Attitude of the Farmers towards IARI-Post Office Linkage Extension Model: Scale Construction

Abstract:

Addressing a lot of marginal and small farmers in developing country like India, ICAR-Indian Agricultural Research Institute initiated an alternate approach to public extension as IARI-Post office Linkage Extension Model in 2009 to reach out the grass root farmers with improved frontline technologies in remote villages through Branch post masters. In the initial expansion phase, there is a need to analyze the impact and future perspective of the model in relation to farmers' behaviors. Interpreting farmers' orientation towards the model could be measured through attitude scale construction with the new concept. Likert-type scale was considered with statements preparation and validation through juries' method and relevancy score method. The scale was pretested in a non-sample area. Item analysis of thirty-six (36) filtered statements could reduce to eighteen (18) reliable attitude statements in the final scale with accepted "t" values. The reliability test showed the scale was quite reliable through Cronbach alpha value as 0.75 and split half reliability full test value as 0.72 after Spearman-Brown correction. The scale was found to be valid through content validity and known group method test. The administration of the scale to the sample farmers with five point continuum response in the Likert scale would categorize farmers into five classes like least favourable, less favourable, favourable, highly favourable, very highly favourable attitudes. Measuring attitude through a standardized scale of stakeholders facilitates future strategy and decision making by policy makers. It can be further validated in meeting several future innovative extension methods.

Key Words: IARI-Post office Linkage Extension Model, Attitude, item analysis, reliability, validity

Abbreviation: ICAR: Indian Council of Agricultural Research, IARI: Indian Agricultural Research Institute, NAARM: National Academy of Agricultural Research Management, NDRI: National Dairy Research Institute, KVK: Krishi Vigyan Kendra, BPM: Branch Post Master

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Introduction:

Smallholders are the representatives of Indian agriculture, constituting 83 percent of total land holding. The scale and heterogeneity of these section of the farmers is a huge challenge for the extension system, to reach out with required information and services. The magnitude of the problem is compounded with increasing proportion of farmers in remote and risk prone areas. Many researchers (Sontakki et al., 2010; Pal 2008; Joshi et al., 2005) have expressed their apprehensions about efficiency and effectiveness of public extension system in reaching out to varying size groups of farmers. Structural and functional change in agricultural extension is being perceived as important to meet these challenges. (Saravaran, 2001). In order to bridge gap felt continuously in technology dissemination to clients in remote areas of a large diverse country like India, one innovative alternative approach was conceived by ICAR-Indian Agricultural Research Institute (ICAR-IARI). In order to out-reach improved technologies for complementing and supplementing the public extension in remote villages, the institute IARI-Post office linkage model envisaged the Branch Postmaster (BPMs) as the local community-based extension agent. Krishi Vigyan Kendras (KVKs) also became the resource partner for technology backstopping to BPMs and farmers. The pilot project started in rabi 2009 in Sitapur district of Uttar Pradesh state and expanded in another four states namely Bihar, Madhya Pradesh, Rajasthan and Jammu Kashmir in 2012-13.(Burman et.al, 2016)

The basic idea behind IARI-Post office Linkage Extension Model is to facilitate the existing system enabling access to technology and advisory services in proposed locations. Therefore, in the coming years, experimentation or implementation of the alternate extension method might occur/replicate in similar situations by several functionaries in India and many developing and underdeveloped countries with a large number of the postal network. Before carrying out such change, it is imperative to know the preference of stakeholders mainly farmers, Branch Postmasters and KVK scientists. As we know, a person prefers for or against or being neutral of any psychological object, ideas and values are expressed in terms of opinion or attitude. Among these, attitude act as the determinant factor behind converting covert behavior into over action which is emphasized by Ray that attitude is rooted in motivation which provides a meaningful background for individual's overt behavior. (Ray,2013).

Several researchers define attitude with in-depth analysis to unknot the domain of the vital psychological trait. Allport (1935) defined attitude as a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.(Allport, 1935, p. 810). Thurstone (1946) defined attitude as a degree of positive or negative affect associated with some psychological object that may be any symbol, phrase, slogan, person, institutions and

idea. An attitude can be defined as an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspects of the individual's world. (Krech and Crutchfield, 1948, p. 152). Campbell (1950) stated that an individual's social attitude is a syndrome of response consistency with regard to social objects. (Campbell, 1950, p. 31). A learned orientation, or disposition, toward an object or situation, which provides a tendency to respond favorably or unfavorably to the object or situation.' (Rokeach, 1968).According to Triandis (1971), an attitude is defined as an idea charged with emotion which predisposes a class of actions to a particular class of social situations. (Triandis, 1971, p. 2).

