



CONSTRUCTION OF KNOWLEDGE TEST TO MEASURE THE PADDY GROWERS KNOWLEDGE ON RECOMMENDED CROP PRODUCTION PACKAGE OF PRACTICES IN TAMIL NADU STATE

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ABSTRACT

The non-availability of a standardized scale to measure unreached farmer's knowledge level influenced the researchers to construct a test for measuring knowledge of unreached farmers of Tamil Nadu state on recommended paddy production package of practices. Pertinent items were collected covering all aspects from crop production guide developed by TNAU. After getting jury opinion on the items, test index of item difficulty, index of item discrimination and index of item validity were worked out. To administer the knowledge test a respondent was given one mark for each correct answer and zero for wrong answer. Thirty five (35) statements were finally selected from a total of sixty (60) statements.

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INTRODUCTION

In the present study knowledge was operationalized as the quantum of information known to the unreached farmers on recommended crop production package of practices in order to lead a sustainable life. A knowledge test was developed with thirty five (35) items to measure the knowledge of unreached farmers on recommended practices. Each item was measured on two point continuum viz., correct and incorrect with '1' and '0' score respectively. The possible maximum and minimum scores to be obtained by unreached farmers were 35 and 0 respectively. The detailed procedure followed for the construction and standardization of the knowledge test is shown below.

MATERIALS AND METHODS

Collection of items

On perusal of relevant literatures and discussion with the experts in extension, biological sciences, a total of 72 items were collected focusing on various aspects of paddy cultivation i.e., crop improvement, production and protection by referring the crop production guide of Tamil Nadu Agricultural University on Agritech portal. Experts in the field of Agronomy and Agricultural entomology of Prof. Jayashankar Telangana State Agricultural University were consulted for screening, fine tuning and editing of the items.

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Based on the opinion of the scientists a total of sixty (60) items were retained. These retained sixty (60) items were then subjected to item analysis to have suitable items to be included in the final schedule based on the opinion of the respondents from non-sample area.

Item analysis

The item analysis was carried out in terms of three indices that is item difficulty index, item discrimination index and point-biserial correlation. The index of item discrimination provides information on how well an item discriminates well informed respondent from poorly informed. Whereas item difficulty index indicates the extent to which an item was difficult. The main aim of calculating Point biserial correlation (rpbis) was to work out the internal consistency of the items i.e., the relationship of the total score to a dichotomized answer to any given item.

Difficulty index (P)

The selected items (60 items for paddy) were administered to 60 non-sample respondents with two point continuum response for each statement. The scores allotted were one (1) for correct response and zero (0) for incorrect response. After computing the total score obtained for each of the 60 respondents on items, they were arranged in order from highest to lowest. Based on which the 60 respondents were then divided into six equal groups. These groups were labelled as G1, G2, G3, G4, G5 and G6 with 10 respondents in each group.

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$$\text{Difficulty index} = \frac{\text{Total number of correct answers}}{\text{Total number of respondents}}$$

For the purpose of item analysis, the middle two groups G3 and G4 were eliminated keeping only four extreme groups with high and low scores. The index of 'Item difficulty' was worked out as the percentage of the respondents answering an item correctly. The items with 'p' values ranging from 30.0 to

70.0 were considered for the final selection of the knowledge test. For each item the correct answer was calculated to get the difficulty index. The results were presented in table 1.

Discrimination Index (E I/3)

Where S1, S2 and S5, S6 are the frequencies of correct answers in the groups G1, G2, G5 and G6 respectively. 'N' is the total member of respondents of the sample selected for the item analysis that is 60.

