

## Development of a Scale to Measure Farmers' Perceptions on Quality of Groundnut

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### ABSTRACT

*The major impediment to diversify groundnut from oil extraction to food uses is maintenance of quality of the produce. It was well recognized that the maintenance of high quality fetches more income to the farmers, but studies on the farmers' perception of quality were very limited in India. There was no scale available to measure the farmers' perception of quality of groundnut. The present study made an attempt to develop the same, with the specific objective to develop and standardize a scale for measuring farmers' perception of quality of groundnut. The process started with selection of 42 statements and 22 statements were finally retained in the scale. The validity and reliability of the scale indicated the precision and consistency of the results. This scale can be used to measure the farmers' perceptions beyond the study area and to other crops with little modifications.*

**Key words :** Perception scale; Quality of groundnut; Summated rating scale; Aflatoxin contamination

There is great potential for direct consumption of groundnut and groundnut-based products due to its high nutritive value (Basu, 1997). The major impediment to diversify groundnut from oil extraction to food uses is maintenance of quality of the produce. The characteristics features considered for evaluating the quality of groundnut were: pod shape; size, cleanliness, freedom from damage, absence of blind nuts for in-shell and grading for size or count: shape; ease of blanching; skin color and condition; resistance to splitting, moisture content; cleanliness, oil content and flavor for kernels (Tanna, 2002). Apart from the above characteristics, the aflatoxin contamination is considered as one of the important criterion for judging the quality of groundnut. It was well recognized that the maintenance of high quality fetches more income to the farmers, but studies on the farmers' perception of quality were very limited in India. There was no scale available to measure the farmers' perception of quality of groundnut. Hence, the present study was designed to develop and standardize a scale for measuring farmers' perception of quality of groundnut. This was a part of the larger Ph.D study on "Farmers perceptions of quality and aflatoxin contamination of groundnut" conducted during 2006.

### METHODOLOGY

The perception, in psychology, is mental organization

and interpretation of sensory information. Perception was operationally defined as the meaningful sensation of the quality aspects of groundnut by the respondents. The method of summing rating suggested by Likart (1932), Edwards (1957) and Patil *et al.*, (1996) were followed in the development of the scale. The following points were considered for measuring the perception of farmers.

*1. Collection and editing of statements :* Referring the available literature on quality and aflatoxin contamination of groundnut collected a large number of statements covering the entire universe of content. The researchers, farmers and extension experts were consulted for preparation of statements. The statements were then edited according to the fourteen criteria laid down by Edward (1957). In all, 41 statements were selected as they were found to be non-ambiguous and non-factual. Further, for the sake of convenience and ease in application of scale the identified statements were grouped under three components considering the important aspects of quality of groundnut. The identified components along with number of statements initially selected under each component were given in Table 1.

*2. Relevancy test :* It was possible that all the statements collected may not be relevant equally in measuring the perception of farmers' about quality of groundnut. Hence, these statements were subjected to scrutiny by an expert panel of judges to determine the relevancy and their

subsequent screening for inclusion in the final scale. For this, all the forty one statements that were grouped under three categories were typed and the list was then sent to panel of judges. The judges comprised of experts in field of Plant Pathology, researchers working on aflatoxins, scientists of National Research Centre for Groundnut (NRCG), and faculty members of Department of Extension Education, Junagadh Agricultural University (JAU). The statements were sent to 85 judges with necessary instructions to critically evaluate each statement for its relevancy to measure perception of farmers' on quality of groundnut. The judges were requested to give their response on a five point continuum viz., highly relevant, relevant, neutral, irrelevant, and highly irrelevant with scores 5, 4, 3, 2, and 1, respectively.

In all, 36 judges could respond in time of two and half months, out of which six judges responses were rejected. The relevancy score of each item was found out by adding the scores on the rating scale for all the thirty judges responses. From the data so obtained relevancy percentage, relevancy weightage and mean relevancy scores were worked out for all the 41 statements individually by using the following formulae.

*a. Relevancy percentage* : Relevancy percentage was worked out by summing up the scores of highly relevant, relevant and neutral categories, which were converted into percentage.

*b. Relevancy weightage (R.W.)* : Relevancy weightage was obtained by the formula.

$$R.W = \frac{\text{Highly relevant response } X5 + \text{relevant response } X4 + \text{neutral response } X3 + \text{irrelevant response } X2 + \text{highly irrelevant } X1}{\text{maximum possible score } (30 \times 5 = 150)}$$

*c. Mean relevancy score (M.R.S.)* : M.R.S. was obtained by the following formula.

$$M.R.S. = \frac{\text{Highly relevant response } X5 + \text{relevant response } X4 + \text{neutral response } X3 + \text{irrelevant response } X2 + \text{highly irrelevant } X1}{\text{Number of judges } (30)}$$

Using these three criteria the statements were screened for their relevancy. Accordingly, statements having relevancy % >70, relevancy weightage >0.70 and mean relevancy score > 3.5 were considered for final selection of statements. By this process, 24 statements were isolated in the first stage, which were suitably modified and rewritten as per the comments of judges.