Person's feeling, beliefs or knowledge about attitude object and inclination to act towards the attitude object in a particular way are three general components of attitude that are affective, cognitive and behavioral respectively. (Triandis, 1971 cited by Hilary PageBucci,2003). Gross (2015) suggests it is a 'hypothetical construct' which becomes apparent that it cannot be directly measured and the use of only a single statement or question to assess it [attitude] will not be effective in gaining reliable responses. It is very difficult to measure and interpret attitude as personality trait which is subjective in nature. Many researchers tried to develop different scales which are basically meant for objective measurement of subjective variable i.e. attitude illustrated by Mueller, 1986. Thurstone & Chave (1929) described a method of equal appearing intervals named Thurstone scaling is 'based on the law of comparative judgment' (Neuman, 2000). Subjects select the attitudinal statements they agree with most out of statements which have a range of weights from high (usually 11) to low (usually 1). Even if items are weighted rather than subjects in this scale but its difficulty in constructing, time-consuming, rigorous statistical calculations; and no more reliability than a Likert scale which opens up the path towards developing comparatively easy simple and quick method of Likert scaling illustrated by Gardner Murphy and Rensis Likert (1938).

The expansion of IARI-Post office Linkage Extension Model since 2009 from one state to fourteen (14) states of India with coverage of fifty-five (55) districts in 2015 makes researcher inquisitive to find out the behavioral pattern of stakeholders and socio-economic impact on beneficiaries. Hence, attitude plays a vital role in behavior leading into social action. There is an imperative to know the attitude of stakeholders towards the model. But the researcher is not able to find an adequate or appropriate existing scale to measure an important construct like attitude towards a new concept. In these circumstances, it is essential to create a new scale as it's mentioned that failure to carefully develop a measurement instrument can result in invalid data. (Hinkin et al., 1997.) The objective of the study was to develop and

standardize a scale for measuring farmers' attitude towards IARI-Post office Linkage Extension Model which was a part of larger master's study on "Analysis of functional mechanism and impact assessment of IARI-Post office Linkage Extension Model."

Construction of attitude scale:

In this study, a measurement of an attitude of farmers towards IARI-Post office linkage extension model was studied. In the meantime, an attitude scale was developed using the Likert method of summated rating (1932). Likert scales are an extremely popular method for measuring attitude, most efficient and effective method of developing highly reliable scales (Oppenheim, 1966; Crano & Brewer, 1973; and Anderson, 1981 cited by Dwyer, E, 1993). Besides all these, this method was moderately simple and saved time. It is essential for individuals to make a decision on their level of agreement, mostly on a five-point scale (ie. Strongly Agree, Agree, Disagree, Strongly Disagree) with a statement. The respondent score to each item leads to the total score obtained by summing the subject's response to each item hence termed as summated rating scale which measures the favourableness-unfavourableness continuum as highest score by any respondent to all the items considered as highly favorable and lowest score by any respondent as highly unfavorable easily. The method provided unique opportunities for item analysis and selecting items based upon their discriminating power as well as being appropriate. Its reliability was tested with the split half method where content validity was accomplished through jury's opinion.

Collection of items:

A boundary of the universe about the positive and negative attitudes of the farmers towards IARI-Post office linkage extension model was outlined through available relevant literature and discussion with experts at various institutes and universities. A tentative list of 52 statements consisting 27 positives and 25 negative statements were drafted keeping in view the applicability of statements suited to the area of study. It was well discussed by Likert (1932) as knowingly preparing and selecting more statements than are likely ever to be used since many of the items would be found unsatisfactory for the intended purpose of an instrument. Also Lemon (1973) recommended using approximately the same number of positive and negatively stated items in a Likert scale. According to fourteen 14 informal criteria suggested by Edwards (1969), the statements were carefully edited. Utmost care was taken so that the statements could measure what it is intended. Excitingly, Dyer (1995) remarked that attitude scales need not be factually accurate they simply need to reflect one possible perception of the truth that feelings which the statement triggers in them.

