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Standard Scale to Measure Knowledge of Farmers About Production Recommendations of Rainfed Groundnut in Chittoor District of Andhra Pradesh

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ABSTRACT

The knowledge test was developed to measure the knowledge level of rainfed groundnut growers. Pertinent items were collected covering all aspects of groundnut production. After getting jury opinion on the items of test item, difficulty index, index of item discrimination and index of item validity were worked out. To administer the knowledge test a score of one was given for each correct answer and zero was given for wrong answer. The total score of the respondents on all items of the test is taken on the basis of their knowledge score and the respondents may be categorized into three groups having low, medium and high knowledge about groundnut production.

Key words : Groundnut, Rainfed, Standard scale.

The rain fed agriculture has the stigma of low productivity of oilseed crops. One of the most important oilseed crops of the Rayalaseema region of Andhra Pradesh is groundnut. The yield of this crop depend on the knowledge and adoption of production recommendations by the farmers. Hence an effort was made to develop the standard knowledge test to appraise the knowledge levels of farmers.

In spite of several extension methods the groundnut farmers do not have sufficient knowledge about specific production recommendations. This necessitated the development of a standard knowledge test for the accurate assessment of knowledge levels of farmers.

MATERIALS AND METHODS

The present investigation was conducted in three villages viz. Mitturu, Khammakandriga and Ramireddypuram of Ramachandrapuram mandal of Chittoor district of Andhra Pradesh during July, 2009. The mandal was purposively selected as it has highest groundnut area under cultivation. A total of 30 groundnut growers were selected randomly i.e. 10 respondents from each village constituted the sample.

The knowledge test was developed by employing following methodology and the standardization of the test items were presented below.

RESULTS AND DISCUSSION

a. Collection and Framing of Knowledge Items

A large number of items were obtained from the Subject Matter Specialists, Scientists and field extension workers of Acharya N.G.Ranga Agricultural University and State Department of Agriculture, Andhra Pradesh. Finally 50 items were scrutinized after careful editing to develop standardized knowledge test. The items were then framed in to objective form of questions, such as true or false, yes or no, multiple choice and fill in the blank types.

b. Selection of items

Content of the test was composed of items asked in the form of questions. The criteria used for selection of items were:

i. Response to items should promote thinking rather than rota memorization.

ii. They should differentiate the well informed respondent from the less informed and should have certain difficulty value.

iii. The items included should cover all areas of knowledge about rain fed groundnut production.

c. Item analysis:

The item analysis was carried out as per the standard procedure, so as to yield three kinds of information viz., “index of item difficulty”, “item discrimination index” and “point biserial correlation”.

The index of the item difficulty reveals how difficult an item is, where as discrimination index indicates the extent to which an item discriminates the well informed individual from the poorly informed. The point biserial correlation provides information on how well an item measures or discriminates with the rest of the test items.

Pre-testing of the items was done as suggested by Gonard (1948). The items were revised and administered to thirty respondents selected for the purpose of pre-testing in controlled situation. Care was taken to see that thirty respondents for this purpose were outside the main sample selected for the study. The data thus obtained was subjected for item analysis. To analyze 50 items each of the thirty respondents to whom the test items were administered was scored on the basis of the score allotted i.e. 1 for correct response and 0 for incorrect response. After computing the total score obtained by each of the thirty respondents on 50 items, they were arranged in order, from highest to lowest. These thirty respondents were then divided into six equal groups, arranged in descending order of total scores obtained by them. These groups were labeled as G_1, G_2, G_3, G_4, G_5 and G_6 respectively with five respondents in each group. For the purpose of item analysis, the middle two groups G_3 and G_4 were eliminated keeping only four extreme groups with high and low scores. The data of correct responses for each of 50 items were tabulated for each of these four groups (Bloom *et al*.1956)

d. Selection of the items for the final test
item difficulty index (P)

The Item difficulty index for each of 50 items was calculated as the percentage of the respondents answering an item correctly and is presented in Table 1. The items with 'P' values ranging from 30 to 70 were considered for the final selection of the standard knowledge test.

