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Scale construction for measuring the attitude of farmers towards restoration and management of tanks under mission Kakatiya programme

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Abstract
The study aimed at constructing of an attitude scale to measure the attitude of farmers towards restoration and management of tanks under Mission Kakatiya programme. Likert's Summated Rating Scale Technique was followed for development of the scale. The validity of the scale was examined with the help of face and content validity. Split half method was used for testing reliability of the scale and the reliability co-efficient was 0.88. The scale thus met the reliability and validity test satisfactorily indicated its ability as an instrument attitude of farmers towards restoration and management of tanks. The scale was developed finally consists of 43 statements including 28 positive and 15 negative statements.

Keywords: attitude, restoration, management of irrigation tanks, validity, reliability

Introduction
In Telangana state, every village has a minor irrigation tank and these tanks are functioning since ages. Tanks are the major source for irrigation, apart from this, these are useful to meet the domestic needs of water, livestock, rearing of fish. These tanks are helpful for maintaining ecological balance apart from being centres for socio–economic and religious activities of the village communities. Tanks plays very important role in providing assured water supply to mitigate the adverse effects of drought in agriculture and ensure food security. The tanks have lost their original capacity mainly due to siltation and partly due to urbanization. The Government of Telangana has recognized the importance of reclamation of tanks and initiated the restoration of all the tanks under "Mission Kakatiya" programme as a peoples movement in a decentralized manner through community involvement in a sustainable manner in a span of 5 years starting from 2014 – 15 onwards. (Source: https://missionkakatiya.cgg.gov.in)
The objective of Mission Kakatiya is to enhance the development of agriculture based income for small and marginal farmers, by accelerating the development of minor irrigation infrastructure, strengthening community based irrigation management and adopting a comprehensive programme for restoration of tanks. Mission Kakatiya would have the benefits like increase in water retention capacity of the soil, capacity of the tank, yield and productivity of farms through suitable cropping pattern and increased cropping intensity. (Source: https://missionkakatiya.cgg.gov.in)
Attitude is the degree of positive or negative affect associated with some psychological object (Thurstone and Chave, 1929) [5]. Thus the attitude in this study was operationalised as the degree of positive or negative affect of respondents towards restoration and management of tanks. In this backdrop a scale was developed to assess the attitude of the farmers towards restoration and management of tanks.

Materials and Methods
Selection of type of attitude scale: In this study, method of summated rating scale developed by Likert (1932) was followed to construct the attitude scale of the farmers towards restoration and management of tanks under Mission Kakatiya programme.

Collection of attitude statements: A set of statements covering the area of restoration and management of tanks under Mission Kakatiya were collected from available literature and through interaction with the Irrigation officials and Extension experts. A tentative list of 65 statements were drafted keeping in view of the applicability of statements suited to the area of study.

Editing the statements: Each statement was edited considering the 14 informal criteria suggested by Thurstone & Chave (1929) [5] and Edwards and Kilpatrick (1948) [2]. The statements which were ambiguous, irrelevant and not conforming to the suggested criteria were deleted. Fifty two statements were retained for scale construction (Table -1).

Selection of statements: For the purpose of preparation of final scale, 52 statements consisting of 31 positive and 21 negative statements were administered to 120 respondents. For this purpose Vennampally village of Kalva Srirampur mandal, Peddapalli District, Telangana state was selected randomly. The respondents were asked to indicate their degree of agreement or disagreement with each statement on five-point continuum ranging from "strongly agree" to "strongly disagree". The scoring pattern adopted was 4 weight to strongly agreed response, 3 to agreed response, 2 to undecided response, 1 to disagreed response and 0 to strongly disagreed response, for a favorable attitude statement and for an unfavorable attitude statement the scoring pattern was reversed viz. Strongly agree response with 0 weight, agree with 1, undecided with 2, disagree with 3 and strongly disagree with 4 weight in that order. Their response was recorded and the summated score for all the statements was obtained. For each individual, the maximum possible score on 52 statements was 208 and the minimum possible score was zero. The scores of the respondents were arranged in descending order. The highest 25 per cent and the lowest 25 per cent scores were taken for the item analysis that means 30 respondents from the high group and 30 from the low group. These responses were subjected to analysis for selection of the statements that constituted 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 suggested by Edward (1957) [1].

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

Where, Where

$\overline{X}_H$ = the mean score on a given statement for the high group.

