A SCALE TO MEASURE COMMUNICATION BEHAVIOUR OF KVK SCEINTISTS

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ABSTRACT

The present research study was conducted during 2021-22. In this study communication behaviour of scientists of KVK was studied. As a part of research work it was necessary to construct a scale for the purpose of study. Keeping this in view, an attempt has been made to develop a scale for measuring the communication behaviour. Method of summated rating scale by Likert (1932) was used. From all these sources tentative lists of 56 statements were prepared keeping in view of the applicability of statements suited to the area of study. The 56 statements collected were carefully edited and 44 statements were prepared in the form of questionnaire and was sent to experts. 38 statements out of 44 were selected through relevancy testing. After computing 't' values for all the 38 statements, statements with 't' values more than 1.75 were selected for the final scale. 32 statements with 't' value more than 1.75 were selected in the scale and final scale comprised of 32 statements to measure the communication behaviour of scientists of KVK.

Keywords: reliability, summated rating scale, communication behaviuor, scientists, kvk

INTRODUCTION

The information need of the farmers is diverse and they also search different sources for getting information on agriculture and scientists of KVKs were found as one of the important sources of knowledge of the farmers (Jamir and Sharma, 2018). It was observed that 88.33 per cent of the respondents perceived that the extension services implemented by Krishi Vigyan Kendra were useful to more useful for them regarding the dissemination of knowledge (Sarnaik *et al.*, 2020). Especially in areas with such a geographic complexity as India, agricultural extension departments such as KVKs serve to gather, test and disseminate knowledge between centralized institutions and a geographically-dispersed rural population.

The Head or Programme Coordinator and Subject matter specialists (SMSs) are the crucial human resource persons working for the fulfilment of the mandate framed for the KVK. The generated technology is disseminated to its end users by the Head or programme coordinator and SMSs using different programmes such as Front Line Demonstrations (FLD), On Farm Trials (OFT), Trainings, agricultural fairs, farmers advisory services, etc. Hence, for effective performance of the above programmes and various responsibilities undertaken by the scientists, communication is very much essential.

There are three systems involved in agriculture development process namely 'Research system', 'Extension system' and 'Client system'. The research system generates knowledge; the extension system disseminates the same to the farmers (Client system). Therefore, a constant flow of information from 'Research system' to 'Extension system' and there on to farmers is necessary for rapid agricultural development. This flow of information comprises information acquisition (input), information processing (processing), information dissemination (output) and feedback (response). It is only through communication that the external ideas, new information and new technologies enter the communities. This entails the extension personnel (KVK scientists) to have thorough understanding of the communication process. The extension worker cannot expect change among farmers unless he or she is able to communicate effectively to them. Hence, there is need to study the communication behaviour of the KVK scientists. Communication behaviour of the KVK scientists has been operationalized as the various activities undertaken by them for the development and dissemination of the improved agricultural information.

OBJECTIVE

To develop and standardize the scale to measure communication behaviour of scientists of KVKs

METHODOLOGY

Area of the study

The study was conducted in Western India consisting of Gujarat, Rajasthan, Maharashtra and Goa states.

Research design

The study was conducted under ***ex-post facto*** research design. It is systemic empirical enquiry in which the scientist does not have direct control over the independent variables because their manifestations have already occurred or they are inherently not manipulated (Kerlinger, 1969).

Sampling techniques

A random sampling technique was used for this study. The sampling technique is described as under.

Selection of states

All the states of the Western India *i.e.*, Gujarat, Rajasthan, Maharashtra and Goa were selected purposely for the study.

Selection of KVKs

All the KVKs of Gujarat, Rajasthan, Maharashtra and Goa were purposely selected for the study.

Selection of respondents

Considering the total number of KVKs in Western India, 160 respondents were selected for the study.

To measure the communication behaviour, scale construction has been done by sending the list of collected and finalized statements to 87 judges that comprised of scientists of State Agricultural Universities, Extension Education Institute (Anand), National Institute of Rural Development, MANAGE, NAARM and others through mailed questionnaire and google forms. Out of 87 judges, 58 judges responded by sending their judgements.

