A SCALE TO MEASURE ATTITUDE OF FARMERS TOWARDS AGRICULTURAL DIVERSIFICATION

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ABSTRACT

Attitude is defined as the degree of favourable or unfavourable feeling of the farmers towards agricultural diversification. It is the accepted fact that an attitude of an individual plays an important role in determining ones behaviour. Keeping this in view a standardized scale has been developed to measure the attitude of farmers towards agricultural diversification. A summated (Likert) rating scale was been developed. The process started with identifying the dimension, 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 fifty-five statements were framed in which finally nineteen statements were finally retained for measuring attitude of farmers towards agricultural diversification. The scale contains total nineteen statements, out of which fourteen statements are positive and five statements are negative. The scale developed was found highly reliable and valid.

Keywords: *attitude, agricultural diversification, scale, reliability, farmers*

INTRODUCTION

In India, agriculture is a major sector that plays a crucial role in the development of agrarian economies. During the past decade, securing livelihoods have been increasingly recognized as an important element of sustainable development. However, in India, land-based livelihoods of small and marginal farmers are increasingly becoming unsustainable, since their land is no longer able to meet the requirements of food for the family and fodder for their cattle. The majority of small and marginal farmers cultivate mainly low value, subsistence crops. Therefore, in a subsistence agricultural system, diversification is considered as a strategy to minimize farm risk, which arises as a result of fluctuations in output prices, weather uncertainties and insect-pest incidences *etc*. More precisely in the era of commercial and market-led agriculture, however, diversification is a growth strategy which replaces the subsistence enterprises with the sustainable and profitable ones.

In relation to agricultural development, "diversification" is probably one of the most frequently used terms in the recent decade. Traditionally, diversification was used more in the context of a subsistence kind of farming, wherein farmers grown many crops on their field. The household level food security as also risk was an important consideration in diversification. In the recent decade, diversification is increasingly being used to describe increase in area under high value crops.

OBJECTIVE

To develop and measure the attitude scale of farmers towards agricultural diversification

METHODOLOGY

Attitude refers to the "degree of positive or negative affect associated with some psychological object" (Thurstone, 1946). Thurstone's Equal Appearing Interval Scale (1928) and the Likert's Summated Rating Scale (1932) are quite well known. Both the methods suffer from the limitations, the first one in getting discriminating response and second one in the selection of items. Thus, the technique chosen to construct the attitude scale was of "Scale Product Method" which is combination of the Thurstone's technique of equal appearing interval scale for selection of the items and Likert's technique of summated rating for ascertaining the response on the scale as proposed by Eysenck and Crown (1949). The methodology is also followed by Vekariya et al (2022), Patel et al. (2022), Yeragorla *et al.* (2021) and Vinaya *et al.* (2018).

RESULTS AND DISCUSSION

The following procedure was adopted to develop

and standardize the scale to measure the attitude of farmers towards agricultural diversification.

Statement collection

In preliminary stage for developing the scale, numbers statements reflecting feelings of the farmers towards agricultural diversification were collected from relevant literature, discussion with major advisor, extension educationists and experts.

Editing of statements

The collected statements were screened and edited by following criteria laid down by Edwards (1957) and finally 55 statements were selected as they were found to be non-factual and non-ambiguous.

Statement analysis

In order to judges were asked to judge the degree of "Unfavourableness" to "Favourableness" of each statement on the five-point equal appearing interval continuum, a panel of 153 selected judges. Out of these 153 experts, 100 experts returned the statements after duly recording their judgments and were considered for analysis. The judges selected for the study comprised of extension educationists from State Agricultural Universities of Gujarat, ICAR as well as other extension personnel with considerable field experience.

