



International Journal of Agriculture Extension and Social Development

ISSN Print: 2618-0723
ISSN Online: 2618-0731
NAAS Rating (2025): 5.04
IJAESD 2025; 8(8): 785-789
www.extensionjournal.com
Received: 26-06-2025
Accepted: 07-08-2025
Published: 26-08-2025

S Sahana

Professor and Head,
Department of Agricultural
Extension Education,
KSNUAHS, Shivamogga,
Karnataka, India

BM Alekya

Research Scholar, Department
of Agricultural Extension
Education, KSNUAHS,
Shivamogga, Karnataka, India

TS Ganesh Prasad

Assistant Professor, College of
Forestry, Ponnampet Keladi
Shivappa Nayaka Agricultural
and Horticultural Sciences,
Shivamogga, Karnataka, India

Development and Standardization of a Knowledge Test to Measure Farmers' Knowledge of Market-Led Extension

S Sahana¹, BM Alekya², TS Ganesh Prasad³

DOI: <https://www.doi.org/10.33545/26180723.2025.v8.i8k.4305>

ABSTRACT

A standardized scale was developed to measure the attitude of farmers towards Market-Led Extension (MLE) using the Likert's summated rating method. Based on an extensive review of literature, consultations with experts, and identification of relevant dimensions, an initial pool of 69 statements was formulated. The statements were subjected to content validation by 300 scientists and extension specialists from the Indian Council of Agricultural Research (ICAR) institutes and State Agricultural Universities. The judges were requested to evaluate the relevancy of each statement on a five-point continuum. Responses received from 93 judges were analyzed, and 52 statements having a relevancy weightage score (RWS) of ≥ 0.75 and a mean relevancy score of ≥ 3.00 were retained for item analysis. The selected statements were administered to 40 farmers from a non-sample area of Chitradurga district, Karnataka. Item analysis was carried out to assess the discriminatory power of individual statements, and 25 statements satisfying the prescribed criterion of 'r' value (> 0.90) were finally retained for inclusion in the scale. The reliability of the developed scale was assessed, and the obtained reliability coefficient ($r = 0.90$) was statistically significant at the five per cent level, indicating a high degree of reliability. The developed scale demonstrated satisfactory reliability and validity and can be effectively used to assess farmers' attitudes towards Market-Led Extension.

Keywords: Attitude, Farmers, Market-led extension, Scale development, Reliability, Validity

Introduction

Agriculture plays a vital role in the economic development and livelihood security of farming communities. In the present agricultural economy, efficient marketing is as important as efficient production because the economic benefits of agricultural production largely depend on the farmer's ability to market the produce effectively (Singh, 2014). This is particularly important in the case of perishable commodities such as fruits and vegetables, where timely and efficient marketing is essential to minimize post-harvest losses and ensure remunerative returns to farmers. An effective agricultural marketing system requires coordinated activities extending from production to final consumption, including grading, packaging, storage, transportation, price information, market selection and sale of produce (Patnaik, 2011).

Farmers' marketing decisions are influenced by several factors, including the quantity and quality of produce, prevailing market prices, distance to markets, transportation facilities, access to market information, risk orientation, innovativeness and availability of extension support. Conventional agricultural extension has traditionally focused on increasing production and productivity; however, changing market conditions and increasing commercialization of agriculture have created a need for an extension approach that integrates production decisions with market opportunities. Market-Led Extension (MLE) emphasizes the orientation of farmers towards consumer demand, market intelligence, value addition, quality standards, price realization and appropriate marketing channels.

The effectiveness of Market-Led Extension depends not only on the availability of market information and extension services but also on farmers' perceptions and attitudes towards market-oriented agricultural practices. Attitude is an important psychological construct that influences an individual's acceptance, response and behavioural intention towards a particular object or concept. Edwards (1957) defined attitude as the degree of positive or negative affect associated with a psychological object. In the present study, attitude refers to the degree of favourable or unfavourable disposition of farmers towards Market-Led Extension.

Despite the growing importance of market-oriented extension approaches, there is a need for a reliable and valid standardized instrument to systematically assess farmers' attitudes towards Market-Led Extension. Therefore, the present study was undertaken to develop and standardize a scale for measuring farmers' attitudes towards Market-Led Extension. The developed scale is expected to serve as a useful research instrument for researchers, extension professionals and agricultural institutions in assessing farmers' attitudes and facilitating further studies on market-oriented extension interventions.

