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Development a Scale to Measure Impact of KVK Interventions on Socio-economic upliftment of Small Landholding Tribal Farmers

Sundarlal Alawa[1], Seema Naberia[2], S.R.K. Singh[3], R.S. Raghuvanshi[4], Umesh Singh[5], Sarita Singh[6], Ashutosh Singh Rajpoot[7] and Arpit Somtiya[8]*
[1]*Ph.D. Scholar, Department of Extension Education, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (Madhya Pradesh), India.*
[2]*Assistant Professor, Department of Extension Education, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (Madhya Pradesh), India.*
[3]*Director ICAR-ATARI, Zone-IX, Jabalpur (Madhya Pradesh), India.*
[4]*Professor and Head, Department of Agricultural Economics, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (Madhya Pradesh), India.*
[5]*Assistant Professor, Department of Agricultural Statistics and Mathematics, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (Madhya Pradesh), India.*
[6]*Scientist Agricultural Extension, Krishi Vigyan Kendra Chhindwara (Madhya Pradesh), India.*
[7]*Visiting Faculty at School of Studies in Agricultural Sciences, Vikram University Ujjain (Madhya Pradesh), India.*
[8]*Young Professional, ICAR-ATARI, Zone-IX (Madhya Pradesh), India.*

(Corresponding author: Arpit Somtiya)*
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ABSTRACT: A scale was developed to measure the Impact of KVK interventions on socio-economic upliftment of small landholding tribal farmers based on Likert's technique. A tentative list of 45 statements was drafted keeping in view the applicability of statements suited to the area of study. The statements collected were edited in the light of the informal criteria suggested by Edward (1969) for scale construction. These statements were framed in such a way that they expressed the socio-economic upliftment of small landholding tribal farmers. The score of each individual item on the scale was calculated by summing up the weights of the individual items. The statements were sent to 80 judges with a request to critically evaluate each statement and give their response in three-point continuum *viz.*, Most Relevant (MR), Relevant (R) and Not Relevant (NR) with unipolar scores 2, 1 and 0 respectively. Two types of tests where relevancy weightage and mean relevancy scores were worked out. The score of each individual item on the scale was calculated by summing up the weights of the individual items. On the basis of total score, 25 percent of the subjects with the highest total score and also 25 percent of the subjects with lowest total scores were taken assuming that these groups provided criterion groups in terms of high and low evaluated by the individual statement. In order to find out the discriminating index for each item, 't' value was calculated using the formula and procedure given by Edward and Kilpatrick (1957). The scale so developed finally consisted of 18 statements (9 for Social and 9 for economic) whose 't' values were found to be significant at five percent and one percent level of probability.

Keywords: socio-economic scale, continuum, reliability, validity.

INTRODUCTION

The Krishi Vigyan Kendra (KVK) was firstly come as a ICAR project and launched in 1974. The first KVK was established in Pondicherry under Tamil Nadu Agricultural University (TNAU) for testing and transferring the agricultural improved packages and practices to enhance farm production and productivity, provide vocational training to increase self-employment opportunities among the farming communities. The effectiveness of the KVK was further enhanced by their mandates as technology assessment and demonstration for its application (on-farm testing, Front-Line Demonstration) and capacity development of farm youth through vocational training. The training programme were designed to impart the latest knowledge to the farmers by applying the principles of 'Learning by Doing'. The prime goal of KVK is to impart training as per needs & interest in agriculture and allied sectors to farmers, farm women, small, marginal and landless laborer and farm youths including school drop-outs individuals of rural area.

Such vocational trainings help them to sustain themselves through self-employment and to make them self-reliant economically as well as socially and thus discourages them to migrate to the urban areas. KVKs provide training not only in agriculture and allied sectors but also in various other income generating activities that may alternatively source of income of farm families. KVK's are functioning by the collaborative efforts of scientists, subject matter specialist, extension workers and farmers. There are 731 Krishi Vigyan Kendra in India under 11 Agricultural Technology Application Research Institute (ATARI), which has been established to meet the mandates of KVK. In Madhya Pradesh total 54 KVK's are functioning under ATARI Zone-IX, Jabalpur. KVKs are actively engaged in dissemination of location-specific and need based technologies related to agriculture.

