Short Research Article

DEVELOPMENT AND STANDARDISATION OF SCALE TO MEASURE ATTITUDE OF THE FARMERS TOWARDS NATURAL FARMING: A SUSTAINABLE ENVIRONMENTAL APPROACH

ABSTRACT

Attitude is defined as the degree of favourable or unfavourable feeling of the farmers towards natural farming.Natural farming, a sustainable agricultural practice that eschews synthetic inputs, has garnered significant interest globally for its potential to enhance soil health, biodiversity and crop resilience. Understanding farmer's attitude towards natural farming is crucial for its widespread adoption. It is the accepted fact that attitude of an individual plays an important role in determining ones behaviour. Keepingthis in view a standardized scale has been developed to assess the attitude of the farmers towards natural farming. The Likert's summated rating method was used to construct the scale. The process started with collection of items followed by relevancy testing and item analysis and checking the reliability and validity for precision and consistency. A total of twenty four statements were finally retained for measuring attitude of the farmers towards natural farming, out of which fourteen statements were positive and ten statements were negative. The reliability was checked using split-half method and validity was examined through content validity. The scale developed was found highly reliable and valid.

Keywords: Attitude, Farmers, Natural farming, Likert Scale, standardisation

INTRODUCTION

In recent years, there has been growing concern about the environmental and human health impacts of the excessive use of agricultural pesticides, fertilizers and other chemicals. Besides, climate change poses a significant threat to world food production, necessitating the adoption of sustainable agricultural practices. Natural farming emerges as a viable alternative to chemical-intensive farming (Rana and Patel, 2022). Unlike conventional farming methods that contribute to greenhouse gas emissions and rely heavily on synthetic inputs, natural farming emphasizes the use of natural processes to maintain soil fertility and enhances crop resilience.

Natural Farming represents a chemical-free farming system deeply rooted in Indian tradition, complemented by modern insights into ecology, resource recycling, and on-farm resource optimization.Natural farming has been recognised as an important pathway for achieving sustainable development goals and is said to have the potential to meet 169 targets of SDGs(*FAO*).Natural Farming presents a remedy to numerous issues including food insecurity, farmer distress and health concerns stemming from pesticide and fertilizer residues in food and water, as well as global warming, climate change, and natural disasters. Additionally, it holds promise for creating employment opportunities, which can help curb the migration of rural youth. As implied by its name, Natural Farming embodies the art, practice, and increasingly, the science of collaborating with nature to achieve greater outcomes with fewer inputs (NITI AAYOG).

An individual's attitude reflects their positive or negative feeling toward something, which further influences their actions. In the social sciences, scaling techniques are commonly employed to measure or order entities based on quantitative attributes or traits.In this study, attitude was operationalized as the set of beliefs and mental state of readiness organized through experience that influence the individual's response towards natural farming. To promote the uptake of natural farming, farmers must possess sufficient knowledge about it and harbour a positive attitude toward this approach. Changes in both knowledge and attitude are crucial precursors to adopting new practices. Thus, it is essential to examine farmer's attitude towards natural farming, which is integral to its successful adoption.

METHODOLOGY

A step-by-step procedure of Likert's summated ratings was followed to develop a standardized attitude scale. Likert's summated ratings is a scale construction technique in which statements (items) expressing either favourable or unfavourable opinions about a psychological object are standardized. This method is used to assess the attitudinal orientation of a group of individuals toward a specific object. (Likert, 1932).The respondents were asked to respond to each item according to their perceived attitude intensity usually on five point continuum *viz.,*Strongly agree, Agree, Undecided, Disagree and Strongly disagree. This technique offers advantages over other methods of scale construction and standardization due to its simplicity in scoring and summarizing the gathered information. The process involves several steps, including item collection, relevancy testing, item selection, item analysis, reliability testing and validity testing.

ITEM COLLECTION

During the item collection process, 75 sets of statements were gathered through a review of literature and consultations with agricultural scientists, extension experts, farmers and personal experiences. These statements were then screened using the 14 criteria proposed by Edwards (1969) for attitude scale construction. As a result, a set of 53 statements that met the scaling criteria were ultimately selected from the pool of collected items.

