



## Development of a scale to measure the perception of seed growers towards vegetable seed production in Koppal district

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### Abstract

An attempt was made to develop a scale to measure perception of seed growers towards vegetable seed production. The method of summated rating scale suggested by Likert (1932)<sup>[5]</sup> and Edwards (1969)<sup>[3]</sup> were followed in the development of the scale. A list of 95 items/statements reflecting the perception about seed production system was prepared through extensive review of literature and discussion with scientists. The statements were sent to 135 judges in State Agricultural Universities, Central Agricultural Universities, Indian Council of Agricultural Research institutions and Karnataka State Department of Agriculture on three point continuum. In all, 48 judges could respond in time. The relevancy score for each item/statement was found out by adding the scores on the rating scale for all the 48 judges. Based on their judgment an aggregate of 33 statements were selected by finding the relevancy weightage scores (RWS). Statements having an equal or more RWS of 0.75 and mean relevancy score of 2.00 were selected for the item analysis. In item analysis the selected statements were administered to 30 growers in non-sample area of Koppal taluk of Karnataka state during 2018-2019. Finally a total of 21 statements were selected for the study based on 't' values (> 1.75) resulted from the item analysis and were included in the final scale. The 'r' value of the scale was found to be 0.9327, which was significant at one per cent level indicating the high reliability. Hence, the scale developed was found to be reliable and valid.

**Keywords:** scale, perception, seed growers, vegetable seed production, Koppal

### Introduction

“Subeejam Sukshetre Jayate Sampadya” is a Sanskrit quote which means “A good seed on good soil will yield abundantly”. The importance of quality seed has been realized by mankind long ago. The need for a good viable seed for prosperity of human race is mentioned in Rigveda of ancient India. Seed is the basic and most critical input for sustainable agriculture. The response of all other inputs depends on quality of seeds to a large extent. (Poonia, 2013)<sup>[6]</sup>. The profile of seeds in India has changed over the years. Earlier, it was the seeds saved from the previous crop that was used in Indian agriculture. Now it is the most advanced seeds that are developed by seed companies that dominate the farmers' fields. Today, the Indian seed industry is the fifth largest seed market in the world, accounting for 4.4 per cent of global seed market after the U.S. (27.00%), China (20.00%), France (8.00%) and Brazil (6.00%). In terms of global trade, India is almost self-sufficient in flower, fruits and vegetables and field crops seeds. (Anon., 2020a). Vegetable seed constitutes a major segment of the total seed market which holds a value of \$ 9.8 billion in 2020 and is expected to grow at a cumulated average growth rate of 8.2 per cent generating the revenue of \$14.4 billion by 2025. (Anon., 2022). According to Udai Pareek perception is defined as the process of receiving, selecting, organizing, interpreting, checking and reacting to sensory stimuli and data” in the present context the perception of seed growers towards vegetable seed production it is favourably understanding and interpreting the information received and

organizing it into the process of seed production. Hence, in order to study the perception of seed growers from their long term experience in the seed production of various crops and to understand the scalability of seed production to all the sectors of farming community scale was developed to know the perception of seed growers towards vegetable seed production.

### Methodology

The study was conducted in Koppal district during the year 2018-19 as it is a major seed production area in North East Karnataka. Thirty seed growers from a non-sample area were personally interviewed. The method suggested by the Likert (1932)<sup>[5]</sup> in developing summated rating scale was used to construct the perception scale. The details of the procedure followed in standardization of the scale to measure the perception of seed growers towards vegetable seed growers are explained neatly in the following results.

### Results

Perception of growers towards seed production is operationally defined as the interpretation of growers towards vegetable seed production. As there is no scale to measure perception of seed growers, an attempt was made to develop a scale to measure perception of growers towards vegetable seed production. The method of summated rating scale suggested by Likert (1932)<sup>[5]</sup> and Edwards (1969) were followed in the development of the scale.