The socio-economic upliftment of small landholding tribal farmersinvolves in the implementation of strategies and initiatives to improve the well-being and opportunities of individuals who living in rural areas. It encompasses various aspects such as education, health, employment, gender equality, and community participation.

Among the techniques available for the construction of scale on Impact of KVK interventions on socio-economic upliftment of small landholding tribal farmers, the Likert's technique of summated rating scale is quite well known. The advantage of this technique above other methods of scale construction and standardization is the ease of scoring and ease of summarizing the information obtained. Likert's technique was used for constructing the scale onImpact of KVK interventions on socio-economic upliftment of small landholding tribal farmersto measure the socio-economic upliftment of respondents by KVK interventions. The details of the steps followed in the construction of Likert's (1932) type scale for measuring the socio-economic upliftment of small landholding tribal farmers have been discussed below:

METHODOLOGY

Item collection. In the item collection process, a pool of statements was collected from the review of literature as well as consultation with Agricultural scientists, Extension Experts, Farmers and Personal experience. A total of eighty-five (45) sets of statements were collected from the pool of scientific sources as well as information covering most of the areas related to a various aspect ofsocio-economic upliftment of tribal farmers.

The sets of forty-five (45) statements collected were subjected to screening using the fourteen (14) criteria suggested by Edwards (1969) for scale construction. Hence, the sets of thirty-two (32) statements that satisfied the scaling criteria were finally selected from the pool of items collected.

Relevancy Test. The statements prepared and collected may not be relevant equally in measuring the socio-economic upliftment of tribals farmers. So, these statements were scrutinized 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 different ICAR research institutes and SAUs. Also, the scientists of KVKs 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 three-point continuum *viz.,* Most Relevant (MR), Relevant (R)and Not Relevant (NR) with unipolar scores 2, 1 and 0 respectively.

Out of 80 judges, only 50 responded in two months. The relevancy score of each item was established by adding the scores on the rating scale for all the 50 judges' responses. From these data 2 types of tests where relevancy weightage and mean relevancy scores were worked out for all the statements by using different formulas.

a. Relevancy Weightage (R.W.): Relevancy Weightage was obtained by the formula.

$$RW = \frac{MR + R + SWR + LR + NR}{MPS}$$

b. Mean Relevancy Score (M.R.S.): M.R.S. was obtained by the following formula.

$$MRS = \frac{MR + R + SWR + LR + NR}{N}$$

Where

MR = Most Relevant

R = Relevant

SWR = Somewhat relevant

LR = Least Relevant

NR = Not Relevant

PS = Maximum possible score (50×2=100).

N = Number of judges (50).

The screening statements having relevancy weightage >0.70 and a mean relevancy score >1.38 were considered for the final selection of statements. Also, repetition and duplication type statements opined by judges were relooked. By this process out of a total of 32 statements, 14 statements were discarded and finally, 18 statements have remained for further item analysis which is depicted in Appendix. Among those thirty-two (32) statements, rephrasing and shortening of lengthy statements were also made according to the juries' opinion to create a solid item pool for the final scale (Thangjam *et al.,* 2024).

Table 1: socio-economic upliftment with Relevancy Weightage and Mean Relevancy Score.