Relevancy test:

It is possible that all the statements collected may not be relevant equally in measuring the attitude of stakeholders towards IARI-Post Office Linkage Extension Model. Hence these statements were subjected to scrutiny by an expert panel of judges to determine the relevancy and screening for inclusion in the final scale. Therefore those statements list was sent to the panel of judges. Judges comprised experts in the field of agricultural extension of ICAR-IARI, ICAR-NDRI, NAARM, National Institute of Agriculture Extension Management (MANAGE), Extension Education Institutes (EEIs), different ICAR research institutes. Also, the scientists of collaborating KVKs those who are involved in this model were taken as judges for the relevancy of statements. The statements were sent to 80 judges with a request to critically evaluate each statement and give their response in four point continuum viz. most relevant, relevant, somewhat relevant, not at all relevant with unipolar scores 4, 3, 2 and 1 respectively.

Out of 80 judges, only 45 responded in a time span of two months. The relevancy score of each item was ascertained by adding the scores on the rating scale for all the 45 judges' responses. From these data three types of tests where relevancy percentage, relevancy weightage and mean relevancy scores were worked out for all the statements by using different formulas. According to Kumar and Ratnakar (2011) illustration in relevancy test, the researcher tried to put the framework in its own situation below.

a. Relevancy percentage: Relevancy percentage was worked out by summing up the scores of most relevant, relevant and somewhat relevant categories, which were converted into the percentage.

b. Relevancy weightage (R.W.): Relevancy weightage was obtained by the formula.

$$RW = \frac{MRR + RR + SRR + NRR}{MPS}$$

c. Mean relevancy score (M.R.S.): M.R.S. was obtained by the following formula.

$$MRS = \frac{MRR + RR + SRR + NRR}{N}$$

MRR = Most relevant response (X4)

RR = Relevant response (X3)

SRR = Somewhat relevant response (X2)

NRR = Not at all relevant response(X1)

MPS = Maximum possible score (40×4 =160).

N = Number of judges (40).

In the screening statements having relevancy % >70, relevancy weightage >0.70 and mean relevancy score > 2.8 were considered for final selection of statements. Also repetition and duplication type statements opined by judges were relooked. By this process out of total fifty two (52) statements, sixteen (16) statements were discarded and finally thirty six (36) statements were remained for further item analysis which is depicted in Table 1.

Table 1. Attitude statements of farmers towards IARI-Post office linkage extension model after relevancy test.

Statements/Items	M.R.S	Rel. W	Rel.%
1. Seeds supplied through IARI-Post office model are of good quality.	3.56	0.89	88.89
2. Seeds supplied by the model are economical	3.02	0.74	72.22
3. Seeds are not supplied in right time through the model.	2.93	0.72	70.00
4. The model does not distribute required amount of seeds.	3.07	0.72	70.56
5. The seeds, got through the model, do not help in increasing the yield.	2.82	0.71	52.78
6. The model helped to reduce transaction cost in getting quality seeds	3.20	0.80	80.56
7. The model helped to access technology of research institute directly by the farmers.	3.33	0.83	83.33
8. The Model helped to increase awareness of farmers about quality seeds.	3.40	0.85	85.00
9. The Model helped to increase awareness about improved package of practices.	3.07	0.75	73.33
10. It is not easy to communicate Branch postmaster about farming aspect.	2.86	0.70	70.00
11. Branch postmaster doesn't show keen interest in farmer's requirements	2.80	0.70	70.56
12. Direct access to improved technologies through this model, increase the production and productivity of farmers	3.02	0.74	71.67
13. Technologies given through this model is not suitable for the local area.	2.82	0.71	70.56
14. Seeds supplied through this model are more credible (reliable) than purchased from other sources	3.38	0.84	83.89
15. Even if model is withdrawn, I will continue practicing with improved technologies.	3.04	0.76	75.00
16. After the introduction of model, I always look for new	3.16	0.79	77.78

