A SCALE TO MEASURE ATTITUDE OF FARMERS TOWARDS INSTITUTIONAL SUPPORT MEASURES FOR CLIMATE CHANGE

Abstract

Institutional support measures are formulated to induce the agricultural of the nation and also improve the livelihood of the farming community. The study aims to develop a scale to measure the attitude of farmers towards institutional support measures to mitigate the climate change for sustainable livelihood of Cauvery delta zone farmers. Thurstone and Chave's (1929) equal appearing intervals scale method was adopted to develop the attitude scale. Hundred possible statements were prepared to assess the farmer's attitude towards climate change using the five-point continuum. The scale was developed using the equal appearing interval method The S-value and Q-value of each statement were found and the final scale comprised of ten statements., which comprises of 10 statements (six positive and four negative).

Keywords: Attitude, Climate change, Livelihood, Institutional support measures

1. Introduction

Climate change and variability are concerns of human being. Natural disaster such as drought, flood and cyclones are a major source of risk in agriculture. More than 2/3rd of the cropped acreage is vulnerable to drought in different degrees. On an average 12 million ha of agricultural lands are damaged annually by natural calamities and adverse seasonal condition and climatic variation in the country, grossly impacting the level of agricultural productivity and production. Tamil Nadu is heavily dependent on monsoon rain and thereby is prone to droughts when the monsoon fails. Van koopen et al. (2017) attributed the poor status of infrastructure and low utilization of irrigation schemes to poor focus on institutional and social factors. Deepa (2003) reported that among the farm women more than half of the respondents (53.33%) had favorable attitude towards development programs followed by more favorable (38.34%) and less favorable (8.33%) attitude

Comment [VW1]: The abstract has not told the summary story of this research as it has not captured key findings not policy implications emanating from these findings

Comment [VW2]: These key words have been stated in the title. Identify new key words that would give your work greater exposure.

Comment [VW3]: This introduction needs to tell the story and history of natural and climate change induced disasters and the relationship it has with agricultural practices in other parts of the world and narrow it down to the study area.

towards development programs. Marimuthu (2001) observed that almost 57.14 per cent of the tribal respondents had low, followed by medium (25.72%) and high level (17.14 %) of attitude towards tribal developmental programmes.

Cauvery delta region is the rice bowl of Tamil Nadu. It also accounts for a large part of food grains and other agricultural produce in the state and ensure the food security for the state. In recent years, severe droughts and floods are being experienced in the Cauvery Delta zone region posing serious problems to the farmers. In order to protect their livelihood against climate change effects they depend on the various institutional support measures. Institutions support measures play a crucial role in shaping adaptation to climate change; they connect households to local resources and collective action; determine flowsof external support to different social groups, and link local populations to national interventions. The risk bearing capacity of marginal and small farmers in the country has limited. In order to avoid the risk and uncertainty in agriculture at National level and State level, various agricultural development schemes are implemented by central and State government. With a view to bring the development in agricultural and facilities provided to the farmer. The objective of the study executed the selection of districts based on maximum area under paddy cultivation. The district therefore selected was Thanjavur, Tiruvarur and Nagapattinam. The success of any developmental programs would mainly depend upon the people's attitude towards it. Hence, it is necessary to study the attitude of farmers towards those institutional support programs. Based on a review of the literature and discussions with scientists and extension professionals, around 110 statements were chosen. The items were reviewed and modified using the specified informal criteria suggested by Edwards [3] for editing the statements was used in the construction of the attitude scale. After screening, 100 items were finally selected which formed the universeof content.

Comment [VW4]: This section can be better discussed in the methods section under the sub heading of study area description or another appropriate heading.

Provide a map of the study area showing relevant information.

Comment [VW5]: Inconsistent intext referencing. Kindly adopt a uniform referencing style. Also rewrite this section to convey the actual message being passed across.

2. MATERIALS AND METHODS

Item Scoring and Computation of Scale Values and Q Values

- The selected statements were sent to judge's opinion for item scoring of computation of scalevalues and Q values

- In total, 110 statements were prepared which were organized and structured in the form of attitudeitems. The items were screened by following the informal criteria suggested by Edwards (1969).

After the screening, 100 items were selected which formed the universe of the content. The selected item includes both positive and negative statements. The 100 statements were then subjected to judge's opinion on a five-point continuum ranging from most unfavorable to most favorable. The list of statements was sent to 75 judges who comprised of scientists of state agricultural universities, ICAR and Krishi Vigyan Kendra. Among the 60 judges, 30 judges responded by sending their judgments.