Sr. No.	Statement regarding socio-economic upliftment of small landholding tribal farmers	RW	MRS	Selected / Rejected
A.	**social upliftment**			
1.	KVK initiatives have strengthened social well-being and community cohesion among the tribal farmers by promoting knowledge-sharing, networking, and collaboration within the farming community.	0.91	1.82	Selected
2.	Through KVK interventions, tribal farmers have improved access to educational resources and information related to modern farming practices.	0.85	1.7	Selected
3.	KVK has not played role in increasing tribal farmers' awareness and access to modern farming practices and technologies.	0.3	0.6	Rejected
4.	Tribal farmers involved in KVK initiatives result in increased sense of empowerment, self-confidence, and decision-making processes related to agriculture.	0.78	1.56	Selected
5.	Tribal farmers' participation in community-based agricultural and development initiatives has increased because of Krishi Vigyan Kendra interventions.	0.84	1.68	Selected
6.	KVK has played a vital role in reducing social disparities and discrimination faced by tribal farmers within their communities.	0.76	1.52	Selected
7.	Access to education and healthcare services for tribal farmers has improved through KVK initiatives, leading to increased social well-being	0.66	1.32	Rejected
8.	As a result of KVK interventions, tribal farmers have developed stronger social bonds with fellow farmers, leading to increased collective decision-making and problem-solving.	0.69	1.38	Rejected
9.	The level of participation of tribal farmers in local governance has increased due to KVK initiatives.	0.77	1.54	Selected
10.	Due to KVK initiatives, tribal farmers have become increasingly involved in the establishment of Self-Help groups, Farmer Producer Organizations (FPOs), and Community Interest Groups (CIGs).	0.83	1.66	Rejected
11.	Adoption of KVK-recommended practices has made farming more difficult for tribal farmers.	0.4	0.8	Rejected
12.	Tribal farmers' access to information and knowledge-sharing networks has expanded through Krishi Vigyan Kendra interventions.	0.76	1.52	Selected
13.	Tribal farmers reported an enhanced understanding of sustainable farming practices after participating in Krishi Vigyan Kendra programs.	0.74	1.48	Selected
14.	The level of food security among tribal farmers has been deteriorating due to Krishi Vigyan Kendra initiatives.	0.38	0.76	Rejected
15.	Tribal farmers' ability to adapt to changing climate conditions has improved because of Krishi Vigyan Kendra support.	0.73	1.46	Selected
16.	Krishi Vigyan Kendra interventions have contributed to a reduction in rural-to-urban migration among tribal farmers.	0.63	1.26	Rejected
17.	Tribal farmers' overall satisfaction with Krishi Vigyan Kendra interventions is very low.	0.35	0.7	Rejected
B.	**Economic Upliftment**			
1.	KVK interventions have made a positive impact on their family's financial stability.	0.74	1.48	Selected
2.	KVK's interventions have facilitated the tribal farmers' access to financial services and credit options for agricultural investment.	0.66	1.32	Rejected
3.	Farmers' access to government schemes and subsidies related to agriculture has increased through Krishi Vigyan Kendra support.	0.75	1.5	Selected
4.	Participation of farmers in KVK interventions has contributed to a reduction in income inequality among the farmers in the target region	0.53	1.06	Rejected
5.	KVK interventions have led to an increase in farm productivity and crop yields, resulting in higher income for farmers.	0.77	1.54	Selected
6.	KVK interventions have not helped the tribal farmers in crop	0.27	0.54	Rejected

	diversification, resulting to decreased income stability			
7.	KVK's guidance has encouraged the tribal farmers to explore and invest in alternative income sources outside of farming as livestock rearing or agri-business ventures.	0.73	1.46	Selected
8.	With KVK's guidance, farmers have been able to save more and invest in long-term agricultural improvements.	0.71	1.42	Selected
9.	Farmers have better access to markets for selling their agricultural produce, leading to procurement of better prices because of KVK's assistance	0.69	1.38	Rejected
10.	KVK has been encourage the tribal Farmers to adopt value added agricultural activities as (e.g., grading, processing, marketing) which ensure more income of farmers.	0.8	1.6	Selected
11.	The income generated from KVK-supported farming practices has allowed tribal farmers to invest in diversifying their sources of income, such as livestock rearing or agri-business ventures	0.69	1.38	Rejected
12.	KVK initiatives introduced the tribal farmers to innovative farming methods, which had positively impacted their income.	0.8	1.76	Selected
13.	Tribal farmers feel that their overall economic well-being has improved significantly due to KVK's initiatives	0.69	1.38	Rejected
14.	KVK interventions have helped the tribal farmers in reducing their outstanding agricultural debts.	0.71	1.42	Selected
15.	Through KVKs' guidance, the tribal farmers adopted more efficient farming techniques which reduces the costs of farming so thereby agricultural activities become more economically sustainable and increase the farm profitability.	0.73	1.46	Selected