Table 1 Calculation for selection of suitable knowledge items for paddy crop

Sl. No.	Frequencies of correct answer of respondents in four extreme groups				Total frequencies of correct answers by all giving correct six groups	Percent of responses	Difficulty index (P)	Discrimination power (E I/3)	Point Biserial Correlation (Rpbis)
	G-1	G-2	G-5	G-6					
1*	10	7	5	1	39	65	57.5	0.55	0.551*
2	10	9	3	1	37	61.66	57.5	0.75	0.665
3*	10	8	5	0	42	70	57.5	0.65	0.609*
4*	10	5	5	2	38	63.33	55	0.4	0.403*
5*	8	6	2	1	38	63.33	42.5	0.55	0.421*
6*	10	8	6	2	46	76.67	65.0	0.5	0.472*
7*	10	7	2	2	39	65	52.5	0.65	0.557*
8	8	9	1	1	35	58.33	47.5	0.75	0.593
9	9	9	2	0	32	53.33	50	0.8	0.679
10*	10	8	7	3	52	86.67	70	0.4	0.419*
11*	9	9	4	1	45	75	57.5	0.65	0.530*
12	9	10	2	2	38	63.33	57.5	0.75	0.599
13	8	6	3	2	43	71.67	47.5	0.45	0.346
14	9	7	4	2	43	71.67	55	0.5	0.379
15*	9	8	4	2	41	68.33	57.5	0.55	0.475*
16	8	6	4	2	33	55	50	0.4	0.345
17*	10	7	4	4	50	83.33	62.5	0.45	0.445*
18*	10	10	4	4	50	83.33	70	0.6	0.523*
19*	10	7	3	0	38	63.33	50	0.7	0.629*
20*	9	10	4	2	47	78.33	62.5	0.65	0.536*
21*	9	6	2	1	32	53.33	45	0.6	0.517*
22	8	8	5	2	48	80	57.5	0.45	0.336
23	7	9	5	2	43	71.67	57.5	0.45	0.337
24	10	9	2	1	35	58.33	55	0.8	0.657
25	6	6	4	2	37	61.67	45	0.3	0.268
26	10	9	3	0	31	51.67	55	0.8	0.689
27*	9	8	2	2	36	60	52.5	0.65	0.501*
28*	9	8	5	3	44	73.33	62.5	0.45	0.406*
29	10	9	1	2	41	68.33	55	0.8	0.599
30*	10	7	2	2	43	71.67	52.5	0.65	0.496*
31*	9	7	2	1	29	48.33	47.5	0.65	0.548*
32	8	7	5	4	48	80	60	0.3	0.315
33*	8	10	4	2	37	61.67	60	0.6	0.511*
34*	9	8	2	2	37	61.67	52.5	0.65	0.518*
35	9	8	6	1	44	73.33	60	0.5	0.493
36	8	8	5	3	42	70	60	0.4	0.336
37*	10	8	5	1	46	76.67	60	0.6	0.500*
38	8	8	1	0	33	55	42.5	0.75	0.551
39*	9	7	3	3	41	68.33	55	0.5	0.436*
40*	10	9	5	2	48	80	65	0.6	0.541*
41	5	7	2	1	36	60	37.5	0.45	0.312
42	10	7	1	0	42	70	45	0.8	0.583
43*	9	10	6	2	55	91.67	67.5	0.55	0.498*
44*	10	7	4	2	50	83.33	57.5	0.55	0.462*
45*	9	7	3	1	44	73.33	50	0.6	0.472*
46*	10	9	4	3	54	90	65	0.6	0.484*
47	10	9	1	3	44	73.33	57.5	0.75	0.511
48	10	8	3	6	56	93.33	67.5	0.45	0.394
49*	8	8	2	2	44	73.33	50	0.6	0.418*
50*	9	8	2	1	38	63.33	50	0.7	0.584*
51	10	9	4	6	56	93.33	72.5	0.45	0.357
52*	10	6	3	2	43	71.67	52.5	0.55	0.469*
53*	10	10	5	3	53	88.33	70	0.6	0.513*
54	10	6	3	5	46	76.67	60	0.4	0.328
55*	9	5	1	1	25	41.67	40	0.6	0.527*
56	9	8	5	3	52	86.67	62.5	0.45	0.367
57*	10	9	5	4	50	83.33	70	0.5	0.424*
58*	10	8	4	5	50	83.33	67.5	0.45	0.400*
59	8	6	4	2	41	68.33	50	0.4	0.319

The discrimination index varies from 0 to 1. The items with discrimination index ranging from 0.30 to 0.70 were selected for the final test.

This shows whether the items actually distinguished a well-informed person from one who is inadequately informed about the subject matter. The formula used was as below. This is the second criterion for item selection i.e., by the item discrimination index indicated by 'E 1/3' is calculated with the formula. The results were presented in table 1.

$$\frac{(S1+S2) - (S5+S6)}{N/3} \quad \text{(or)}$$

$$D = \frac{R_u - R_l}{N}$$

Where,

- D : Discrimination Index
- R_u : Frequency of correct answers in high knowledge group
- R_l : Frequency of correct answers in low knowledge group
- N : Total number of respondents in sample taken for item analysis

Point Biserial Correlation (r_{pbis})

The main aim of calculating point biserial correlation (rpbis) was to work out the internal consistency of the items i.e., the relationship of the total score to a dichotomized answer to any given item. It is the correlation between right/wrong scores obtained by farmers in the non-sample area (Thiruvannamalai district) on a given set of items. The total scores the farmers obtained when their scores across the remaining items were summed up. It is a special type of correlation between a dichotomous variable (the multiple-choice item score which is right or wrong, 0 or 1) and a continuous variable (the total score on the test ranging from 0 to the maximum number of multiple-choice items on the test). Like in all correlations, point-biserial values range from -1.0 to +1.0. A large positive point-biserial value indicates that farmers with high scores on the overall test are also getting the item right and farmers with low scores on the overall test are getting the item wrong (Seemavarma, 2015). The results were presented in table 1.

