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RESEARCH ARTICLE

Attitude of Farmers Towards Custom Hiring Centers– Development and Standardization of Attitude Scale

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ABSTRACT

Farm mechanization has become inevitable for augmenting agricultural production and achieving the steady growth in agriculture in synchronization with population growth. Increasing shortage of agricultural labours also necessitates availability of agricultural machinery at right time and at an affordable cost to farmers. In this situation, custom hiring of agricultural machinery appears to be logical and most appropriate best institutional intervention pushed forward in recent years. Attitude was defined as a positive or negative feeling of the farmers towards Custom Hiring Centers. Keeping this in view, a standardized scale had been developed to measure the attitude of farmers towards Custom Hiring Center. Method of summated rating scale, by Likert (1932) was used. The process started with identifying the dimension, collection of items followed by relevancy and item analysis, checking the reliability and validity for precision and consistency of the results. Thirty-four statements were selected from 56 statements which has practical applicability in ascertaining the attitude towards Custom Hiring Center and for which 't' values were worked out, whose values were highest i.e., t-values more than 1.75 were selected for final scale. The scale was containing a total of thirty-four statements, out of which twenty were positive and fourteen statements were negative.

Key words: Custom hiring center; Farm mechanization; Attitude scale; Summated ,rating scale.

Indian agriculture is changing rapidly by gradual shift from dependence on human power and Draft Animal Power (DAP) to mechanical power because maintenance of DAP and manual labour is becoming increasingly costly coupled with scarce availability of fodder and feed to animal. As a result, mechanical power has become more cost-effective and necessary for completing task and maximizing the use of natural resources and inputs. Technological advancements, which were mostly absent in the early years of Indian agriculture are increasingly making their way into all stages of production. Farm Mechanization is the process of developing machines and substituting this machine power for human and animal power in agriculture and allied production practices. Farm mechanization has become mandatory for increasing agricultural production and achieving the stable growth in agriculture in synchronization with population growth.

The current degree of agriculture mechanization in India is only around 40-45 per cent. The country's level of mechanization is uneven, with regions like Uttar Pradesh, Haryana, and Punjab leading the way with extremely high

levels and states in the North-East with virtually little mechanization. Farm machinery also aids in improving farm labour efficiency and lowering drudgery and responsibilities. Farm mechanization is projected to save farmers 15-20 per cent of their time. In Indian agriculture, custom renting of agricultural machinery was first introduced in the 19th century, when a steam thresher was rented out during harvesting. This was brought to ten different locations, where it worked for two days at one location before moving on to another. (Srinivasarao *et al.*, 2013). Custom hire has a number of advantages over conventional means of obtaining machine services, including reduced responsibility for owning and managing the machine, no long-term capital commitment, better farm budget planning, and giving farmers more time to do other things (Beaton *et al* 2003).

A Custom Hiring Center (CHC) is a convenient, one stop solution for farm equipments owned and managed by community-based organizations like Farmer Producer Organisations /Non-governmental organisation (NGO)/ Mandala Samakhya/ Krishi Vigyan Kendra /Village

Organisations with an objective to meet the local needs of the women farmers and with an intension to drudgery reduction. The centre comprising a set of farm machinery, implements, tools and equipment meant to be rented in primarily by small and marginal farmers, women and agriculture labour. CHCs enhance access to good tools, implements, draught power and machinery services for ensuring quick response and timely operations such as land preparation, sowing, inter-cultivation, other crop management, harvesting and post harvesting specific to existing cropping pattern of the cluster.

It was very much needed to know the farmers preferences and opinion towards this Custom Hiring Centers. *Thurstone (1946)* defined attitude as a degree of positive or negative affect associated with some psychological object. It may be any symbol, phrase, slogan, person, institutions and idea towards which people can differ with respect to positive or negative effect. The objective of the study was to develop a scale to measure attitude towards Custom Hiring Centers/Scheme. The definition of attitude in accordance with the present study was operationalized as a positive or negative feeling of the farmers towards Custom Hiring Center/Scheme.