The scale has been developed by the following procedure. Method of summated rating scale developed by Likert (1932) which was followed by Vinaya *et al.* (2016) Yeragorla *et al.* (2021), Ravi and Patil (2022) was used to construct the communication behaviour of the KVK scientists.

The steps used in construction of communication behaviour scale were as follows

Definition of universe

The first step in the scale construction is to define the general area of universe of content. The class of all possible statements that could be made about a given psychological object is often called a universe. In the present study all the possible statements about 'Communication behaviour of KVK scientists' represent the universe.

Collection of items

Fifty six statements expressing the communication have been collected after thorough review of available literature, in consultation with the experts in the field of Agricultural Extension and the senior KVK scientists and they were edited on the basis of criteria suggested by Thurstone and Chave (1929), Likert (1932) and Edward (1957). Based on the screening, forty four items were finally selected which formed the universe of contents.

Relevancy weightage of the items

The forty four selected statements were then subjected to judge's opinion on a five-point continuum ranging from most relevant to least relevant. The list of statements was then sent to 87 judges that comprised of scientists of State Agricultural Universities, Extension Education Institute (Anand), National Institute of Rural Development, MANAGE, NAARM and others. Out of 87 judges, 58 judges responded by sending their judgements. The responses obtained from judges were subjected to Standard Normal Deviate test (z test). After giving the scores to the statements, 'z' values were calculated for each statement. Finally, the grand 'z' of all the 44 statements were obtained and '$\bar{z}$' was calculated. All the statements with 'z' values above $\bar{z}$ (0.00) were selected as the scalable statements of communication behaviour of KVK scientists. The statements with 'z' values below '$\bar{z}$' were eliminated. Thus, 38 statements out of 44 were selected through relevancy testing. The list of statements along with their 'z' values was given in Table 1.

Table 1: Selection of statements based on relevancy test

Sr. No.	Statements	'Z' values
A	**Information input behavior**	
1	I prefer considering of farmers' reaction or feedback. (+)	0.80
2	I used to interact with talented (senior) extension personnel for new farm information. (+)	1.99
3	I often discuss with colleagues to get current agricultural information. (+)	1.33

