



Research Article

DEVELOPMENT OF A SCALE TO MEASURE THE PERCEPTION OF EXTENSION PERSONNEL TOWARDS AGRICULTURE TECHNOLOGY MANAGEMENT AGENCY (ATMA)

CHITHRA Y.D.* AND MANJUNATHA B.N.

Department of Agricultural Extension, University of Agricultural Sciences, Bangalore, 560065, Karnataka, India

*Corresponding Author: Email - chithra.chitru@gmail.com

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Abstract: The present study was contemplated to develop and standardize the scale to measure the perception of extension personnel towards ATMA. Likert and Edwards method were employed in development of scale. Based on review of literature and discussion with the experts, 46 statements were enlisted. These were mailed to 110 judges in the agricultural extension. Fifty-five judges were responded and from the data gathered, "Relevancy Percentage" and "Mean Relevancy Score" were worked out. The final scale comprising of 21 statements was standardized for administration. The scale developed was administered to 30 respondents in non-sample area for measuring perception. The results revealed that the reliability co-efficient and validity of the scale is found to be 0.8459 and 0.9197 respectively, which is higher than the standard value (0.70). It indicates the developed scale is found to be reliable and valid. Further, the results revealed that 46.66 percent of extension personnel had average perception towards ATMA followed by 30.00 and 23.34 percent had better and poor perception towards ATMA, respectively. The variables like age, education, innovative process, perception of work load and mass media participation were showed positive relationship with perception level at 5 percent level of probability, whereas experience in implementing ATMA and participation were showed significant relationship at 1 percent level of probability with perception of extension personnel towards ATMA.

Keywords: Perception, ATMA, Extension Personnel, Reliability and Validity, correlation

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Introduction

Agricultural Technology Management Agency (ATMA) is a Centrally Sponsored Scheme to provide support to State Extension Reforms was launched by ICAR during 1999. About a decade ago, to introduce reforms in the public sector agricultural extension system and to increase its relevance, accessibility, and efficiency of knowledge sharing among various players, actors and stakeholders, the Agricultural Technology Management Agency (ATMA) was introduced as a pilot basis (1998-2003) in 28 districts [1]. Following a positive feedback from the pilot implementation [2], the ATMA model was scaled up across 251 rural districts in 2005 and throughout the country in 2007 [3]. ATMA was implemented in the country under the Innovation Technology Dissemination component of NATP. ATMA is a registered society of key stakeholders (farmers, line/development departments, non-government organizations, input dealers, mass media, agri-business companies, farmers organizations, etc.) involved in agriculture activities for sustainable agricultural development in the district. It provides flexible working environment and establishes effective integration of all the stakeholders at the district level. Strategic Research and Extension Plan (SREP) is prepared by every district for implementing ATMA in respective districts. It prioritizes the research-extension strategies within the district and it becomes the basis for development work plans at block/district level. ATMA has been provided financial and operational flexibilities so that the extension agenda moves on the demand driven lines in a given agro-ecological situation. This block level extension apparatus has been re-organized accordingly by establishing farm information and advisory centres (FIACs). This provides an interdisciplinary advisory mechanism at this level. The farm advisory committees (FACs) consisting of the farmers in turn would provide their suggestions and feedback to these centres for making the

extension programmes farmer accountable [4]. The main function of ATMA is transfer of technology. The effectiveness of this project depends upon the adoption or rejection of new technology by farmers. The perception of the extension personnel towards ATMA has a critical role in its modernizing. With this background, the present study has been conceptualized with the following objectives.

1. To develop and standardize a scale to measure the perception of extension personnel towards the mechanism and activities of ATMA
2. To analyse the perception of extension personnel towards ATMA
3. To study the relationship between personal, socio-psychological and communication characteristics of extension personnel with their perception level

Methodology

Developing and Standardizing perception scale

Perception is operationally defined as an act of being aware of "one's environment through physical sensation about ATMA. In developing summated rating scale, the method suggested by Likert, (1932) and Edwards, (1969) [5,6] was followed in the construction of perception scale through six stages viz., identification of components, collection of items/statements, relevancy test, item analysis, reliability, and validity.

