

Original Research Article

Scale to measure attitude of farmers towards recommended water management technologies and practices

Abstract

Recommended water management technologies and practices are a number of measures developed for specific crop of varied farming systems as a resolution for conserving water in agriculture. These technologies are developed after a meticulous research and recommended to farmers by research institutes of ICAR, State Agricultural University or other organization. Attitude is a developed feeling or emotion about some psychological object which helps an individual to give a verdict on that psychological object. A scale was developed to measure attitude of farmers towards recommended water management technologies and practices for which 'Likert method of summated ratings' was followed.

About 57 statements resulted after edition of a total of 85 statements as per the criteria suggested by Edwards (1969), and were sent to 100 extension specialists working in various research and extension wings of Indian Council of Agriculture Research (ICAR), State Agricultural Universities throughout the country for critical evaluation of statements on a 5 point continuum. The responses received from 46 judges out of 100, an aggregate of 29 statements were selected based on the relevancy test i.e., relevancy weightage, percentage and mean relevancy scores. Further the statements were subjected to item analysis by administering them to 100 farmers from a non-sample area. Finally a total of 12 statements were selected based on the 't' values (> 2.75) resulted from the item analysis and included in the final scale. Thus, the instrument developed to measure attitude of farmers towards recommended water management technologies and practices consisted of 6 positive and 6 negative attitude statements.

Keywords: Attitude, farmers, recommended water management technologies.

Introduction

To measure the attitude of farmers towards recommended water management technologies and practices a scale was developed by following the procedure. Edwards

(1957) defines attitude as the degree of positive or negative affect associated with some psychological object. Attitude in this study was operationally defined as the degree of favourable or unfavourable feeling of farmers towards recommended water management technologies and practices.

Methodology

Summated ratings method of Likert (1932) was used to construct the attitude scale and the details of the procedure followed and standardization of the scale to measure attitude of farmers towards recommended water management technologies and practices is as follows:

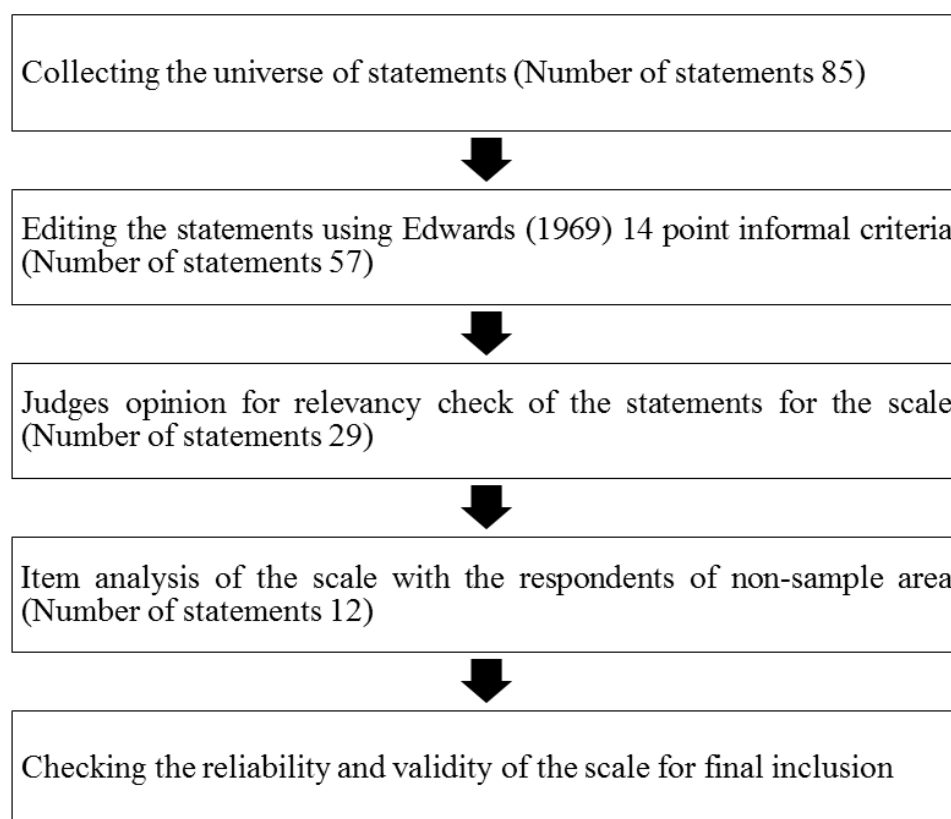


Figure 1: Representation of the methodology used for construction of the scale

1. Collection and editing of items

About 85 statements representing the attitude of farmers towards recommended water management technologies and practices were collected initially from various sources viz., literatures, journals, thesis of post-graduation and interaction with experts of different Institutes viz., Water Technology Centre, Tamil Nadu Agricultural University, Irrigation Management and Training Institute, MANAGE (National Institute of Agricultural Extension

