Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.6733

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (4):** 29-35 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Development of a Test for Measuring the Knowledge Level of Farmers in Paddy Cultivation

Mir Rufaida*, Rekhi Singh, Dar Mushtaq and Zahoor Shah

Division of Agriculture Extension and Communication, Shere Kashmir University of Agricultural Sciences and Technolog, Faculty of Agriculture, Wadura, Sopore

*Corresponding Author E-mail: ruffamir@gmail.com

Received: 19.07.2018 | Revised: 16.08.2018 | Accepted: 23.08.2018

ABSTRACT

A study was designed to develop a standardized test to measure the knowledge of paddy growing farmers. A preliminary test of thirty six knowledge items was initially administered to 30 paddy farmers for item analysis. Finally thirteen knowledge items were included in the final format of the knowledge test based on difficulty index (30 to 80), discrimination index (≥ 0.3). The reliability of the knowledge test was measured with the help of split-half method and the reliability coefficient was found to be 0.87, which indicates that the knowledge test is reliable. Also, criterion validity was measured after establishing theoretical relationship between knowledge and adoption of recommended package of practice. Adoption levels of recommended package of practices for rice were calculated for 30 farmers. These scores were correlated with the knowledge scores. The 'r' value was found to be 0.86. Since the 'r' values were significant at 0.01 level of probability, the scale developed was considered as valid. The test was further administered to 150 respondents and it was found that majority of the respondents (44%) had medium level of knowledge about recommended package of practices for paddy cultivation.

Key words: *Knowledge test, Reliability, Validity, Item Analysis. Difficulty Index*

INTRODUCTION

Rice (*Oryza sativa* L.) in Jammu and Kashmir it occupies an area of 261.66 thousand hectares with the production of 5456 thousand quintals. And in Kashmir valley it is cultivated over an area of 140.51 thousand hectares with a production of 3266 thousand quintals[2]. The state Jammu and Kashmir owns a distinct geographical outlook and agro climatic zones which in turn determine cropping patterns and productivity of crops. Given the variety of agro-climatic situations across the Kashmir Division and weather abnormalities in the long run the agriculturists and farmers have adopted several area specific and time specific cultivation practices to meet the requirements of the staple food crops. Jammu and Kashmir is well known for its rice. The growth rate particularly in the crop sector is on a decline as the percentage of deficit is continuing on a high, to meet the requirements of the growing population which has resulted in the import of these gaps from the central pool[9].

Cite this article: Rufaida, M., Singh, R., Dar M. and Shah, Z., Development of a Test for Measuring the Knowledge Level of Farmers in Paddy Cultivation, *Int. J. Pure App. Biosci.* **6(4):** 29-35 (2018). doi: http://dx.doi.org/10.18782/2320-7051.6733

Though the technological breakthrough in agriculture has resulted in increased productivity, yet the crop yields realized on the farmers' fields are considerably low as compared to those obtained on demonstration plots and farms of Research Stations. There exists considerable untapped yield potential in various crops which may be attributed to the gap in adoption of recommended practices and differences in input use levels between at the farmer's field and demonstration plots. However there is a sufficient potential to increase the productivity of food grains if farmers know and adopt scientific technologies that assumes greater significance in attaining potential output at the farm level.

Knowledge is generally understood as an intimate acquaintance of an individual with facts. Knowledge is one of the important components of behavior and as such plays an important role in the covert and overt behavior of an individual. In a development programme it is our endeavor to improve the level of knowledge of the participants with relevant facts. An appropriate knowledge test helps us to know the level of relevant knowledge of the respondents from time to time. Knowledge test score is also used as a variable to test its relationship with other variables.