information in agriculture.			
17. Participation in the model has improved my interaction with fellow farmers.	2.93	0.73	71.11
18. Participation in the model has increased my income from farming.	3.11	0.78	76.67
19. I feel happy in participating in the model.	3.00	0.72	71.11
20. My knowledge about the farming improved a lot by participating in the model.	3.13	0.78	77.22
21. Even if model is withdrawn, I would like to make group with other farmers to keep contact with institutes for technology.	2.98	0.73	70.56
22. I am willing to pay the cost for the technologies to sustain the model.	3.13	0.78	77.22
23. Model increased my interest in farming.	2.89	0.71	70.00
24. The model has inspired the farmers to participate in demonstration of improved technologies.	3.14	0.77	76.67
25. The model has inspired the farmers in participating in the training program.	3.05	0.74	73.89
26. Branch postmaster is biased in selecting farmers for distribution of technology.	3.00	0.73	71.11
27. When there is a problem in technology, I find Postmaster is not able to solve.	2.98	0.71	71.11
28. The model does not facilitate farmer's interaction with scientists or experts.	2.89	0.72	70.00
29. The model helps us to know about modern agricultural practices	3.00	0.70	71.67
30. I feel I don't get the desired result from the technologies what is told in the beginning.	2.80	0.70	70.00
31. I think, Branch postmaster is not interested in collecting feedback from farmers.	2.91	0.71	70.56
32. I believe, this model should continue in future.	3.36	0.84	83.33
33. I think this model should be replicated for other technologies also.	3.36	0.84	82.22
34. If any local SAU or Research institute replicates this concept, our farmers will be benefitted.	3.40	0.85	83.89
35. I think Branch postmaster is not distributing the seeds timely and efficiently.	2.82	0.71	70.56
36. Model reduced the uncertainty of farm regarding seed availability.	3.11	0.76	73.89

M.R.S: Mean relevancy score

Rel. W. Relevancy weightage

Rel. %: Relevancy percentage

Among those thirty-six (36) statements, rephrasing and shortening of lengthy statements were also made according to juries' opinion to create a solid item pool for final scale.

Item analysis (calculation of t-value):

The purpose of an item analysis is to find those items form an internally consistent scale and to eliminate those items that do not represent the universe of study (Spector, 1992). The item analysis provides evidence about how well each individual item relates to the other item in the analysis. Similarly, Anderson (1935) used a technique for determining the discrimination of items in a test. The result of his study that one means of item analysis was possible to build a test which had almost as great reliability as a longer examination containing poor items. Likert (1932) also suggested a second objective method for the assignment of correct scale values and for determining whether the items were differentiating. This criterion was designated as the criterion of internal consistency. The final thirty-six (36) statements after relevancy test were subjected to item analysis to delineate the items based on the extent to which they can differentiate the respondents with favorable attitude than the respondents with an unfavourable attitude towards IARI-Post office linkage extension model. For these, there was a pilot study arranged in non-sample areas of model intervention in Sheopur district of Madhya Pradesh. Among the stakeholders 40 experts as farmers, BPMs and KVK scientists were selected as experts initially. They were asked to designate their degree of favorableness or unfavourableness for each statement on a five-point continuum ranging from ‘strongly agree' to ‘strongly disagree'. Likert (1932) suggested two types of scoring methods. The sigma method of scoring is based on the assumption that attitudes are fairly normally distributed. For purposes of obtaining scale values, it appears satisfactory to round off to the nearest whole number in a simpler method, five-point scale and the three-point scale. Here the simpler method of the scoring pattern was used ,the respondent was asked to react to each item in terms of several degrees of agreement or disagreement; for example,(1)strongly agree, (2) agree,(3) undecided, (4) disagree, and(5) strongly disagree. The response alternatives were weighted so the most favorable response carries the highest weight. For example, if a statement is favorable regarding the attitudinal object, "strongly agree" carries the highest weight. On the other hand, if the statement is unfavorable toward the object, then "strongly disagree" carries the highest weight. Consequently, when scoring, the tallies on negative items would be reversed.

The criterion of internal consistency is commonly used as a method of selecting items for inclusion on a final Likert scale (Likert, 1932; Ferguson, 1981; Crano & Brewer, 1973; Anderson 1981 cited by Dwyer, E, 1993). The criterion of internal consistency is applied by correlating item scores with total scores. Any item with a non-significant item to total

correlation is eliminated from consideration for use in the final scale. Researchers agree that high correlations between scores on a particular item and total test scores suggest the item represents the attitude under study.