METHODOLOGY

Selection of type of attitude scale : To measure the attitude of farmers towards Custom Hiring Center a scale has been developed using the following procedure. Method of summated rating scale, by *Likert (1932)* was used to construct the attitude scale of farmers towards Custom Hiring Center. The steps used in construction of attitude scale are as follows:

Collection of statements: A set of 102 statements representing the attitude of farmers towards Custom Hiring Centers/scheme were collected initially from various sources *viz.*, literature and interaction with experts.

Editing of statements : Each statement was edited considering the fourteen-point informal criteria suggested by *Thurstone & chavez (1929)* and *Edwards and kirkpatrick (1948)*. The statements which were ambiguous, irrelevant and not conforming to the suggested criteria was deleted. Total 75 statements were finally selected after editing for scale construction. Further, there is a need to include approximately equal number of negative and positive statements for analysis.

Relevancy test: Not all the statements selected were equally relevant, there is every need to know the relevancy of all the 75 selected statements. Hence, these statements were subjected to scrutiny by mailing to 120 judges with appropriate necessary instructions.

Judges were also requested to make any necessary modifications of words and sentences in according to their preferences. Judges were experts in field of agriculture extension in Indian Council of Agricultural Research (ICAR) and State Agriculture University (SAU) and asked to determine the relevancy under five-point continuum *viz.*, most relevant, relevant, somewhat relevant, less relevant and not relevant with scores 5, 4, 3, 2, and 1, respectively. Out of 120 judges, 60 judges were responded to the statements. Thereby the relevancy score of each item was found out by adding the scores. From the data so obtained relevancy per centage, relevancy weightage and mean relevancy scores were worked out for all the 75 statements individually. Considering a relevancy per centage more than 70, relevancy weightage more than 0.70 and mean relevancy score was more than 3, then the statements were selected for further analysis with suggested modification by judges.

Item analysis: After the items have been carefully edited, they are subjected to procedure called "Item Analysis". Item analysis is to examine the extent to which each item can discriminate the respondent with high favorableness than the respondent with low favorableness towards Custom Hiring Center. This is applied to a schedule of 56 selected relevant statements and is administered by personally interviewing a sample of 120 farmers from non-sampled area. The responses for the statements were obtained on a five-point continuum *viz.*, strongly agree, agree, undecided, disagree and strongly disagree with scores of 4, 3, 2, 1 and 0 respectively. In case of negative statements, the scoring was reversed *i.e.*, 0, 1, 2, 3, and 4 respectively. The attitude score of the respondent on the scale was obtained by summing up the scores of all statements.

Computing 't' values: In item analysis, the respondents were arranged in ascending order based on the obtained attitude scores. Later, the criterion group was selected by elimination of middle 50 per cent scores, *i.e.*, 25 per cent of respondents with high scores (high group) and 25 per cent respondents with low scores (low group) were taken and finally subjected to calculate t-values. t-value is a measure of extent to which a given statement differentiates the high group from the low group.

Their response was recorded and the summated score for the total statements was obtained. For each individual the maximum possible score on 56 statements was 224 and the minimum possible score

was 0. The scores of the respondents were arranged in descending order. 25 per cent of the highest and 25 per cent of the lowest scorers were taken for the item analysis, meaning 30 respondents from the high group and 30 from the low group. 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 suggested by *Edwards (1957)*.

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

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

X_L = the mean score on a given statement for low score group

S_H^2 = the variance of the distribution of responses of the high group of the statement

S_L^2 = the variance of the distribution of responses of the low group of the statement

n_H = the number of respondents in high score

n_L = the number of respondents in low scores

As n_H was equal to n_L (15 each) the modified formula for calculating the *t*-values of the statements was used. The formula was:

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

Where

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

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

After computing the '*t*' value for all the items, the statements with highest '*t*' value equal to or greater than 1.75 were finally selected and included in the attitude scale. It was observed that, 34 statements were finally retained in the scale. The statements were given in Table 2.

