Development of knowledge test to measure the Extent of Knowledge of women Farmers about Rice Production Technology

[1]Dr. Pompi Saikia, Laboratory Assistant, Regional Arial. Research Station, Nagaon, AAU, India.
pompisaikia.aau@gmail.com
[2]Dr. Manoshi Baruah Deka, Professor & Head, Faculty of Community Science, AAU, India.
manoshib.deka@gmail.com

ABSTRACT - Both male and female farmers participate in rice farming but have different roles. It is therefore not appropriate to measure their knowledge level with the same yardstick. In this study, knowledge test was developed for measuring the knowledge level of women farmers who are involved in rice production. Pertinent items were collected covering all aspects of the rice production including variety and seed selection, nursery raising, site selection, land preparation; transplanting, crop management, harvesting and processing were prepared from the pertinent literature and consultation with scientific experts. After getting the jury opinion on the items, fifty-five items were selected and administered to 30 farmers. Finally, 28 knowledge items were included in the final format of the knowledge test based on the difficulty index, discrimination index and point- biserial correlation coefficient. The reliability of the knowledge test was measured with the help of split-half method and reliability coefficients was found to be r=0.63, which indicates that this knowledge test is quite reliable. To administer the knowledge test a respondent is given one mark for each correct answer and zero mark for each wrong answer. The final study was conducted in Nagaon District of Assam in improved rice cultivation practices. The knowledge test was administered 200 female farmers of Batardava development block and the result indicates that majority of the female farmers (68.75%) have medium level of knowledge.

Key words: ***Knowledge test; Measure, Extent of knowledge, women farmers, rice production, and technology***

I. INTRODUCTION

Rice is the main crop of the state of Assam and like all rice growing areas of the world; both male and women play an active role in rice cultivation one way or the other. Knowledge about improved rice cultivation practices is an important determinant of effectiveness in rice farming. However, men and women have varied roles, opportunities and constraints which in turn would affect their knowledge level.

A standardized knowledge test which can measure the knowledge of women farmers on improved rice production technology has not been developed in the past. With this background, the present study endeavours to develop a standardised knowledge test to measure the knowledge level possessed by a women farmer on different rice farming strategies or practices. A knowledge test is a set of questions, each of which has a correct answer, to which people respond (Roy and Mondal,2004). Here, knowledge on improved rice production technology of women farmers were measured at the local level based on their experience.

II. METHODOLOGY

In this study, knowledge level of women farmers belonging to Bartadava development block of Nagaon District of Assam were assessed using knowledge tests developed specially for the study. The methodologies followed for the study are described hereunder

Construction of knowledge test

a. **Collection of item:** The content of knowledge test is composed of statements called items. A comprehensive list of ninety two (92) items regarding the rice production including variety and seed selection, nursery raising, site selection, land preparation, transplanting, crop management, harvesting and processing were prepared from the pertinent literature and consultation with scientific experts. The items were edited and drafted in such a way that each item highlighted only one idea and did

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not have any ambiguity. All items were logically sequenced.

b. **Preliminary selection of items:** The prepared items were sent to a panel of experts (32 nos.) in the field of Agronomy and Extension specialist. The experts were requested to check each item carefully whether items were really measuring the knowledge of the respondents about rice production or not. They had, of course, liberty to add/delete or modify any of the items. After considering the opinion of experts, fifty five (55) items were selected for developing a standardized knowledge test. All selected items were in objective form having correct and incorrect type questions.

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 initial test was pre tested with 15 respondents. The item were revised and finally administered to 30 rural women selected randomly from three non sampled villages of Jorhat district of Assam. The data thus obtained was subjected for item analysis. To analyze 55 items each of the 30 respondents to whom the test item 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 55 items, they were arranged in order from highest to the lowest. These thirty respondents were then divided into six equal groups –G1, G2, G3, G4, G5 and G6 respectively with 5 respondents in each group. For the purpose of iem analysis the middle two groups G3 and G4 were eliminated keeping only four extreme groups with high (G1and G2) and low (G5and G6) score (Appendix – II).