Item Analysis (Calculation of t-value). Item analysis is a critical step for the construction of a valid and reliable scale by using Likert's technique of socio-economic upliftment measurement. The final eighteen (18) statements after the relevancy test were subjected to item analysis to delineate the items based on the extent to which they can differentiate the respondents with most relevant, 'somewhat relevant' and not relevant from the respondents towards socio-economic upliftment of small landholding tribal farmers. For these, a pilot survey was conducted in non-sample areas of KVK intervention. These were administered to 40 farmers during the pilot survey. The data were collected through the personal interview method. They were asked to designate their degree of relevant to un-relevant for each statement on a three-point continuum ranging from 'most relevant', 'somewhat relevant' and 'not relevant' with a score of 2, 1 and 0 respectively for positive statements and vice-versa for negative statements. The upliftment score of a respondent was obtained by summing the score of all items, thus total score obtained by each respondent was calculated.

Computation of 't' value: For the computation of "t" value, the respondents were arranged in descending order based on the total individual score. 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 these two groups provide criterion groups in terms of evaluating the individual statements as suggested by Edward and Kilpatrick (1957). Thus, out of 40 farmers to whom the items were administered for the item analysis, 10 farmers with the lowest, and 10 with the highest scores were used as criterion groups to evaluate individual items. 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 the respondents for each statement was calculated by using the formula suggested by Edward and Kilpatrick (1957).

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

Where,

$$\sum(X_H-\bar{X}_H)^2=\sum(X_H)^2-\frac{(\sum X_H)^2}{n}$$

$$\sum(X_L-\bar{X}_L)^2=\sum(X_L)^2-\frac{(\sum X_L)^2}{n}$$

$\bar{X}_H$ = Mean score of given statement in High group

$\bar{X}_L$= Mean score of given statement in Low group

$\sum(\bar{X}_H)^2$ = Sum of squares of the individual score on a given statement for the High group

$\sum(\bar{X}_L)^2$ = Sum of squares of the individual score on a given statement for the 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

Final selection of item: The critical ratio ('t' value) of each statement was calculated for the final selection of items. Items or statements were selected on the basis 't' value greater than 1.75 as of this 't' value significantly differentiating between high and low groups of items. Therefore, all 18 statements were retained in the final scale for measuring the Impact of KVK interventions on socio-economic upliftment of small landholding tribal farmersas shown in table given below.

Table 2: Scale statements of socio-economic upliftment with 't' values.

