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Development of Scale to Measure the Attitude of Farmers Towards Integrated Farming System

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ABSTRACT

Attitude can exert a specific influence upon one's response to people, objects, and situations with which it is related. It could affect our actions positively or negatively. Understanding the attitude of farmers towards any activity helps us to formulate better strategies to reduce the vulnerabilities of farmers. The attitude of growers is very important for the adoption of any new agricultural technology. In Kerala, IFS is viewed as a viable option for ensuring optimum production and profitability from unit area due to the significant prevalence of homestead farming and marginal farmers. Realising this fact, many programmes were launched for promoting integrated farming systems throughout the state. The attitude of farmers towards IFS units has a large impact on their upkeep. In the present study, an attitude scale was constructed for measuring the attitude of respondents towards Integrated Farming Systems. The Likert's summated rating method was used to construct the scale. The scale consisted of 22 statements among which 13 statements chosen for the study were positive, while nine were negative. It was administered to 180 farmers who adopted IFS in their units. The result showed that 58.33 per cent of the total respondents had a neutral attitude towards IFS, followed by a favourable attitude (31.67%). It was important to note that just 10 per cent of the farmers were found to fall into the unfavourable category. The district wise analysis showed that, among the selected districts, Kollam district had the highest percentage of farmers in the favourable category followed by Kannur district.

***Key words**: Attitude; Categorization; Integrated farming system; Likert's summated rating; Scale construction.*

Agrarian condition of Kerala is slightly different from that of the national scene. The peculiarities of the agricultural systems in the state are shrinkage of area, predominance of cash crops over food crops, homestead systems of cultivation and marginal holders (*Jeromi, 2007*). Thus, in Kerala, IFS is viewed as a viable option for ensuring optimum production and profitability from unit area. Realising the benefits of IFS, the Kerala government has launched many programmes that offer financial and technical support to farmers for switching to IFS. The final choice to establish and maintain an IFS is heavily dependent on the farmer's attitude towards it. Numerous studies have shown that various benefits provided by IFS units helped to improve farmers' perceptions towards IFS and led to its adoption. According to the findings of *Dadabhau (2014),* most of the farmers had the perception that through IFS they could lower the vulnerability of traditional farming and provide a steady and diversified income. A study conducted by *Nair (2017)* in the Kuttanad area of Kerala reported that most of the farmers who adopted IFS in their fields had a positive perception towards its utility. *Rahman (2003)* and *Wei et al. (2007)* opined that farmers' perception is important as a guide to their decision making and is a good reflection of the basis for their adoption behaviour. The benefits offered by IFS aided to increase the acceptance of IFS among the farmers of Kerala. Although the numbers of farmers who adopt IFS are increasing, they still represent only a meagre portion of the whole farming population. In order to increase the rate of adoption, more efforts are required.

In this context, there is a need to understand the attitude of farmers towards IFS. Attitude refers to the degree of positive or negative effect related to some psychological object or person (*Ravikishore and Seema, 2017*). Attitude is the primary cause of an individual's development and has a significant impact on the way we think, perceive, and act (*Patel and Sharma, 2022*). Thus, the study of one's attitude towards something provides a snapshot of how encouraged or discouraged they are about that subject. If the growers have a positive attitude or positive behaviour about any new concept, they can easily adopt it or use it in an effective manner. Attitude is a behavioural construct that encapsulates how a person feels about someone or something. As various factors influence the attitude, a single variable cannot be used to quantify it, necessitating the construction of a standardised instrument (*Shitu et al., 2018*). Measurement of attitude helps to formulate new policies and better strategies for increasing adoption. Identifying their attitude helps to explore the possibilities for developing new models and examine whether existing models could be scaled up.

METHODOLOGY

The study was conducted in Kerala state. Three districts from each of southern, central and northern Kerala were chosen randomly. With the assistance of officials and local leaders in the research area, four *panchayats* were chosen from each district and fifteen dairy-based IFS farmers were randomly chosen from each *panchayat*.

The attitude of a person refers to their positive or negative feelings towards something. It could affect our actions positively or negatively. In the social sciences, the scaling technique is widely used to measure or order entities with respect to quantitative attributes or traits (*Elakkiya and Asokhan, 2023*). 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 IFS. An attitude scale was constructed for studying the attitude of respondents towards Integrated Farming Systems. The summated rating method was used to construct the scale (*Likert, 1932*). It is one of the popular methods for scale construction (*Sahoo et al., 2019*). In this method, rather than using a single statement, it employs several statements to represent different aspects of a concept, which are intended to indicate the real behaviour (*Pordhiya et al., 2022*). The

following steps were taken to construct the scale:

Collection of items: The first step in developing an attitude scale was to gather statements or items pertaining to the objective.