According to Hassan & Shrigley (1984) and Edwards (1957), another test of the validity of a particular item is the discriminating quality of the item. A positively written item is valid only if those individuals with a generally positive attitude toward the attitudinal object agree or strongly agree with the item and if those with a generally negative attitude disagree or strongly disagree with the item. The researchers cited above suggested establishing positive and negative criterion groups composed of subjects having the highest and lowest 27% of scores within the overall group being considered. Student t scores would then be calculated comparing the mean score for each criterion group. A significant difference in the mean scores of the two criterion groups would suggest that the item has discriminating quality. Here, based upon the total score, the respondents were organized in the descending order. The top 25 percent of the respondents with their total scores were considered as the high group and the bottom 25 percent as the low group, as these two groups provide criterion groups in terms of evaluating the individual statements as suggested by Edwards (1957). Thus out of 40 respondents, 10 respondents with lowermost and 10 respondents with uppermost scores were used as criterion groups to evaluate individual items. The critical ratio, that is the t value, which is a measure of how significantly a given statement could differentiate between the high and low groups of the respondents for each statement, was calculated by using the formula suggested by Edwards (1957).

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

Where:

X_H = The mean score on given statement of the high group

X_L = The mean score on given statement of the low group

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

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

$\sum X_H$ = Summation of scores on given statement for high group

$\sum X_L$ = Summation of scores on given statement for low group

n = Number of respondents in each group

$\sum$ = Summation

Selection of the statements for final scale:

After calculating the t value for all items, the statements with ‘t' values equal to or greater than 1.75 were finally selected and included in the attitude scale. It was observed that eighteen (18) statements (Table) were found to be having the' values more than 1.75. According to Edwards (1957), Likert suggested that the ‘t' value above 1.75 of any item was having high discriminating power which could be placed in the final attitude scale. Therefore, the attitude scale consisted of 18 items (12 positive and 6 negative statements) which were finally included in the study. Items not classified by the majority of judges as either positive or negative with regard to the attitudinal object are eliminated from consideration for use in the final scale

Table 2: Attitude of farmers towards IARI-Post office model after item analysis:

S. No.	**Statements/Items**	**“t” value**
1.	Seeds supplied through IARI-Post office model are of good quality.	4.25
2.	Seeds are not supplied in right time through the model.	3.93
3.	The model does not distribute required amount of seeds.	3.50
4.	The seeds, received through the model, do not help in increasing the yield.	3.05
5.	The model helped to reduce transaction cost in getting quality seeds	1.76
6.	Technologies given through this model is not suitable for the local area.	2.71
7.	Seeds supplied through this model are more credible (reliable) than purchased from other sources	2.70
8.	Participation in the model has improved my interaction with fellow farmers.	1.99
9.	I feel happy in participating in the model.	4.13
10.	I am willing to pay the cost for the technologies to sustain the model.	2.73
11.	The model has inspired the farmers to participate in demonstration of improved technologies.	2.39
12.	The model has inspired the farmers in participating in the training program.	1.94
13.	Branch postmaster is biased in selecting farmers for distribution of technology.	2.19
14.	The model helps us to know about modern agricultural practices	2.15

15.	Branch postmaster is not interested in collecting feedback from farmers.	2.54
16.	This model should continue in future.	4.26
17.	This model should be replicated for other technologies also.	3.84
18.	The Model reduced the uncertainty of farm regarding seed availability.	3.30

Note: SA-Strongly Agree, A-Agree, UD-Undecided, D–Disagree, SDA- Strongly Disagree

Reliability of the scale:

A scale is said to be reliable when it consistently produces the same or similar results when applied to the same sample at different time. The reliability of a test indicates the trustworthiness of scores obtained. The reliability of a test is an expression of both the stability and consistency of test scores (Cureton, 1958; Thorndike, 1966; Dick & Haggerty, 1971 cited by Dwyer, E, 1993). Reliability coefficient is represented by a numerical value between 0 and 1 reflecting the stability of the instrument. To compute reliability coefficients, four basic methods are generally used (Ferguson, 1981):

1. **Test-retest method** - The same test is administered to the same group of subjects twice (before-after) with administrations separated by an interval of time.
2. **Parallel-forms method** - An alternative test form is administered to the same group after a period of time.
3. **Split-half method** - A test is divided into two parts and two scores are obtained. The paired observations are correlated.
4. **Internal-consistency methods** – It is based on the average correlation among items and the number of items on a test.