There are considerable knowledge gaps between researchers, extension agents, and farmers. Farmers' experience or indigenous knowledge (IK) is accumulated over generations. Scientists' technical knowledge is synthesized from years of research. These two systems of knowledge should be integrated for the benefit of both and to enhance mutual learning to reduce knowledge gaps between farmers and researchers. The new knowledge and technologies are not reaching most of the farmers due to poor extension efforts. The technology delivery system should be re-oriented to handle changing circumstances and to deliver complex, knowledge-intensive technologies to farmers. Technical knowledge is an important factor in determining the adoption of improved crop management practices and increased yields. Transfer of knowledge intensive technologies has to receive priority. The bridging of knowledge gaps can bridge yield gaps. New paradigms need to be added to transfer and use newer quality seed and knowledge based technologies under new policy environments.

It has become imperative to develop an effective and holistic system of tackling lower production problems along with management of pests and diseases to make it more environmental friendly, economically viable and socially acceptable to farmers, which can be achieved through ecofriendly technologies. Extension activities involving more of skill based techniques which can be learned only through active participation of farmers is necessary. Hence, it was felt important to assess the knowledge level of paddy growing farmers in order to identify gap in adoption. Therefore, a study was designed to develop a standardized test to measure the knowledge of paddy growing farmers.

Keeping in view the importance of knowledge as one of the basic components that greatly affect the extent of adoption of the scientific practices the present study entitled "Development of a test for measuring the knowledge level of farmers in paddy cultivation" was undertaken.

MATERIAL AND METHODS

The study was conducted during 2017 in the state of Jammu & Kashmir. It is the Northern most state of India. Following steps were followed in the process of knowledge test construction

1. Collection of items

Considering the subject matter coverage forty nine and twenty seven items on different dimensions of paddy respectively were selected as knowledge measurement items.

2. Item selection.

A list of 65 judges was prepared, the judges considered were the agricultural extension workers, scientists in the agricultural universities, senior level extension workers of State Department of Agriculture and scientists in the area. A total of 37 judges have responded to the judgment sheets sent to them indicating the relevancy of statements included

in the format. The responses were given in the form of most relevant, relevant, undecided and not relevant to measure the knowledge of recommended package of practices for rice and maize. Based on the responses the relevancy weightages (ratio of actual score obtained by an item to the maximum possible score of that item) were calculated for all the items. The items which had above 80.85 relevancy weightage score and every one selected to measure the knowledge of rice growing farmers.

3. Framing of test items

Each item was transformed into a question form to elicit the information from the farmer as possessed by him or her at that point of administration of the test. The questions were framed in a simple and unambiguous manner

4. Pre-testing and item analysis:

The test items were initially pre tested in a non sample area to know the opinion of the 30 farmers about the language and content used in the test and to carry out the item analysis.

The item analysis of a test usually yields two kinds of information i.e. item difficulty and item discrimination. The index of item difficulty reveals how difficult an item is, whereas, the index of discrimination indicates the extent to which an item discriminates the well informed individuals from the poorly informed ones. The items were checked and modified on the basis of pretesting and administered on 30 respondents (here they were farmers) for item analysis. They were non respondents and randomly selected for the study. The items were administered on theses non sample respondents given a score 1 or 0 for each correct and incorrect item respectively. After calculating the total score of each respondent, the scores were arranged from highest to lowest in order of magnitude. These 30 respondents were divided in six groups, each having five respondents and were arranged in descending order of total scores obtained by them. These were named G1, G2, G3, G4, G5 and G6 respectively. For item analysis middle two groups were eliminated and only four extreme groups were considered for item analysis.

Calculation of difficulty index: the difficulty index of an item was defined as the proportion of respondents giving correct answer to that particular item. This was calculated by the formula:

$$Pi = ni/Ni \times 100$$

Where, *Pi* = difficulty index in percentage of the *ith* item

ni = number of respondents giving correct answer to *ith* item

Ni = total number of respondents to whom the *ith* item was administered i.e. 30 in the present case.

Calculation of discrimination index: the discrimination index can be obtained by calculating the phi-coefficient formulated by Mehta (1958) using $E^{1/3}$ formula

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

Where, S1, S2, S5 and S6 were the frequencies of correct answers in groups G1, G2, G5 and G6 respectively.