Corresponding Author:

S Sahana

Professor and Head,
Department of Agricultural
Extension Education,
KSNUAHS, Shivamogga,
Karnataka, India

Objective

To develop the scale to measure Attitude of farmers towards Market-Led Extension

Methodology

The scale for measuring farmers' attitudes towards Market-Led Extension (MLE) was developed following the Likert method of summated ratings proposed by Likert (1923). A summated rating scale consists of a set of attitude statements, each representing an aspect of the psychological construct being measured. Respondents indicate their degree of agreement or disagreement with each statement on a continuum, and the individual item scores are combined to obtain an overall attitude score (Thakur *et al.*, 2017) [1]. The Likert technique was considered appropriate for the present study because it allows a multidimensional concept to be represented through several statements covering different facets of the construct rather than relying on a single statement. The major steps followed in the development and standardization of the scale are described below.

1. Identification and selection of statements

An initial pool of statements was developed to measure farmers' attitudes towards Market-Led Extension. The statements were generated through an extensive review of relevant literature, previous research studies, publications and discussions with subject-matter specialists and experts in agricultural extension and related disciplines. Care was taken to include statements representing various dimensions of Market-Led Extension, including farmers' orientation towards markets, market information, price realization, marketing practices, value addition and other market-oriented activities.

Based on the above procedure, a preliminary list of 69 statements was prepared, comprising 59 positive and 10 negative statements. The statements were formulated considering their relevance, clarity and applicability to the study area. The statements were carefully scrutinized and edited according to the criteria suggested by Thurstone,

Likert and Edwards for the construction of attitude scales (Edwards, 1957). Ambiguous, irrelevant, double-barrelled and technically inappropriate statements were eliminated or suitably modified. Thus, a total of 69 statements were retained for further validation.

2. Relevancy weightage test

All the statements included in the initial pool may not be equally relevant for measuring farmers' attitudes towards Market-Led Extension. Therefore, the statements were subjected to expert evaluation to determine their relevancy and suitability for inclusion in the final scale. A panel of experts comprising scientists, extension specialists and subject-matter experts from agricultural universities, research institutions and extension organizations was identified for this purpose.

The list containing 69 statements was sent to 300 experts for critical evaluation. The experts were requested to indicate the relevancy of each statement on a five-point continuum, namely Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR), Less Relevant (LR), and Not Relevant (NR), with corresponding scores of 5, 4, 3, 2 and 1, respectively. For negatively worded statements, the scoring procedure was reversed.

The experts were requested to return their responses within the specified period. Out of the 300 experts contacted, **93 experts** returned their completed responses within 45 days, and these responses were considered for further analysis.

The relevancy of each statement was determined by calculating the Relevancy Percentage (RP), Relevancy Weightage (RW), and Mean Relevancy Score (MRS) based on the responses obtained from the 93 experts. These statistical measures were used to assess the suitability and relevance of individual statements for inclusion in the subsequent stages of scale development.

The Relevancy Percentage (RP), Relevancy Weightage (RW) and Mean Relevancy Score (MRS) were calculated using the following procedures:

Relevancy Percentage (RP):

$$RP = (\text{Number of experts indicating the statement as relevant} / \text{Total number of experts}) \times 100$$

Relevancy Weightage (RW):

$$RW = \text{Obtained relevancy score} / \text{Maximum possible relevancy score}$$

Mean Relevancy Score (MRS):

$$MRS = \text{Total relevancy score obtained for a statement} / \text{Total number of experts}$$

Statements satisfying the predetermined criteria of relevancy weightage and mean relevancy score were retained for the subsequent item analysis.

Relevancy percentage (RP): It is the number of respondents who rated the statements as Most Relevant (MR), Relevant (R), Somewhat Relevant (SR), Less Relevant (LR) and Not Relevant (NR) which is converted into percentage by using the following formulae.

$$\text{Relevancy Percentage (RP)} = \frac{MR \times 5 + R \times 4 + SWR \times 3 + LR \times 2 + NR \times 1}{\text{Maximum possible score (93 X 5 = 465)}} \times 100$$

Relevancy Weightage (RW): It is the ratio of actual score obtained to the maximum possible scores obtainable for each statement.

$$\text{Relevancy Weightage (RW)} = \frac{MR \times 5 + R \times 4 + SWR \times 3 + LR \times 2 + NR \times 1}{\text{Maximum possible score (93 X 5 = 465)}}$$

Mean Relevance Score: It is the ratio of actual score obtained by each respondent to the number of judges responded for the variable.