Procedure followed in development of scale

1. **Collection of items:** The first step in the construction of perception scale was to collect statements pertaining to the perception of the extension personnel.

Tentative list of 68 statements pertaining to the perception of the extension personnel towards ATMA were collected by the consultation of experts in the area, the resource personnel and from available literature relevant to the subject.

2. Editing of the items: These statements were edited as per the 14 criteria enunciated by Edwards (1969), Thurstone and Chave, (1929) [7] consequently 22 statements were eliminated. These statements were found to be non-ambiguous and non-factual. The remaining 46 statements were included for the construction of the scale.

3. Relevancy analysis: Forty-six statements were mailed to 110 experts in the agricultural extension and other related fields working in SAUs and ICAR institutions to critically evaluate the relevancy of each statement viz., Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR), Less Relevant (LR) and Not Relevant (NR) with the score of 5, 4, 3, 2, 1, respectively. The judges were also requested to make necessary modifications and additions or deletion of statements, if they desire so. A total of 55 judges returned the questionnaires duly completed were considered for further processing. From the data gathered, 'relevancy weightage', 'relevancy percentage' and "mean relevancy score" were worked out for all the 46 statements. Using these criteria individual statements were screened for relevancies using the following formulae.

$$R.W. = \frac{MR \times 5 + R \times 4 + NR \times 3 + SWR \times 2 + NR \times 1}{\text{No. of judges responded} \times \text{Maximum score}}$$

$$R.P. = \frac{MR \times 5 + R \times 4 + NR \times 3 + SWR \times 2 + NR \times 1 \times 100}{\text{No. of judges responded} \times \text{Maximum score}}$$

$$M.R.S. = \frac{MR \times 5 + R \times 4 + NR \times 3 + SWR \times 2 + NR \times 1}{\text{No. of judges responded}}$$

MR= Most relevant

R= Relevant

SWR= Somewhat relevant

LR= Less relevant

NR= Not Relevant

Maximum possible score = 230 (46x5)

Number of judges=55

Relevancy percentage was calculated by summing up the scores of most relevant and not relevant categories, which were converted into percentage. Accordingly, statements having 'relevancy percentage' of 75 percent and above mean relevancy score of 3.8 and above were considered for final selection. 28 statements were retained after relevancy test and these statements were suitably modified and written as per the comments of the judges wherever applicable.

Item analysis: For carrying out item analysis, two types of score used, these were the item score, referring to the score of an individual on an item and the total score referring to the summation of the item scores of an individual. These scores were used to arrive at the discrimination index. This index indicates the power of an item to discriminate the low effectiveness category from the high effectiveness category of the judges 25 percent of the subjects with the highest total score is compared with 25 percent of the lowest total scores. These two groups provided the criterion group for which item analysis was conducted and critical ratio was calculated by using the following formula.

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

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

$\sum X_H^2$ = 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 differentiate between the high and low group.

The critical ratio, that is the 't' value which is a measure of the extent to which a given statement differentiates between the high and low groups of judges for each statement was calculated. After computing the 't' value for all the statements, 21 statements with highest 't' value equal to or greater than 2.048 were finally retained in the scale.

Standardization of the scale

Reliability: The developed scale was administered to analyse the perception of 30 extension personnel who are working under ATMA in Ramanagara taluk of Ramanagara district. The split-half method was employed to test the reliability of the perception scale was found 0.733. The reliability co-efficient of the scale after applying spearman brown prophecy formula was found to be 0.84593, which is higher than the standard of 0.70, indicating higher reliability of the scale.

Half test reliability formula

$$r_{1/2} = \frac{N(\sum XY - (\sum X)(\sum Y))}{\sqrt{(N\sum X^2 - (\sum X)^2)(N\sum Y^2 - (\sum Y)^2)}}$$

Where,

$\sum X$ =sum of the socres of the odd number items

$\sum Y$ =sum of the scores of the even numbers 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

Validity: It refers to how well a scale measures what it is purported to measure. The validity of the scale was tested by content and statistical validity methods which was tested by content and statistical validity methods, which ensured during judges rating and statistical formula.