*3. Item analysis* : It was essential to delineate the items based on the extent to which they can differentiate the respondent with high perception than the respondent with low perception of the quality of groundnut. For this pur-

pose, item analysis was carried out on the statements selected in the first stage. A schedule consisting of 24 statements was prepared and used for personally interviewing a sample of 40 farmers' from non-sampled area. The responses for the statements were obtained on a five-point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2 and 1, respectively. The perception score of the respondent was obtained summing up the scores of all statements.

For item analysis, the respondents were arranged in ascending order based on perception score. Twenty five percent of the respondents with highest total scores and 25% with lowest total scores were selected. These two groups provided the criterion groups in terms of which item analysis was carried out. The critical ratio was calculated by t-test. The t value was a measure of the extent to which a given statement differentiates the high group from the low group. Based on the t values, 22 statements were finally retained in the scale. The statements under each component were given in Table 2.

*4. Standardization of the scale* : The validity and reliability was ascertained for standardization of the scale. The validity was confirmed by content validity and criterion validity.

*a. Content validity* : The content validity is the representativeness of sampling adequacy of the content, the substance, the matter and the topics of measuring instrument. This was ensured while selecting perception statements. Due care was exercised in selecting and wording the statements so as to cover all the relevant aspects of quality. Thus, ensuring a fair degree of content validity.

*b. Criterion validity* : The criterion validity may be an object measure of performance or quality. In the present study, criterion validity was measured by using criteria of farm size. Comparison was made between the perception score and farm size of 40 non-sampled respondents. Pearson's product moment correlation coefficient was calculated. The r-value was 0.55, which indicated the validity of the scale.

*c. Reliability* : The split-half method for testing reliability was used. The scale was split into two halves on the basis of odd and even number of items and administered to 40 farmers'. Thus, two sets of scores were obtained. The Pearson's product moment correlation coefficient was calculated. The value of correlation coefficient was 0.53 and this was further corrected by using Spearman's Brown formula and obtained the reliability coefficient of the whole set. The r-value for scale was 0.76, which was significant at 0.01 *p* indicating high reliability of the instrument.

## RESULTS AND DISCUSSION

The final scale consisted of 22 statements representing three components (Table 2). The responses had to be recorded on a five point continuum representing strongly agree, agree, undecided, disagree and strongly disagree with scores of 5, 4, 3, 2, and 1, respectively. The perception score of each respondent can be calculated by adding up the scores obtained by him/her on all the items. The perception score on this scale ranges from

a minimum of 22 to a maximum of 110. The higher scores indicate that the respondent had more sensation of the quality aspects of groundnut and vice-versa.

Table 1. Important components and number of initial and final statements

S.No.	Component	Initial items	Final items
1.	Quality aspects	25	12
2.	Pre-harvest contamination	07	04
3.	Post-harvest contamination	09	06

Table 2. The final perception scale with 22 statements representing three components

S.N.	Statement	SA	A	UD	DA	SDA
I.	Quality Characteristics					
a.	Good quality groundnuts are:					
1.	Spotless pods					
2.	High shelling percentage					
3.	Big bold pods					
4.	Uniform seed size					
b.	Inferior quality groundnuts are:					
5.	Presence of high percentage of pods with fungal growth					
6.	Presence of high percentage of damaged and broken pods					
7.	Presence of immature and shriveled pods					
8.	Presence of discolored seeds					
9.	Presence of high percent of splits in the produce					
10.	Presence of high percent of extraneous matter					
11.	Presence of high percent of pods of other varieties					
12.	Grading improves the quality of groundnut					
II.	Pre-harvest aflatoxin contamination					
13.	The quality of groundnut is affected badly due to aflatoxin contamination					
14.	Aflatoxin contamination of groundnut occurs at any time during pre-harvest stage of groundnut					
15.	Mechanical injury to pods during inter-cultural operation leads to aflatoxin contamination					
16.	End of season drought for more than twenty days leads to aflatoxin contamination					
III.	Post harvest contamination					
17.	Aflatoxin contamination occurs at any time during post harvest operations					
18.	Delayed harvesting is one of the major reasons for aflatoxin contamination					
19.	Mechanical damage to pods during harvest leads to aflatoxin contamination					
20.	Stacking the harvested plants before proper drying (<10% moisture level) leads to aflatoxin contamination					
21.	Improper drying of pods before storage leads to aflatoxin contamination					
22.	Improper storage of groundnut pods / seeds leads to aflatoxin contamination					

SA: Strongly agree    A: Agree    UN: Undecided    DA: Disagree    SDA: Strongly disagree

## CONCLUSION

The validity and reliability of scale indicated the precision and consistency of the results. This scale

can be used to measure the farmers' perceptions beyond the study area and to other crops with little modifications.

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