Research Tool

Indian Journal of Extension Education
Vol. 59, No. 2 (April–June), 2023, (118-120)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

A Tool to Measure the Attitude of Farmers Toward Conservation Agriculture

Sherin Maria Saji[1], Vinaya Kumar Hebsale Mallappa[2]* and Minal Rathwa[1]

[1]Post Graduate Student, [2]Assistant Professor, Department of Agricultural Extension and Communication, BACA, AAU, Anand-388110, Gujarat, India

*Corresponding author email id: vinayhm11@gmail.com

ARTICLE INFO

Keywords: Attitude, Conservation agriculture, Guttman split-half coefficient, Reliability, Validity, Scale product method

http://doi.org/10.48165/IJEE.2023.59225

Conflict of Interest: None

ABSTRACT

When assessing farmers' predispositions and developing a strategy for extension work in the region, the attitude of farmers toward conservation agriculture is a crucial consideration. The purpose of this study was to develop a valid and reliable instrument for assessing farmers' attitudes toward conservation agriculture. The scale product method is used to construct the scale. It is a hybrid of the Likert and Thurstone techniques. The study was conducted in March 2022. On a 5-point scale, 65 judges evaluated 25 statements. Finally, 18 statements including 14 positive statements and 4 negative statements were chosen to build a scale that would assess the attitude of farmers towards conservation agriculture. The scale was found reliable, with the reliability coefficient (r) (Guttman split-half Coefficient and Spearman-Brown Coefficient Equal Length) determined to be 0.917. The scale's validity was evaluated using expert judgement. Employing the scale in research will aid in knowing farmers' attitudes about conservation agriculture.

INTRODUCTION

India has recovered from a severe food shortage. In the last 57 years, the country has seen a significant transition, going from a condition of food shortage to an expected record output of 316.06 million tonnes of food grain in 2021-22 (Second Advance Estimates of Production of Major Crops for 2021-22). Similarly, the Green Revolution has helped several developing countries overcome food scarcity. However, the high rates of output growth in the early years of the programme could not be sustained continuously, prompting some to doubt the new style's "sustainability." In 1968, production grew at a 45 per cent faster rate. Wheat productivity has grown from 887.50 kg/ha in 1966-67 to 3177.10 kg/ha in 2011-12 (Mallapur, 2017). However, productivity growth has decreased considerably over the last decade (Rahman, 2015).

Some of the detrimental consequences of the over-adoption of production technologies by the farming community to make the Green Revolution successful include loss of soil fertility, soil toxicity, the salinity of underground water, underground water pollution, diminishing water resources, global warming, and increased incidence of human and livestock diseases(Sharma et al., 2022). Chemicals such as nitrates, carbamates, organophosphates, organochlorine synthetic, and pyrethroids are present in food products, dairy products, water, livestock feeds, and fodder at levels higher than the permissible limit (Dumanski et al., 2006). As a result, more environmentally friendly farming methods must be implemented. Conservation agriculture is one of several environmentally beneficial farming methods available. In contrast to other farming approaches, conservation agriculture advocates a set of principles instead of a specific technology to achieve a sustainable farming system. This is because, worldwide, agriculture is practised in a variety of ecosystems, necessitating the careful tailoring of technology to ensure success (Bera et al., 2022).

Conservation agriculture is impactful in lowering land and water pollution, soil erosion, and long-term reliance on external inputs (Saha et al., 2022). It also improves environmental management, increases water quality and water use efficiency, and decreases greenhouse gas emissions by reducing fossil fuel consumption and enhancing the soil carbon sink.

Received 13-02-2023; Accepted 07-03-2023

Conservation agriculture is widely promoted as one of the few win-win approaches available to farmers in that it has the potential to increase farmers' yields (in the long run) while also conserving the environment. This is because conservation agriculture reduces soil nitrogen loss, promotes soil and water conservation, and enhances the agronomic use effectiveness of applied nutrients. However, some questions have been raised about the viability of conservation agriculture on small and marginal farms due to the biophysical and institutional constraints that smallholder farmers face (Mango et al., 2017). In this context, it is necessary to research opinions on conservation agriculture. Especially assessing farmers' attitudes will provide important information in developing government policy planning to meet feed and food demands. There was no scale in place to gauge farmer's opinion on conservation agriculture. As a result, the current study was designed to construct and standardise a scale to assess farmers' attitudes toward conservation agriculture.

