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# A Scale to Measure the Attitude of Organic Farmers towards Paramparagrat Krishi Vikas Yojana

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***Authors' contributions***

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## ABSTRACT

Organic farming is considers as the medium and long term effect of agricultural interventions on the agro ecosystem. A scale has been developed for the study of attitude of organic famers towards PKVY. Attitude is a behavioural construct that cannot be measured by a single variable, hence there arise a need for developing a standardized instrument for its measurement. A method of Equal-Appearing Intervals was used to construct the attitude scale. A total of 60 attitude statements about PKVY scheme expressing varied degree of favourableness were collected and modified based on the Edward's criteria. These statements were subjected to judge's opinion by agricultural extension scientists of State Agricultural Universities and ICAR Research Institutes and field level extension workers. Based on expert's response a standardized scale has been developed with 10 statements which are having universe of content, uniform distribution of scale values along the psychological continuum and high scale "S" values and lower Interquartile range "Q" values and more or less equal number of favourable and unfavourable attitude items. The selected statements were tested with validity and reliability.

*Keywords: Attitude; organic farming; equal – appearing scale; s value; q value.*

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## 1. INTRODUCTION

Agriculture plays a crucial role in the part of Indian economy. Chemical use has increased under intensive cultivation, disrupting the balance between soil, plant, and human health. Chemical additives are being used by farmers to increase crop productivity, but this is just destroying the environment. Farmers were confronted with a slew of socioeconomic issues, particularly small farmers who were more excluded due to a lack of access to foreign inputs. The frequent application of harsh and hazardous chemicals has depleted their soil. Organic farming's goal is to improve or maintain the overall quality and health of the soil ecosystem [1,2]. Agriculture's long-term viability is dependent on fruitful soil. During the last several decades, many research have focused on improving output and protecting environmental quality under various farming systems, and those studies show that employing organic fertilizers in organic farming has increased crop yields and enhanced food security around the world [3,4]. Organic food and farming have continued to grow across the world. Since 1985, the total area of farmland under organic production has been increased steadily over the last three decades [5].

In India, organic farming is still in its infancy. According to the Union Ministry of Agriculture and Farmers' Welfare, about 2.78 million hectares of cropland were under organic agriculture in March 2020. This represents 2% of the country's total net sown area of 140.1 million ha. The "Paramparagat Krishi Vikas Yojana" (PKVY) scheme is an extended component of Soil Health Management (SHM) of major project National Mission of Sustainable Agriculture (NMSA). Organic farming is encouraged under the PKVY scheme through the adoption of an organic village cluster strategy and PGS certification. To expand the importance of the PKVY scheme in enhancing organic farming, it is vital to understand organic farmers' attitudes regarding the scheme. In this instance, the study was designed with the objective to develop a scale to measure the attitude of organic farmers towards PKVY scheme.

## 2. METHODOLOGY

Thurstone and Chave (1927) devised the equal seeming interval scaling technique, which was used to create the attitude scale . Initially, a set of items and statements related to organic farmers' attitudes toward PKVY scheme were gathered and developed based on a review of the literature, consultation with experts from State Agricultural Universities and ICAR Research Institutes, as well as the researcher's field experience [6,7]. A preliminary list of 100 statements was created with the application of statements relevant to the study topic in mind. The statements gathered were carefully vetted using Edwards' 14 informal criteria (1957). The statements were carefully edited to ensure that they could measure what was meant. As a result, there are 60 statements in all.

### 2.1 Calculations of Scale and Q Values

The data obtained from 30 subjects for each statement are arranged in table as frequency and proportions in the first and second row respectively. The proportions are obtained by dividing each frequency by the total number of subjects. The ‘S’ and ‘Q’ values given in scale were judged on the basis of 30 respondent’s opinion and equal appearing interval which were computed by calculating the median value (S) and their inter quartile range (Q). The objective was to have small number of statements evenly placed on the continuum. The median value is considered as scale value and it was calculated by using following formula.