Item difficulty index

Item difficulty was determined by percentage of respondents answering an item correctly. In practice, if an item is to distinguish among individuals, it should not be so easy that all people can answer it, nor should be difficult that none are able to answer it.

The index of item difficulty indicated the extent to which an item was difficult. The item difficulty as worked out in the present study was P i.e., percentage of the respondents answering an item correctly. The items with P value ranging from 30 to 70 were considered for the final selection of the standard knowledge. It was calculated by following the formula:

$$P = \frac{\text{No. of respondents answer correctly}}{\text{Total no. of respondents}} \times 100$$

Item discrimination index ($E^{1/3}$)

The second criteria for item selection were the discrimination index indicated by E 1/3 value for an item. The function of the item discrimination index is to find out whether an item really discriminates a well informed respondent from poorly informed respondent. The formula used is as follows :

$$E\frac{1}{3} = \frac{(S1 + S2) - (S5 + S6)}{\frac{N}{3}}$$

Where,

S1, S2, S5 and S6 = frequencies of correct answers in groups G1, G2, G5 and G6, respectively

N = Total no of respondents in the sample selected for item analysis, that is thirty. The item with discrimination index ranging from 0.30 to 0.70 was 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 item 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).

$$rpbis = \frac{Mp - Mq}{SD} \times pq$$

Where,

rpbis = Point biserial correlation

Mp = Mean of the total scores of the respondents who answered the item correctly

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

SD = Standard deviation of the entire sample

p = Proportion of the respondents giving correct answers to the item

q = Proportion of the respondents giving incorrect answers to the item (or) q= 1-p

Items having significant Point biserial correlation, either at 1 per cent or 5 per cent level of probability were selected for the final knowledge check.

Test of significance of rpbis:

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

$$t = \frac{rpbis\sqrt{N-2}}{\sqrt{1-rpbis\ 2}}$$

Where,

rpbis = Point biserial correlation

N = Total no of respondents

Reliability of the test

Split half reliability method was used to find out the reliability. The test was administered to thirty respondents and test was corrected by using the Spearman Brown formula and it was found to be r =0.63 was highly significant indicating a high degree of dependability of the test measuring knowledge of rural women in rice production.

Validity of the test

Content validity was measured to find the extent to which the item included in the test represents the total universe of rice production technology. The universe of the content was covered widely from the available literature, through interviews with several rural women, experts and extension personnel. Hence, it was assumed that the scores obtained by administering the knowledge test measures what it was intended to be measured.

Moreover, the validity of the test items also tested by the method of Point biserial correlation co-efficient (rpbis). The item with highly significant biserial correlation co-efficients at 1 per cent or 5 per cent level of probability indicated the validity of the items in relation to knowledge test designed to measure the knowledge of rural women.

III. RESULTS AND DISCUSSION

The results of the knowledge test obtained were as follows in Table-1. Out of 55 items, 28 items were finally selected based on item discrimination index and t values obtained. Each of the 28 items in the knowledge test were administered to the respondents 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 .

Table 1: Difficulty, Discrimination and Point Bi-Serial Correlation for Knowledge Test Items