For example here we calculated "*t*" value for statement 1.

High group: frequencies of responses for statement no1(SA-17, A-12, UD-1, D-0, SD-0)

x	f	x ²	fx	fx ²
4	17	16	68	17×16=272
3	12	9	36	108
2	1	4	2	0
1	0	1	0	0
0	0	0	0	0
Total	30	30	106	380

$$X_H = \frac{106}{30} = 3.53$$

$$(\sum X_H - X_H)^2 = 380 - \left(\frac{106^2}{30}\right) = 5.46$$

Low group: (SA-10, A-13, UD-7, D-0, SD-0)

x	f	x ²	fx	fx ²
4	10	16	40	160
3	13	9	39	117
2	7	4	14	28
1	0	1	0	0
0	0	0	0	0
Total	30	30	93	305

$$X_L = \frac{93}{30} = 3.10$$

$$\sum(X_L - \bar{X}_L)^2 = 305 - \frac{(93)^2}{30} = (93)^2/30 = 16.70$$

$$t = \frac{3.53 - 3.10}{\sqrt{\frac{(5.46) + (16.70)}{30 - (30 - 1)}}} = 2.72$$

This statement is included in the final scale as it has "*t*" value greater than 1.75

Reliability of attitude scale: According to *Kerlinger (1943)* "Reliability is the accuracy or precision of measuring instrument". To know the reliability of the Test-retest method was used.

Reliability: A test to be called sound must be reliable because reliability indicates the extent to which the scores obtained in the test are free from internal defects of standardization, which are likely to produce errors of measurement (*Chandrakandan et al. 2001*). With respect to the reliability split- half method has been used. The scale was split into two halves based on odd and even number of items and was employed on fresh group of 60 respondents outside the sample area. The correlation coefficient was 0.83, indicating high reliability of the instrument and was suitable for administrating to the farmers to test their attitude towards Custom Hiring Center/Scheme. *Helen and Khaleel (2009)*; *Kumar and Popat (2009)*; *Kumar and Ratnakar (2016)* and *Thakur et al., (2017)* also followed the same procedure.

Content validity: Here the validity used for the analysis was content validity. While selecting attitude statements due care was taken in selecting and wording the statements so as to cover all the relevant aspects by discussing formally and informally with extension experts, resource personnel/subject matter specialists and researchers and also followed the available reviews obtained thus, ensuring the scale to satisfy the content validity.