Cronbach's alpha basically increases when the correlations between the items increase. For this reason the coefficient measures the internal consistency of the test. Its maximum value is 1, and usually its minimum is 0. Coefficient alpha is the basic formula for determining the reliability of test scores based on internal consistency for items not dichotomously scores (Nunnally, 1967).According to Cronbach (1951), the coefficient alpha ($\propto$) is the mean of all possible split-half coefficients which can result from different splitting of a test and can be used as an index of inter-item homogeneity. In simpler form, Cronbach's alpha is computed by correlating the score for each scale item with the total score for each observation (usually individual survey respondents or test takers), which comparing that to the variance for all individual item scores. Thus, Cronbach's alpha is a function of the number of items in a test,

the average covariance between pairs of items, and the variance of the total score. The resulting α coefficient of reliability ranges from 0 to 1 in providing this overall assessment of a measure's reliability. If all of the scale items are entirely independent from one another (i.e., are not correlated or share no covariance), then α = 0; and, if all of the items have high covariance, then α will approach 1 as the number of items in the scale approaches infinity. In other words, the higher the 'α' coefficient the more the items have shared covariance and probably measures the same underlying concept. Here, the Cronbach alpha value was 0.75 which indicated moderately high reliability in case of Social sciences. Here the reliability was tested by means of split-half method. The scale was administered to 40 non-sample respondents (other than the study area) and was divided into two halves based on odd and even number of statements. The total scores obtained for odd and even numbered items were subjected to correlation analysis. Pearson product moment correlation coefficient is obtained on the scores of even numbered items and the scores of odd numbered items. The resulting coefficient is the split half reliability. Based on the analysis, it was found that the split half reliability was 0.567. To adjust the split half reliability in to full test reliability, for example, on an 18 item test, 9 of the items would be correlated with the 9 other items with each set of correlated items having similar content. In effect, correlation would occur between paired scores based on scores from two 9 item tests. However, the reliability for the total 18 item test is needed. That's why; the use of the Spearman Brown (SB) formula approximates the reliability for the total test. One form of the Spearman Brown formula (Ferguson, 1981) is shown below:

$$r_{tt} = \frac{nr_{11}}{1 + (n\text{-}l)\, r_{11}}$$

Where n is the ratio of the number of items on the desired test to the number of items on the original test and r is the already obtained reliability for the partial test. The Spearman-Brown formula can also be utilized to estimate reliabilities obtained by the test-retest and alternate forms methods. Alternately, Spearman Browns prophecy formula can be used which as follows,

Reliability $= 2 \times r$ half test$1 + r$ half test

The full test (18 items) reliability was found to be 0.72 and found to be significant at one percent level of significance ($p<0.01$). Since the reliability value was more than 0.7, the scale was considered to be highly reliable.

Validity of scale:

Validity is an indication of how well a test measures what it was designed to measure (Garrett, 1937, 1947; Mehrens & Lehmann, 1980 cited by Dwyer, E, 1993). A test can be valid for one group but inappropriate for another. Validity involves gathering and evaluating information for determining how well test measures what its authors purport it measures. Although there are many procedures for determining validity, all aspects of validity are interrelated. Types of validity usually considered when instruments are developed for measuring psychological traits are: 1. Content, 2. Concurrent,3. Construct, and 4. Predictive (Wainer & Braun, 1988).Some of the other types of validity mentioned in the literature are . Face, 2. Curricular, and 3. Differential

1. **Content validity**: The following definition of content validity was offered by the American Psychological Association (1966, p. 12):

"The test user wishes to determine how an individual performs at present in a universe of situations that the test situation is claimed to represent." If test items are to have content validity, items should be representative of the characteristic being measured.

2. **Predictive and Concurrent Validity**: In describing predictive validity the American Psychological Association (1966, pg. 12) stated: The test user wishes to forecast an individual's future or to estimate an individual's present standing on some variable of particular significance that is different from the test. When tests correlate highly with subsequent performance, the tests are said to have predictive validity. Validation of this type sometimes takes a long period of time. Concurrent validity sometimes termed "immediate predictive validity," correlates a test in the process of being developed with scores obtained from previously established measures.

3. **Construct Validity**: In defining construct validity, the American Psychological Association (1966, pg. 12) stated: The test user wishes to infer the degree to which the individual possesses some hypothetical traitor quality (construct) presumed to be reflected in the test performance. Construct validity involves formulating a theory of relationships and cannot generally be expressed in terms of one coefficient.

4. **Face Validity**: This type of validity merely answers the question, "Does the test appear to measure what it purports to measure"?

5. **Curricular Validity**: Cronbach (1960) introduced the term "curricular validity. "This type of validity required determining if tests are representative of the instructional content and reflect goals of instruction.