Sl. No.	Frequencies of correct answers of respondents in four extreme groups				Total frequencies of correct answers N=30	Difficulty index P (%)	Discrimination Index ($E^{1/3}$)	Point biserial co-relation (rpbis)	" t" value
	G1	G2	G5	G6					
1.	3	5	3	1	19	63.33	0.40	0.360	2.0450*
2.	5	2	4	3	22	73.33	0.00	0.137	0.7329NS
3.	4	5	2	2	19	63.33	0.50	0.445	2.6310*
4.	4	2	1	1	15	50.00	0.40	0.237	2.2710*
5.	5	4	1	0	16	53.33	0.80	0.606	4.0306**
6.	5	3	3	1	19	63.33	0.40	0.447	2.6431*
7.	5	4	1	0	15	50.00	0.80	0.576	3.7294**
8.	5	2	4	3	22	73.33	0.00	0.137	0.7329NS
9.	5	5	2	0	16	53.33	0.80	0.535	3.3511**
10.	4	4	3	2	21	70.00	0.30	0.470	2.8167**
11.	4	4	1	0	16	53.33	0.70	0.506	3.1164**
12.	4	4	0	0	16	53.33	0.80	0.561	3.5828**
13.	5	3	1	1	13	43.33	0.60	0.348	2.0837*
14.	5	4	2	2	20	66.67	0.50	0.622	4.2041**
15.	3	2	2	0	11	36.67	0.30	0.160	0.8600NS
16.	3	3	1	2	14	46.67	0.30	0.164	0.8774NS
17.	4	4	2	0	18	60.00	0.60	0.561	3.5865**
18.	4	1	4	0	16	53.33	0.10	0.207	1.1188NS
19.	4	3	0	4	18	60.00	0.30	0.087	0.4645NS
20.	5	4	0	0	17	56.67	0.90	0.427	2.4987*
21.	5	3	2	0	14	46.67	0.60	0.437	2.5674*
22.	4	3	0	4	18	60.00	0.30	0.087	0.4645NS
23.	4	4	1	0	10	33.33	0.70	0.413	2.3996*
24.	4	3	2	3	17	56.67	0.20	0.127	0.6770NS
25.	5	2	2	0	15	50.00	0.50	0.414	2.4100*
26.	3	2	2	2	15	50.00	0.10	0.120	0.6411NS
27.	5	5	5	1	25	83.33	0.40	0.976	2.3876*
28.	5	4	3	1	20	66.67	0.50	0.619	4.1713**
29.	5	3	0	0	16	53.33	0.80	0.693	5.0935**
30.	5	4	2	1	18	60.00	0.60	0.574	3.7103**
31.	5	5	3	2	21	70.00	0.50	0.625	4.2394**
32.	5	4	3	5	24	80.00	0.10	0.084	0.4463NS
33.	5	2	0	0	14	46.67	0.70	0.439	2.5861*
34.	4	5	2	2	20	66.67	0.50	0.446	2.6405*
35.	5	4	2	2	21	70.00	0.50	0.646	4.4730**

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Sl. No.	Frequencies of correct answers of respondents in four extreme groups				Total frequencies of correct answers N=30	Difficulty index P (%)	Discrimination Index ($E^{1/3}$)	Point biserial co-relation (rpbis)	" t" value
	G1	G2	G5	G6					
36.	4	3	4	3	19	63.33	0.00	0.013	0.0687NS
37.	4	3	3	0	12	40.00	0.40	0.247	2.6364*
38.	3	3	4	2	16	53.33	0.00	0.038	0.2033NS
39.	4	3	2	1	20	66.67	0.40	0.545	3.4414**
40.	4	4	2	0	15	50.00	0.60	0.342	2.1415*
41.	5	2	4	3	22	73.33	0.00	0.137	0.7329NS
42.	5	4	3	3	20	66.67	0.30	0.276	1.5211NS
43.	4	3	3	0	12	40.00	0.40	0.247	2.6364*
44.	2	3	2	2	17	56.67	0.10	0.050	0.2638NS
45.	5	4	4	2	21	70.00	0.30	0.532	3.3240**
46.	2	4	4	2	18	60.00	0.00	0.081	0.4321NS
47.	3	3	3	1	15	50.00	0.20	0.136	0.7273NS
48.	4	4	3	2	20	66.67	0.30	0.203	2.0654*
49.	2	4	3	2	15	50.00	0.10	0.082	0.4328NS
50.	5	4	3	1	20	66.67	0.50	0.652	4.5484**
51.	4	4	2	0	15	50.00	0.60	0.342	2.1415*
52.	4	3	3	0	15	50.00	0.40	0.269	1.4767NS
53.	2	4	4	2	18	60.00	0.00	0.081	0.4321NS
54.	4	3	2	3	17	56.67	0.20	0.127	0.6770NS
55.	4	4	3	2	20	66.67	0.30	0.203	2.0654*

*Significant at 0.05 level of probability

** Significant at 0.01 level of probability

NS – Non Significant

IV. KNOWLEDGE LEVEL OF THE RESPONDENTS

From Table 2 it is evident that majority of the respondents had medium level of knowledge in Variety and seed selection (67.00%), Site selection, land preparation and Transplanting (72.25%), Harvesting (65.75%) followed by low level of knowledge Improved Nursery raising (54.50%), crop management (64.50%), Scientific processing (53.00%)and Storage and packaging (58.50%).