Computation and interpretation of Point-Biserial Correlation

The scores obtained by the farmers are arranged in matrix comprised of 60 items. The items were represented in the matrix columns from left to right and farmers represented as rows. A value of '1' was assigned to correct response and '0' for wrong. The steps followed for computing Point-Biserial Correlation are 1. computed the total farmers score for each items 2. computed the total score minus each item score, 3. computed the Point-Biserial Correlation for each item using the 'CORREL' function.

A low point biserial implies that the farmer got the items incorrect. Therefore, items with low-point-biserial correlation values need further examination. It was reported by Seemavarma (2015) that the wordings, presentation or content of such items may explain the low point-biserial correlation. However, even if nothing appears visibly faulty with the

items, it is recommended that they may be removed from scoring and future testing or may even be removed from final set of questions that may be included in the interview schedule. It is always recommended to use a minimum threshold value for the point-biserial correlation. A point biserial value of at least 0.15 is recommended (Seemavarma, 2015) though experience shown that a very good number of items have point-biserial correlation value.

Point biserial correlation: item discrimination

The items to be considered for final inclusion into the interview schedule were based on its point biserial correlation value. Penn (2009) and McGahee and Ball (2009) have categorized items based on items point biserial correlation value i.e., the items which possess the point biserial correlation value of 0.20 and below said to be 'poor' and need revision, 0.20 - 0.29 said to be 'fair', 0.30 - 0.39 said to be 'good' and 0.40 - 0.70 said to be 'very good'. In the present study, the items which belong to 'very good' category (i.e., the items with point biserial correlation value of 0.40 – 0.70) were selected for final inclusion in the interview schedule.

Item selection

The items with difficulty level indices ranging from 30.0 to 70.0, discrimination indices ranging from 0.30 to 0.70 and the items with point biserial correlation ranging from 0.40 to 0.70 level were selected finally to include in the interview schedule for assessing the level of knowledge of unreached farmers on recommended crop production package of practices. A total of 35 knowledge items for paddy were finally selected (table 2).

Thus, the finally selected knowledge test items comprised of 3 types of questions viz true/false, multiple choice and direct one word questions. The selected items with frequency of correct response, P, E1/3 and Rpbis values for the selected.

Reliability of knowledge test

According to Kerlinger (1973) "Reliability is the accuracy or precision of measuring instrument". To know the reliability of the items the Split-Half method was followed.

Split-Half Methodology

The reliability of the scale was determined by split-half method. The selected items i.e., thirty five (35) items were divided into two halves. The two halves were further administered separately to 30 unreached farmers in a non-sample area (Thiruvannamalai district). The scores were subjected to product moment correlation test in order to find out the reliability of the scale. The half-test reliability co-efficient (r) was 0.431. Further, the reliability co-efficient of the whole test was computed using the Spearman Brown Prophecy formula (Singh, 1986) given below.

$$\text{Reliability co-efficient of whole test} = \frac{2 \times \text{Reliability co-efficient of half test}}{1 + \text{Reliability co-efficient of half test}}$$

The whole test reliability co-efficient of the whole test was computed using the Spearman Brown Prophecy worked out and the results were 0.603 for the items selected for paddy crop. According to Singh (1986), when the mean scores of the two groups are of narrow range, reliability co-efficient of 0.50

or 0.60 would be sufficient. Hence, the constructed scale to assess unreached farmers knowledge was considered reliable.

earlier. It was assumed that the score obtained by administering the knowledge test of this study measures what was intended to measure.

Table 2 Knowledge items identified for paddy crop to be included in the interview schedule