$$\text{Mean Relevance Score} = \frac{MR \times 5 + R \times 4 + SWR \times 3 + LR \times 2 + NR \times 1}{\text{Number of judge's responded}}$$

Using these three criteria the statements were screened for their relevancy. The statements having relevancy percentage more than 75.00 per cent and relevancy weightage more than 0.75 and mean relevancy score more than 3.00 follow were considered for final selection of statements. By this process, out of 69 statements, 52 statements had relevancy percentage above 75.00 per cent, relevancy weightage above 0.75 and mean relevancy score more than 3.00 and they were isolated in the first stage of screening, suitably modified and rewritten as per the comments of experts. Thus, finally 52 statements were selected after the relevancy test.

Item analysis

Item analysis is an important step as per the Likert's technique of attitude measurement in the construction of valid and reliable scale. The purpose of item analysis is to select such items which can very well discriminate between two criterions. The selected 52 statements were subjected to item analysis to demarcate the items. Thus, scrutinized statements representing the attitude of farmers towards market-led extension to 40 respondents from non-sample area of Challakere taluk of Chitradurga Districts of Karnataka state were pre tested. The respondents were asked to indicate their degree of agreement or disagreement with each statement on a five-point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2 and 1, respectively and negative statements scores were reversed.

The summated score for the total statements of each respondent was calculated. For each respondent the maximum possible score for 52 statements was 260 and the minimum was 52. The scores of the respondents were then arranged in a descending order. The 25.00 per cent from highest scores (high group) and 25.00 per cent from lowest scores (low group) were taken for the item analysis so as these two groups provide criterion groups in terms of evaluating the individual statements as suggested by Edwards (1957). Thus, out of 40 farmers to whom the items were administered for the item analysis, 10 farmers with lowest and 10 with highest scores were used as criterion groups to evaluate individual items. These responses were subjected to item analysis for selection of the items that constitute the final attitude scale.

The critical ratio of (*t*-value) measure, the extent to which a given statement differentiates between the high and low groups of respondents for each statement was calculated by using following formula suggested by Edward (1957).

$$t = \frac{\bar{x}_H - \bar{x}_L}{\sqrt{\left(\frac{\sum x_H^2}{n} - \bar{x}_H^2 \right) + \left(\frac{\sum x_L^2}{n} - \bar{x}_L^2 \right) \frac{1}{n(n-1)}}}$$

Where,

$\bar{x}_H$ = The mean score on given statement of the high group

$\bar{x}_L$ = The mean score on given statement of the low group

$\sum x_H^2$ = Sum of squares of the individual score on a given statement for high group

$\sum x_L^2$ = Sum of squares of the individual score on a given statement for low group

n = Number of respondents in each group

t = The extent to which a given statement differentiates between the high and low group

After calculating the *t*-values for all the items of the attitude scale using the formula, the values of the statements were arranged in descending order from the highest to the lowest and 52 statements were selected from the scale whose values are highest (*t*-values more than 2.10) for both positive and negative statements.

Selection of attitude statements for final scale

After computing 't' value for all the items, 25 statements with highest 't' value equal to or greater than 2.10 were selected (Table 1). The reject items with 't' value less than 2.10 was followed. As per the procedure items to be retained in the scale are decided, includes the scales with highest discriminating values excluding the scales with poor discriminating ability and questionable validity. Thus, 25 statements were retained for consideration in the final scale based on the following norms

- The 't' value should be more than 2.10
- The item should not get overlapped it should be new idea
- The statement should be simply worded and clear.

Table 1. Scale on measure attitude of farmers towards Market-Led Extension 't' test

Sl. No.	Statement	t value
1.	Market-led extension is a complex process	4.04
2.	Market-led extension consider farmers as an agripreneur	2.11
3.	It is Difficult to follow market led production for small and marginal farmers	2.56
4.	Time of cultivation has no impact on fruits and vegetable production *	2.98
5.	Customized logistics leads to less profits *	3.16
6.	Market-led extension helps to know about right market for the produce	3.27
7.	Market-led extension is more efficient with group approach	2.95
8.	Extension system should shift from supply driven to market driven information dissemination	3.72
9.	Traditional methods of cultivation resulted risk in production	4.04
10.	Agro climatic conditions influences on market- led production	2.50
11.	Grading and standardization of produce increases demand in the market	3.83
12.	Harvesting at right time increases shelf life of the crop	4.64
13.	Market- led extension helps to achieve sustainable agricultural production	2.97
14.	Market intelligence does not help in deciding cropping pattern *	6.00
15.	Market-led extension involves in achieves vertical coordination	4.58
16.	Demand created in the market is unpredictable	4.02
17.	Market-led production helps to get assured income during crisis	5.18
18.	Government should make efforts to establish new market	2.10
19.	Activities implemented under NHM are not based on need of small and marginal farmers*	4.58
20.	Crop insurance scheme protects farmers against the risk and uncertainty during production	2.27
21.	Small scale production creates difficulty in attracting export market	4.00