Sr. No.	Statement regarding socio-economic upliftment of small landholding tribal farmers	T-Value
A.	**Social upliftment**	
1.	KVK initiatives have strengthened social well-being and community cohesion among the tribal farmers by promoting knowledge-sharing, networking, and collaboration within the farming community.	4.24
2.	Through KVK interventions, tribal farmers have improved access to educational resources and information related to modern farming practices.	3.89
3.	Tribal farmers involved in KVK initiatives result in increased sense of empowerment, self-confidence, and decision-making processes related to agriculture.	3.77
4.	Tribal farmers' participation in community-based agricultural and development initiatives has increased because of Krishi Vigyan Kendra interventions.	8.95
5.	KVK has played a vital role in reducing social disparities and discrimination faced by tribal farmers within their communities.	3.53
6.	The level of participation of tribal farmers in local governance has increased due to KVK initiatives.	2.00
7.	Tribal farmers' access to information and knowledge-sharing networks has expanded through Krishi Vigyan Kendra interventions.	4.53
8.	Tribal farmers reported an enhanced understanding of sustainable farming practices after participating in Krishi Vigyan Kendra programmes.	5.66
9.	Tribal farmers' ability to adapt to changing climate conditions has improved because of Krishi Vigyan Kendra support.	3.40
B.	**Economic Upliftment**	
1.	KVK interventions have made a positive impact on their family's financial stability.	4.53
2.	Farmers' access to government schemes and subsidies related to agriculture has increased through Krishi Vigyan Kendra support.	5.47
3.	KVK interventions have led to an increase in farm productivity and crop yields, resulting in higher income for farmers.	3.08
4.	KVK's guidance has encouraged the tribal farmers to explore and invest in alternative income sources outside of farming as livestock rearing or agri-business ventures.	2.55
5.	With KVK's guidance, farmers have been able to save more and invest in long-term agricultural improvements.	2.61
6.	KVK has been encourage the tribal Farmers to adopt value added agricultural activities as (e.g., grading, processing, marketing) which ensure more income of farmers.	4.37
7.	KVK initiatives introduced the tribal farmers to innovative farming methods, which had positively impacted their income.	3.53
8.	KVK interventions have helped the tribal farmers in reducing their outstanding agricultural debts.	1.80
9.	Through KVKs' guidance, the tribal farmers adopted more efficient farming techniques which reduces the costs of farming so thereby agricultural activities become more economically sustainable and increase the farm profitability.	2.78

Standardization of the scale: For standardization of the present scale, reliability and validity were ascertained using the split-half method and content validity, respectively.

Reliability of scale: Reliability of the testing instrument is the ability to give consistent, stable and accurate measurement scores in repeated testing with the same scale. The reliability of the present scale was calculated by using the split-half method in which a scale is divided into two halves based on an even and an odd number of statements. The Pearson product-moment correlation between odd and even scores was 0.73. This coefficient indicates the split-half reliability of the scale. To adjust the split-half reliability into full test reliability, Spearman-Brown's (1910) prophecy formula was used which is as follows;

$$R = \frac{2r}{1+r}$$

Where,

R= Reliability coefficient of the whole scale

r = Estimated correlation between two halves (Pearson r)

The whole test reliability was found to be 0.84 and found to be significant at a 1 per cent level of significance. The split-half method is a popular method of assessing the reliability of a test primarily for the advantage of the single administration of the test and use of one sample. The main limitation of the Split half method has been that it does not provide the same information as the correlation between two forms given at different times (Cronbach, 1949). A solution to the problem is provided by Cronbach's alpha which is interpreted by many researchers as the average of all possible split-half correlations (Cortina, 1993). Cronbach's alpha also assumes that average covariance among non- parallel items is equal to the average covariance among all parallel items. Thus, in the present study standardized Cronbach's alpha was also used to get more stability and accuracy with the following formula:

$$\text{Standardize} = \frac{Kr}{[1+(K-1)r]}$$

Where, K = Number of items in scale

r = Mean of the K (K-1)/2 non-redundant correlation coefficients

The value of Cronbach's alpha calculated and found to be 0.813 which means scale is consistent in measurement.

Validity of scale: Validity means the ability of any instrument to measure what one intended to measure. The developed scale was tested for content validity. According to Kerlinger (1987), the content validity of the scale is the representative or sampling adequacy of the content, the substance, the matter and the topics of a measuring instrument. The content validity of the scale was determined by a group of experts. Since the items selected were from the universe of content, it was ensured that items covered the various aspects of 'impact of KVK intervention on socio-economic upliftment of small landholding tribal farmers.

The content validity method was applied to test whether the developed scale could discriminate between the individuals who have most relevant towards socio-economic upliftment of small landholding tribal farmersand those who do not. The pilot testing exposed that the scale could differentiate the individuals having most relevant opinion from that with not relevant opinion towards socio-economic upliftment of small landholding tribal farmers. 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 thesocio-economic upliftment. Thus, it ensured a fair degree of validity.