Sl. No.	Selected questions	Knowledge items for paddy (included in the interview schedule)
1	1	How much land is required to raise paddy nursery for one hectare of paddy cultivation?
2	3	What is the chemical used for seed treatment in paddy _____ a. Carbendazim b. Pyroquilonc.Both a and b d. none
3	4	How many days the paddy crop can be protected, when it is given wet seed treatment _____
4	5	Do you agree that, length of the seed bed varies with soil type and slope of the land _____
5	6	Soon after sowing the seed in nursery, what is the probable period of maintaining soil water saturation level
6	7	Is it necessary to increase the water level upto 1.5 cm from the 6 th day onwards _____ (T/F)
7	10	Level of water to be maintained during puddling in the mainfield _____ cm
8	11	How many days before puddling of mainfield the sufficient water has to be maintained _____
9	15	How much time the seedlings are to be kept in the bacterial suspension before transplanting _____ min.
10	17	What is the number of seedling to be transplanted per hill _____
11	18	Do you agree that shallow planting (3 cm) of paddy in the main field ensures quick establishment and more tillers. (T/F)
12	19	What is the best amendment for overcoming the salinity problem in the paddy fields _____
13	20	Do you feel that gap filling is not required during 7-10 days after transplanting _____(T/F)
14	21	Is it sufficient to maintain the spacing of 5 cm in the main field for running the rotary weeder _____(T/F).
15	27	What is the quantity of FYM to be applied in one hectare a. 12.5 t b. 15.5t c. 17.5 d. 20.5
16	28	At which day of transplanting you take observations with the help of LCC a. 14 DAT b. 18 DAT c. 20 DAT d. 22 DAT
17	30	What are the nutrient deficiency symptoms of N
18	31	What is the period of active tillering _____ a. 35-40 b. 50-55 c. 55-60 d. 70-75
19	33	At what stage of the crop you apply N and K fertilizers
20	34	Do you agree that the fully opened third leaf from the top as index leaf to compare LCC. (Yes/No)
21	37	What is the deficiency symptoms of Zinc
22	39	Do you think that the appropriate time for application of pre-emergence herbicide is after the emergence of seedlings of paddy _____ (T/F)
23	40	Do you know that, the herbicide is mixed with the sand before application _____(Yes/No)
24	43	What are the Nutrient deficiency symptoms of K (Potassium deficiency)
25	44	Do you agree that, usage of rotary weeder not saves labour, not aerates soil and root zone and also not prolongs root activity _____(T/F)
26	45	Do you know that, irrigation should not be given after herbicide application and also water should not be drained out (Yes/No)
27	46	At what leaf stage of the weeds, the Post-emergence herbicide is to be applied in the paddy field _____
28	49	Do you think, puddling and leveling maximize the water requirement (T/F)
29	50	Leaves fold longitudinally and larvae remains inside is a symptom of _____
30	52	Which pest can be controlled using Poison bait at 1 part zinc phosphide with 49 parts popped corn/rice/dry fish _____. a. Rat b. Cat c. Bat d. Earhead bug
31	53	What happens to paddy crop during booting and maturity stages when it is completely inundated _____. a. Root decay b. Leaf fall c. Stemfall d. Poor fruit set
32	55	Do you feel that, keeping the field weed free, trimming the field bunds, provide effective drainage pest population _____(T/F).
33	57	Avoiding excess application of 'N' fertilizer controls the pest population _____(T/F).
34	58	Do you agree that, usage of rotary weeder prolongs root activity _____
35	60	Circular patches of drying and lodging of matured plant is a symptom of BPH. (T/F)

* Items selected for final inclusion

Validity of the test items

The validity of the test items was tested by the method of correlation coefficient (r) and content validity. The items belonged to 'very good' category (i.e., the items with point biserial correlation value of 0.40 – 0.70) were considered to measure the knowledge of the unreached farmers on recommended crop production package of practices. Also the content validity of the knowledge test was derived from a long list of test items representing the whole universe on recommended crop production package of practices on paddy was collected by refereeing crop production guide of Tamil Nadu Agricultural University Agritech portal as discussed

Thus, the knowledge test developed, exactly measures the knowledge of unreached farmers on recommended crop production package of practices of paddy as it showed a greater degree of reliability and validity.

RESULTS

The table 2 represents the final knowledge items (i.e., thirty five (35)) selected for assessing the knowledge level of farmers on recommended crop production package of practices on paddy crop. The scale standardized may be directly used by a researcher for assessing knowledge level of farmers on recommended crop production package of

practices. The items selected finally using standard procedures includes different aspects of crop production and different form of questions viz., choose the best answers, yes or no type questions, true or false and fill up the blanks.

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Reference

- Kerlinger, F.N. 1973. Foundations of behavioral research. Holt, Rinehart and Winston. New York.
- McGahee, T.W. and Ball, J. 2009. How to read and really use an item analysis. *Nurse Educator*, 34: 166-171.
- Penn, B.K. 2009. Test item development and analysis. Presented at Creighton University School of Nursing Faculty Retreat, Omaha, Nebraska, US.
- Seemavarma.2015. Preliminary Item Statistics Using Point-Biserial Correlation and P-values, Education data System, Morgan Hill, California.
- Singh, A.K. 1986. Tests, Measurement and Research Methods in behavioural Sciences, Tata Mcgraw-Hill Publishing Company Ltd., New Delhi.

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