$\overline{X}_L$ = 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 (52 each) the modified formula for calculating the t- values of the statements was used. The formula was:

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

After calculating the t- values for all the statements of the attitude scale, the values were arranged in descending order from the highest to the lowest and 43 statements were selected from attitude scale whose values were highest i.e., with t-values more than 1.75, for both positive and negative statements. Statements were categorized in to four categories i.e. general statements, operational statements, functional statements and management statements after selection of statements.

Table 1: Mean scores of high and low groups and t- values of statements

S. No.	Statements	High group	Low group	t- value
1.	In my view this programme increases the farmers economic and social status	3.6	2.23	4.94
2.	I feel that it increases productivity of farms through suitable cropping pattern and increased cropping intensity	3.40	3.13	2.21
3.	I believe that effective management of tanks will improve soil health	3.27	2.57	3.00
4.	I feel that the funds under this programme utilized properly.	3.37	2.23	4.15
5.	I am optimistic about the long term benefits of Mission Kakatiya activities	3.50	2.40	4.97
6.*	Quality of work in farming is greatly hindered due to more involvement in tank management activities	3.63	2.40	4.77
7.	In Mission Kakatiya all activities are participatory and executed in fair and democratic way	3.20	1.77	5.12
8.	Mission Kakatiya improves physical condition and functioning of the tank	3.63	3.50	0.92
9.	I feel that Irrigation management is carried in a better way through community participation	3.57	3.13	2.17
10.*	I feel that Mission Kakatiya has not been implemented successfully in our state.	3.30	2.20	4.15
11.*	I think the cost of cultivation is increased after restoration and management of tanks	3.40	2.47	3.19
12.	I believe that restoration of tanks increases irrigated area and crop yield	3.67	2.90	3.80
13.	I feel that farmers are motivated to utilize the useful silt excavations in their fields	3.37	2.63	2.95
14.	I feel that Mission Kakatiya increases irrigation intensity over the base year	3.70	2.57	4.74
15.	I feel that this programme enhances the confidence of farmers relating irrigation management.	3.73	2.73	3.58
16.	Mission Kakatiya is a boon for farmers	3.47	2.57	4.26
17.*	I feel that most of the farmers are unaware of Mission Kakatiya Programme	3.23	2.83	1.64
18.	Mission Kakatiya is one of the best community based irrigation management programme	3.57	2.83	3.53
19.	Mission Kakatiya provides employment opportunity for rural people	3.63	2.23	5.82
20.	I feel that participatory approach of Mission Kakatiya paves way towards self reliance in irrigation management by the farmers themselves.	3.20	2.37	3.48
21.	Mission Kakatiya aid in mitigating the adverse impact of drought in the villages	3.27	2.13	4.67
22.	I believe that community based irrigation management enables quick and easy settling of irrigation conflicts	3.53	0.63	3.29

23.	I feel that Mission Kakatiya increases the water level of wells and borewells	3.77	3.03	3.59
24.	I feel that community based irrigation management approach helps to develop competency of each tank user to manage tanks by themselves	3.53	0.83	3.56
25.	I feel that Mission Kakatiya improves ground water recharging capacity of the tank	3.63	3.47	1.09
26.	I feel that everyone is aware of this programme	3.50	2.73	4.32
27.*	In Mission Kakatiya programme all activities are not executed in fair and democratic way.	3.47	2.03	5.53
28.	In my opinion Mission Kakatiya increases the farmers investments in farming	3.27	1.90	4.06
29.*	I feel that irrigation management is not carried out in a better way through community participation	3.60	3.40	1.55
30.*	In my view this programme not increases the farmers economic and social status.	3.50	2.43	4.17
31.	In my opinion Mission Kakatiya is very successful programme	3.50	2.37	4.71
32.	I feel that people participation is effective in restoration of tanks	1.13	1.47	-0.84
33.*	I think still farmers are not equipped technically and financially to cope up with this community based irrigation management approach	3.27	1.73	5.34
34.	I feel that every farmer is getting maximum benefits under Mission Kakatiya programme	3.30	2.07	4.28
35.	I believe that the approach i.e. Community based approach is followed under Mission Kakatiya programme - 'for the farmers', 'by the farmers', and 'with the farmers'.	3.30	2.50	3.22
36.	I feel that Mission Kakatiya programme is one of the important programme for encouraging the farmers	3.33	2.77	1.97
37.	I believe in long run participatory approach will lead to over all development of irrigated agriculture and society as a whole	3.43	3.47	-0.24
38.*	In my opinion local people are not giving much importance for maintenance of tanks	3.37	2.23	3.56
39.*	I feel that Mission Kakatiya disappointed the hopes of the farmer in getting higher yields	3.67	2.43	4.78
40.	In my view cost of cultivation can be reduced through Mission Kakatiya	3.30	1.10	8.18
41.*	In my opinion farmers are unaware of benefits of Mission Kakatiya programme	3.53	2.03	5.27
42.*	I feel that Community based approach is limited to influential people and they only are benefited more.	3.73	3.63	0.72
43.*	In my opinion there is no need for participatory approach at all now a days, as the individual can strive for himself.	3.50	3.40	0.68
44.*	I believe that community based irrigation management delayed settling of irrigation conflicts	3.50	3.03	1.98
45.*	I feel that the funds under this programme is not utilized properly.	3.37	2.07	5.28
46.*	Mission Kakatiya widened the gap between tank command area farmers and others	3.73	3.43	1.76
47.*	I feel that people participation is not effective in restoration of tanks	1.00	3.33	2.61
48.*	I feel that too much political interference make the Mission Kakatiya programme ineffective	3.40	2.93	2.20
49.*	Mission Kakatiya programme not improves the physical condition and functioning of the tank	3.63	3.57	0.52
50.*	I feel that there is lack of local people participation in restoration and management of tanks	3.33	1.37	6.95
51.*	Mission Kakatiya does not provides employment opportunity for rural people	3.63	2.83	3.12
52.	I opinion that sustainable livelihoods for the local community could be achieved through Mission Kakatiya programme	3.53	2.30	4.87