Discrimination index ($E^{1/3}$)

Discrimination index of each of the 50 items were computed by using the following formula and presented in Table 1.

$$E^{1/3} = \frac{(S_1-S_2) - (S_5-S_6)}{N/3}$$

S_1 S_2, S_5 and S_6 are the frequencies of correct answers in the groups G_1, G_2 and G_5 and G_6 respectively. 'N' is the total number of respondents selected for item analysis, that is thirty. The items with discrimination index ranging from 0.30 to 0.70 were selected for the construction of final knowledge test.

Point biserial correlation (rpbis)

Point biserial correlation was calculated to work out the internal consistency of the items i.e. relationship of the total score to a dichotomized answer on any given item. It was calculated by using the formula suggested by Garrett (1966).

$$r\,pbis = \frac{Mp - Mq}{SD} \times \sqrt{pq}$$

Where
r pbis = Point biserial correlation
Mp = Mean of the total scores of the respondents who answered the item correctly (or)

$$Mp = \frac{\text{Sum of the total of XY}}{\text{Total number of correct answers}}$$

Mq = Mean of the total scores of the respondents who answered the item incorrectly or

$$Mq = \frac{\text{Sum total of X - Sum total of XY}}{\text{Total number of wrong answers}}$$

SD = Standard deviation of the entire sample
p = Proportion of the respondents giving correct answer to the item
q = Proportion of the respondents giving incorrect answer to the item (or) q = 1- p
X= Total score of the respondent for all the items
Y= Response of the individual for the items (Correct =1; Incorrect =0)

XY=Total score of the respondent multiplied by the response of the individual to the item.

Items having significant point biserial correlation, either at 1 per cent or 5 per cent level were selected for the final test of the knowledge (Table 1).

To set significance of Point biserial correlation co-efficient the following 't' test was used.

$$t = \frac{r\,pbis \times \sqrt{N-2}}{\sqrt{1-rpbis^2}}$$

The resulting co-efficient is a product moment correlation co-efficient and is used and interpreted just as the Pearson correlation co- efficient.

e. Total items selected

Out of 50 items, 26 items pertaining to production recommendations of rain fed groundnut were finally selected comprising of three formats of the test items that are true or false, multiple choice and fill in the blanks.

Table1. Difficulty, discrimination and point biserial correlation for knowledge test items.