### Collection and editing of items

A list of 95 items/statements reflecting the perception about seed production system was prepared through extensive review of literature and discussion with scientists. The items/statements so identified were carefully edited in the light of 14 criteria suggested by Edwards (1969)<sup>[3]</sup> and Thurstone and Chavue (1929)<sup>[7]</sup>.

### Relevancy Test

Sixty eight items/statements were sent to 135 judges in State Agricultural Universities, Central Agricultural Universities, Indian Council of Agricultural Research institutions and Karnataka State Department of Agriculture with necessary instructions to critically evaluate each item/statement as to its relevancy to measure the perception of seed growers towards vegetable seed production and give their response on three point continuum viz., Most relevant (MR), Relevant (R) and Not Relevant (NR) with the score of 3, 2 and 1, respectively. In all, 48 judges could respond in time. The relevancy score for each item/statement was found out by adding the scores on the rating scale for all the 48 judges. From the data so gathered "Relevancy Percentage" (RP), "Relevancy Weightage" (RW) and "Mean Relevancy Score" (MRS) were worked out for all the 68 items/statements by using the following formulae:

$$\text{Relevancy Percentage} = \frac{(MR \times 3) + (R \times 2) + (NR \times 1)}{\text{Maximum Possible score}} \times 100$$

Relevancy weightage was worked out by the following standard formula

$$\text{Relevancy Weightage} = \frac{(MR \times 3) + (R \times 2) + (NR \times 1)}{\text{Maximum Possible score}}$$

Mean Relevancy score was worked out by the following standard formula

$$\text{Mean Relevancy Score} = \frac{(MR \times 3) + (R \times 2) + (NR \times 1)}{\text{Number of Judges responded}}$$

Using these three criteria individual statements were screened for these relevancies. Accordingly, items/statements having relevancy percentage of more than 75 per cent, relevancy weightage of more than 0.75 and Mean Relevancy score of more than 2.0 were considered for the final selection. By this process, 33 statements were isolated in the first stage which were suitably modified and written as per the comments of judges wherever applicable. (Table 1)

**Table 1:** Relevancy scores retained from judges for each item to measure the perception of growers towards vegetable seed production

Sl. No.	Items	RW	RP	MRS
1	Selection of male and female lines is important criteria for better seed quality	0.866	86.666	2.6
2	The vegetable seed crop must be isolated from other nearby fields of the same crop and other contaminating crops as per requirement of the certification standards	0.914	91.428	2.742
3	Adequate and timely rouging is extremely important in seed production is done as per needs of the seed crop at vegetative stage, flowering stage and maturity stage	0.923	92.380	2.771
4	Emasculation and Pollination are done manually for better crossing	0.819	81.904	2.457
5	Protected cultivation helps for the production of vegetables round the year	0.819	81.904	2.457
6	Right time and harvesting indicators will give required quality of seeds and allow maximum yield	0.790	79.047	2.371
7	Protected cultivation increases productivity per unit of investment on land, water, energy and labour, implements, manures etc.	0.895	89.523	2.685
8	Acid treatment is the major activity done for vegetable seed production. Seeds are dried and treated with acid.	0.800	80.000	2.400
9	Field inspection and approval of growing crops at critical stages for verification of genetic purity, detection of mixtures, weeds, and for freedom from noxious weeds and seed borne diseases etc.	0.790	79.047	2.371
10	Providing adequate isolation to prevent contamination by natural crossing or mechanical mixtures	0.7904	79.047	2.371
11	Roughing of seed fields prior to the stage at which they could contaminate the seed crop	0.771	77.142	2.314
12	Seed production is the remunerative rural enterprise which generates additional income	0.819	81.904	2.457
13	There is comparative advantage in private seed production system than public seed production system.	0.838	83.809	2.514
14	Seed production improves the social status of the growers in the community	0.809	80.952	2.428
15	Seed production activities can reduce the migration of the youth	0.819	81.904	2.457
16	Vegetable Seed production can also provide new opportunities for households to diversify their livelihood strategies	0.761	76.190	2.285
17	Quality seed production can help other fellow growers which may give the feeling of achievement	0.752	75.238	2.257
18	Vegetable Seed production improves adoption rate of new technologies like improved varieties, hybrids, better cultivation practices and post harvest technologies	0.780	78.095	2.342
19	Seed production enhances the confidence of the growers towards commercial agriculture	0.847	84.761	2.542
20	Involvement of concerned stakeholders in production, processing and certification of seeds helps to maintain quality of the produce	0.790	79.047	2.371
21	Small and marginal growers are the who gets more benefited from vegetable seed production	0.714	71.428	2.142
22	Financial assistance from public sector banks for seed growers can reduce the burden of high interest of money lenders	0.761	76.190	2.285
23	All the farm operations in vegetable seed production can be performed well under the technical guidance.	0.819	81.904	2.457
24	Pre sowing buyback arrangements is most important in vegetable seed production to enhance confidence of the growers in market stability	0.838	83.80	2.514
25	Organizers control over distribution and marketing hinders market activities of growers leading to low interest of seed growers in marketing.	0.7523	75.23	2.257