Editing the statements: The selected statements were edited in accordance with the 14 criteria for developing statements stated by *Edward (1957)*. The statements were edited carefully to ensure that they accurately measured what was intended.

Expert's response to raw statements: All the statements gathered might not be equally relevant for assessing attitudes towards IFS. In order to find out the relevance and screening for inclusion in the final scale, the enlisted statements were sent by post, through mail and handed over personally to a panel of judges in the field of agricultural extension comprised of experts from ICAR institutes, SAUs and research scholars. The statements were placed on a three-point scale, ranging from most relevant to least relevant. For each statement, the judges were requested to provide their responses as most relevant, relevant, and least relevant with respective scores of 3, 2 and 1. After analysis, some statements were rewritten again in light of the criticism and comments of the experts. The relevancy weightage (RW) was calculated for each statement by using the following formula:

$$RW = \frac{MRR \times 3 + RR \times 2 + LRR \times 1}{Maximum\ Possible\ Score}$$

Where,

RW=Relevancy weightage, MRR=Most Relevant Responses, RR=Relevant Responses, LRR=Least Relevant Responses

The statements having relevancy weightage more than 0.70 were considered for the final selection of statements.

Item analysis: Item analysis is a critical step for the construction of a valid and reliable scale (*Dadabhau, 2014*). It helps to categorise the items based on the degree to which they can differ the respondents with high and low impact (*Arun et al., 2022*). A schedule of relevant statements was developed and responses were gathered from 60 farmers in the non-sampling area through personal interviews. The farmers were requested to rate their level of agreement on a five-point scale namely strongly agree, agree, undecided, disagree and strongly disagree, with scores of 5, 4, 3, 2 and 1 for each positive statement and reverse scoring for negative statements, respectively. The total attitude score of a respondent was computed by adding the

individual scores of all items.

Calculation of 't' values: Respondents were sorted in descending order based on their total score. The top 25 per cent of the respondents with their total scores were considered as high group and the bottom 25 per cent as the low group, so that these two groups provide criterion groups in terms of evaluating the individual statements (*Semie et al., 2009*). The 't' values were calculated in order to differentiate the responses of high and low groups for the individual statements by using the under mentioned formula (*Edward, 1957*).

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

t = t value of particular statement (The extent to which a given statement differentiates between the high and low group).
$\overline{X}_H$ = The mean score on given statement of high group
$\overline{X}_L$ = The mean score on given statement of low group
N = Number of respondents in each group
Σ = Summation

As a general rule, a 't' value of 1.75 or greater indicates that the average response of the high and low groups to a statement differs significantly.

Standardisation of the scale: For the standardisation of the scale, validity and reliability were examined. The split-half method and content validity were used to examine reliability and validity, respectively. The reliability coefficient of the whole scale was calculated by the formula given by *Spearman (1910)* and *Brown (1910)* as follows;

$$\text{Reliability Coefficient (rSB)} = \frac{2 \times rhh}{1 + rhh}$$

Where, rhh = Reliability coefficient of the whole scale

RESULTS AND DISCUSSION

Based on the review of relevant literature and discussions with experts in the field, eighty statements related to the attitude of farmers towards the IFS concept were prepared, keeping in view the suitability of the statements to the study area. The list consisted of both positive and negative statements. Through proper editing of the collected statements and applying Edwards 14 principles, seventy statements were chosen for further analysis. Relevancy test was conducted for these statements and a total of 48 statements were chosen based on the relevancy weightage score. The results of the study have been presented in this section under subheads item analysis, standardisation of the scale and administration of the scale.

Table.1 Selected Attitude statements with respective 't' values

Statements	't value'
IFS reduces farm vulnerabilities on climate related hazards	5.27
It promotes better waste management through recycling of farm waste	4.37
Adoption of IFS leads to the effective use of available natural resources.	4.28
IFS offers multiple source of income	4.14
IFS guarantees supply of balanced and nutritious food to family	3.95
IFS ensures effective utilization of available land	3.79
IFS increases competition for resources among different components.	3.61
Farm with various enterprises leads to sustainable income throughout the year.	3.54
I feel today's need is to concentrate on multiple enterprises at a time.	3.52
Farm mechanization is very difficult in IFS due to integration of various enterprises.	3.39
IFS reduce soil, water and atmospheric pollution to a greater extent.	3.09
Time management for all activities is very difficult.	2.92
IFS demands less quantity of inputs than other farming systems.	2.70
Marketing of products from IFS unit is very difficult.	2.51
The social status of the IFS farmers is better compared to non-IFS farmers.	2.45
Maintenance of an IFS unit is very difficult than conventional farms since it contains many components.	2.26
It helps to minimize cost of cultivation	2.24
The labor requirement is more in IFS compared to other farming systems.	2.11
Initial investment for IFS is very high.	2.01
IFS can be adopted by all categories of farmers.	1.92
The IFS concept is not compatible with the values and beliefs of the society.	1.86
IFS is suitable only for skillful person.	1.79

Item analysis of the relevant statements : It was conducted for the relevant statements and based on this, 22 statements with 't' values greater than 1.75 were retained (Table 1). Thirteen of the 22 statements chosen for the study were positive, while nine were negative.

