone's technique of equal appearing interval scale for selection of the statements and Likert's technique of summated rating

for ascertaining the response on the scale as proposed by Eysenck and Crown (1949). The steps followed (Raval *et al.*, 2023; Raval *et al.*, 2023; Kumbhani *et al.*, 2023; Chigadoll *et al.*, 2022; Krushnpalsinh and Vinaya, 2020; Vinaya *et al.*, 2016) in construction of scale to measure the perception of crop crisis and its management are discussed.

Item collection

In the preliminary stage of developing the scale, a total of 113 items reflecting feelings of the perception of crop crisis and its management were collected from relevant literature and discussed with the experts and faculties of extension education.

Item analysis

The collected items were edited according to the criteria laid down by Edward and Kilpatrick (1948). Out of 113 statements, 70 statements were retained. Enough care was taken to develop non-ambiguous and non-factual items.

It may be possible that all the collected items may not be appropriate equally in measuring the perception of crop crisis and its management. Therefore, these items were subjected to scrutiny for its appropriateness by the judges. The five-point equal-appearing interval continuum was used

to judge each statement on the degree of unfavourableness to favourableness. The personnel working as extension educationists, sociologists, and psychologists were identified from various universities in India. Schedule contents 70 items was prepared for judging the relevancy. The schedule was sent to 180 judges with the request to analyse the relevancy of items on the five-point continuum. Out of the total, 98 judges had responded. The investigator has found that some of the judges have responded very carelessly, misunderstood the directions and not be aware of the judgments desired in scale construction. Considering these points in mind 38 schedules were eliminated. Hence, 60 schedules were kept for the analysis.

Determination of scale and quartile values

The five-point equal-appearing interval continuum was used to judge each statement on the degree of unfavourableness to favourableness. In Equal Appearing Interval Scaling Technique, the Scale Value (S) and Inter Quartile Value (Q) are important for the selection of the item. The procedure for calculation of S and Q values of the 1st item is shown in Tables 1 and 2.

Table 1 shows the continuum-wise frequency of judgments made by the judges for the 1st item.

Table 1: Distribution of frequency assigned for 1st item by the judges on five continuum (n=60)

Sorting categories	1	2	3	4	5	Total
Distribution of judges judgments on 1 st item	II	III	IIII	IIII IIII IIII IIII III	IIII IIII IIII IIII IIII I	60
Frequency	2	4	5	23	26	

The frequency obtained on 1st item was used to work out the proportion (*p*) and cumulative proportion (*cp*) to find out the S and Q values. It is depicted in table 2.

Table 2: Summary of judgments on five continuum for 1st item (n = 60)

1 st item	Sorting categories					S	Q
	1	2	3	4	5		
<i>f</i>	2	4	5	23	26	4.3	1.23
<i>p</i>	0.03	0.07	0.08	0.38	0.43		
<i>cp</i>	0.03	0.10	0.18	0.57	1.00		
S = Median or Scale value					Q = Inter quartile Value		

The table 2 showing the *f*, *p* and *cp* value of 1st item. The *p* value was derived by dividing each *f* value received on 5 continuums with the total number of the judges (n= 60), while in calculation of *cp*, the *p* value of given continuum was considered and added to the sum of all the *p* values of below

continuums.

Based on judgment, the scale (median) value of the distribution and the Q value for the statement concerned were calculated by the following formula.

$$S = l + \frac{(0.50 - \sum pb)}{pw} \times i$$

Where,

S = Median or Scale value of a statement

l = Lower limit of the interval in which the median falls

$\sum pb$ = Sum of the proportion below the interval in which the median falls

Pw = Proportion within the interval in which the median falls

i = Width of the interval which was assumed as equal to 1.0.

Thurstone and Chave (1929) used the inter quartile range Q as a means of the variation of the distribution of the judgments for a given statement. Moreover, it was worked out to determine the ambiguity involved in the items.

The inter quartile range contents the middle 50 per cent of the judgments. To determine the value of Q, it is needed to find two other points also, the 75th centile and 25th centile.

The 25th centile was obtained from the following formula.

$$C_{25} = l + \frac{(0.25 - \sum pb)}{pw} \times i$$

Where,

C₂₅ = the 25th centile

l = Lower limit of the interval in which the median falls

$\sum pb$ = Sum of proportion below the interval in which the 25th centile falls

pw = Proportion within the interval in which the 25th centile falls

i = Width of the interval which was assumed as equal to 1.0.