Table 2. Existing knowledge of rural women on improved practices of rice production
N=200

Sl. No.	Activity area	Category (score)	%
1	**Variety and seed selection**	Low < 3.43	22.25
		Medium 3.43 to 6.03	67.00
		High > 6.03	10.75
2	**Improved Nursery raising**	Low < 3.06	54.50
		Medium 3.06 to 5.24	41.75
		High > 5.24	3.75
3	**Site selection, land preparation and Transplanting**	Low < 2.54	14.75
		Medium 2.54 to 5.74	72.25
		High > 5.74	13.00
4	**Crop management**	Low < 3.38	64.50
		Medium 3.38 to 5.74	25.75
		High > 5.74	9.75
5	**Harvesting**	Low < 2.68	19.50
		Medium 2.68 to 4.78	65.75
		High > 4.78	14.75
6	**Scientific processing**	Low < 2.76	53.00
		Medium 2.76 to5.03	35.00
		High > 5.03	12.00
7.	**Storage and packaging**	Low < 3.87	58.50
		Medium 3.87 to 6.34	32.00
		High > 6.34	9.50

Distribution of Respondents According To Knowledge Level

Table 3 revealed that majority (69.00%) of respondent had medium level knowledge followed by low (21.50%) and high level of knowledge (9.5%). The low level of knowledge may be due to the fact that respondents had only few exposures to training

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on rice production technology. On the basis of the results the medium level of knowledge percentages was very high. It may be due to lack of awareness and lack of proper information regarding recommended rice production practices.

Table 3: Distribution of respondents According to their Knowledge Level N= 200

Sl. No.	Category	Frequency	Percentage	Mean Score	S.D	C.V
1.	Low > 7.58	43	21.5			
2.	Medium 7.58 to 12.46	138	69.00	10.02	2.44	24.35
3.	High < 12.46	19	9.5			

Relationship between knowledge and selected independent variables

Table 4 shows the relationship between level of knowledge and selected independent variables. The findings revealed that correlation between knowledge level and age was significant. It means knowledge of the rural women increased as their age increased. Again, correlation between mass media exposure and knowledge was significant. It means knowledge of rural women increased as their mass media exposure is high. Higher the mass media exposure they gather different information from different sources leading to increase in knowledge, hence found to be positively and significantly related. Again educational qualification, extension contact, organizational membership and socio-economic status had positive but non-significant relationship with knowledge.

Table 4. Relationship between knowledge and selected independent variables

N=200

Sl. No.	Variables	'r' value
1	Age	0.21*
2	Educational qualification	0.13
3	Extension contact	0.08
4	Mass media exposure	0.26*
5	Organizational membership	0.05
6	Socio-economic status	0.18

* Significant at 0.05 level probability

V. CONCLUSION

The standard test conducted to measure the knowledge of women rice farmers on recommended rice production technologies is useful for the researcher to find out number of items actually related to measure the knowledge level of the rice farmers. The knowledge tests developed for measuring the level of knowledge in improved rice cultivation practices for female farmers were found to be highly stable and reliable as indicated by the highly significant value of reliability co-efficient. The knowledge level of the respondents measured using the developed tests indicated that majority of the female farmers (69.00%) have medium level of knowledge. Therefore, women farmers in these villages should be provided with opportunities to participate in extension activities. They should be trained in different rice farming techniques. Training programmes and other extension activities should also be conducted to enhance the knowledge of the women rice farmers.

VI. RECOMMENDATIONS

- Women training centres should be established at national level whose responsibility to conduct training for rural women on different agricultural activities to enhance their knowledge and skill.
- KVK/line department, extension functionaries should give attention for increasing social and mass media participation, achievement motivation and innovativeness of farm women through effective and participatory trainings/ demonstrations for better understand and adoption of improved technology.
- Government should improve on the supply and access to improved and disease resistant rice varieties among women farmers in the study area.

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