26	Ensuring all fields are properly labeled, for easy identification of crop and varieties in vegetable seed production is very important	0.761	76.190	2.285
27	Management of skilled labourers for special activities of seed production	0.847	84.761	2.542
28	Documentation and maintenance of growers records to verify: cropping history, variety, category, origin of seed planted, cost of production and profits etc.	0.819	81.905	2.457
29	Deciding the proper schedule and amount of resources to be spent on seed production activities will enhance financial management	0.810	80.952	2.429
30	Staggered sowing of crop lines is important criteria for better seed quality	0.895	89.523	2.685
31	Seed production helped to set quality seeds among the community	0.819	81.905	2.457
32	Profitability of crop increased through better management practices followed for the seed production	0.790	79.048	2.371
33	Seed production has increased seed replacement ratio which is most important for higher productivity of the crop	0.810	80.952	2.429

**Item Analysis**

To delineate the items/statements based on the extent to which they differentiate the perception items/statements about vegetable seed production as favorable or unfavorable, item analysis was carried out on the items/statements selected in the first stage. A schedule consisting of 33 items/statements was prepared and used for personally interviewing the perception of growers three point continuum from non-sample area. For item analysis, the respondents were arranged in ascending order based on perception scores. Twenty five per cent of the subjects with the highest total score and 25 per cent with the lowest total scores were selected. These two groups provided the criterion groups in terms of which item analysis was conducted and critical ratio was calculated by using the following formula:

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

Where,

$\bar{X}_H$  = Individual scores in the high group

$\bar{X}_L$  = Individual scores in 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

$\sum$  = Summation

t = Extent to which a given statement differentiate between the high and low group.

Based on the item analysis ('t' value), fifteen items/statements were non-significant, while twelve items/statements were significant at five per cent and nine items/statements were significant at one per cent level were finally retained in the scale to measure the perception of growers towards seed production. Twenty-one items/statements which were statistically significant at five per cent and one per cent level were retained in the scale to measure perception of seed growers towards vegetable seed production. (Table 2)

