

A Scale to Measure the Attitude of Famers towards Backward and Forward Linkages in Cotton Cultivation

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Authors' contributions

This work was carried out in collaboration among all authors. Author KRC designed the study, performed the statistical analysis, wrote the protocol, collected data through interview schedule and wrote the first draft of the manuscript. Authors SVP, PVSG, GPR and GMN managed the analyses of the study and the literature searches. All authors read and approved the final.

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ABSTRACT

The aim of this study is to develop an attitude scale to measure the attitude of farmers towards backward and forward linkages in cotton cultivation. It has been a long time need for a proper scale to measure the attitude of farmers towards backward and forward linkages in cotton cultivation, it was thought necessary to construct a scale for the purpose. Keeping this in view, an attempt has been made to develop a scale for measuring the attitude of farmers towards backward and forward linkages in cotton cultivation. Method of summated rating scale, by Likert [1], was used. Twenty four statements were selected from 45 statements for which 't' values were worked out, whose values were highest i.e., with t-values more than 1.75.

Keywords: Backward linkages; forward linkages; attitude scale; Likert.

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1. INTRODUCTION

Agriculture ranks second in forward linkages in terms of supplying its output to other sectors to the extent of 42 percent of its output. Agricultural sector has the least input requirements (backward linkage) compared to nonfarm sectors and contributes 16 per cent to gross value added in the economy [2]. Agriculture provides food, raw materials, and export earnings for the growth of nonfarm sectors. On the other hand, non-agricultural sectors support agriculture by supplying inputs (fertilizers, insecticides, irrigation structures, infrastructure and markets for farm produce). Consequently, the deficiency in production of one sector becomes the limiting factor for the growth of other sectors, thereby affecting the overall growth of the economy. It is imperative to study the magnitude of backward and forward linkages of farmers with various agencies for achieving a desired rate of growth in agriculture [3].

Cotton is one of the most important fiber and cash crop of India and plays a dominant role in the industrial and agricultural economy of the country. Cotton is the backbone of Indian textile industry, which produces 59% of the country's total fiber production. It accounts for 34% of the country's export and fetches about Rs.50, 000 crores annually to the exchequer. Along with the industry, which it sustains, it touches the country's economy at several points including employment and export earnings. India ranks first in the world in cotton cultivation with 12.66 million hectares of area constituting about 38% to 41% of the world area under cotton cultivation and ranked first in production yielding 28.71 million bales production with productivity of 466 Kgs per ha (Source: Directorate of Economics & Statistics, 2019). So it is imperative to study and critically analyse the extent of backward and forward linkages followed by farmers in cotton cultivation. Backward linkages are the channels through which information, material and money flow between a firm and its suppliers and create a network of economic independence. Forward linkages are distribution chains connecting producers or suppliers to its customers.

Hence there is a need to study the attitude of farmers towards ICTs. Edwards defines attitude as the degree of positive and negative affect associated with some psychological object. Attitude in this study was operationally defined as the degree of positive or negative feeling of

farmers towards backward and forward linkages in cotton cultivation.

2. MATERIALS AND METHODS

To measure the attitude of farmers towards ICTs a scale has been developed by the following procedure. Method of summated rating scale, by Likert [1], was used to construct the attitude scale of farmers towards ICTs.

The steps used in construction of attitude scale are as follows:

2.1 Collection of Statements

Sixty seven statements each expressing the attitude of farmers towards backward and forward linkages towards cotton cultivation were collected from available literature, in consultation with the specialists in the field of cotton and they were edited on the basis of criteria as suggested by Thurstone and Chave [4], Likert [1] and Edward [5].

Out of sixty seven statements, forty five statements were retained after editing. These statements were administered to 100 judges taken as respondents having expertise in psychology and cotton cultivation. The judges 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 pattern adopted was a score of 5 was given to strongly agree, 4 to agree, 3 to undecided, 2 to disagree and 1 to strongly disagree for a positive statement and for negative statement, the scoring pattern was reversed viz., 'strongly agree' response with a score of 1, 'agree' with 2, 'undecided' with 3, 'disagree' with 4 and 'strongly disagree' with 5. Their responses were recorded and total score for each respondent was arrived by summing up the scores on all the statements. The scores of the individual statements were summed up to get the total scores of the respondents. Based on the total scores obtained, the respondents were arranged in descending order. Then the top 25 percent of the respondents with the highest scores and the bottom 25 percent of the respondents with the lowest scores were considered as criterion groups to evaluate individual statements. The middle 50 percent of the respondents were deleted for further analysis. The top 25 percent was considered as high group and bottom 25 percent was considered as low group to calculate the critical

ratio i.e. 't' value for each statement. The calculated 't' value for each statement will measure the extent to which the statement differentiates between the respondents of high group and low group. The 't' values were calculated by using the formula suggested by Edwards [5]. The 't' value for each statement was calculated by using the formula.