Table 1. Statements with calculated “t” values

S. No	Statements	High group (n=30)						Low group (n=30)						t - value
		SA	A	UD	D	SDA	Total	SA	A	UD	D	SDA	Total	
1**	In my view farm operations are delayed if I depend on Custom Hiring Centers	17	12	1	0	0	30	10	13	7	0	0	30	2.72*
2.	I believe that CHC are located at strategically within the radius of 5-7 kms	18	6	4	2	0	30	10	10	5	3	2	30	2.01*
3	I feel that CHC are charging rents reasonably for farm machineries.	15	10	3	2	0	30	0	14	11	5	0	30	4.48*
4	I believe that CHC always provide machinery in good working condition.	5	19	6	0	0	30	5	14	7	4	0	30	1.48
5	In my view CHC play important role in In-situ Crop Residue Management.	8	19	1	2	0	30	9	14	6	1	0	30	1.70
6**	I feel that CHC personnel are not skilled in handling machinery.	5	20	5	0	0	30	8	13	9	0	0	30	1.45
7	I believe that crop residue burning events have come down drastically with CHC services.	21	5	2	2	0	30	0	22	6	2	0	30	3.73*
8	I am aware of CHC and its services through media and extension activities by CHC.	19	3	7	0	1	30	0	8	10	12	0	30	5.95*
9	I believe that easy access to CHC lead to reduction of cost and increase in crop yields.	12	14	4	0	0	30	1	9	15	4	1	30	5.58*
10	It is good that trainings and workshops are conducted to farmers to get to know the benefits of new technologies and services of CHC.	21	6	3	0	0	30	3	11	9	6	1	30	5.82*
11	In my view subsidy has to be provided to CHCs for purchase of machinery by govt.	12	14	2	2	0	30	7	9	11	3	0	30	2.32*
12	I am very much satisfied with machinery and services of CHC.	9	7	4	10	0	30	3	6	10	11	0	30	0.55
13	I strongly feel that subsidy provision acts as safeguard against risk for CHC	4	5	4	17	0	30	0	0	12	14	4	30	2.98*
14	I feel that availability of custom hiring services are essential for the growth of agriculture	19	5	6	0	0	30	0	21	5	4	0	30	4.38*
15**	I feel that possibility of spread of disease through contaminated machines provided by CHC cannot be ruled out.	4	23	3	0	0	30	8	19	3	0	0	30	4.19*
16	I believe that CHC facilitate availability of the right quantity of machinery and services	9	7	4	10	0	30	3	8	10	9	0	30	0.51
17	I observed that CHC are providing agricultural information on technologies and services	4	21	3	2	0	30	8	9	7	6	0	30	1.55
18**	In view lack of entrepreneurial experience of manager of CHC led to poor services delivery.	9	9	10	2	0	30	0	4	16	10	0	30	4.92*
19	I believe that CHC reduces drudgery in all farm operations.	22	5	3	0	0	30	5	14	8	3	0	30	4.62*
20**	I feel that small holding farmers are no way getting benefitted with CHCs.	10	20	0	0	0	30	7	7	16	0	0	30	3.57*
21	I observed increase in cropping intensity in my area, after establishment of CHC.	17	7	0	6	0	30	5	11	13	1	0	30	1.93*
22	In my view CHC provides employment opportunities to skilled labour and artisans.	12	14	2	2	0	30	6	8	11	5	0	30	2.35*
23	In my view Government should fix rates for farm machinery services of CHC.	18	10	2	0	0	30	7	5	10	5	3	30	4.88*
24**	In my view CHC has made most of the farm family members idle.	17	7	6	0	0	30	8	13	9	0	0	30	1.98*
25	In my view CHC offer farm machinery on rent to small and marginal farmers	10	12	7	1	0	30	2	13	15	0	0	30	2.44*
26	I prefer CHC services over depending on animals and labour.	8	1	17	4	0	30	5	8	14	3	0	30	0.086
27	I feel that CHC has to be promoted in a big way for their collective ownership.	18	10	2	0	0	30	1	20	9	0	0	30	5.40*
28**	I observed that CHC is not equipped with all necessary equipment that are crop specific.	2	3	0	6	19	30	1	2	2	5	20	30	0.42