$$S = l + \frac{0.50 - \sum Pb}{Pw} \text{ i}$$

Where,

S = the median or scale value
l = the lower limit of the interval in which the scale value falls
Pb = the sum of the proportion below the interval in which the scale value falls
Pw = the proportion within the interval in which the scale value falls
I = the width of the interval and it is assumed to be equal to 1.00

$$Q = C75 - C25$$

Q = inter quartile range; C75 = 75th centile; C25 = 25th Centile

$25^{th}$ centile = $C25 = l + \frac{0.25 - \sum Pb}{Pw}$ i

$75^{th}$ centile = $C75 = l + \frac{0.75 - \sum Pb}{Pw}$ i

**Table 1. Universe of statements related to the attitude of farmers towards PKVY scheme**

| S. No. | Statements |
|---|---|
| 1. | PKVY scheme provides possible solutions to the organic farmers |
| 2. | Consumption of organic products from PKVY scheme has improved the health |
| 3. | The cluster approach by PKVY strengthens farmers who practice organic farming |
| 4. | PKVY promotes chemical free methods for crop cultivation |
| 5. | PKVY ensures certification in Participatory Guarantee System (PGS – India) |
| 6. | PKVY integrates farmers with traditional resources to promote organic farming |
| 7. | PKVY does not focus on building up soil fertility |
| 8. | PKVY has improved the income of the practioners |
| 9. | Direct market linkages possible through PKVY |
| 10. | PKVY helps farmers in certification of their organic products |
| 11. | PKVY promotes the production of botanical pesticides |
| 12. | Transparency in selecting the Lead Resource Person |
| 13. | PKVY is a potential scheme to reach the needy organic farmers |
| 14. | PKVY paves the way for farmers with organic ideologies |
| 15. | PKVY involves complex procedures in enrollment for organic certification |
| 16. | Only resourceful farmers can be enrolled in PKVY scheme |
| 17. | The demand for organic products among consumers has been met out by PKVY |
| 18. | Specific technologies for irrigated and rainfed situations are suggested by PKVY |
| 19. | Difficulties during registration are faced by the farmers on PKVY scheme |
| 20. | PKVY is a farmer friendly approach |
| 21. | Cost of cultivation is reduced by PKVY |
| 22. | Domestic production of organic products is increased |
| 23. | Organic certification is made possible through PKVY scheme |
| 24. | Training programmes conducted under PKVY on organic production practices were effective |
| 25. | Demonstrations conducted under PKVY are not able to be followed by the organic farmers |
| 26. | Exposure visits are useful in observing the benefits of successful farmers |
| 27. | Delayed release of funds for PKVY scheme |
| 28. | Increased in purchase of organic inputs (GLM, FYM, compost and organic seeds) under PKVY |
| 29. | Awareness on biological nitrogen harvesting plants are created by PKVY |
| 30. | Natural pest control agents like Neem oil are not promoted by PKVY |
| 31. | Purchase on chemical fertilizers and pesticides are increased after enrolling in PKVY |
| 32. | Poor identification of potential crops and locations by PKVY |
| 33. | PKVY has encouraged the involvement of private companies in marketing with huge profit |
| 34. | The PGS – India web portal enables huge profit for farmers to track their products easily |
| 35. | There is nothing new in PKVY scheme |
| 36. | PKVY won't make any difference in the farming community |
| 37. | The process involved in PKVY complex in nature |
| 38. | PKVY improves the socio- economic status of the farming community |
| 39. | Relative advantage of PKVY is very less than other related schemes |
| 40. | The subsidies of PKVY scheme is not sufficient |
| 41. | PKVY scheme provides potential market for the produce |
| 42. | PKVY scheme helps in promoting organic farmers |
| 43. | PKVY scheme motivates natural resource mobilization |
| 44. | PKVY scheme helps to produce residue- free products |
| 45. | PKVY scheme encourage mobilization of farmers and local people to form as groups |
| 46. | PKVY helps to avail farm implements through custom hiring centres |
| 47. | Under PKVY scheme assistance availed timely to the beneficieries |
| 48. | The process of product certification is too lengthy |
| 49. | Meetings and discussions are conducted periodically |
| 50. | Trainings conducted are based on assessed needs of the farmers |

| S. No. | Statements |
|---|---|
| 51. | Periodical evaluations are done on the fields of cluster farmers to provide suggestions |
| 52. | PKVY scheme encourages the group based approach |
| 53. | Timely subsidies are provided on soil sample testing |
| 54. | Online registration of farmers is an easy process |
| 55. | PKVY scheme will promote organic products production commercially |
| 56. | PKVY have not provide efficient support for farmers to adopt organic farming |
| 57. | Limited support from PKVY to farmers in adopting organic methods. |
| 58. | PKVY degrading the organic farming |
| 59. | I am willing to pay for organic farming certification |
| 60. | PKVY is in line with the needs and problems of organic farmers |

*(MUF- Most Unfavourable; UF- Unfavourable; N- Neutral; F-Favourable; MF- Most Favourable)*

When there is good agreement among the subjects in judging the degree of favourableness of a statement, Q value will be small. A large Q value indicates disagreement among the judges as to the degree of attribute possessed by a statement and it is, therefore, taken as an indication that there is some ambiguity in the statement. Thurstone & Chave [8] regard large Q values primarily as an indication that a statement is ambiguous. It is also may be since statement is interpreted in more than one way by the subjects.