Sr. No.	Statements	'Z' values
4	I get new ideas through group discussions and meetings. (+)	-0.95
5	I am interested in listening to farm broadcast. (+)	1.51
6	I don't have a good rapport with Agri input and bank agencies. (-)	0.39
7	I wish to read farm journals (Periodicals) to find research findings. (+)	1.61
8	When I need information, I Visit Agri portals and websites. (+)	1.19
9	I refer various news published in local newspaper and believe them. (-)	-1.71
10	I try to watch other people's body language and facial expressions while communicating with them. (+)	0.72
11	I am not giving equal importance to verbal and non verbal language. (-)	1.25
12	I try to see the other person's point of view. (+)	0.81
13	I use Agri-mobile apps and expert system portals to get crop specific information. (+)	1.12
14	I follow social media (Facebook, WhatsApp and YouTube) to get information about modern farm technologies. (+)	1.26
15	I undergone training programmes and participates in workshop as a means to update the knowledge skills.(+)	1.57
B	**Information processing behaviour**	
16	Whatever the information I gets from other scientists, I accept it unreservedly. (-)	0.39
17	Before disseminating, new technology to farmers, I discuss with other scientists in the KVK. (+)	1.36
18	I never consider the economic and local flexibilities of information/ technology. (-)	0.49
19	I conduct a trail on farmer's fields to know the feasibility of technical information. (+)	0.20
20	I always judge new information/ technology in the light of past experiences. (+)	0.15
21	I preserve or keep the information for future use by maintaining in proper files. (+)	0.37
22	I prepare charts, graphs, posters etc. with the information for better communication. (+)	0.14
23	I recognize when two people are trying to say the same thing, but in different ways. (+)	0.42
24	I organize information in my head before speaking. (+)	1.89
25	Before I respond, I try to understand what another person is saying. (+)	1.73
26	I never rephrase what others says to me. (-)	0.33
27	I discuss with progressive farmers for new technology. (+)	-0.81
28	I add my personal experiences to the information which I received. (+)	1.82
29	I prepare lectures and power points of scientific information in local language which I received from different sources. (+)	2.17
30	I Judging by technology by the degree of complexity. (-)	-1.09
C	**Information output behvaiour**	
31	I disseminate farm information among farmers by participating farm broadcasts. (+)	0.74
32	I utilize training programmes as a means to dissiminate knowledge and skills. (+)	1.03
33	I use SMS/voice messages mails for sending information among farmers. (+)	0.77
34	I use my tone of voice to reinforce what I am trying to say. (+)	0.50
35	I prefer film shows mostly in all locations. (-)	-1.26
36	I wish to complete what I want to say rather than listening a person, he/she wish to say. (-)	0.81
37	I try to utilize my body language to reinforces what I am trying to say. (+)	1.54
38	When talking to someone, I try to maintain eye contact. (+)	0.56
39	I interrupt other people to speak before I forgot what I want to say. (+)	1.10
40	I recognize when a person is hearing to me, but not listening. (+)	1.63
41	I interact with farmers regularly over phone (+)	-0.33
42	On the basis my own experiences, I makes my friends to understand that I am getting what they are saying. (+)	0.05
43	I change the way of taking to someone based on my relationship with them (*i.e.*, farmer, friend, senior scientist, colleagues, *etc.*). (+)	0.66
44	I use most modern means of ICTs like WhatsApp, Facebook and other means to disseminate the information. (+)	1.03

IV) Calculation of 't' value

The scores of the individual statements were summed up to get the total scores of the respondents. Based on the total scores obtained, the respondents were arranged in descending order. The top 25 per cent of the respondents with their total scores were considered as the high group and the bottom 25 per cent as the low group, so as these two groups provide criterion groups in terms of evaluating the individual statements as suggested by Edwards (1957). Thus, out of 58 respondents to whom the items were administered for the

item analysis, 14 respondents with highest scores and 14 respondents with lowest scores were used as criterion groups to evaluate individual items.

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

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

$$\sum (X_H - \overline{X_H})^2 = X_H{}^2 - \frac{(\sum X_H)^2}{n}$$

$$\sum (X_L - \overline{X_L})^2 = \sum X_L{}^2 - \frac{(\sum X_L)^2}{n}$$

$\overline{X}_H$ = The mean score on a given statement for the high group

$\overline{X}_L$ = The mean score on a given statement for 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

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

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

n = Number of respondents for in each group

$\sum$ = Summation

After computing the 't' value for all the statements, statements comprising of twenty six positive and six negative statements with t value equal to or greater than 1.75 were finally selected and included in the scale developed to measure the communication behaviour of scientists of KVKs. There were 32 statements in the finalscale developed from 38 statements and mentioned in Table 2.