Reliability of attitude scale: According to Kerlinger (1973) [3] "Reliability is the accuracy or precision of the measuring instrument". To know the reliability of the attitude scale Split half method was used.

Split half method: The set of 43 statements which represented the attitude of respondents towards restoration and management of tanks were divided into two nearly equal halves. The common way of splitting is by odd-even method. Under Split half method Rulon and Flanagon formulae was used to estimate the Internal consistency reliability. Both provided the reliability of whole test. The formula estimate the reliability coefficient on the basis of proportion of error variance in total variance of the test. The lesser the variance the greater will be the reliability.

Rulon Formula: In this formula the test was divided into two equal halves through odd-even method. Each farmer had one sub total score on odd numbered items and another sub -total score on even numbered items. The difference indicates the Error of measurement or Chance Error of each farmer.

$$\text{The Rulon Formula is } r_{tt} = 1 - \frac{d^2_d}{d^2_t}$$

Where $r_{tt=}$ reliability coefficient

d^2_d= variance of the difference between two half scores of each farmer.

d^2_t= variance of the total score

$$d_d = 1/N\sqrt{N\sum d^2-(\sum d)^2}$$

$$d^2_d = (d_d)^2$$

$$d_t = 1/N\sqrt{N\sum X^2 - (\sum X)^2}$$

Flanagan Formula: The variance of the score of odd numbered items and the score of the even numbered items was calculated separately and an estimate of error of variance was made.

$$\text{The Flanagan Formula is } r_{tt} = \frac{2\,(1 - d_1^2+d_2^2)}{t}$$

$d^2_{1 =}$ variance of scores of the first half

$d^2_{2=}$ variance of scores of the second half

d^2_t= variance of the total score

For Odd numbered items

$$d_1 = 1/N\sqrt{N\sum X^2 - (\sum X)^2}$$

For Even numbered items

$$d_2 = 1/N \sqrt{N\sum X^2 - (\sum X)^2}$$

Both formulae yielded the same reliability coefficient i.e. 0.88, indicating that the attitude scale was highly suitable for administration to the farmers.

Validity of attitude scale: The validity of the test depended on the fidelity with which it measures what is expected to measure. The validity of the scale was examined with the help of "content validity" by determining how well the contents of the scale represented the subject matter under study. As all the possible items covering the universe were selected by discussion with extension experts and research experts, the scale satisfied the content validity

Final Attitude Scale: Farmers will have different opinion towards restoration and management of tanks under Mission Kakatiya programme. The following statements represents the diverse opinion on restoration and management of tanks under Mission Kakatiya programme. Please indicate by putting tick (√) mark in the appropriate box whether you strongly agree (SA), Agree (A), Undecided (UD), Disagree (DA) and Strongly Disagree (SDA) with these statements.