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

where, \bar{X}_H = Mean score on a given statement for the high group
 \bar{X}_L = Mean score on a given statement for the low group

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

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

$$\bar{X}_H = \frac{\sum X_H}{n_H}$$

$$\bar{X}_L = \frac{\sum X_L}{n_L}$$

n = the number of respondents in higher and lower group

2.2 Selection of Attitude Statements for Final Scale

After computing 't' values for all the items statements comprising of twenty four five positive statements with t value equal to or greater than 1.75 were finally selected and included in the attitude scale.

2.3 Reliability of the Scale

A scale is reliable when it will consistently produce the same results when applied on the same sample [6]. For testing the reliability, split half method was employed. The attitude scale of 34 statements was distributed to thirty farmers in non sample area for their responses.

After getting back the responses, the scale was divided into two halves, all odd statements into one half and all even statements into another. Then the co-efficient of reliability was calculated between the two halves. The correlation coefficient for both the sets was worked out. The correlation coefficient (r=0.82) was significant at 0.01 level indicating the attitude scale was highly suitable for administration to the farmers using kappa coefficient which evaluates agreement [7], since it is not an association between variables.

2.4 Validity of the Scale

The validity of the scale means ability of any instrument to measure what it intended to measure. The developed scale was tested for content validity. According to Kerlinger [8], content validity of scale is the representative or sampling adequacy of the content, the substance, the matter and the topics of a measuring instrument. The content validity of the scale was determined through a group of experts. Since the items selected were from the universe of content, it was ensured that items covered the various aspects of attitude of the farmers towards backward and forward linkages

The content validity was applied to test whether the developed scale could discriminate between the individuals who have favourable attitude towards backward and forward linkages and those who do not. The pilot testing exposed that the scale could differentiate the individuals having favourable attitude from that of unfavourable attitude towards backward and forward linkages. As the scale value difference for almost all the statements included had a high discriminating value, it seemed reasonable to accept the scale as valid measure of the attitude. Thus it ensured a fair degree of validity.

2.5 Administration of the Test

The twenty four statements were administered to the sample farmers for studying the attitude of farmers towards backward and forward linkages. For which 't' values were worked out, whose values were highest i.e., with t-values more than 1.75. The score for each individual in the scale was computed by summing up the weights of individual item response. The possible maximum and minimum scores for each respondent was 120 and 24 respectively.

The scale thus meet the reliability and validity test satisfactorily indicated its ability as an instrument for measuring attitude of farmers towards backward and forward linkages in cotton cultivation.

3. RESULTS

From Table 1 it can be inferred that statement ten with highest t-value with 'Backward linkages of cotton growers with farmers associations/ farmers organization ensure timely availability of inputs' s followed by I firmly believe that forward

linkages make sure effective storage and transportation facilities.

4. DISCUSSION

From Table 1 it can be inferred that statement ten with highest t-value with 'Backward linkages of cotton growers with farmers associations/ farmers organization ensure timely availability of inputs' s followed by I firmly believe that forward linkages make sure effective storage and transportation facilities.

The possible reason might be that Commodity based Farmer Producer Organizations enhances marketing linkages and also achieve economy of scale and enhance the bargaining power and farm related value accruals. Convergence and synergy between different institutions like CCI, APMC and Cotton Millers etc. can fetch better marketing linkages with efficiency in marketing channel by reducing number of middleman and cost of the input and output.

Table 1. List of attitude statements towards backward and forward linkages with their respective 't' value

S. no.	Statements	t values for all statements
1.	I perceive backward linkages ensure effective flow of information, material and money between a firm and its supplier	1.967*
2.	I perceive linkages as essentials to bridge the gap between research and client systems	1.859*
3.	I foresee functional linkages between research and extension may not guarantee better income (-)	1.700*
4.	I feel strong functional linkages within research and extension ensures better transfer of technology	1.953*
5.	I feel linkages are not beneficial to the small and marginal farmers (-)	1.994*
6.	In my view forward linkages may not attribute for effective post-harvest operations in cotton (-)	1.789*
7.	I believe linkages helped me to reduce the cost of cultivation in cotton.	0.447
8.	I foresee a great opportunity for small and marginal farmers to become exporters by establishing forward linkages	1.988*
9.	I believe that export of cotton is more profitable because government pays more attention to it	1.053
10.	Backward linkages of cotton growers with farmers associations/farmers organization ensure timely availability of inputs	2.903*
11.	I believe that backward linkages ensure gain in knowledge on production technologies in cotton	1.818*
12.	I perceive that backward linkages facilitate me in availing timely credit facilities	1.921*
13.	I believe that backward linkages guarantee access to farm machinery in cotton	1.919*
14.	I feel backward linkages make sure potentially gain access to latest <i>technologies</i>	2.065*
15.	I perceive that backward linkages facilitate me in getting adequate input support.	0.723
16.	I foresee forward linkages ensure me of direct marketing of produce.	0.169
17.	I feel that decisions regarding post production activities cannot be relied upon forward linkages. (-)	1.794*
18.	I firmly believe that forward linkages make sure effective storage and transportation facilities	2.664*
19.	I believe that linkages may hamper free flow of information (-)	2.449*
20.	I am of belief that forward linkages with textile units promote entrepreneurship among cotton farmers	1.536
21.	I believe that only experienced farmer can consider linkages in cotton (-)	2.822*