6. **Differential Validity**: Anastasi (1986) defined differential validity as the difference between two correlation coefficients when one measure is correlated with two different measures. This

procedure is undertaken to determine what test measures and what it does not measure. It is popularly called as Known group method of validation.

7. **Computational Procedures**: In the case of "Reliability," several methods were given for approximating the reliability by correlation coefficient obtained by correlating a test in some manner with itself. Correlations can also approximate validity coefficients. When statistical procedures correlate a test (x) and some other external criterion (y), such as another test, then they become calculations of validity coefficients. Thus calculating validity coefficients with considerations concerning the choice of statistical procedures are found in works by Ferguson (1981), Guilford (1965), Wainer & Braun(1988), Edwards (1972), Nunnally (1967), Guilford (1954) and, Mehrens and Ebel (1967) cited by Dwyer, E, 1993.

Another procedure, factor-analysis, has been suggested by researchers as a useful indicator of the construct validity of scales (Oppenheim, 1966; Hassan & Shrigley, 1984; Gorsuch, 1974; and Mulaik, 1972 cited by Dwyer, E, 1993).Through the use of factor analysis, researchers can test how well statistical clustering of items match the intended construct groupings. These clusters of items which appear as a result of factor analysis can be examined to determine if they represent the component or subcomponents of the attitude under study.

8. **Innovations**: The Mantel-Haenszel procedure was proposed as a "practical and powerful way to detect test items that functioned differently in two groups" (Holland, 1985, pg. 129).This statistical application can be used to shed light concerning the effect of experiential background relative to subject reaction to test items.

Meta-analysis is another statistical innovation in validity assessment. In relationship to validity, meta-analysis is concerned with quantitative methods for combining evidence from different studies. Wainer and Braun (1988) explored information from a variety of sources concerning the calculation and merits of meta-analysis, including the empirical Baysian approach.

Here, the developed scale was verified for validity. Though there are different methods for which validity can be determined cited above, content validity was employed in this case. According to Kerlinger (1986), the content validity is the representative or sampling adequacy of the content, the substance, the matter and the topics of a measuring instrument. The content validity was determined by a group of experts. Since the items selected were from the universe of content, it was ensured that the items covered the various aspects of the attitude of the farmers towards IARI-Post office linkage extension model. The differential validity or commonly called as Known Group Method was used to test the construct validity of the instrument.

This method was applied to test whether the developed scale could discriminate between the individuals who have the favourable attitude towards IARI-Post office linkage extension model and those who do not have the favourable attitude towards IARI-Post office linkage extension model. The pilot testing exposed that the scale could differentiate the people having the favourable attitude from that of unfavorable attitude towards IARI-Post office linkage extension model. As the scale value difference for almost all the statements included had a very high discriminating value, it seemed reasonable to accept the scale as a valid measure of the attitude. Thus it ensured a fair degree of validity. The computational procedure also helped in ensuring higher validity through clustering items intended to measure different components by factor analysis.

Administration of the scale:

The final scale which would measure the attitude of farmers towards IARI-Post office linkage extension model consisted of 18 statements. Each statement would be noted on a five-point continuum as strongly Agree, Agree, Undecided, Disagree, Strongly Disagree with scores of 5, 4, 3, 2, and 1, respectively for positive statements. Reversed scoring would be done in the case of negative statements. The score would be obtained for each item and summed up. The maximum score would be 90 and the minimum score would be 18. These scores would be further converted into T-scores as described below

$T=50+10\ (X-xs\ )$

Where,

T= T score

X= Score of a given subject

x= Arithmetic mean of the distribution

s= Standard deviation of the distribution of the scores

Categorization of the respondents:

The respondents would be categorized as follows after getting the total attitude score based on the range values of the attitude score possible. Mean + 2 sd. The formula would be used for categorization.

Table: 3.4.3: Categorisation of respondents based on attitude

S. No.	Category
1	Least favourable attitude
2	Less favourable attitude
3	Favourable attitude

4	Highly favourable attitude
5	Very highly favourable attitude

Conclusion:

The standardized scale would have practical applicability in ascertaining the direction and intensity of attitude of farmers, scientists, resource partners or other stakeholders and, and thereby it facilitates to take right decisions by policy makers. It can be used extensively by further validating the scale in meeting several future innovative extension methods. The relevancy analysis points out that selected items are highly relevant statistically significant. The scale can be modified to measure the attitude of farmers towards other linkage mechanisms in the provision of agricultural extension services.

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