Management). They were then edited on the basis of criteria suggested by Edward and about 57 statements were selected based on their appropriateness.

2. Relevancy test

All the statements collected may not be relevant equally in measuring the attitude of farmers towards recommended water management technologies and practices. Hence, these statements were subjected to scrutiny by an expert panel to determine the relevancy and screening for inclusion in the final scale. For this, the list of scrutinized 57 statements was sent to a panel of 100 experts with request to critically evaluate each statement for its relevancy to measure attitude of farmers towards water management technologies and practices.

The experts comprised Scientists of ICAR Research Stations and Institutions, Subject matter specialists in KVKs and experts from State Agricultural Universities throughout the country for critical evaluation. The experts were requested to give their response on a five point continuum viz, highly relevant, Relevant, Neutral, irrelevant, Highly Irrelevant with scores 5,4,3,2 and 1 respectively.

Out of 100 experts only 46 responded in a time span of two months. The relevancy score of each item were ascertained by adding the scores on rating scale for all the 46 experts' responses. From this data, relevancy percentage, relevancy weightage and mean relevancy scores were worked out for all the statements by using the following formulae.

a) Relevancy Percentage

Relevancy percentage was worked out by summing up the scores of highly relevant, relevant and neutral categories, which were converted into percentage.

b) Relevancy Weightage (RW)

Relevancy weightage was obtained by the Formula

$$RW = \frac{HRR + RR + NR + IR + HR}{MPS}$$

c) Mean Relevancy Score (MRS)

This was obtained by the following formula

$$MRS = \frac{HRR + RR + NR + IR + HR}{MPS}$$

N

Where,

HRR = High Relevant Response (X5)

RR = Relevant Response (X4)

NR = Neutral Response (X3)

IR = Irrelevant Response (X2)

HR = Highly Irrelevant (X1)

MPS = Maximum Possible Score ($46 \times 5 = 230$)

N = Number of Experts (46)

Using these three criteria the statements were screened for their relevancy. Accordingly, statements having relevancy percentage >70 , relevancy weightage >0.70 and mean relevancy score >3.5 were considered for final selection of statements. By this process, out of 59 statements, 29 statements had relevancy percentage >70 , relevancy weightage >0.70 and mean relevancy score >3.5 and were isolated in the first stage of screening and suitably modified and rewritten as per the comments of experts. Thus finally about 29 statements were selected after the relevancy test.

3. Item Analysis and Calculation of “t” value

These selected 29 statements were subjected to item analysis to demarcate the items based on the extent to which they can differentiate the respondents with high attitude and the respondents with low attitude towards recommended water management technologies and practices. The statements representing the attitude of farmers towards recommended water management technologies and practices were administered to 100 respondents. The respondents were asked to indicate their degree of agreement or disagreement with each statement on a five-point continuum ranging from “strongly agree” to “strongly disagree”, the scoring given was 5 weightage to strongly agree responses, 4 to agree, 3 to undecided, 2 to disagree and 1 to strongly disagree responses for favourable statements.

For un-favourable attitude statements the scoring pattern was reversed viz. strongly agree response with 1 weightage, agree with 2, undecided with 3, disagree with 4 and strongly disagree with 5 weightage in that order. The respondents responses were recorded and the summated score for the total statements of each respondent was obtained. For each

respondent the maximum possible score for 29 statements is 145 and the minimum is 29. The scores of the respondents were then arranged in a descending order. The 25 per cent from highest scores (high group) and 25 per cent from lowest scores (low group) were taken for the item analysis. These responses were subjected to item analysis for selection of the items that constitute the final attitude scale.

The critical ratio i.e., t-value which is a measure of the extent to which a given statement differentiates between the high and low groups of respondents for each statement was calculated by using the formula proposed by Edwards (1957).