S. no.	Statements	t values for all statements
22.	I feel forward linkages doesn't guarantee effective harvesting of cotton	1.798*
23.	I think backward linkages fetch cotton farmer's adequate liaison with banks, cooperatives at village level.	0.692
24.	I trust forward linkages ensure effective processing facilities for cotton.	0.994
25.	I foresee forward linkage with markets reduce transportation cost	0.522
26.	I opine that backward linkages reduces cost of cultivation	2.261*
27.	I believe that due to poor linkages majority of the farmers do not get crop loans from lending agencies in time	1.588
28.	I foresee backward linkages reduces the exploitation by the input dealers in procuring different inputs	1.534
29.	I feel that poor guidance on forward and backward linkages discourage the farmers	1.347
30.	I believe post harvest technologies are neither profitable to cotton producers nor consumers	1.216
31.	Export of good quality products/ by products can increase valuable foreign exchange	1.669
32.	I think forward/backward linkages can reduce price risk	2.531*
33.	I agree that forward and backward linkages have improved social status of farmers	0.288
34.	I feel Bt cotton production technology is the sign of progressiveness	0.623
35.	I agree that ICT based extension services assist the farmer in selection of effective backward and forward linkages	1.876*
36.	I feel that information delivered through backward linkages should be cost effective while practicing in the field.	0.449
37.	I feel that technologies provided through linkages should be cost effective while applying in the field.	0.342
38.	A farmer is always eager to know about functional linkages exist in cotton cultivation	2.534*
39.	Information provided through linkages help to meet location specific needs of cotton farmers	1.376
40.	I feel that diverse linkages between various agencies lead to confusion among the farmers.	1.049
41.	Farm information from input dealers is mostly useful for the large farmers only.	1.814*
42.	Post-harvest related agro-advisory services like information on value addition helps to improve the market value of the cotton produce	1.449
43.	Export of cotton has become a real boon to farmers due to forward linkages	1.952*
44.	Linkages provided are contradictory in nature as they are given by many in the area	1.083
45.	I believe that forward linkages ensure gain in knowledge on post harvest and processing technologies	1.770*

(-) Statements indicates negative statements of the study

*Statements which were selected for the study.

5. CONCLUSION

Out of forty five statements twenty four statements were administered to the sample farmers for studying the attitude of farmers towards backward and forward linkages based on t-values more than 1.75. A farmer is always

eager to know about functional linkages exist in cotton cultivation was selected for the study with high 't' value, followed by I think forward/backward linkages can reduce price risk. This scale can be used in future studies on perceptions and feeling about the farmers towards backward and forward linkages in cotton

cultivation. It will be helpful to the policy makers and administrators to develop suitable strategies towards backward and forward linkages in cotton cultivation by knowing the attitude of farmers towards it.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Likert RA. A technique for the measurement of attitude. *Arc. Psycho*; 1932.
2. Sharma KL. Production linkages between farm and nonfarm sectors in Fiji Islands. Workshop on farmers and agricultural research: Complementary methods, University of the South Pacific, Suva, Fiji Islands; 2008.
3. Delgado CL, Hopkins J, Kelly VA. Agricultural Growth Linkages in Sub-Saharan Africa, Research Report 107, Washington, D.C.: International Food Policy Research Institute; 1998.
4. Thurstone LL, Chave EJ. Measurement of attitude. University of Chicago press, Chicago; 1929.
5. Edwards AL. Techniques of attitude scale construction. Vaklis, Feffer and Simon private ltd. Bombay; 1969.
6. Goode J, Hatt PK. Methods in social research. Mc Graw-Hill book Co., New York; 1952.
7. SCHUSTER C. A Note on the interpretation of weighted kappa and its relations to other rater agreement statistics for metric scales. *Educational and Psychological Measurement, California*. 2004;64(2):243-253.
8. Kerlinger FN. Foundations of behavioural research. Holt, Rinehart and Winston, New York; 1973.

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