METHODOLOGY

The degree of "positive or negative feelings and emotions connected with particular psychological entities" is referred to as attitude (Thurstone, 1946). The degree of favourable or unfavourable feelings that farmers have toward conservation agriculture may be operationally described as attitude in this study. To create a reliable and valid attitude scale, the Scale Product Method is applied (Chauhan et al., 2016). This approach combines Thurstone's (1946) equal-appearing interval scale for item selection with Likert's (1932) summated rating for determining the scale response. A systematic procedure was followed for the scale construction as followed by Kumar et al., (2016); Gupta et al., (2022); Vijayan et al., (2022). Possible statements concerning the psychological object 'conservation agriculture' were collected. The items were screened by following the informal criteria suggested by Edward's (1969) for editing the statements to be used in the construction of the attitude scale. Based on the screening, the items that formed the universe of content were selected. Totally 25 statements were collected, organised and structured in the form of attitude items. The 25 statements were then subjected to the judge's opinion on a five-point continuum, ranging from most unfavourable to most favourable.

The set of items was sent to the experts for judgement through an online medium. The judges were requested to read and analyse each item carefully. Experts were also requested to make necessary modifications in items. The list of statements was sent to 65 judges who comprised extension scientists and research scholars from the State Agricultural Universities of Gujarat. The Scale value or Median value (S value) of the distributions and the Quartile (Q) value for each statement were derived based on the judgement of 65 assessors for each statement. The S and Q values of each statement were then utilised to determine whether or not the statement should be included in the attitude scale. The scale values and Q values were computed for the 25 statements by applying the formula as suggested by Thurstone & Chave (1946).

Guttman split-half Coefficient and Spearman-Brown Coefficient Equal Length were used to determine the reliability of the scale. The analysis was conducted in MS Excel. The content validity of the developed scale was tested, and the scale's content validity was confirmed by expert judgment, as was the content's representativeness of sampling adequacy.

RESULTS AND DISCUSSION

Initially, 30 statements were created utilising relevant research and expert opinion. The statements were refined using Likert and Edward's (1969) criteria. Twenty-five statements were retained. The set of statements was afterward assessed by 65 judges from agricultural universities in India, which included research scholars, specialists, extension educators, and social scientists. According to the judge's decision, 18 statements were considered important (14 Positive statements and 4 negative statements).

Scale reliability

The precision or accuracy of a surveying device is referred to as reliability. The split-half approach was used to determine the scale's dependability. Eighteen statements were separated into two halves, with 9 odd number statements in one group and 9 even number ones in the other. A group of 20 farmers was given these two sets of statements on a five-point scale "Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree". The positive statements received a score of 5, 4, 3, 2 and 1, while the negative statements received a score of 1, 2, 3, 4 and 5.

The reliability coefficient (r) (Guttman split-half Coefficient and Spearman-Brown Coefficient Equal Length) was determined to be 0.917, which is extremely significant. As a result, the attitude scale is reliable and expected to give consistent results**.**

Content validity

The scale's content validity was determined by talking to extension workers and academicians at Anand Agricultural University about how well the scale's contents were chosen. Experts determined that the scale's content may be used to assess farmers' attitudes toward conservation agriculture. As a result, the current scale was found to be content-valid.

Final Scale to measure the attitude of farmers toward conservation agriculture

The final scale to assess farmers' attitudes toward conservation agriculture included 18 statements (Table 1). Table 1 illustrates the scale value and interquartile range based on which the statements were chosen. The statements above are reliable and valid. Hence, these statements can be used to measure the attitude of farmers toward conservation agriculture in the research. The scale indicates a five-point continuum (strongly agree, agree, undecided, disagree, and strongly disagree) with weightage as 5, 4, 3, 2 and 1, respectively, while the negative statements receive a reverse score. Individual statement scores can be added together to get an attitude score. The score for attitude will range from 18 to 90. A higher score implies that the farmer is supportive of conservation agriculture and vice versa.

Table 1. The Scale to measure the attitude of farmers toward conservation agriculture

S.No.	Statements	Scale value (S)	Interquartile range (Q)
1.	I believe that conservation agriculture decreases the degradation of natural resources. (+)	2.78	1.88
2.	Conservation agriculture significantly reduces crop failure risk. (+)	2.25	1.32
3.	I don't think conservation agriculture will help with the pesticide residue problem. (-)	2.16	1.40
4.	I think conservation agriculture is better than conventional agriculture. (+)	2.09	1.36
5.	In my opinion, conservation agriculture will reduce long-term dependency on external inputs. (+)	2.05	1.28
6.	In my opinion, It is good to have an optimized and sustainable yield from the field trough conservation agriculture. (+)	2.02	1.03
7.	Conservation Agriculture is a win-win situation for farmers and environment. (+)	1.97	1.01
8.	Conservation agriculture does not help in adequately distributing nutrients in the soil profile. (-)	1.95	1.39
9.	I would like to suggest conservation agriculture to other farmers. (+)	1.93	0.93
10.	In my opinion, conservation agriculture is not applicable to my field. (-)	3.25	2.11
11.	I believe that conservation agriculture improves production efficiency. (+)	1.90	0.95
12.	In my opinion, conservation agriculture requires new management skills. (+)	1.83	1.18
13.	Conservation agriculture balances the soil ecosystem by carefully managing residue and waste. (+)	1.80	1.10
14.	To practice conservation agriculture, appropriate technical packages and training programs are needed. (+)	1.79	1.00
15.	Conservation agriculture reduces the occurrence of pests and diseases by interrupting their life cycles. (+)	1.71	1.11
16.	Conservation agriculture is ineffective for weed control (-)	2.27	1.51
17.	Conservation agriculture reduces climate risk. (+)	1.68	1.12
18.	Conservation agriculture reduces soil erosion. (+)	1.52	1.14