Table 2: Final Attitude Scale General statements

S. No.	Statement	Response categories				
		SA	A	UD	DA	SDA
1.	In my view this programme increases the farmers economic and social status					
2.	I am optimistic about the long term benefits of Mission Kakatiya activities					
3.*	I feel that Mission Kakatiya has not been implemented successfully in our state.					
4.*	I think the cost of cultivation is increased after restoration and management of tanks					
5.	Mission Kakatiya is a boon for farmers					
6.	Mission Kakatiya provides employment opportunity for rural people					
7.	Mission Kakatiya aid in mitigating the adverse impact of drought in the villages					
8.	I feel that everyone is aware of this programme					
9.	In my opinion Mission Kakatiya increases the farmers investments in farming					
10.	In my opinion Mission Kakatiya is very successful programme					
11.*	In my view this programme not increases the farmers economic and social status.					
12.	I feel that every farmer is getting maximum benefits under Mission Kakatiya programme					
13.	I feel that Mission Kakatiya programme is one of the important programme for encouraging the farmers					
14.*	I feel that Mission Kakatiya disappointed the hopes of the farmer in getting higher yields					
15.	In my view cost of cultivation can be reduced through Mission Kakatiya					
16.*	In my opinion farmers are unaware of benefits of Mission Kakatiya programme					
17.	Mission Kakatiya widened the gap between tank command area farmers and others					
18.*	Mission Kakatiya does not provides employment opportunity for rural people					
19.	I opinion that sustainable livelihoods for the local community could be achieved through Mission Kakatiya programme					

Operational statements:

S. No	Statement	Response categories				
		SA	A	UD	DA	SDA
1.	I feel that Irrigation management is carried in a better way through community participation					
2.	Mission Kakatiya is one of the best community based irrigation management programme					
3.	I believe that the approach i.e. Community based approach is followed under Mission Kakatiya programme - 'for the farmers', 'by the farmers', and 'with the farmers'.					
4.*	In my opinion local people are not giving much importance for maintenance of tanks					
5.*	I feel that people participation is not effective in restoration of tanks					
6.*	I feel that too much political interference make the Mission Kakatiya programme ineffective					
7.*	I feel that there is lack of local people participation in restoration and management of tanks					

Functional statements:

S. No.	Statement	Response categories				
		SA	A	UD	DA	SDA
1.	I feel that it increases productivity of farms through suitable cropping pattern and increased cropping intensity					
2.	I believe that restoration of tanks increases irrigated area and crop yield					
3.	I feel that farmers are motivated to utilize the useful silt excavations in their fields					
4.	I feel that Mission Kakatiya increases irrigation intensity over the base year					
5.	I feel that Mission Kakatiya increases the water level of wells and borewells					
6.*	I think still farmers are not equipped technically and financially to cope up with this community based irrigation management approach					

Management statements:

S. No.	Statement	Response categories				
		SA	A	UD	DA	SDA
1.	I believe that effective management of tanks will improve soil health					
2.	I feel that the funds under this programme utilized properly.					
3.*	Quality of work in farming is greatly hindered due to more involvement in tank management activities					
4.	In Mission Kakatiya all activities are participatory and executed in fair and democratic way					
5.	I feel that this programme enhances the confidence of farmers relating irrigation management.					
6.	I feel that participatory approach of Mission Kakatiya paves way towards self reliance in irrigation management by the farmers themselves.					
7.	I believe that community based irrigation management enables quick and easy settling of irrigation conflicts					
8.	I feel that community based irrigation management approach helps to develop competency of each tank user to manage tanks by themselves					
9.*	In Mission Kakatiya programme all activities are not executed in fair and democratic way.					
10.*	I believe that community based irrigation management delayed settling of irrigation conflicts					
11.*	I feel that the funds under this programme is not utilized properly.					

* Negative statements

Administration of the scale: People can use this scale who is conducting the study on the attitude of farmers towards restoration and management of tanks, after administering this scale total attitude score of each respondent may calculated and categorized with the help of class interval in to high, medium, low categories. Accordingly strategies for further restoration, effective tank management and cropping schemes or programmes may be planned and executed.

Conclusion

The study aimed at developing a scale to measure the attitude of farmers towards restoration and management of tanks. The affective aspect of attitude scale consisted of 43 statements, with high reliability, and more predictive validity. This scale can be used in future studies on attitude and feeling of farmers about the restoration and management of tanks. It will be helpful to the policy makers and administrators to develop suitable strategies towards successful implementation of the Mission Kakatiya programme by knowing the attitude of farmers towards restoration and management of tanks.

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