Administration of the scale: The final scale which would measure the 'impact of KVK intervention on socio-economic upliftment of small landholding tribal farmers'consisted of 18 statements. The scale was administered on three-point continuums *viz.*, 'most relevant', 'somewhat relevant' and 'not relevant' with a score of 2, 1 and 0 respectively for positive statements and reverse scoring for negative statements.

Table 3: Final Scale statements to measure the impact of KVK on socio-economic upliftment of small landholding tribal farmers.

Sr. No.	Statement regarding socio-economic upliftment of small landholding tribal farmers	Most Relevant	Somewhat Relevant	Not Relevant
A.	**Social upliftment**			
1.	KVK initiatives have strengthened social well-being and community cohesion among the tribal farmers by promoting knowledge-sharing, networking, and collaboration within the farming community.			
2.	Through KVK interventions, tribal farmers have improved access to educational resources and information related to modern farming practices.			
3.	Tribal farmers involved in KVK initiatives result in increased sense of empowerment, self-confidence, and decision-making processes related to agriculture.			
4.	Tribal farmers' participation in community-based agricultural and development initiatives has increased because of Krishi Vigyan Kendra interventions.			
5.	KVK has played a vital role in reducing social disparities and discrimination faced by tribal farmers within their communities.			
6.	The level of participation of tribal farmers in local governance has increased due to KVK initiatives.			
7.	Tribal farmers' access to information and knowledge-sharing networks has expanded through Krishi Vigyan Kendra interventions.			
8.	Tribal farmers reported an enhanced understanding of sustainable farming practices after participating in Krishi Vigyan Kendra programmes.			
9.	Tribal farmers' ability to adapt to changing climate conditions has improved because of Krishi Vigyan Kendra support.			
B.	**Economic Upliftment**			
1.	KVK interventions have made a positive impact on their family's financial stability.			
2.	Farmers' access to government schemes and subsidies related to agriculture has increased through Krishi Vigyan Kendra support.			
3.	KVK interventions have led to an increase in farm productivity and crop yields, resulting in higher income for farmers.			
4.	KVK's guidance has encouraged the tribal farmers to explore and invest in alternative income sources outside of farming as livestock rearing or agri-business ventures.			
5.	With KVK's guidance, farmers have been able to save more and invest in long-term agricultural improvements.			
6.	KVK has been encourage the tribal Farmers to adopt value			

	added agricultural activities as (e.g., grading, processing, marketing) which ensure more income of farmers.			
7.	KVK initiatives introduced the tribal farmers to innovative farming methods, which had positively impacted their income.			
8.	KVK interventions have helped the tribal farmers in reducing their outstanding agricultural debts.			
9.	Through KVKs' guidance, the tribal farmers adopted more efficient farming techniques which reduces the costs of farming so thereby agricultural activities become more economically sustainable and increase the farm profitability.			

Therefore, the overall possible score of the individual respondent towards 'impact of KVK intervention on socio-economic upliftment of small landholding tribal farmers' could range from 00 to 36. Based on the theoretical range of scores three categories were formulated

Table 4: Categorization of knowledge score.

Sr. No.	Categories	Score
1.	Low	00 to 12
2.	Medium	13 to 24
3.	High	25 to 36

CONCLUSIONS

The socio-economic upliftment scale developed in this study aids in measurement of socio-economic upliftment of tribal farmers by adopting recommended KVK intervention. The socio-economic upliftment of small landholding tribal farmers involves in the implementation of strategies and initiatives to improve the well-being and opportunities of individuals who living in rural areas. It encompasses various aspects such as education, health, employment, gender equality, and community participation. Out of 32 statements, 18 statements were retained on the final scale. The reliability and validity of the scale indicates its precision and consistency of the results (Jaisridhar *et al*., 2013). The final socio-economic upliftment of small landholding tribal farmers scale developed in this study and can be administered to farmers with suitable modifications in further studies for determining the socio-economic upliftment of small landholding tribal farmers by adopting KVK interventions.

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