Determination of scale and quartile

The five points of the rating scale were assigned score ranking from 1 for most unfavourable and 5 for most favourable. The based on judgment, the median value of the distribution and the Quartile (Q) value for the statement concerned was calculated with the help of following formula.

$$S = L + \frac{0.50 - \sum Pb}{Pw} \times i$$

Where,

S = Scale value

L = The Lower limit of the interval in which the median falls

$\sum Pb$= The sum of the proportion below the interval in which the median falls

P_W = The proportion within the interval in which the median falls

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

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.

$$C_{25} = L + \frac{0.25 - \sum Pb}{Pw} \times i$$

The 25th centile was obtained by the formula.

Where,

C_{25} = Median or scale value of the statement

L = Lower limit of the interval in which the 25th centile falls

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

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

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

The 75th centile was obtained by the following formula.

$$C_{75} = L + \frac{0.75 - \sum Pb}{Pw} \times i$$

Where,

C_{75} = Median or scale value of the statement

L = Lower limit of the interval in which the 75th centile falls

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

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

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

Then the interquartile range would be given by taking the difference between C_{75} and C_{25}, thus,

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

Table 1: Discrimination of items on the bases of S and Q values

Statement Number	Statements	S Value	Q Value	Selected/ Not selected
01	I feel that diversification creates new job opportunities for rural people other than traditional farming.	1.500	2.000	Not selected
02	I consider that crop diversification effectively increases soil fertility and controls pest incidences.	2.587	2.672	Not selected
03	Agriculture diversification facilitates risk management.	3.917	3.850	**Selected**
04	I dislike using any agricultural risk creating techniques. (-)	3.063	3.988	Not selected
05	I consider that demonstration has to be conducted to prove the worth of diversification before adoption at the farm.	2.587	2.617	Not selected
06	Diversification in farming system is the right way to increase agricultural income.	4.026	2.952	**Selected**
07	I believe that small and marginal farmers can be benefitted by diversifying from present farming system.	3.773	2.952	**Selected**
08	I prefer for stabilization as well as increase in income, the diversification in farming system is necessary.	1.443	1.943	Not selected
09	I like conservation and enhancement of natural resources can be achieved by diversification in farming system.	1.480	1.980	Not selected
10	I feel that judicious mixing of enterprises brings stability in farm income.	3.978	2.438	**Selected**
11	Diversification in farming system is need of time.	3.913	2.718	**Selected**
12	I feel that diversification is advantageous to deviate from present farming system.	1.500	2.690	Not selected
13	I realize that diversification in farming system is necessary for survival.	2.816	2.951	Not selected
14	I feel that farmer needs technical expertise to properly diversify their farming.	2.611	2.808	Not selected
15	I think that most of the farmers' present situation does not permit diversification in farming system. (-)	2.929	3.786	Not selected
16	I understand that diversification in farming system can spoil the soil health and environment. (-)	3.015	3.606	Not selected
17	I feel that diversification in farming system is useful only to the resourceful farmers.(-)	3.976	3.018	**Selected**
18	I think that there is no advantage of diversified farming system as well as wastage of resources.(-)	3.875	3.145	**Selected**
19	I feel that value addition in agriculture diversification provides better alternative.	4.024	3.380	**Selected**
20	I accept that diversification is harmful for eco-system. (-)	1.480	1.980	Not selected
21	I believe that diversification is against the traditional system of farming. (-)	1.462	1.962	Not selected
22	I feel whatever father did for us was right that's why there is no need of new technologies. (-)	1.443	1.943	Not selected
23	I feel that using agricultural diversity allows me to reduce my input expenses.	4.050	3.453	**Selected**