- Based on the judgments the "S" and "Q" values for each statement were calculated by applying the equal appearing scale Interval formula as suggested by Thurstone and Chave (1929). The S value obtained from the formula given below,

$$S = l + \left[\frac{0.5 - \sum pb}{pw}\right] i$$

Where,

S–The median or scale value of the statement

l–The lower limit of the interval in which the median falls

∑pb–The sum of the proportions below the interval in which the median falls

pw–The proportion within the interval in which the median falls

i– The width of the interval and is assumed to beequalto1.0

Thurston and Chave (1929) used the interquartile range or Q as a measure of the variation of the distribution of judgments for proposed statements. To determine the Q value, need to find two other point measures, the 75th centile and the 25th centile

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

Where Q= interquartile range

C_{75} = the 75th centile $C_{75} = l + \left[0.75 - \frac{\sum pb}{pw}\right] i$

C_{25}=the25thcentile, $C_{25} = l + \left[0.25 - \frac{\sum pb}{pw}\right] i$

Comment [VW6]: Kindly state the type of research this is. Is it cross sectional? Justify the method chosen.
Also provide a clear path for the selection of respondents (judges)

Results and discussion

Based on the calculation, Individual statements with "S" and "Q" values are presented in Table 1.

Selection of attitude items: The attitude items to be included in the final attitude scale were selected based on the following criteria

Item selection

- The final attitude items were selected based on the universe of content, uniform distribution of scale values along the psychological continuum.
- Those items with high Scale values and smaller Q values should be selected as far as possible.
- There should be more or less equal number of statements with favorable and unfavorable attitudes as far as possible

The scale values were arranged in descending order of magnitude and the difference between the successive scale values and the cumulative total of the computed differences were worked out. Since the selected scale values should have equal appearing interval and distributed uniformly along the psychological continuum. It was necessary to form ten compartments to select 10 statements with one statement from each of the compartments. For this purpose, the cumulative value (1.63) was divided by ten, which worked out to 0.163 and this formed the width of the first class interval. The second interval was worked out by adding the value with the width of the first class interval. Subsequently all the ten intervals were worked out.

List 1 : Ten compartments

Compartment 1	0.163333
Compartment II	0.326667
Compartment III	0.49
Compartment IV	0.653333
Compartment V	0.816667
Compartment VI	0.98
Compartment VII	1.143333
Compartment VIII	1.32
Compartment IX	1.47
Compartment X	1.633333

To select the attitude items from the ten compartments the "scale values" and the

Corresponding "Q" values were considered. Based on the criteria already stated, the items having high Scale values and low Q values were selected at one item from each compartment. Thus, ten items were selected with equal appearing interval and with a uniform distribution along the psychological continuum. Final constructed attitude statements are given inTable.1.

Table 1. Computation of equal appearing interval scale

Statement no	Q value	S value	Difference between successive scale values	Cumulative frequency	Equal appearing class interval	Compartments
17	2.395833	2.7				
34	**2.1875**	**2.875**	**0.175**		**0.16**	**1**
53	**2.288889**	**2.928571**	**0.053571**	**0.228571**	**0.32**	**2**
68	**2.5625**	**3.166667**	**0.238095**	**0.466667**	**0.49**	**3**
93	**2.233766**	**3.25**	**0.083333**	**0.55**	**0.65**	**4**
73	2.142857	3.357143	0.107143	0.657143		
87	**1.25**	**3.416667**	**0.059524**	**0.716667**	**0.81**	**5**
16	-0.06818	3.5	0.083333	0.8		
18	2.190476	3.5	0	0.8		
33	1.363636	3.590909	0.090909	0.890909		
22	2.479167	3.625	0.034091	0.925		
25	1.9	3.666667	0.041667	0.966667		
92	**1.863095**	**3.666667**	**0**	**0.966667**	**0.98**	**6**
65	1.866667	3.7	0.033333	1		
61	1.707692	3.730769	0.030769	1.030769		
36	1.065359	3.735294	0.004525	1.035294		
35	1.036932	3.75	0.014706	1.05		
30	1.704545	3.772727	0.022727	1.072727		
48	1.258929	3.785714	0.012987	1.085714		
59	1.404762	3.785714	0	1.085714		
63	1.759615	3.807692	0.021978	1.107692		
6	1.190476	3.833333	0.025641	1.133333		
57	1.458333	3.833333	0	1.133333		
39	1.333333	3.833333	0	1.133333		
43	**1.125**	**3.833333**	**0**	**1.133333**		
49	1.333333	3.833333	0	1.133333	1.14	7
56	1.309524	3.857143	0.02381	1.157143		
58	1.309524	3.857143	0	1.157143		
86	1.392857	3.857143	0	1.157143		