CONCLUSION

The scale's development and standardisation aim to promote research into the behavioural aspects of conservation agriculture. Scale product method has been used to develop the attitude scale. Wherein 30 statements were initially drafted. After the refinement made by experts and criteria, 25 statements were retained. Further, based on the judges' responses, the statements were refined to 18 statements (14 positive statements and 4 negative statements). The developed tool has a reliability coefficient of 0.917, which may be described as highly consistent and thus usable in a variety of scenarios. The remarks cover a wide range of topics related to conservation agricultural attitudes. The findings will aid in changing farmers' attitudes about conservation agriculture. With appropriate changes, this scale can also be used to assess farmers' attitudes beyond conservation agriculture. It will also assist policymakers in developing a strategy for implementing sustainable agriculture practices.

REFERENCES

Bera, S., Acharya, S. K., Kumar, P., Chatterjee, R., Mondal, K., & Haque, M. (2022). Organic manure in conservation agriculture: perception, reality and interpretation. *Indian Journal of Extension Education, 58*(2), 53–57.

Chauhan, N. B., Patel, J. B., Vinaya Kumar, H. M., Saini, H., & Gulkari, K. D. (2017). Scales to measure attitude towards various components of rural & agricultural development. *A Special Issue on Measurement of Attitude Gujarat Journal of Extension Education, 1,* 1-41.

Dumanski, J., Peiretti, R., Benetis, J. R., McGarry, D., & Pieri, C. (2006). The paradigm of conservation tillage. *Proceedings of the World Association of Soil and Water Conservation,* pp 58–64.

Edward, A. L. (1969). *Techniques of Attitude Scale Construction.* Vakils, Feffer and Simons Inc, New York.

Gupta, S. K., Nain, M. S., Singh, R., & Mishra, J. R. (2022). Development of scale to measure agripreneurs attitude towards entrepreneurial climate, *Indian Journal of Extension Education, 58*(2), 153-57.

Kumar, R., Slathia, P. S., Peshin, R., Gupta, S. K., & Nain, M. S. (2016). A test to measure the knowledge of farmers about rapeseed mustard cultivation. *Indian Journal of Extension Education, 52*(3&4), 157-159.

Likert, R. A. (1932) A technique for the measurement of attitude. *Archives of Psychology*, *22*(140), 1-55.

Mallapur, C. (2017). *Food grain Output Up 5-Fold In 60 Years, Hides India's Farm Distress*. https://www.indiaspend.com/foodgrain-output-up-5-fold-in-60-years-hides-indias-farm-distress-99910/

Mango, N., Siziba, S., & Makate, C. (2017). The impact of adoption of conservation agriculture on smallholder farmers' food security in semi-arid zones of southern Africa. *Agriculture & Amp; Food Security*, *6*(1). https://doi.org/10.1186/s40066-017-0109-5

Rahman, S. (2015). Green revolution in India: environmental degradation and impact on livestock. *Asian Journal of Water, Environment and Pollution, 12*(1), 75–80.

Saha, C., Acharya, S. K., Haque, M., Chatterjee, R., & Mandal, A. (2022). Attributes of farm income operating on conservation agriculture: The multivariate and ANN analytics. *Indian Journal of Extension Education, 58*(1), 44–48.

Second Advance Estimates of Production of Major Crops for 2021-22 Released. (2022). Public Information Bureau. https://pib.gov.in/PressReleasePage.aspx?PRID=1798835

Sharma, B. C., Kumar, R., Slathia, P. S., Puniya, R., & Vaid, A. (2022). Evaluation of refresher training programme on conservation agriculture practices. *Indian Journal of Extension Education, 58*(1), 49–52.

Thurstone, L. L. (1946). Note on a reanalysis of Davis' reading tests. *Psychometrika, 11*(3), 185-188.

Thurstone, L. L., & Chave, E. J. (1946). The measurement of attitude comment. *American Journal of Sociology, 52,* 39–50.

Vijayan, B., Nain, M. S., Singh, R., & Kumbhare, N. V. (2022). Knowledge test for extension personnel on National Food Security Mission, *Indian Journal of Extension Education, 58*(2), 191-94.