S.No	Frequencies of correct answer of respondents in four extreme groups				Totals of frequencies of correct answers by all six groups (n=30)	Difficulty index (% of respondents giving correct responses)	Discrimination index ($E^{1/3}$)	Point biserial correlation (rpbis)	t values
	G_1	G_2	G_5	G_6					
1	3	5	3	1	20	66.67	0.40	0.450	2.6636 *
2	1	0	0	0	1	3.33	0.10	0.099	0.5286 NS
3	4	5	2	2	19	63.33	0.50	0.366	2.0780*
4	4	2	1	1	15	50.00	0.40	0.234	1.2713 NS
5	5	4	1	0	16	53.33	0.80	0.609	4.0660**
6	5	3	3	1	19	63.33	0.40	0.439	2.5854*
7	5	4	1	0	15	50.00	0.80	0.579	3.3785**
8	5	5	2	0	16	53.33	0.80	0.538	3.3785**
9	4	3	1	0	11	36.67	0.60	0.255	1.3939 NS
10	4	4	3	2	21	70.00	0.30	0.381	2.1824*
11	4	4	1	0	16	53.33	0.70	0.510	3.1408**
12	4	4	0	0	16	53.33	0.80	0.564	3.6120**
13	5	3	1	1	13	43.33	0.60	0.351	1.9837 NS
14	5	4	2	2	22	66.67	0.50	0.608	4.0552**
15	3	2	2	0	11	36.37	0.30	0.159	0.8507 NS
16	3	3	1	2	14	46.67	0.30	0.121	0.6446 NS
17	4	4	2	0	18	60.00	0.60	0.564	3.3169**
18	4	1	4	0	16	53.33	0.10	0.209	1.1308 NS
19	4	3	4	0	15	50.00	0.30	0.239	1.3045 NS
20	5	4	0	0	9	56.67	0.90	0.427	2.4987*
21	5	3	2	0	14	46.67	0.60	0.439	2.5878*
22	4	3	0	4	18	60.00	0.30	0.037	0.1938 NS
23	4	4	1	0	10	33.33	0.70	0.413	2.3996*
24	4	3	2	3	17	56.67	0.20	0.129	0.6880 NS
25	5	2	2	0	15	50.00	0.50	0.417	2.4290*
26	3	2	2	2	15	50.00	0.10	0.122	0.6250 NS
27	5	5	5	1	25	83.33	0.20	0.135	0.7210 NS
28	5	4	3	1	20	66.67	0.50	0.623	4.2148**
29	5	3	0	0	16	53.33	0.80	0.697	5.1461**
30	5	4	2	1	18	60.00	0.60	0.578	3.7437**
31	5	5	3	2	21	70.00	0.50	0.608	4.0573**
32	5	4	3	5	24	80.00	0.10	0.029	0.156 NS
33	5	2	0	0	14	46.67	0.70	0.442	2.6065*
34	4	5	2	2	20	66.67	0.50	0.437	2.5731*
35	5	4	2	2	21	70.00	0.50	0.513	3.1657**
36	4	3	2	1	19	66.67	0.00	0.038	0.1995 NS
37	3	3	4	2	16	53.33	0.00	0.048	0.2131 NS
38	4	3	2	1	20	66.67	0.40	0.549	3.4724**
39	5	2	4	3	22	73.00	0.00	0.064	0.3418 NS
40	5	4	3	3	20	66.67	0.30	0.210	1.1360 NS
41	2	3	2	2	12	40.00	0.40	0.245	1.3364 NS
42	2	3	2	2	17	56.67	0.10	0.052	0.2734*
43	5	4	4	2	21	60.00	0.00	0.083	0.5423 NS
44	2	4	4	2	18	60.00	0.00	0.083	0.4418 NS
45	3	3	3	1	15	50.00	0.20	0.134	0.0606 NS
46	4	4	3	2	20	66.67	0.30	0.397	2.0654*
47	2	4	3	2	15	50.00	0.10	0.083	0.4431 NS
48	5	4	3	1	20	66.67	0.50	0.656	4.5991**
49	4	4	2	0	15	50.00	0.60	0.344	1.9415 NS
50	4	3	3	0	15	50.00	0.40	0.271	1.4905 NS

* Significant at 0.05 level of probability ** Significant at 0.01 level of probability
NS Non Significant

f. Reliability of the Test

Split half reliability method was used to find out the reliability. The test was administered to thirty respondents. The two sets of knowledge scores obtained by the farmers were correlated. The correlation (r = 0.86) was highly significant indicating a high degree of dependability of the test for measuring knowledge of rain fed groundnut farmers.

g. Validity of the Test

The validity of the test items was tested by the method of point biserial correlation (rpbis). The items with significant correlation coefficients either at 1 or 5 per cent level were included in the standard knowledge test designed to measure the knowledge of production recommendations of rain fed groundnut.

h. Practicability of the Test

Each of the 26 items in the knowledge test was administered to the respondents in Telugu language and their responses were recorded in the form of correct or incorrect answers. The correct answer was assigned a weightage of "1" and a weightage of "0" was assigned to incorrect answer. The total score of correct answers given by a individual respondent will be the knowledge of that particular respondent. Later the respondents will be categorized in to different groups (low, medium and high) based on the mean and standard deviation.

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