RESULTS AND DISCUSSION

RELEVANCY TEST

The relevancy test involved sending the selected items to experts in the field of agriculture for their judgment. The set of 53 statements that passed the item collection process were sent to 100 judges. These judges were asked to assess the relevancy of the items, their difficulty level, and their content validity using a four-point continuum*viz.,* Highly Relevant (HR), Moderately Relevant (MR), Slightly Relevant (SR) and Less Relevant (LR) with scores 4,3,2 and 1 against each item. The judges were also asked to make necessary modifications, addition or deletion of the items.The responses were received from 40 judges and were subjected to Standard Normal Deviate test (z test). After giving the scores to the statements, 'z' values were calculated for each statement and '$\bar{z}$' was calculated . All the statements with 'z' values above $\bar{z}$ (0.00) were selected as the scalable statements. The statements with 'z' values below '$\bar{z}$' were eliminated . Thus, 40 statements out of 53 were selected through relevancy testing. The list of statements selected along with their 'z'values was given in table 1.

ITEM ANALYSIS

The set of 40 statements that satisfied the criteria for relevancy test (i.e., above relevancy mean score) were administered to 60 respondents in non-sampling area. The respondents were asked to indicate their degree of agreement on a five point continuum namely; Strongly agree, Agree, Undecided, Disagree and Strongly disagree with scores of 5 to 1 for each positive statements and 1 to 5 for each negative statements respectively. The scores for their response was summed up and arranged in a descending order. The high and low group was selected, which were the top 25 percent of the respondents with highest total score and the bottom 25 percent respondents with lowest total score respectively 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' value for each statement was calculated by using the formula suggested by Edwards (1969).

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

After computing 't' values for all the 40 statements, 24 statements with the 't' values more than 1.75 were selected for the final attitude scale,out of which were 14 positive statements and 10 negative statements and are presented in the table2.The results of the item analysis showed that the statements were able to differentiate between the high and the low group.

RELIABILITY TEST

According to Ray and Mondal (1999), Reliability refers to the precision or accuracy of measurement or score. When a test gives consistently the same results when applied to the same sample, the test is said to be reliable. The results of the reliability statistics for the constructed attitude scale show that the split half model reliability coefficient was 0.76, which indicated high internal consistency of attitude scale constructed for the study. This is most crucial to attitude scale development as it shows the strength of the attitude scale.

VALIDITY TEST

The 24 final items were given to 20 judges for their expert guidance in the scale development. The suggestions given by the experts were included in the scale and therefore the scale satisfied content validity. Hence, 24 items which satisfied procedural conditions of Likert's summated ratings were selected for the final attitude scale as shown in table 3.

CONCLUSION

The developed Attitude scale has been found to be highly reliable and valid. This standardized scale addresses a gap in the literature concerning the assessment of natural farming adoption among farming communities. Furthermore, it will serve as a valuable tool for researchers, extension workers and social organizations engaged in studying natural farming, facilitating further research in this area.

Table 1. Selection of the attitude statements based on relevancy test

S.No	Statements	Relevancy (Z value)
1	Adopting natural farming practices will improve the quality of agricultural produce	0.19#
2	Natural farming enhances biodiversity on the farm and promotes a healthier ecosystem	0.26#
3	Natural farming improves the overall health of consumers by providing chemical-free produce	1.37#
4	Natural farming is a mixed approach of traditional and modern farming methods	-0.83
5*	There is no strong support from government for natural farming	1.33#
6	Natural farming practices are more in tune with the natural cycles of the environment	-1.49
7	Natural farming enhances the resilience of my farm in tune with the changing environmental conditions	0.76#
8	Transitioning to natural farming helps to reduce operational costs in the long run	0.81#
9*	Pests and diseases doesn't control quickly through natural farming practices	-1.47
10*	Natural farming is beneficial to only small and marginal farmers	1.37#
11	Natural farming mitigates soil erosion and soil degradation besides improving soil fertility	0.16#
12*	Transition to natural farming is a complex process	0.26#
13	I am interested in learning about the potential government incentives for adopting natural farming methods	-1.05
14	Natural farming practices contributes to the preservation of traditional farming wisdom	1.32#
15*	There is little or no readily available asthrams or kashayams for plant protection in natural farming	0.67#
16	One must have passion towards natural farming to practice it	-0.98
17	Natural farming leads to better pest and disease management over time	0.26#
18*	Natural farming practices will increase the physical labour and drudgery associated with farming	0.18#
19	There is no scientific validation of natural farming practices	-1.00
20	Natural farming can be economically viable in the long run	0.70#