The 75th centile was obtained from the following formula.

$$C_{75} = l + \frac{(0.75 - \sum pb)}{Pw} \times i$$

Where,

C₇₅ = the 75th centile

l = Lower limit of the interval in which the median falls

$\sum pb$ = Sum of proportion below the interval in which the 75th centile falls

pw = Proportion within the interval in which the 75th centile falls

i = Width of the interval which was assumed as equal to 1.0. The inter quartile range find out by taking the difference between C₇₅ and C₂₅.

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

According to Thurstone scaling technique, only those items were selected whose median values were greater than Q value. Further, Thurstone and Chave (1929) have also described other criteria in addition to Q value as a base for rejecting the item while scales constructed. They stated that when two or more items have the same S values, then the item having lowest Q value has to be selected.

RESULTS AND DISCUSSION

Table 3 : Final statement for the perception scale

Sr. No.	Statement	S Value	Q Value
1	Contingency plans mitigate the risk of a farmer (+)	3.8	1.70
2	A drought-resistant variety prevents economic losses (+)	4.2	1.09
3	Multiple cropping increases the food crisis (-)	1.6	1.07
4	Wooden boxes prevent damage to tomatoes during transport (+)	4.5	1.12
5	Diversification agriculture reduces the weather effect on crops (+)	4.0	1.36
6	Early harvesting of the green gram can prevent the shattering of pods (+)	4.3	1.13
7	Border plants restrict the shattering of the crop from the wind (+)	2.9	1.52
8	Crop management is a strategy for drought mitigation (+)	4.8	0.67
9	Genetically modified seeds have resistance against pests/ diseases (+)	3.9	1.57
10	Crop rotation can control pests/ diseases (+)	3.7	1.26
11	Trap crops increase pest damage in major crops (-)	4.1	1.20
12	Use balanced chemical fertilizer in the crop (+)	4.4	1.09

Sr. No.	Statement	S Value	Q Value
13	Using drip or sprinkler system for irrigation (+)	2.0	1.06
14	Rainwater should be stored in the farm pond (+)	3.5	1.32
15	Soil testing is not advisable (-)	1.2	0.95
16	Crop monitoring is beneficial for decision making (+)	3.4	1.80
17	Tillage destroys weeds and disrupts the pest life cycle (+)	2.5	2.18
18	Denavelling technique helps to uniform fruit in the banana (+)	3.6	1.93

Reliability of the scale

A scale is reliable when it gives consistently the same results when applied to the same sample. The designed perception scale for the study was tested for its reliability by using the split half method. It was introduced to 30 respondents of non-sample area. The coefficient of reliability between these two sets of score will be calculated by Rulon's formula (Guilford 1954).

$$r_{tt} = 1 - \frac{\sigma^2_d}{\sigma^2_t}$$

Where,

R_{tt} = Coefficient of reliability

σ^2_d = Variance of those differences

σ^2_t = Variance of the total scores

The coefficient of reliability between two sets of score between was found to be 0.8483 which was found to be significant at 1 per cent level, thereby testifying the reliability of the scale.

Validity of the scale

The content validity of the scale was tested. The content validity is the representative or sampling adequacy of the content, the substance, the matter, and the topics of a measuring instrument. This method was used in the present scale to determine the content validity of the scale. As the content of the perception was thoroughly covered the subject matter under the study through literature and expert opinion, it was assumed that the present scale satisfied the content validity.

Administration of the scale

The selected 18 statements for the final format of the perception scale were randomly arranged to avoid

response biases. Out of the 18 selected statements, three statements were the indicators of the unfavorable perception and fifteen statements were the indicators of favorable perception. Against these 18 statements, there were five columns representing five points continuum of favorableness and unfavorableness to the statements. The five points on continuum were Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree with respective weights of 1, 2, 3, 4 and 5, for the positive statements while 5, 4, 3, 2, and 1 for the negative statements. The final perception scale was administered on the selected sample respondent. They were asked to express their reaction in terms of their favorableness or unfavorableness with each statement by selecting one of five response categories.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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