Statement Number	Statements	S Value	Q Value	Selected/ Not selected
24	Rather than being a business, I see agricultural diversification as a means of ensuring livelihood.	1.443	2.628	Not selected
25	I do not rely heavily on market information for taking decision on agricultural diversification. (-)	1.409	1.909	Not selected
26	I believe that increasing agricultural diversity can help farmers to produce enough food to support their livelihoods.	3.352	3.074	**Selected**
27	I feel agricultural diversification might need more management than what is usually done in conventional practices. (-)	1.480	1.980	Not selected
28	I understand that reduction in weed, disease and pest infestation are another benefit of agricultural diversification.	1.443	1.943	Not selected
29	I feel that agricultural diversity enables one to maximise return on investment with minimal outlay.	1.564	2.635	Not selected
30	I trust that conventional farming is more profitable than diversified one. (-)	4.278	3.202	**Selected**
31	I accept that almost all the challenges faced by farmers may be resolved by agricultural diversification.	2.750	2.897	Not selected
32	I feel that long-term environmental benefits result from agricultural diversification.	3.978	3.207	**Selected**
33	I trust that diversification guarantees the family members year round employment.	4.119	3.361	**Selected**
34	I believe that managing different kinds of enterprises is a highly tiresome task. (-)	2.851	3.224	Not selected
35	I think that diversification can helps to overcome unpredictable failures of any enterprise through sustaining with other enterprises.	2.636	2.908	Not selected
36	Agricultural diversification is a labour intensive strategy. (-)	4.722	2.548	**Selected**
37	Agricultural diversification is a way to help farmers to deal with climate change.	3.923	2.327	**Selected**
38	I accept that diversification helps to reduce dependency on other sources for the livelihood.	2.611	2.644	Not selected
39	Agricultural diversification can meet the needs of our society for food, fuel and fodder.	3.935	3.222	**Selected**
40	I believe that due to a lack of market facilities, it is unsuccessful. (-)	3.650	3.824	Not selected
41	I feel one factor driving agricultural diversification is a lacklustre return from conventional farming.	2.851	3.052	Not selected
42	I think diversification provides one way for efficient utilization of available local resources.	2.720	3.090	Not selected
43	Agricultural diversification protects against risk/ changes price in the market.	3.667	3.411	**Selected**
44	I understand that diversification helps to acquire different type of livelihood security required by rural people.	2.542	2.765	Not selected
45	I feel that a farmer suffers losses due to inadequate diversification expertise. (-)	2.564	2.801	Not selected

Statement Number	Statements	S Value	Q Value	Selected/ Not selected
46	I believe that adoption of agricultural diversification is hampered by limited resources.(-)S	2.690	2.976	Not selected
47	It aids in bringing about socioeconomic transformation in the farming community.	1.462	2.730	Not selected
48	I accept that farm production benefits from agricultural diversification.	2.750	2.966	Not selected
49	I don't want to waste time by adopting agricultural diversification. (-)	2.690	2.780	Not selected
50	I understand that starting various enterprises takes a sizable upfront expenditure. (-)	2.520	2.672	Not selected
51	Diversification is more profitable than relying just on one industry, like agriculture.	1.409	1.909	Not selected
52	I accept that small farm family's steady income is ensured by agricultural diversification.	3.971	3.737	**Selected**
53	I feel that diversification of agriculture is a complicated process. (-)	2.971	4.098	Not selected
54	I think need of technical skills in diversification is a key barrier in adoption.(-)	2.663	3.641	Not selected
55	I feel, nutrients among soil, plants and animal's residues recycling does not benefit the farmer economically. (-)	4.000	2.613	**Selected**

Final statements for attitude scale

When there was a good agreement among the judges in judging the degree of most appropriateness or least appropriateness of a statement, the Q value remains smaller as compared to the obtained S value. Thus, only those statements were selected whose S values were greater than Q values.

Based on the median and Q values, 19 statements numbering 3, 6, 7, 10, 11, 17, 18, 19, 23, 26, 30, 32, 33, 36, 37, 39, 43, 52 and 55 of a schedule were finally selected to measure the attitude of farmers towards agricultural diversification. The final format of the attitude scale is given in the Table 2.