Table 2. Selection of statements based on 't' values

Sr. No.	Statements	't' values
A	**Information input behavior**	
1	I prefer considering of farmers' reaction or feedback. (+)	2.14
2	I used to interact with talented (senior) extension personnel for new farm information. (+)	2.99
3	I often discuss with colleagues to get current agricultural information. (+)	2.12
4	I am interested in listening to farm broadcast. (+)	1.82
5	I don't have a good rapport with Agri input and bank agencies. (-)	1.94
6	I wish to read farm journals (Periodicals) to find research findings. (+)	3.21
7	When I need information, I Visit Agri portals and websites. (+)	2.19
8	I try to watch other people's body language and facial expressions while communicating with them. (+)	2.11
9	I am not giving equal importance to verbal and non verbal language. (-)	1.25
10	I try to see the other person's point of view. (+)	1.81
11	I use Agri-mobile apps and expert system portals to get crop specific information. (+)	3.12
12	I follow social media (Facebook, WhatsApp and YouTube) to get information about modern farm technologies. (+)	2.26
13	I undergone training programmes and participates in workshop as a means to update the knowledge skills	2.73
B	**Information processing behaviour**	
14	Whatever the information I gets from other scientists, I accept it unreservedly. (-)	3.86
15	Before disseminating, new technology to farmers, I discuss with other scientists in the KVK. (+)	1.98
16	I never consider the economic and local flexibilities of information/ technology. (-)	2.09
17	I conduct a trail on farmer's fields to know the feasibility of technical information. (+)	2.37
18	I always judge new information/ technology in the light of past experiences. (+)	2.19
19	I preserve or keep the information for future use by maintaining in proper files. (+)	2.74
20	I prepare charts, graphs, posters etc. with the information for better communication. (+)	2.81
21	I recognize when two people are trying to say the same thing, but in different ways. (+)	0. 42
22	I organize information in my head before speaking. (+)	1.89
23	Before I respond, I try to understand what another person is saying. (+)	1.93

Sr. No.	Statements	't' values
24	I never rephrase what others says to me. (-)	2.33
25	I add my personal experiences to the information which I received. (+)	1.82
26	I prepare lectures and power points of scientific information in local language which I received from different sources. (+)	2.11
C	**Information output behvaiour**	
27	I disseminate farm information among farmers by participating farm broadcasts. (+)	2.24
28	I utilize training programmes as a means to dissiminate knowledge and skills. (+)	1.12
29	I use SMS/voice messages mails for sending information among farmers. (+)	2.77
30	I use my tone of voice to reinforce what I am trying to say. (+)	0.87
31	I wish to complete what I want to say rather than listening a person, he/she wish to say. (-)	1.99
32	I try to utilize my body language to reinforces what I am trying to say. (+)	2.07
33	When talking to someone, I try to maintain eye contact. (+)	2.29
34	I interrupt other people to speak before I forgot what I want to say. (+)	2.02
35	I recognize when a person is hearing to me, but not listening. (+)	1.63
36	On the basis my own experiences, I makes my friends to understand that I am getting what they are saying. (+)	0.95
37	I change the way of taking to someone based on my relationship with them (*i.e.*, farmer, friend, senior scientist, colleagues, etc.). (+)	2.66
38	I use most modern means of ICTs like WhatsApp, Facebook and other means to disseminate the information. (+)	2.38

Reliability of the scale

The reliability of the scale was determined by 'split-half' method (Garrett and Woodworth, 1973). The thirty two selected attitude items were divided into two equal halves by odd-even method (Singh, 2008). The two halves were administered separately to 50 extension personnel in a non-sample area. The score for each respondent were recorded separately for even and odd questions based on a five-point continuum of 'strongly agree', 'agree', 'undecided' 'disagree' and 'strongly disagree' was used as response categories. The scoring procedure adopted was as follows. The scoring was given for all the statements on a five point continuum method used by Ghasura *et al.* (2021). The score given for the positive statement were 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree respectively and the score was reversed for negative statements. Then scores were summed to get total score of each respondent. The scores were subjected to Pearson product-moment correlation coefficient (r) between the respondents scores on the even-numbered items and their scores on the odd-numbered items. The resulting coefficient is an estimate of the half-test reliability *i.e.*, the reliability of the odd-numbered items, or the even-numbered items, but not both combined. The value of r is **0.71** So, further the reliability coefficient of the whole test was computed using the Spearman-Brown prophecy formula because only half the number of items were used so the reliability coefficient was reduced hence in order to get a better estimate of the reliability of the full test, we apply this correction.

The formula of Spearman-Brown correction :

$$\rho = \frac{2 \times r \, half - test}{1 + r \, half - test}$$

The whole test reliability (rtt) was **0.86** According to Singh (2008), when the mean scores of the two groups are of narrow range, a reliability coefficient of 0.50 or 0.60 would suffice. Hence, the constructed scale was reliable as the rtt was greater than 0.60.