Standardization of the scale : For the standardization of the scale, validity and reliability were examined.

Reliability of the scale : A scale is reliable, if it consistently generates the same results, when applied to the same sample (*Lal et al., 2014; Rajesh and Smitha, 2023*). The attitude scale so designed for the study was pre tested for its reliability by using the split half method. The twenty-two selected attitude items

were divided into two halves by odd even method. It was administered to 60 respondents from non-sample areas and who were not covered in the actual sample size of the research. The responses were collected on a five-point scale, *viz.,* Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA) and Strongly Disagree (SDA), having scores 5, 4, 3, 2, and 1 respectively. Two sets of scores were obtained and these scores were correlated with each other. The correlation coefficient (rhh) between the scores of two halves of statements was 0.761. The positive and significant correlation between the two sets of scores indicated that the scale was reliable.

Here, the Correlation coefficient of the half-scale, found experimentally, i. e., 0.761.

$$\text{Reliability Coefficient (r)} = \frac{2 \times 0.761}{1 + 0.761} = 0.864$$

The reliability coefficient of whole scale was 0.864 which found significant and positive indicated that the whole scale was reliable.

Validity of scale : The content validity of statements was assessed by juries (experts) opinions through a relevancy test. As the content of the attitude scale was thoroughly covered, the entire aspects of IFS through literature consultation and expert's opinion, it was assumed that the attitude scale measured what it was intended to measure. Furthermore, the calculation of 't' values assured high discriminatory values of the statements. Thus, the scale was taken as a valid measure of the desired dimension. Finally, 22 statements were selected to determine the attitude of farmers towards Integrated Farming Systems and arranged in such a way that positive and negative statements appear randomly to avoid biased responses.

Administration of the scale : The final scale consisting of 22 statements, was administered to the selected sample. The statements were rated on a five-point continuum ranging from 'Strongly Agree' to 'Strongly Disagree'. The positive statements were weighted with 5, 4, 3, 2, and 1, respectively, whereas reverse scoring was done for negative statements. The total score of a respondent was computed by adding the scores obtained for each item. Based on the obtained score, by using the mean and standard deviation methods, the respondents of the study were further grouped into unfavourable, neutral, and favourable groups as follows (Table 2).

From Table 2, it was evident that 58.33 per cent of the total respondents had a neutral attitude towards IFS, followed by favourable attitude (31.67%). It was

Table 2. Distribution of respondents according to their attitude towards IFS (N =180)

Categories (Score)	Kollam (%)	Thrissur (%)	Kannur (%)	Total
Unfavourable (< 73.78)	6.67	11.67	11.67	10.00
Neutral (73.78 - 86.38)	58.33	61.66	55.00	58.33
Favorable (> 86.38)	35.00	26.67	33.33	31.67
Total	100	100	100	100

worth noting that the percentage of farmers who fell into the unfavourable category was very low (10%). The district-wise data also mimics the same trend. The result revealed that the attitude of most of the farmers varies from neutral to favourable. Since IFS contains many components, the risk of maintaining the unit in a sustainable manner as well as the constraints encountered for each adopted component might have led to a neutral attitude towards IFS.

It was also discovered that less than one-third of them had a favourable attitude towards IFS. The IFS unit might have protected them from financial crisis due to crop failures as it contained various components. This might be the reason for developing a favourable attitude towards IFS. As majority of farmers had also realised that it was now more important to focus on various enterprises rather than just one. This could also be a factor in reaching this result. The findings were like those of *Bhoir et al. (2020)*, who tried to identify the attitude of farmers towards different integrated farming system components and revealed that more than three fourth (76.67%) of the respondents had a medium level of attitude towards IFS, followed by a high level (18%) and a low level (5.3%) of attitude towards IFS.

CONCLUSION

An attitude scale was developed for measuring the attitude of farmers towards integrated farming system. It was evident from the results that the attitude of farmers, who adopted IFS in their unit, were neutral to favorable. Farmers were facing certain challenges in establishing and maintaining an IFS unit. These results highlighted that, by implementing better strategies to overcome these constraints through more government assistance, the neutral category of farmers could be converted into a favourable category. By organizing more training and workshops, for managing different components effectively and sustainably in a unit, helps to increase the productivity and profitability which ultimately lead to favourable attitude towards IFS.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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