Table 2: Final scale to measure the attitude of farmers towards agricultural diversification

Sr. No.	Statement	SA	A	UD	DA	SDA
1	Agriculture diversification facilitates risk management.					
2	Diversification in farming system is the right way to increase agricultural income.					
3	I believe that small and marginal farmers can be benefitted by diversifying from present farming system.					
4	I feel that judicious mixing of enterprises brings stability in farm income.					
5	Diversification in farming system is need of time.					
6	I feel that diversification in farming system is useful only to the resourceful farmers. (-)					
7	I think that there is no advantage of diversified farming system as well as wastage of resources.(-)					
8	I feel that value addition in agriculture diversification provides better alternative.					
9	I feel that using agricultural diversity allows me to reduce my input expenses.					
10	I believe that increasing agricultural diversity can help farmers to produce enough food to support their livelihoods.					
11	I trust that conventional farming is more profitable than diversified one. (-)					
12	I feel that long-term environmental benefits result from agricultural diversification.					

Sr. No.	Statement	SA	A	UD	DA	SDA
13	I trust that diversification guarantees the family members year round employment.					
14	Agricultural diversification is a labour intensive strategy. (-)					
15	Agricultural diversification is a way to help farmers to deal with climate change.					
16	Agricultural diversification can meet the needs of our society for food, fuel and fodder.					
17	Agricultural diversification protects against risk/ changes price in the market.					
18	I accept that small farm family's steady income is ensured by agricultural diversification.					
19	I feel, nutrients among soil, plants and animal's residues recycling does not benefit the farmer economically. (-)					

Reliability of scale

The split-half technique was used to measure the reliability of the scale. The 19 statements were divided into two halves with ten odd numbered in one half and other nine even numbered statements in the other part. These were administered to 30 respondents. Each of the two sets was treated as separate scales having obtained two score, for each of the 30 respondents. Co-efficient of reliability between the two sets of score was calculated by Rulon's formula (Guilford, 1954) which came to **0.77**. Reliability is directly related to the length of scale when we split to odd and even number items. The reliability coefficient which has been calculated is the value of half size of the original scale. In case of finding reliability using split half method, researcher needs to apply correction factor for final value of reliability. In this scale it was found 0.86.

Rulon's Formula

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

Where,

$$\sigma^2 d = \frac{\Sigma d^2 - \frac{(\Sigma d)^2}{20}}{20}$$

Where,

rtt	=	co-efficient of reliability
$s^2 d$	=	variance of those two differences
$s^2 t$	=	variance of total score

$$\sigma^2 d = \frac{\Sigma d^2 - (\Sigma d)^2/n}{N} \qquad \sigma^2 t = \frac{\Sigma t^2 - (\Sigma t)^2/n}{N}$$

The correction factor can be calculated by using

Sperman-Brown formula

$$rtt = \frac{2roe}{1 + roe}$$

Where,

rtt = Coefficient of reliability of original test

roe = reliability of coefficient of odd and even score

Validity of the scale

The validity of a test depends upon fidelity with which it measures what it is purported to measure. The validity of the scale was examined with the help of content validity by determining how well the content of the scale represented the domain subject matter under study. Since as many items covering the area as possible were selected by discussion with the experts, reviewing the literature and strict adherence to the judges' ratings, it was presumed that the instrument satisfied the content validity.

Administering the scale

The final attitude scale was administered on the selected sample farmers. The responses were collected in five point continuum *viz.* strongly agree, agree, undecided, disagree and strongly disagree with weight age of 5, 4, 3, 2 and 1, respectively for positive statements and reverse scoring for negative statements. The total attitude score for each respondent was obtained by adding all the scores of their responses of all the statements and categories on arbitrary basis.

CONCLUSION

The attitude scale developed was found to be reliable and valid. The attitude scale developed was

administered on 30 farmers of a non-sample area, there were no complications in using the scale, hence it can be concluded that the scale developed was useful in measuring the attitude towards agricultural diversification.

Hence, researcher can use this scale in future for measuring the attitude of farmers in similar studies.

CONFLICT OF INTEREST

All authors declare that they have no conflict of interest

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