**Table 2:** Statements't-value analysis of perception of seed growers towards vegetable seed production

Sl. No.	Items	't' Value
1.	Protected cultivation helps for production of vegetable seed round the year	2.63
2.	Protected cultivation increases productivity per unit of investment on inputs	3.17
3.	Staggered sowing of crop is important criteria for better seed quality	2.29
4.	Subsidy is one of the motivation for seed production	2.58
5.	Small and marginal growers got more benefits from the vegetables seed production	2.68
6.	Deciding the proper schedule and amount of resources to be spent on vegetable seed production activities will enhance financial management	3.11
7.	Maintenance of isolation distance in different crops prevents contamination and natural crossing	2.89
8.	Adequate and timely rouging is important for getting quality seed at vegetative, flowering and maturity stage	3.27
9.	Hybridization: Emasculation and pollination are done manually for producing better quality seeds	3.09
10.	Prevention of natural crossing leads to reduction in varietal deterioration	2.44
11.	Harvesting indicators will give required quality of seeds and allow maximum yield	2.35
12.	Seed production is the remunerative skilled rural enterprise which generates additional income and employment	2.38
13.	There is comparative advantage in private seed production system than public seed production system	2.61
14.	Seed production activities encourages for retention of youth in agriculture	2.77
15.	Seed production enhances the socio-economic security of the family	2.50
16.	Seed production provides new opportunities for households to diversify their livelihood strategies	2.03
17.	Seed production enables to attain a sense of achievement/ recognition among fellow growers	3.08
18.	Seed production sustains the interest in agriculture by increasing the level of confidence	2.47
19.	Buyback arrangements is most important in vegetable seed production to enhance confidence of the growers in market stability	3.68
20.	All the farm operations in vegetable seed production can be performed well under the technical guidance	3.44
21.	Management of skilled labourers for special activities of seed production	2.89

**Reliability**

Reliability in its true sense refers to precision of the scale constructed for any purpose. It is otherwise called extent to

which repeated measure produces the same result. In any social science research newly constructed scale has to be tested for its reliability before it is used.

The split-half method was employed to test the reliability of the perception scale. The value of correlation co-efficient was 0.8439 and this was further corrected by using Spearman Brown formula and obtained the reliability co-efficient of whole set. The 'r' value of the scale was 0.9327, which was highly significant at one per cent level indicating the high reliability of the scale. It was concluded that the perception scale constructed was reliable.

#### 1. Split half test reliability formula

$$r_s = \frac{(N \cdot \sum XY) - (\sum X)(\sum Y)}{\sqrt{[N \cdot \sum X^2 - (\sum X)^2][N \cdot \sum Y^2 - (\sum Y)^2]}}$$

Where,

$\sum X$ =sum of the scores 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

#### 2. Whole test reliability formula

$$r_{11} = \frac{2 \cdot r_{1/2}}{1 + r_{1/2}}$$

Where,

$r_{1/2}$ =half test reliability

#### 3. Validity formula

$$V = \sqrt{r_{11}}$$

#### Validity

Validity refers to the ability of the instrument to measure what it proposed to measure. Validity of a scale is the property which ensures that the test scores obtained measure the variable they are supposed to measure. Content or construct and statistical validity are the methods generally followed to know the validity of the scale.

##### (i) Content Validity

According to Kerlinger (1978)<sup>[4]</sup>, it is the representativeness or sampling adequacy of the content- the substance, the matter and the topics of a measuring instrument. He further stated that content validation consists essentially in judgement alone or with others, one judges the representativeness of the item.

##### (ii) Statistical Validity

The Validity co-efficient for the scale was 0.9657, which was also statistically significant at one per cent level of probability indicating the higher validity of the developed scale. Hence, the scale is valid.

Thus, the developed scale to measure perception of seed growers on vegetable seed production activities was feasible and appropriate.

#### Administration of perception scale and Method of scoring

The final scale of 21 items/statements can be administered to the respondents along a three point continuum representing 'agree', 'undecided' and 'disagree' with

weightage of 3, 2 and 1, respectively. The perception score of a respondent can be calculated by adding up the scores obtained by him/her on all items/statements. The perception score of this scale ranges from a minimum of 21 to a maximum of 63. Higher score on this scale indicates that the respondent has higher level of perception towards vegetable seed production.

Based on the total cumulated score obtained, the growers were classified in to three category viz., low, medium and high perception level based on the mean and 0.425 of standard deviation.

#### Conclusion

The perception scale developed was found to be reliable and valid. The perception scale developed was administered to 30 vegetable seed growers of non sample area, there was no complications in using and finalizing the scale, hence it can be concluded that the scale developed was useful and helpful in explicitly measuring the perception of seed growers towards vegetable seed production. In future other researchers can use present the scale for measuring the perception of growers in similar studies and area.

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