## 2.2. Reliability of the Scale

Reliability refers to the consistency of scores obtained by the same individuals when re-examined with the test on different occasions, or with different sets of equivalent items Anastasi [9]. The reliability of the scale was determined by 'split – half' method. The test is divided into two halves in which one half contains the odd-numbered items (1,3,5,7,9) and other half contains the even-numbered items (2,4,6,8,10). A single administration of the two sets of items to a sample of respondents, yields two sets of scores. A positive and significant correlation between the two sets of scores indicates that the test is reliable.

From the self-correlation of the half-tests, the reliability coefficient of the whole test may be estimated by the Spearman-Brown formula, as follows.

$$\text{Reliability coefficient of the whole test} = \frac{2 \times \text{reliability coefficient of the half test}}{1 + \text{reliability coefficient of the half test}}$$

## 2.3. Validity of the Scale

Validity refers to the accuracy with which it measures that which is intended to measure (Lindquist 1951). To test the validity of the scale, content validity method is used. The content validity involves essentially the systematic examination of the test content to determine whether it covers a representative sample behaviour domain to be measured, Anastasi [9]. The content validity of the scale is measured using Experts Judgement method.

## 3. FINDINGS AND DISCUSSION

Based on the calculation, Individual statements with *"S"* and *"Q"* values are presented in Table 2.

## 3.1 Item Selection

The final attitude items were selected based on the universe of content, uniform distribution of scale values along with the psychological continuum and high "scale values" and smaller "Q" values and more or less equal number of favourable and unfavourable attitude items. The scale values were arranged in descending order of magnitude and the difference between the successive scale values and the cumulative total of the computed differences were worked out. Since the selected scale values should have equal appearing interval and distributed uniformly along the psychological continuum it was necessary to form ten compartments so as to select ten statements with one statement from each of the compartment. The basis for forming the compartments was that, each compartment should be equally spaced in the continuum. For this purpose, the cumulative value (7.00) was divided by ten, which worked out to 0.70 and this formed the width of the first-class interval. The second interval was worked out by adding the value with the width of the first-class interval. Subsequently all the ten intervals were worked out and presented in Table 3.