Content validity: According to Kerlinger, (1966) [8], it is the representatives or sampling adequacy of the content- the substance, matter and the topics of a measuring instrument. The item included in the scale was based on exclusive review of literature and expert's judgements. Therefore, it was assumed that the scale developed was valid with reference to inclusion of relevant contents of concepts under study.

Statistical validity: While construction of scale, statistical validity was worked out by relating perception score of 30 respondents. The validity co-efficient for scale was 0.9197, which was also statistically significant at one percent level of probability indicating the higher validity of the developed scale. Thus, the developed scale was confined of its validity to use in the sample area. The validity formula is as follows:

$$V = \sqrt{r}$$

The number of perception statements retained during various steps of scale construction is presented in [Table-1].

Table-1 Number of perception statements retained during various steps of scale construction

Steps	No. of perception statements	
	Statements considered	Statements retained
Collection of items	68	68
Editing of items	68	46
Relevancy analysis	46	28
Item analysis	28	21
Reliability and Validity	21	21
Administering the scale	21	21

Administering the scale: The final scale consists of 21 statements [Table-1] for determining the extension personnel's perception towards ATMA. Of which, fourteen are positive statements and the remaining seven statements are negative.

Table-2 Scale to measure the perception of extension personnel towards Agricultural Technology Management Agency (ATMA)

Sl.No.	Statements	RW	RP	MRS
1	ATMA is a registered society established for promoting convergence of all the stakeholders at district level.	0.8727	87.27	4.36
2	ATMA is not an extension reform aimed at farmers development	0.7686	76.86	3.92
3	ATMA is established to strengthen Research-Extension-Farmers linkages	0.9236	92.36	4.61
4	IDWG provides guidance to ATMA Governing Board (Steering Committee) for execution of activities at district level.	0.8727	87.27	4.36
5	Governing body of ATMA functions as a policy making body but not provides guidance in functioning of ATMA	0.7621	76.21	3.80
6	ATMA Governing Board does not reviews and guide for effective implementation of Strategic Research and Extension Plan (SREP)	0.7836	78.36	4.01
7	ATMA does not encourages agriculture lending institutions in the district to arrange required capital for farmers.	0.8123	81.23	4.12
8	SREP is prepared for implementation of ATMA	0.8218	82.18	4.22
9	SREP contains detailed analysis of farming systems existing in the district	0.8545	85.45	4.27
10	SWEP is an annual plan based on SREP	0.7818	78.18	3.90
11	SWEP contains cafeteria of activities to be implemented each year	0.7890	78.90	3.94
12	Block Development Team (BDT) helped district core team in upgrading of SREP	0.8010	80.10	4.01
13	Farm Information and Advisory Centre (FAIC) is an extension arm of ATMA	0.8545	85.45	4.27
14	Farm Advisory Committee helps in providing farmer feedback mechanism	0.8763	87.63	4.38
15	The Farmer Friend (FF) will serve as a vital link between extension system and farmers at village level	0.7672	76.72	3.83
16	ATMA involves in formation of Farmers' Advisory Committee [FACs] in each block to advise the Block Technical Team(BTT) in extension priorities	0.8120	81.20	4.12
17	Farmer-to-farmer extension support at the village level is promoted through Farmers' Group is not much active	0.8763	87.63	4.38
18	ATMA publishes literature on improved practices related to agriculture is difficult to understand for farmers	0.9070	90.70	4.21
19	ATMA extensively use mass media to create awareness about technologies and programmes is expensive	0.7819	78.19	3.89
20	ATMA envisages on Integrated Farming System	0.8509	85.09	4.25
21	ATMA does not helps in updating the market information through market intelligence	0.8741	87.41	4.32

Where RW= Relevancy weightage, RP= Relevancy percentage, MRS= Mean relevancy score

The response was collected on a five-point continuum, namely, strongly agree, agree, undecided, disagree and strongly disagree with assigned score of 5, 4, 3, 2, and 1, respectively for positive statements and vice versa for negative statements. Thus, the minimum and maximum score one could get is 21 and 105, respectively. Higher the perception score indicates the better perception of extension personnel towards ATMA and lesser the perception score indicates poor perception of extension personnel towards ATMA. The total perception score of each respondent was obtained by adding the weights of individual responses made to total scale items.