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{S^2_H + S^2_L}{n_H + n_L}}}$$

Where, $\bar{x}_H$ = the mean score on a given statement for the high group.

$\bar{x}_L$ = the mean score on a given statement for the low group.

S^2_H = the variance of the distribution of the responses of the high group to the statement

S^2_L = the variance of the distribution of the responses of the low group to the statement

n_H = the number of respondents in the high group.

n_L = the number of respondents in the low group.

As n_H was equal to n_L (25 each) the modified formula for calculating the t- values of the statements was used. The formula was:

$$T = \frac{(\bar{X}_H - \bar{X}_L)}{\sqrt{\frac{(X_H - \bar{X}_H)^2 + (X_L - \bar{X}_L)^2}{n(n-1)}}}$$

$$(X_H - \bar{X}_H)^2 = \frac{X_H^2 - (X_H)^2}{n}$$

$$(X_L - \bar{X}_L)^2 = \frac{X_L^2 - (X_L)^2}{n}$$

After calculating the t- values for all the items (table 1) of the attitude scale, the values of the statements were arranged in descending order from the highest to the lowest and

12 statements were selected from the scale whose values were highest i.e., with t- values more than 2.75, for both positive and negative statements.

Table 1: Statements of item analysis by farmers of non-sample area

Sl. No.	Question number	Attitude statements	t-value
1*	2*	Without the adequate support and monitoring of extension personnel farmers cannot follow water management recommendations.	2.274
2*	4*	Only progressive rich farmers get the benefit of improved water management technologies.	2.896
3	6	Water conservative measures has helped the farmers to cover the irrigation water crisis.	1.433
4*	9*	Water conservation recommendations cannot ensure sustainability in agriculture.	0.793
5	11	Water management measures are quite effective to solve the water problems of the farming community.	7.567
6*	12*	Improved water management measures will completely eradicate indigenous Technology knowledge of water management.	4.617
7	13	Adoption of water management recommendations develops self-Reliance among farmers.	6.878
8	15	Water management recommendations are not only useful for agriculture but also to the environment.	5.648
9	16	Water management technologies are not only helpful for agriculture but to the entire society.	0.925
10	17	Soul cause for Environmental Degradation is due to enhance to water usage.	2.562
11*	18*	Rich become richer poor become poorer because of the adoption of water management practices.	2.270
12	20	Creation of life happens due to water and to protect the life one has to use the water judiciously.	2.460
13	22	The potential yield can be obtained only through the adoption of effective water management practices.	5.106

14*	24*	Flood method of irrigation is the best method of irrigation for every crop.	1.638
15	26	I cannot manage the farm without the adoption of water management recommendations.	2.115
16	28	Social harmony is possible when there is judicious use of water by every sector of the community.	5.711
17*	29*	I believe that water conservative measures are the Kinder to the environment.	2.453
18	30	Soil fertility is not a matter when compare to water management practices in crop production.	1.904
19	31	The soul factor for the fragmentation of land holdings is because of ignorance of water conservative measures.	2.212
20	33	Migration of labour can be curtailed if we have already practiced the irrigation management methods.	2.319
21*	34*	Water management practices may promote intensive input oriented agriculture which in turn result in environmental Degradation.	3.245
22*	36*	What is being promoted as water management Technologies is nothing but old wine in new bottle.	2.250
23*	37*	Attending training on water management practices is a waste of time as there is nothing new to learn.	1.114
24*	38*	Water management recommendations are highly technical in nature that the farmer cannot understand.	0.786
25*	41*	Water management practices is a humbug that can give results were only in demonstration but not in full adoption.	6.258
26	42	Only when the existing water management technologies are modified to the local condition there is a possibility for wider adoption.	2.682
27*	45*	By calculating the investments and returns there is no significant profit with adoption of improved water management Technologies.	4.395
28*	46*	The toil that I put in farming remains same even after the adoption of water management recommendations	3.705

29	55	Water management recommendations are helping the farmers to improve their economic condition with available resources.	4.711
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Negative

statements

135 Reliability of attitude scale

136 According to Kerlinger (1973) “Reliability is the accuracy or precision of measuring
137 instrument”. To know the reliability of the attitude scale Split-Half method was followed.