(continued on next page)

22.	Fixing the commodity price in market is not a biggest challenge*	2.71
23.	Local traders help to get assured price for the produce	3.28
24.	Better transport facility induces to sale produce in regulated markets	3.07
25.	Exporting allows to expand the market of produce	5.49

Reliability and validity of attitude scale

The scale developed was further standardized by establishing its reliability and validity. Reliability is the accuracy or precision of measuring instrument Kerlinger (1964). Split-Half method was followed, to know the reliability of the scale.

Split-Half methodology: The 25 selected Attitude items were divided into two halves by odd-even method. The two halves were administered separately to 20 farmers in a non-sample area. The scores were subjected to product moment correlation test in order to find out the reliability of the half-test. The half-test reliability coefficient (r) was 0.90, which was significant at one per cent level of probability. Further, the reliability coefficient of the whole test was computed using the Spearman-Brown prophecy formula given below.

$$r_1 = \sqrt{\frac{n(\sum XY - (\sum X)(\sum Y))}{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}}$$

Where,

$\sum X$ = Sum of the scores of the odd number items

$\sum Y$ = Sum of the scores of the even number items

$\sum X^2$ = Sum of the squares of the odd number items

$\sum Y^2$ = Sum of the squares of the even number items

n = Number of respondents

The whole reliability test of the scale was 0.90, which was highly significant at one per cent level indicating the high reliability of the scale.

Content validity of the attitude scale

The validity of the scale was established through content validity. The scale satisfies both these criteria as the clause of universe of statements that could be made about Market-led extension from the standards and also in consultation with experts. The calculated “ κ ” value being significant for all the finalized statements of the score indicated that the attitude statements of the scale have discriminating values. Hence, it seems reasonable to accept the scale as a valid measure of the attitude.

Administration and scoring of attitude scale

The final scale consisted of 25 statements (Table 2). The 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 for positive statements and vice versa for negative statements. The attitude score on this scale ranges from a minimum of 25 to maximum of 125.

Table 2. Statements selected for inclusion in the final scale

Sl. No.	Statement	SA	A	UD	DA	SDA
1.	Market-led extension is a complex process					
2.	Market-led extension consider farmers as an agripreneur					
3.	It is Difficult to follow market led production for small and marginal farmers					
4.	Time of cultivation has no impact on fruits and vegetable production *					
5.	Customized logistics leads to less profits *					
6.	Market-led extension helps to know about right market for the produce					
7.	Market-led extension is more efficient with group approach					
8.	Extension system should shift from supply driven to market driven information dissemination					
9.	Traditional methods of cultivation resulted risk in production					
10.	Agro climatic conditions influences on market- led production					
11.	Grading and standardization of produce increases demand in the market					
12.	Harvesting at right time increases shelf life of the crop					
13.	Market- led extension helps to achieve sustainable agricultural production					
14.	Market intelligence does not help in deciding cropping pattern *					
15.	Market-led extension involves in achieves vertical coordination					
16.	Demand created in the market is unpredictable					
17.	Market-led production helps to get assured income during crisis					
18.	Government should make efforts to establish new market					
19.	Activities implemented under NHM are not based on need of small and marginal farmers*					
20.	Crop insurance scheme protects farmers against the risk and uncertainty during production					
21.	Small scale production creates difficulty in attracting export market					
22.	Fixing the commodity price in market is not a biggest challenge*					
23.	Local traders help to get assured price for the produce					
24.	Better transport facility induces to sale produce in regulated markets					
25.	Exporting allows to expand the market of produce					

Note * Negative statement

Note- Strongly agree (SA), Agree (A), undecided (UD), Disagree (DA) and strongly disagree (SDA)

The scale developed was found to be reliable and valid and administered. Ravi *et al.* (2022) [2] also developed scale by using same procedure

where a scale used to measure core competency of extension field functionaries in land resource inventory-based watersheds. Meenu *et al.* (2022) [3] also uses same procedure and developed scale on attitude of woman faculties towards professionalism.