29	I feel that CHC if successfully run can bring economic, social and environmental benefits.	9	19	2	0	0	30	13	8	6	3	0	30	0.99
30**	I observed that lack of knowledge among CHC personnel in aspects of operation, maintenance and repair of equipment restricts the use of farm machinery by farmers.	13	17	0	0	0	30	7	17	6	0	0	30	2.64*
31**	In my view CHC services are not right option during when farm operations are at peak.	4	16	8	2	0	30	5	11	5	9	0	30	1.61
32**	I feel that high rents charged from farmers towards the services provided by CHC.	9	7	10	4	0	30	3	6	8	13	0	30	1.25
33**	In my view both modern and traditional farm machineries are not available in CHC.	9	18	1	2	0	30	5	10	10	5	0	30	2.80*
34**	Management of stubbles and crop residue became tough by CHC services.	11	11	6	2	0	30	11	12	2	5	0	30	0.27
35**	I feel that use of modern implements provided by CHC have adversely affected soil health.	22	6	2	0	0	30	10	4	14	2	0	30	4.34*
36	Banks have to come up with hassle free loans for establishment of CHC.	20	7	3	0	0	30	5	14	11	0	0	30	4.26*
37	In my view services of CHC maybe more useful to farm cooperatives and FPOs than to individual farmers.	16	10	4	0	0	30	5	8	14	3	0	30	4.30*
38	In my view repair and maintenance facilities are provided in CHC for my own machinery also.	15	11	4	0	0	30	6	14	6	4	0	30	2.94*
39	I feel that it is easy to get services from CHC without any procedural delays.	11	19	0	0	0	30	4	12	10	4	0	30	4.51*
40	In my view CHC may reduce the credit burden of farmers towards farm machinery.	8	18	2	2	0	30	8	11	6	5	0	30	1.38
41	In my view with CHC services, farmer can reduce the harvest and post-harvest losses.	20	10	0	0	0	30	10	16	2	2	0	30	3.06*
42**	I feel that the CHCs are biased in providing CHC services to all sections of farmers.	0	8	2	20	0	30	2	3	10	14	1	30	0.42
43**	In my view CHC staffs are not supportive and cooperative.	20	6	2	2	0	30	4	12	10	4	0	30	2.57*
44**	I feel that CHCs are not promoting climate resilient practices and technologies among farmers.	15	9	4	2	0	30	12	15	0	4	0	30	1.88*
45**	I strongly feel that CHC are not helpful in timely and efficient agricultural operations.	13	15	2	0	0	30	10	14	2	3	0	30	1.50
46**	In my view most of CHC services are costly and generally remain unaffordable for farmers.	13	16	0	1	0	30	16	12	2	0	0	30	0.36
47**	In my view there is a long procedure to get farm machinery on rent from CHC.	18	11	1	0	0	30	4	14	8	3	1	30	0.78
48**	In my view farm operations are delayed due to improper functioning of CHC.	13	16	0	1	0	30	3	6	10	11	0	30	0.45
49**	In my view establishment of CHC has resulted in farmer's indebtedness.	18	12	0	0	0	30	7	18	5	0	0	30	3.75*
50**	In my view traditional farm implements are better than CHC machinery or equipment.	7	13	10	0	0	30	6	12	8	4	0	30	1.09
51**	I feel that lack of incentives by govt. to CHC has hindered the spread of farm mechanization.	16	11	2	1	0	30	8	17	3	2	0	30	1.83*
52**	I observed that CHC are not providing relevant Agriculture information on technologies and its services to farmers through different media.	16	10	3	1	0	30	9	16	3	2	0	30	1.43
53**	I am not at all satisfied with services and machinery provided by CHC.	7	23	0	0	0	30	7	20	3	0	0	30	0.76
54**	I observed that there is no influence of CHC on income of farmers.	6	9	9	4	2	30	0	6	13	7	4	30	2.67*
55**	In my view there is no change in yield of crops after establishment of CHC.	10	18	0	2	0	30	10	14	6	0	0	30	1.89*
56**	I believe that use of heavy machinery causes permanent damage to the soil.	13	16	0	1	0	30	16	12	2	0	0	30	0.59