45	1.7625	3.863636	0.006494	1.163636		
20	1.378205	3.884615	0.020979	1.184615		
24	1.461538	3.884615	0	1.184615		
47	1.378205	3.884615	0	1.184615		
78	1.378205	3.884615	0	1.184615		
89	1.586538	3.884615	0	1.184615		
41	0.888889	3.888889	0.004274	1.188889		
21	1.15	3.9	0.011111	1.2		
27	1.114286	3.9	0	1.2		
42	1.114286	3.9	0	1.2		
82	1.019608	3.911765	0.011765	1.211765		
74	1.5625	3.916667	0.004902	1.216667		
75	1.419643	3.916667	0	1.216667		
4	1.339286	3.928571	0.011905	1.228571		
15	1.03125	3.9375	0.008929	1.2375		
31	0.989583	3.9375	0	1.2375		
91	1.03125	3.9375	0	1.2375		
5	0.833333	3.944444	0.006944	1.244444		
26	0.833333	3.944444	0	1.244444		
3	1.3125	3.961538	0.017094	1.261538		
64	1.3125	3.961538	0	1.261538		
96	1.3125	3.961538	0	1.261538		
2	1.991071	3.961538	0	1.261538		
23	1.091667	3.966667	0.005128	1.266667		
12	0.9375	4	0.033333	1.3		
32	1.527778	4	0	1.3		
37	**0.833333**	**4**	**0**	**1.3**		
46	0.9375	4	0	1.3		
51	2.083333	4	0	1.3		
55	1.380952	4	0	1.3		
62	1.1625	4	0	1.3	1.32	8
19	0.882353	4.029412	0.029412	1.329412		
70	0.882353	4.029412	0	1.329412		
60	1.029167	4.033333	0.003922	1.333333		
79	1.029167	4.033333	0	1.333333		
88	1.029167	4.033333	0	1.333333		
94	0.9375	4.033333	0	1.333333		
97	1.029167	4.033333	0	1.333333		
99	1.029167	4.033333	0	1.333333		
83	1.416667	4.038462	0.005128	1.338462		
44	1.55	4.045455	0.006993	1.345455		

95	1.464286	4.045455	0	1.345455		
77	0.833333	4.055556	0.010101	1.355556		
90	0.833333	4.055556	0	1.355556		
7	0.833333	4.055556	5.56E-07	1.355556		
98	0.96875	4.0625	0.006944	1.3625		
1	1.130952	4.071429	0.008929	1.371429		
72	0.789474	4.078947	0.007519	1.378947		
38	0.915441	4.088235	0.009288	1.388235		
14	1.066667	4.1	0.011765	1.4		
52	0.868056	4.111111	0.011111	1.411111		
67	0.868056	4.111111	0	1.411111		
29	1.211538	4.115385	0.004274	1.415385		
80	1.142857	4.142857	0.027473	1.442857		
100	1.142857	4.142857	0	1.442857		
84	0.960784	4.147059	0.004202	1.447059		
66	0.7875	4.15	0.002941	1.45		
8	1.75	4.166667	0.016667	1.466667		
10	1.276515	4.166667	0	1.466667		
71	1.276515	4.166667	0	1.466667		
81	1.083333	4.166667	0	1.466667		
85	**1.083333**	**4.166667**	**0**	**1.466667**	**1.47**	**9**
28	1.13961	4.214286	0.047619	1.514286		
54	1.13961	4.214286	0	1.514286		
69	1.084848	4.233333	0.019048	1.533333		
9	1.25	4.25	0.016667	1.55		
11	1.25	4.25	0	1.55		
40	1.25	4.25	0	1.55		
76	1.25	4.25	0	1.55		
50	1.373077	4.3	0.05	1.6		
13	**1.214744**	**4.333333**	**0.033333**	**1.633333**	**1.63**	**10**

The reliability of the scale was determined by 'split – half' method. The ten selected attitudeitems were divided into two equal halves by odd-even method. With respondents, the twosets of statements were administered separately, which yield two sets of scores. The scores were subjected to product moment correlation test in order to find out the reliabilityof the half test. Hence, the half-test reliability coefficient r was 0.565 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. The whole test reliability r_{tt} was