**Table 2. Computation of Equal Appearing Interval Scale**

| S. No | Statement No. | 'Q' value | Scale value | Difference between successive 'Scale' value | Cumulative value | Interval | Compartments |
|---|---|---|---|---|---|---|---|
| 1. | 11 | 2.408 | 2.277 | | | | |
| **2.** | **14** | **2.269** | **2.418** | **0.141** | | **0.19** | **I** |
| 3. | 20 | 2.035 | 2.500 | 0.083 | 0.223 | | |
| 4. | 40 | 1.950 | 3.000 | 0.500 | 0.231 | | |
| **5.** | **4** | **1.940** | **3.165** | **0.165** | **0.396** | **0.38** | **II** |
| 6. | 1 | 2.038 | 3.296 | 0.131 | 0.527 | | |
| 7. | 12 | 1.910 | 3.296 | 0.000 | 0.527 | **0.57** | **III** |
| **8.** | **7** | **1.840** | **3.358** | **0.062** | **0.589** | | |
| 9. | 30 | -0.050 | 3.500 | 0.142 | 0.731 | | |
| **10.** | **21** | **2.065** | **3.500** | **0.000** | **0.731** | **0.76** | **IV** |
| 11. | 39 | 2.125 | 3.500 | 0.000 | 0.782 | **0.95** | **V** |
| 12. | 42 | 1.318 | 3.558 | 0.058 | 0.789 | | |
| 13. | 22 | 0.922 | 3.566 | 0.008 | 0.797 | | |
| 14. | 13 | 1.755 | 3.576 | 0.010 | 0.807 | | |
| 15. | 43 | 2.056 | 3.583 | 0.006 | 0.814 | | |
| 16. | 37 | 1.714 | 3.590 | 0.007 | 0.821 | | |
| 17. | 29 | 1.821 | 3.634 | 0.044 | 0.865 | | |
| 18. | 50 | 1.594 | 3.643 | 0.009 | 0.874 | | |
| 19. | 31 | 1.893 | 3.643 | 0.001 | 0.874 | | |
| 20. | 2 | 1.594 | 3.643 | 0.000 | 0.874 | | |
| 21. | 51 | 2.114 | 3.683 | 0.039 | 0.914 | | |
| 22. | 44 | 1.407 | 3.688 | 0.005 | 0.919 | | |
| 23. | 15 | 2.095 | 3.688 | 0.000 | 0.919 | | |
| 24. | 49 | 2.016 | 3.701 | 0.014 | 0.932 | | |
| **25.** | **38** | **1.813** | **3.714** | **0.013** | **0.945** | | |
| 26. | 56 | 1.707 | 3.731 | 0.017 | 0.962 | | |
| 27. | 52 | 1.304 | 3.750 | 0.019 | 0.981 | | |
| 28. | 45 | 1.969 | 3.750 | 0.000 | 0.981 | | |
| 29. | 58 | 1.944 | 3.750 | 0.000 | 0.981 | | |
| 30. | 59 | 1.319 | 3.778 | 0.028 | 1.009 | | |
| **31.** | **16** | **1.405** | **3.785** | **0.006** | **1.142** | **1.14** | **VI** |
| 32. | 35 | 1.457 | 3.816 | 0.031 | 1.173 | **1.33** | **VII** |
| 33. | 3 | 1.337 | 3.834 | 0.018 | 1.191 | | |
| 34. | 53 | 1.458 | 3.834 | 0.000 | 1.191 | | |
| 35. | 28 | 1.170 | 3.853 | 0.019 | 1.210 | | |
| 36. | 34 | 1.723 | 3.858 | 0.005 | 1.215 | | |
| 37. | 54 | 1.220 | 3.875 | 0.018 | 1.232 | | |
| 38. | 17 | 0.714 | 3.881 | 0.006 | 1.239 | | |
| 39. | 33 | 1.815 | 3.900 | 0.019 | 1.257 | | |
| 40. | 24 | 1.400 | 3.900 | 0.000 | 1.257 | | |
| 41. | 48 | 0.750 | 3.900 | 0.000 | 1.258 | | |
| 42. | 10 | 0.937 | 3.911 | 0.011 | 1.268 | | |
| 43. | 55 | 1.106 | 3.911 | 0.000 | 1.268 | | |
| 44. | 57 | 1.022 | 3.911 | 0.000 | 1.268 | | |
| 45. | 5 | 1.894 | 3.918 | 0.007 | 1.275 | | |
| 46. | 47 | 1.008 | 3.937 | 0.020 | 1.294 | | |
| 47. | 19 | 0.750 | 3.950 | 0.013 | 1.307 | | |
| 48. | 32 | 1.415 | 3.962 | 0.012 | 1.319 | | |
| **49.** | **60** | **1.810** | **3.962** | **0.000** | **1.337** | | |
| 50. | 25 | 0.882 | 3.971 | 0.009 | 1.346 | **1.52** | **VIII** |

| S. No | Statement No. | 'Q' value | Scale value | Difference between successive 'Scale' value | Cumulative value | Interval | Compartments |
|---|---|---|---|---|---|---|---|
| 51. | 9 | 0.600 | 3.980 | 0.009 | 1.355 | | |
| 52. | 27 | 0.750 | 3.999 | 0.019 | 1.513 | | |
| 53. | 46 | 2.303 | 4.000 | 0.001 | 1.514 | | |
| **54.** | **23** | **0.833** | **4.000** | **0.000** | **1.514** | | |
| **55.** | **36** | **0.970** | **4.063** | **0.063** | **1.708** | **1.71** | **IX** |
| 56. | 8 | 0.750 | 4.100 | 0.037 | 1.745 | **1.91** | **X** |
| 57. | 26 | 1.210 | 4.117 | 0.017 | 1.762 | | |
| 58. | 18 | 1.142 | 4.142 | 0.026 | 1.788 | | |
| 59. | 6 | 1.133 | 4.168 | 0.011 | 1.821 | | |
| **60.** | **41** | **1.203** | **4.193** | **0.050** | **1.913** | | |

**Table 3. Computation of class interval values**

| S.No. | Compartments | Interval values |
|---|---|---|
| 1. | I | 0.19 |
| 2. | II | 0.19+0.19 = 0.38 |
| 3. | III | 0.38+0.19= 0.57 |
| 4. | IV | 0.57+0.19=0.76 |
| 5. | V | 0.76+0.19=0.95 |
| 6. | VI | 0.95+0.19=1.14 |
| 7. | VII | 1.14+0.19=1.33 |
| 8. | VIII | 1.33+0.19=1.52 |
| 9. | IX | 1.52+0.19=1.71 |
| 10. | X | 1.71+0.19=1.9 |