Content validity of the scale

It referred to the representativeness or sampling adequacy of the content of a measuring instrument (Kerlinger, 2008). The validity of the test dependents upon the fidelity with which it measures what is expected to measure. This method was used in the present scale to determine the 'content validity' of the scale. As the scale value differences for almost all statements included had a very high discriminating value, it seemed reasonable to accept the scale as a valid measure communication behaviour.

Administration of the scale

The scale thus met the reliability and validity test satisfactorily indicated its ability as an instrument for measuring communication behaviour. A five-point continuum of 'strongly agree', 'agree', 'undecided' 'disagree' and 'strongly disagree' was used as response categories. The scoring procedure adopted was as follows. The scoring was

given for all the statements on a five point continuum. The score given for the positive statement were 5, 4, 3, 2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree respectively and the score was reversed for negative statements. The total score of the respondent on the scale was obtained by summing up the scores of all the statements in the scale. The possible minimum and maximum score was 32 and 160. The scale met the reliability and validity test satisfactorily indicated its ability and validity test satisfactorily indicated its ability as an instrument for measuring the communication behaviour of the KVK scientists. This study aims at constructing a scale to measure the communication behaviour of the KVK scientists.

APPLICATION OF RESEARCH

The scientists of KVKs are the crucial human resource persons working for the fulfilment of the mandate framed for the KVKs. Communication behaviour of the KVK scientists has been operationalized as the various activities undertaken by them for the development and dissemination of the improved agricultural information. Measuring the communication behaviour of the KVK scientists is very much essential and need of the hour for more inclusion of recent Agri related information and technologies which will be measured with help of this developed and standardized Likert scale.

CONFLICT OF INTEREST

No conflict of interest among researchers.

REFERENCES

Edwards, A. L. (1957). Techniques of attitude scale construction. Appleton century crafts, Inc., New York. pp.79-98.

Ghasura, R. S., Durga Rani V. and Singh, R. R. (2021). A scale to measure dairy farmers awareness about climate change issues and its variability. *Guj. J. Ext. Edu.* 32 (1): 1-4.

Jamir, J. and Sharma, A. 2018. Socio-economic and constraint assessment of Krishi Vigyan Kendra training programme in Nagaland. *Int. J. Curr. Microbiol App. Sci.* 7(11): 1759-1770.

Kerlinger, F. N. 2008. Foundations of behavioural research. *Surjeet Publications 2nd edition.* pp. 379.

Likert, R. 1932. A technique for the measurement of attitude. Arch – *Psychology*. pp. 146.

Ravi, K. N and Patil S. L. 2022. A scale to measure core competency of extension field functionaries in land resource inventory-based watersheds. *Guj. J. Ext. Edu.* 33 (1):1-7.

Sarnaik, S. D., Bhople, P. P., Mankar, D. M. and Tekale, V. S. 2020. Perception of farmers towards effectiveness of extension services of KVK. *Ind. J. Ext. Edu*. 56(4): 43-48.

Singh, A. K. 2008. Tests, measurements and research methods in behavioural sciences. Tata McGraw-Hill Publishing Company Limited, New Delhi. pp. 153-165.

Thurstone, L. L. and Chave, E. J. 1929. The measurement of attitude. University of Chicago Press, Chicago. pp. 29-53.

Vinaya Kumar, H. M., Shivamurthy, M. and Biradar, G. S. (2016). A Scale to Measure climate-induced Crisis Management of Farmers in Coastal Karnataka (India). *Advances in Life Sciences.* 5 (16): 6206-6212.

Yeragorla, Venkata Harikrishna, Patel, J. B. and Vinaya Kumar, H. M. (2021) Development of a scale to measure the attitude of extension personnel towards e-extension. *Guj. J. Ext. Edu.* 32(1): 34-37.