21	Natural farming offers a way to reduce reliance on external inputs and resources	0.77#
22	The productivity of natural farming is enough to meet the ever increasing population	-1.00
23*	Procurement of appropriate raw material is difficult in preparing botanicals	0.68#
24	Natural farming empowers women to take on more active roles in agriculture	0.78#
25*	I would not encourage my children to take up natural farming	0.85#
26	Natural farming reduces the reliance on synthetic fertilizers and pesticides, which is beneficial for the environment	-0.97
27	Natural farming leads to consistent and reliable harvest year after year	0.20#
28*	There is little consumer demand for natural farming products	0.43#
29	Natural farming produce fetches more price than that of chemical farming	0.79#
30*	I will not encourage fellow farmers to engage in natural farming	-0.95
31*	Transition to natural farming disrupted my routine whichi am not comfortable.	0.08#
32	One can earn more income through natural farming than any other conventional farming methods	0.12#
33	I am open to investing in training and education related to natural farming	-0.93
34*	There are no proper marketing channels available for natural farming produce	0.26#
35	Natural farming builds stronger connections within my local community	0.13#
36*	Most of my fellow farmers are not adopting natural farming which is good in my opinion	1.14#
37	Natural farming creates a healthier and safer work environment for myself and my co-workers	0.88#
38	Integrated farming system is better than adopting natural farming	-0.91
39*	Preparation of biostimulants is a tedious process	0.68#
40	Natural farming practices can enhance the fertility and structure of the soil	0.77#
41	Natural farming addresses some of the challenges faced by modern agriculture	1.37#
42	Natural farming aligns with my personal values and ethical beliefs about environmental stewardship	-0.85
43*	Natural farming practices require more time and effort than i can commit	1.27#
44	Natural farming ensures sustainable and profitable agricultural practices	1.27#
45	Natural farming helps reduce my carbon footprint and contribute to climate change mitigation	0.89#
46	Natural farming can be a viable option for commercial crops	0.82#
47*	Natural farming produce is limited to household consumption only	0.81#
48	I am motivated to explore innovative ways in practising natural farming	-0.85
49	I am open to experimenting with different natural farming techniques on my land	0.74#
50	Natural farming methods have the potential to enhance the water holding capacity of the soil	0.32#
51*	Yields are less compared to conventional farming methods	0.22#
52	Natural farming enables crops to withstand the adverse effects of climate change	0.77#
53	Monetary investment is little when compared to conventional farming method	0.79#