*Statements selected for final attitude scale **Negative statements

SA = Strongly Agree, A = Agree, UD = Undecided, D = Disagree SDA = Strongly Disagree

Table 2. Final selected Attitude statements

S.No	Statements	t - value
1	I am aware of CHC and its services through media and extension activities by CHC.	5.95
2	It is good that trainings are conducted to farmers to get the benefits of new technologies and services of CHC.	5.82
3	I believe that easy access to CHC lead to reduction of cost and increase in crop yields.	5.58
4	I feel that CHC has to be promoted in a big way for their collective ownership.	5.40
5*	In my view lack of entrepreneurial experience of manager of CHC led to poor services delivery by CHC.	4.92
6	In my view Government should fix rates for farm machinery services of CHC.	4.88
7	I believe that CHC reduces drudgery in all farm operations.	4.62
8	I feel that it is easy to get services from CHC without any procedural delays.	4.51
9	I feel that CHC are charging rents reasonably for farm machineries.	4.48
10	I feel that availability of time bound high-quality custom hiring services are essential for the growth of agriculture.	4.38
11*	I feel that use of modern implements provided by CHC have adversely affected soil health.	4.34
12	In my view services of CHC maybe more useful to farm cooperatives and FPOs than to individual farmers.	4.30
13	Banks have to come up with hassle free loans for establishment of CHC.	4.26
14**	I feel that possibility of spread of disease through contaminated machines provided by CHC cannot be ruled out.	4.19
15*	In my view establishment of CHC has resulted in farmer's indebtedness.	3.75
16	I believe that crop residue burning events have come down drastically with CHC services.	3.73
17*	I feel that small holding farmers are no way getting benefitted with CHCs.	3.57
18	In my view with CHC services, farmer can reduce the harvest and post-harvest losses.	3.06
19	I strongly feel that subsidy provision acts as safeguard against risk for CHC in the initial years.	2.98
20	In my view repair and maintenance facilities are provided in CHC for my own machinery also.	2.94
21*	In my view both modern and traditional farm machineries are not available in CHC.	2.80
22*	In my view farm operations are delayed if I depend on CHC for farm machinery or equipment.	2.72
23*	I observed that there is no influence of CHC on income of farmers.	2.67
24*	I observed that lack of knowledge among CHC personnel in aspects of operation, maintenance and repair of equipment restricts the use of farm machinery by farmers.	2.64
25*	In my view CHC staffs are not supportive and cooperative.	2.57
26	In my view CHC offer farm machinery on rent to small and marginal farmers	2.44
27	In my view CHC provides employment opportunities to skilled labour and artisans.	2.35
28	In my view subsidy has to be provided to CHCs for purchase of machinery by government.	2.32
29	I believe that CHC are located at strategically within the radius of 5-7 kms and are within our reach.	2.01
30*	In my view CHC has made most of the farm family members idle.	1.98
31	I observed increase in cropping intensity in my area, after establishment of CHC.	1.93
32*	In my view there is no change in yield of crops after establishment of CHC.	1.89
33*	I feel that CHCs are not promoting climate resilient practices and technologies among farmers.	1.88
34*	I feel that lack of incentives by government to CHC has hindered the spread of farm mechanization.	1.83

*Negative statements, coding procedure for these statements was, strongly agree response with 1, agree with 2, undecided with 3, disagree with 4 and strongly disagree with 5.

Utility of scale: The final scale which measures the attitude of farmers towards Custom Hiring Center consists of 34 statements. Each statement was noted on a five-point continuum as strongly agree, agree, undecided, disagree and strongly disagree with scores of 5,4,3,2 and 1 respectively for positive statements. The scoring was reversed in the case of negative statements; the score was obtained for each item and summed up to get the attitude scores towards Custom Hiring Center. The maximum score was 170 and the minimum was 34.

RESULTS AND DISCUSSION

The final scale was called to be the standardized one which consisted of 34 statements. The scale developed to measure the attitude of farmers towards Custom Hiring Center where responses had to be recorded on a five-point continuum representing strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2, and 1, respectively. The attitude score of each respondent can be calculated by adding up the scores.

CONCLUSION

This study aims at constructing a scale to measure the attitude of farmers towards Custom Hiring Centers. The affective aspect of attitude scale consisted of 34 items, with high reliability, and more predictive validity. This scale can be used in future studies on perception, attitude and feeling of farmers towards Custom Hiring centers. It will be helpful to the policy makers and administrators to develop suitable strategies towards Custom Hiring Center by knowing the attitude of farmers. This scale also aids in enabling the agriculture department in making future decisions regarding the development of Custom Hiring Centers/Scheme.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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