Conclusion

In conclusion, the present study resulted in the development and standardization of a reliable and valid scale for measuring farmers' attitudes towards Market-Led Extension (MLE). The scale development process was carried out systematically through different stages, including identification and formulation of relevant statements, expert evaluation, relevancy analysis, item analysis, and assessment of reliability and validity. Initially, a comprehensive pool of statements was prepared based on an extensive review of literature, previous research findings, and consultations with experts in agricultural extension and related disciplines. Through systematic screening and statistical analysis, the statements were refined and the most relevant items were retained. Finally, 25 statements were selected for inclusion in the standardized scale. The reliability coefficient of the developed scale indicated a high degree of internal consistency and reliability. The scale can therefore be used by researchers and extension professionals to assess farmers' attitudes towards Market-Led Extension. It may also serve as a useful research tool for evaluating market-oriented extension interventions and understanding farmers' responses to changing agricultural marketing systems.

Recommendations

The scale reliability and content validity, this valuable scale developed is helpful in decision making in realm of market led extension among farmers.

Conflict of interest

This is to declare that there is "No conflict of interest" among researchers.

Acknowledgement

The authors thank and acknowledge Judges and Farmers of Southern Transitional, Northern Transitional and Central Dry Zone of *Karnataka* for sharing their experiences.

References

1. Thakur D, Chander M, Sinha SK. A Scale to Measure Attitude of Farmers towards Social Media Use in Agricultural Extension. *Indian Res. J. Ext. Edu.* 2017;17(3).
2. Ravi KN, Patil SL. A scale to measure core competency of extension field functionaries in land resource inventory-based watersheds. *Guj. J. Ext. Edu.* 2022;33(1):1-7.
3. Meenu M, Pandya RD. Development of scale on attitude of woman faculties towards professionalism. *Guj. J. Ext. Edu.* 2022;33(2):1-4.
4. Chauhan CD, Patel JB. A scale to measure the attitude of member farmers of gram panchayat towards Pradhan Mantri Fasal Bima Yojana. *Guj. J. Ext. Edu.* 2020;31(1):1-5.
5. Mahra GS, Kumar B, Bhardwaj N, Dash D. Trends in Extension Research in India-A Case study. *Indian Journal of Extension Education.* 2017;54(4):25-31.
6. Jagadeeswari B, Kumar HM, Patel JB. Attitude of postgraduate students towards research. *Gujarat Journal Extension Education.* 2019;30(1):87-89.
7. Kumar PG, Ratnakar R. A scale to measure Farmers' Attitude towards ICT-based Extension Services. *Indian Res. J. Ext. Edu.* 2016;11(21):109-112.
8. Debnath A. Hormonal Crosstalk and Signal Transduction Mechanisms Regulating Plant Reproductive Development. *Agriculture Reviews: An International Journal.* 2022.
9. Debnath A. Climate Resilient Horticultural Crops and Breeding Strategies for Abiotic Stress Adaptation. *Xplore Environment: An International Journal.* 2021.
10. Debnath A. Environmental Implications of Peat-Based Growing Media on Carbon Balance and Greenhouse Gas Emissions in Horticultural Systems. *Xplore Environment: An International Journal.* 2021.
11. Patel MR, Kumar HM, Pate JB. A Scale to Measure Attitude of Youth Towards Agristartup Programs. *Guj. J. Ext. Edu.* 2023;36(2).
12. Jadav PP, Christian BM. Scale to Measure Attitude of Farm Women Towards Value Addition in Vegetable Crops. *Guj. J. Ext. Edu.* 2023;35(1).
14. Kaukab S, Mishra A, Sunita T. Application of Convolutional Neural Networks for Ripeness Classification of Fruits. *Agriculture Reviews: An International Journal.* 2025.
15. Radadiya PN, Saini H, Zala S. Attitude of Students Towards Higher Education. *Guj. J. Ext. Edu.* 2024;37(1).
17. Saba S, Saini H. A Tool to Measure Attitude of Agriculture Students towards Student-Ready Programme in Employability Generation. *Gujarat Journal of Extension Education.* 2023;36(1):113-118.

How to cite this article: Sahana S, Alekya B, Prasad TG. Development and Standardization of a Knowledge Test to Measure Farmers' Knowledge of Market-Led Extension. *International Journal of Agriculture Extension and Social Development.* 2025;8(8):785-789. doi: <https://www.doi.org/10.33545/26180723.2025.v8.i8k.4305>