**Table 4. Selected Attitude Statements**

| Items | Statements | S value | Q value | Nature of statement |
|---|---|---|---|---|
| 14. | PKVY paves way for farmers with organic ideologies | 2.418 | 2.269 | Favorable |
| 4. | PKVY promotes chemical free methods of crop cultivation | 3.165 | 1.940 | Favorable |
| 7. | PKVY does not focus on building up soil fertility | 3.296 | 1.910 | Unfavorable |
| 21. | Cost of cultivation of organic crops is reduced by PKVY | 3.500 | 2.065 | Favorable |
| 38. | PKVY improves the socio-economic status of the farmers | 3.714 | 1.813 | Favorable |
| 16. | Only resourceful farmers can be enrolled in PKVY | 3.785 | 1.405 | Unfavorable |
| 60. | PKVY is in line with the needs and problems of organic farmers | 3.963 | 1.810 | Favorable |
| 23. | Organic certification is made possible through PKVY | 4.000 | 0.833 | Favorable |
| 36. | PKVY won't make any difference in the farming community | 4.063 | 0.970 | Unfavorable |
| 41. | PKVY provides potential market for the organic produce | 4.193 | 1.203 | Favorable |

To select the attitude items from the ten compartments the "scale values" and the corresponding "Q" values were considered. Based on the criteria already mentioned items having high "scale values" and low "Q" values were selected with one item from each compartment. Care was taken to ensure that the selected items represented the universe of content and covered the different aspects of PKVY scheme. Thereby ten items were selected with equal appearing interval and with a uniform distribution along the psychological continuum.

The attitude scale thus constructed is given in Table 4.

### 3.2 Scale Reliability

The reliability of the scale was determined by 'split – half' method. The ten selected attitude items were divided into two equal halves by odd even method. The two halves were administered separately to 30 farmers in a non-sample area. The scores were subjected to correlation test in order to find out the reliability of the half test by using SPSS software. The half-test reliability coefficient (r) was 0.638 which was significant at one per cent level of probability. Further the reliability coefficient of the whole test was computed using the Spearman-Brown Prophecy formula. The whole test reliability (rtt) was 0.778. When the purpose of the test is to compare the mean scores of two groups of narrow range a reliability coefficient of 0.50 or 0.60 would suffice. Hence, the constructed scale is reliable as the reliable coefficient (rtt) was >0.60.

### 3.3 Content Validity of the Scale

Content validation was carried out by subjecting the selected ten items to judge's opinion. The judges were requested to indicate their presumed relevance to which the attitude items covered the different aspects of PKVY scheme. The responses were obtained on a four-point continuum of 'most adequately covered', 'more adequately covered', 'less adequately covered' and 'least adequately covered'. Scores of 4, 3, 2 and 1 were given for the points on the continuum respectively. Totally 30 judges responded by sending their judgments. The mean score 2.5 was fixed as the basis for deciding the content validity of the scale. If the overall mean score of the attitude items as rated by the judges was above 2.5 the scale will be declared as valid and if not otherwise. In the present case the overall mean score was worked out as 3.94 and therefore the constructed attitude scale is said to be valid.

### 3.4 Administration of the Scale Value

The ten attitude items selected were arranged randomly in order to avoid biased responses. The scale was administered on a five-point continuum as strongly agree, agree, undecided, strongly disagree and disagree. The score obtained for each statement was summed up to arrive at the attitude score for the respondents. The score ranged from 50 (maximum) to 10 (minimum). Maximum score revealed a favourable attitude, while a minimum score indicated unfavourable attitude towards PKVY scheme. The responses were grouped as unfavourable, moderately favourable and highly favourable based on the cumulative frequency method.

## 4. CONCLUSION

Attitude is the most indispensable concept in social psychology and plays an important role in behaviour leading into social action. The statements were prepared to analyse the attitude of organic farmers towards PKVY by using the equal appearing interval method. The reliability and validity of the items show that the items were highly reliable and valid. The scale would be highly useful to study the attitude of organic farmers towards PKVY scheme. The study reported here set out to understand organic farmers' attitude towards extension and organic agriculture. The information provided by organic farmers reflects their capacity and adeptness of building social capital in addressing their issues and problems related to organic agriculture because of this scale contains both positive and negative statements.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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