0.626. Hence, the constructed scale is reliable as the reliable coefficient (rtt) was >0.60.

Content validation

Content validity involves essentially the systematic examination of the test content to determine whether it covers a representative sample of the behavior domain to be measured. It was carried out by subjecting the selected ten items to judge's opinion. The judges were requested to indicate their presumed relevance to which the attitude items cover the different aspects of institutional support schemes. The responses were obtained on a four-point continuum of 'most adequately covered', 'more adequately covered', 'less adequately covered and 'least adequately covered'. Scores of 4, 3, 2and 1 were given for the points on the continuum respectively. Totally 30 judges responded by sending their judgments. For the purpose of determining the scale's content validity, a fixed mean score of 2.5 was used. If the average score overall of the judges' ratings for the attitude items was greater than 2.5, the scale will be classified as True, and if not, then. The overall mean score in this instance was calculated as 2.5 and therefore the constructed attitude scale is said to be valid.

Table.2 . Final Set of attitude items selected with corresponding Scale and Q values and the nature of the statement

Statement no	Statements	Q value	S value	Nature of statement
34	Flood control measures strengthen rural communities against extreme weather	**2.1875**	**2.875**	**Favorable**
53	Institutional support measures satisfy the needs of the affected farmers	**2.288889**	**2.928571**	**Favorable**
68	Weather information services provided by the institutions are not easily accessible by the farming community	**2.5625**	**3.166667**	**Un favorable**

93	Crop insurance scheme is a farmer welfare-oriented scheme	**2.233766**	**3.25**	**Favorable**
87	Disaster management plans facilitate farmers decision on how and when to use new innovation and climate adaptation strategies	**1.25**	**3.416667**	**Favorable**
92	Rehabilitation program improve the economic status of affected farming community	**92**	**1.863095**	**Favorable**
43	Farmers felt that agricultural input subsidy for flood affected crops was less	**1.125**	**3.833333**	**Un Favorable**
37	Farmers felt that climate smart agricultural technologies are not reaching to farming community	**0.833333**	**4**	**Un Favorable**
85	Disaster relief fund from the institution helps farmers to adopt new technologies	**1.083333**	**4.166667**	**Favorable**
13	Farmers feel difficulties in accessing institutional credit from the institutions	**1.214744**	**4.333333**	**Un Favorable**

Table3.Administrationofthescale

Nature of the statement	**Continuum**				
	Strongly agree	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
Favorable	7	5	4	3	1
Unfavorable	1	3	4	5	7

Administration of the scale value

In order to prevent biased results, the 10 attitude items chosen were distributed at random. A five-point continuum of 'Strongly Agree', 'Agree', 'Undecided' 'Disagree' and 'Strongly Disagree' was used as response categories. The scoring procedure adopted is given in Table3. The score obtained for each statement was summed up to arrive at the attitude score for the respondents. The responses were grouped as unfavorable, moderately favorable and highly favorable based on the cumulative frequency method.

The attitude scale developed through Equal Appearing Interval (EAI) method leads the study to make 10 statements for measuring the attitude of the paddy crop farmers towards various institutional support measures.

Measuring the attitude of farmers towards institutional support measures.

Attitude of farmers towards institutional support measures were studied and data collected from the farmers was analyzed and presented in the table

Table 4. Attitude of farmers towards institutional support measures

S. No	Category	Number	Per cent
1	Less favorable	58	**19.34**
2	Moderately favorable	191	**63.66**
3	High favorable	51	**17.00**

From the table 4. it could be concluded that nearly two third 63.66 per cent of the respondents had moderately favorable attitude towards institutional support measures followed by 19.34 per cent of respondents had less favorable attitude and only 17.00 per cent of respondents had high favorable attitude towards institutional support measures.

Most of the flood and drought affected farmers (63.66 per cent) in the Cauvery delta districts had moderately favorable attitude towards institutional support measures on climate change.

Data from table 4. Also depicts that around 80.00 per cent of the respondents had moderate to high level of attitude towards institutional schemes for climate change this may be due to high level of contact of farmers with the extension workers. It also shows that farmers in the study

area were largely utilizing the institutional support schemes for their betterment of living.

Conclusion

As there is limited study and tools for measuring farmer's attitude pertaining to institutional schemes for climate change. The scale would be highly useful to study the attitude on institutional support measures by the farmers and other agriculture stakeholders. The result indicates that majority of the farmers had positive and interested towards the institutional schemes. Hence, the medium to high level of favorable attitude towards the institutional support measures on climate change is giving hope for the extension professionals for improved and better implementation of climate change-based programmes to the farmers. The study also suggested that there is a need to provide location-specific and need-based information services to farmers which will helps in decision making at grassroot level.

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