Results and Discussion

Overall perception of extension personnel towards ATMA

It is observed from the [Table-3] that a nearly half (46.66%) of respondents had average perception about ATMA programme whereas, 30.00 and 23.34 percent of the respondents had better and poor perception towards ATMA respectively. It can be inferred that as high as 76.66 percent of the extension personnel had average to better perception towards ATMA. The possible reason might be due to education level of extension personnel and also most of the respondents belong to young age people had better perception. Another reason might be activities in the SREP document became the generating force of enthusiasm and interest for extension personnel for over all development of the district. The results were in line with results of Olaniyi, *et al.*, (2011) [9] and Preeti, (2017) [10].

Table-3 Overall perception of extension personnel towards ATMA (n=30)

SN	Category	Criteria	Extension personnel	
			Number	Percent
1	Poor (Mean – 1/2*SD)	Up to 50.62	07	23.34
2	Average (Mean ± 1/2*SD)	>50.62 up to 52.37	14	46.66
3	Better (Mean + 1/2*SD)	>52.37	09	30.00
	Total		150	100

Mean= 51.5 SD=1.943

Relationship between personal, socio-psychological and communication characteristics of extension personnel with their perception level. In order to measure the relationship exists between the independent variables with perception of extension personnel, the correlation co-efficient were worked out

and tested for its statistical significance. The correlation co-efficient of 15 independent variables with the perception of extension personnel are presented in [Table-4]. It could be observed from the [Table-4] that the variables like experience in implementing ATMA and participation were showed significant relationship with perception of extension personnel towards ATMA at one percent level of probability. Whereas age, education, innovative process, perception of work load and mass media participation were showed positive relationship with perception level at five per cent level of probability [10-12].

Table-4 Relationship between personal, socio-psychological and communication characteristics of extension personnel with their perception level (n=150)

SN	Variables	Standard error	't' value
1	Age	2.190	0.122*
2	Educational status	2.683	0.256*
3	Rural urban background	2.433	0.074 ^{NS}
4	Experience in implementing ATMA	1.621	0.136**
5	Achievement orientation	0.534	0.041 ^{NS}
6	Organizational climate	1.145	0.023 ^{NS}
7	Innovative proneness	1.244	0.156*
8	Attitude towards Work	0.577	0.064 ^{NS}
9	Decision making Ability	1.218	0.016 ^{NS}
10	Job perception	1.894	0.037 ^{NS}
11	Job performance	0.531	0.090 ^{NS}
12	Job satisfaction	1.606	0.087 ^{NS}
13	Perception of work load	0.746	0.165*
14	Participation in training programme	2.234	0.189**
15	Mass media participation	2.276	0.256*

Conclusion

The developed scale was administered in non-sample area to analyse the perception of extension personnel towards ATMA. The scale developed is found to be reliable and valid hence, it is useful explicitly to measure the perception of extension personnel. Further, the results revealed that 46.66 percent of respondents were having average perception towards ATMA, whereas 30.00 percent and 23.34 percent of were having better and poor perception towards ATMA respectively.

The variables like age, education, innovative process, perception of work load and mass media participation were showed positive relationship with perception level at 5 percent level of probability, whereas experience in implementing ATMA and participation were showed significant relationship at 1 percent level of probability with perception of extension personnel towards ATMA which means that the government should concentrate more on these variables in order to improve the performance and effectiveness of ATMA and suitable training's has to be given for extension personnel in order to excel them in conducting the ATMA activities.

Application of research: This is a maiden and novel investigation through which the concept of perception of extension personnel towards ATMA is measured by developing a comprehensive scale of measurement. Further the developed scale will be used to assess the actual perception of extension personnel about ATMA can be estimated. The scale developed is reliable and valid and it can be used anywhere in estimation of perception of extension personnel.

Research Category: expost-facto research

Abbreviations:

ATMA- Agriculture Technology management Agency
SREP- Strategic Research and Extension Plan
IDWG- Inter departmental working group
SWEP- State Extension Work Plan

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