Table 2.Selection of final attitude statements based on 't' value

S.No	Statements	t-value

1	Adopting natural farming practices will improve the quality of agricultural produce	5.96#
2	Natural farming enhances biodiversity on the farm and promotes a healthier ecosystem	4.81#
3	Natural farming improves the overall health of consumers by providing chemical-free produce	4.56#
4*	There is no strong support from government for natural farming	3.70#
5	Natural farming enhances the resilience of my farm in tune with the changing environmental conditions	3.45#
6	Transitioning to natural farming helps to reduce operational costs in the long run	2.95#
7*	Natural farming is beneficial to only small and marginal farmers	2.65#
8	Natural farming mitigates soil erosion and soil degradation besides improving soil fertility	2.62#
9*	Transition to natural farming is a complex process	2.46#
10	Natural farming practices contributes to the preservation of traditional farming wisdom	2.19#
11*	There is little or no readily available asthrams or kashayams for plant protection in natural farming	2.14#
12	Natural farming leads to better pest and disease management over time	2.12#
13*	Natural farming practices will increase the physical labour and drudgery associated with farming	2.08#
14	Natural farming can be economically viable in the long run	2.08#
15	Natural farming offers a way to reduce reliance on external inputs and resources	2.02#
16*	Procurement of appropriate raw material is difficult in preparing botanicals	1.97#
17	Natural farming empowers women to take on more active roles in agriculture	1.93#
18*	I would not encourage my children to take up natural farming	1.90#
19	Natural farming leads to consistent and reliable harvest year after year	1.88#
20*	There is little consumer demand for natural farming products	1.85#
21	Natural farming produce fetches more price than that of chemical farming	1.85#
22*	Transition to natural farming disrupted my routine whichi am not comfortable.	1.83#
23	One can earn more income through natural farming than any other conventional farming methods	1.82#
24*	There are no proper marketing channels available for natural farming produce	1.79#
25	Natural farming builds stronger connections within my local community	0.77
26*	Most of my fellow farmers are not adopting natural farming which is good in my opinion	0.64
27	Natural farming creates a healthier and safer work environment for myself and my co-workers	0.50
28*	Preparation of biostimulants is a tedious process	0.47
29	Natural farming practices can enhance the fertility and structure of the soil	0.26
30	Natural farming addresses some of the challenges faced by modern agriculture	0.00
31*	Natural farming practices require more time and effort than i can commit	0.00
32	Natural farming ensures sustainable and profitable agricultural practices	0.00
33	Natural farming helps reduce my carbon footprint and contribute to climate change mitigation	0.00
34	Natural farming can be a viable option for commercial crops	0.00

35*	Natural farming produce is limited to household consumption only	0.00
36	I am open to experimenting with different natural farming techniques on my land	0.00
37	Natural farming methods have the potential to enhance the water holding capacity of the soil	0.00
38*	Yields are less compared to conventional farming methods	0.00
39	Natural farming enables crops to withstand the adverse effects of climate change	-0.19
40	Monetary investment is little when compared to conventional farming method	-1.52

Table 3. Final attitude scale to measure attitude of the farmers towards natural farming

S. No.	Statements	SA (5)	A (4)	UD (3)	D (2)	SD (1)
1	Adopting natural farming practices will improve the quality of agricultural produce					
2	Natural farming enhances biodiversity on the farm and promotes a healthier ecosystem					
3	Natural farming improves the overall health of consumers by providing chemical-free produce					
4*	There is no strong support from government for natural farming					
5	Natural farming enhances the resilience of my farm in tune with the changing environmental conditions					
6	Transitioning to natural farming helps to reduce operational costs in the long run					
7*	Natural farming is beneficial to only small and marginal farmers					
8	Natural farming mitigates soil erosion and soil degradation besides improving soil fertility					
9*	Transition to natural farming is a complex process					
10	Natural farming practices contributes to the preservation of traditional farming wisdom					
11*	There is little or no readily available asthrams or kashayams for plant protection in natural farming					
12	Natural farming leads to better pest and disease management over time					
13*	Natural farming practices will increase the physical labour and drudgery associated with farming					
14	Natural farming can be economically viable in the long run					
15	Natural farming offers a way to reduce reliance on external inputs and resources					
16*	Procurement of appropriate raw material is difficult in preparing botanicals					

17	Natural farming empowers women to take on more active roles in agriculture
18*	I would not encourage my children to take up natural farming
19	Natural farming leads to consistent and reliable harvest year after year
20*	There is little consumer demand for natural farming products
21	Natural farming produce fetches more price than that of chemical farming
22*	Transition to natural farming disrupted my routine whichi am not comfortable.
23	One can earn more income through natural farming than any other conventional farming methods
24*	There are no proper marketing channels available for natural farming produce

REFERENCES

Edwards A L. Techniques of Attitude Scale Construction.VakilsFeffer and Simons Pvt Ltd, Bombay. 1969.

https://www.fao.org/

https://naturalfarming.niti.gov.in/

Likert RA. A technique for the measurement of attitude. Archives of Psychology. 1932;140:1-55

Rana H & PatelJK. A Scale to Measure Attitude of Farmers Towards Zero Budget Natural Farming. Gujarat Journal of Extension Education.2022;34(1):1-5

Ray GL &Mondal S. Research Methods in Social Sciences and Extension Education. Kalyani Publishers,New Delhi. 1999.