138 Split-Half Methodology

139 The reliability of the scale was determined by ‘split- half’ method. The split-half method
140 is regarded by many as the best of the methods for measuring reliability (Garrett and Woodworth,
141 1973). The twelve selected attitude items were divided into two halves by odd-even method
142 (Singh, 1986). The two halves were administered separately to 50 farmers in a non-sample area.
143 The scores were subjected to product moment correlation test in order to find out the
144 reliability of the half-test. The half-test reliability coefficient (r) was 0.628, which was significant
145 at five per cent level of probability. Further, the reliability coefficient of the whole test was
146 computed using the Spearman-Brown prophecy formula (Singh, 1986) given below.

2 x Reliability co-efficient of half test

Reliability co-efficient of whole test =

1+ Reliability co-efficient of half test

147

148

149 The whole test reliability (r_{tt}) was 0.771. According to Singh (1986), when the mean
150 scores of the two groups are of narrow range, a reliability coefficient of 0.50 or 0.60 would
151 suffice. Hence, the constructed scale is reliable as the r_{tt} was greater than 0.60.

152 Validity of attitude scale

153 The validity of the scale was established through content validity i.e., the
154 representativeness or sampling adequacy of the content of a measuring instrument. The scale
155 satisfied both these criteria as the clause of universe of statements that could be made about
156 recommended recommended water management technologies and practices was formulated
157 from the standards and also in consultation with experts who had knowledge about the
158 psychological object. This ensures high content validity of attitude scale. The scale was
159 constructed in accordance with the steps enunciated in the summated rating scale given by

Edward (1957). Therefore, it was assumed that the scores obtained by administering this scale measured nothing other than the attitude of farmers towards recommended crop production package of practices. While selecting attitude statements, 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 attitude statements of the scale had discriminating values. Hence, it seemed reasonable to accept the scale as a valid measure of the attitude.

Results

The calculated ‘t’ values were found to be distributed between zero and 7.566. The statements with ‘t’ values of 2.75 and above were considered for final inclusion. Thus, 7 positive and 6 negative statements with highest ‘t’ values were arrived for the final scale (table 2) as they differentiate between highest and lowest groups.

Table 2: Statements selected for inclusion in the final scale

Sl. No.	Question number	Attitude statements	Degree of statements
1	4	Only progressive rich farmers get the benefit of improved water management technologies.	-
2	11	Water management measures are quite effective to solve the water problems of the farming community.	+
3	12	Improved water management measures will completely eradicate indigenous Technology knowledge of water management.	-
4	13	Adoption of water management recommendations develops self-Reliance among farmers.	+
5	15	Water management recommendations are not only useful for agriculture but also to the environment.	+
6	22	The potential yield can be obtained only through the adoption of effective water management practices.	+
7	28	Social harmony is possible when there is judicious use of water by every sector of the community.	+
8	34	Water management practices may promote intensive input oriented agriculture which in turn result in Environmental Degradation.	-
9	41	Water management practices is a humbug that can give results were only in demonstration but not in full adoption.	-

10	45	By calculating the investments and returns there is no significant profit with adoption of improved water management Technologies.	-
11	46	The toil that I put in farming remains same even after the adoption of water management recommendations	-
12	55	Water management recommendations are helping the farmers to improve their economic condition with available resources.	+

173

174 The reliability of the scale was determined by 'split- half' method. The half-test
175 reliability coefficient (r) was 0.628, which was significant at five per cent level of probability.
176 The reliability coefficient for the whole test was computed using the Spearman-Brown
177 prophecy formula and it was found that the whole test reliability (rtt) was 0.771

178 **Discussion**

179 The final items to be included in interview schedule were selected based on 't' value.
180 The instrument developed to measure the attitude of farmers towards recommended water
181 management technologies and practices consisted of 6 positive and 6 negative attitude
182 statements (table 2) representing the various areas viz. relative advantage, understandability
183 or complexity, sustainability, environment, welfare, social respect, ecological aspects.

184 **Conclusion**

185 The recommended water management technologies and practices yet not fully grasped
186 by many farmers in the rural areas. Farmers residing interior in many villages are still not
187 much concerned about the judicious use of irrigation water which could affect the availability
188 of water and environment adversely in the near future. The scale developed will be of use to
189 assess the attitude of farmers towards recommended water management technologies and
190 practices in order to frame various developmental programmes. Further it could also be used
191 to sketch new methodologies to impart the farmers about water saving in agriculture. The
192 scale can be used by researchers in future for measuring the attitude of farmers in similar
193 studies.

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