5. Selection of items for test:

The two criteria viz., item difficulty index and item discrimination index were considered for the selection of items in the final format of the knowledge test. The items with difficulty index ranging from 30 to 80 and discrimination index ranging from 0.30 and above were used. That is the items which are neither too difficult nor too easy to reply and could discriminate the well informed individuals from the less-informed ones were selected.

6. Final selection of items:

After the item analysis out of 49 statements a total of 13 statements were obtained and selected to carry out the study. The items in the final knowledge test for paddy were covering every major practice of the foodgrain cultivation. Therefore it was assumed that the scores obtained by administering this test measured knowledge of the respondents as intended.. Each item was transformed into a question and the responses were divided into three categories viz., 'Full', 'Partial' and 'No'. a score of '2', '1' and '0' was given to each response respectively.

The developed measurement was administered to farmers in non sample area to know its reliability and validity.

1. Reliability of the Scale.

Reliability refers to the precision of the instrument i.e. to the extent to which repeated measurement produces the same result. Any newly constructed scale has to be tested for its reliability before it is used. In the present study, the reliability of knowledge test scale was determined by test-retest method and split half method as followed by Yadav[7].

Split-half Method

Split-half method of reliability was used to ensure internal consistency of the scale. The final knowledge test was administered to a new sample of 30 farmers for paddy. The items on the scale were divided into odds and even numbered items. Scores of the two sets of the items obtained from 30 respondents were computed and correlated. A correlation coefficient of r=0.77 was obtained which was high enough to adjudge the scale as reliable. The reliability of the test was calculated by the Spearman-Brown formula[8]. The reliability coefficient of the test was found to be 0.87, which was found to be highly significant.

$$r_{tt} = \frac{2rhh}{1+rhh}$$

Where, r_{tt} = reliability coefficient of the test and r_{hh} = the correlation between two halves of the test.

2. Validity of the Scale.

To ensure that obtained test scores measure the variable they are supposed to do, validity of the scale has to be observed.

Criterion validity: In the present study, criterion validity was measured after establishing theoretical relationship between knowledge and adoption of recommended package of practice. Adoption level of recommended package of practices for rice and maize were calculated for 20 farmers following the procedure recommended by Sengupta[5]. These scores were correlated with the knowledge scores. The 'r' value was found to be 0.86. Since the 'r' values were significant at 0.01 level of probability, the scale developed was considered as valid.

TABLE 1: ITEM ANALYSIS OF STATEMENTS SELECTED FOR TESTING KNOWLEDGE ABOUT RECOMMENDED PPACKAGE OF PRACTICE OF PADDY

S.no	Knowledge items	Difficulty index (P) (30-80)	Discrimination index ($E^{1/2}$) (0.3 &above)	S=item selected R= item rejected
1	**Do you know the recommended varieties of paddy for your belt? If yes name**	70*	0.8*	**S**
2	**How many times paddy nursery bed should be ploughed before seeding?**	100	0	**R**
3	**What is the recommended fertilizer dose to be incorporated in the nursery bed during soil preparation?**	43.7*	0.6*	**S**
4	**What is the recommended seed rate for raising seedlings?**	100	0	**R**
5	**Do you know the recommended seed treatment before storage?**	0	0	**R**
6	**What is the recommended pre-sowing seed treatment?**	0	0	**R**
7	**What should be the level of water maintained in the nursery bed?**	90	0.2	**R**
8	**Do you know the scientific management if yellowing of seedlings is observed in the nursery?**	43.4*	0.4*	**S**
9	**Do you know about protected nursery?**	20	0.4*	**R**
10	**What is the recommended dose of FYM to be used in soil at final preparation of land?**	20	0.6*	**R**
11	**How many doses of nitrogen are recommended and when?**	73.4*	0.8*	**S**
12	**Do you know before applying top doses of nitrogen water should be completely drained out from the field?**	50*	-0.1	**R**

13	**Do you know the recommended use of fertilizers in paddy crop? Basal Dose of Urea?**	60*	1*	**S**
14	**DAP**	60*	1*	**S**
15	**MOP**	60*	1*	**S**
16	**1st split (urea)**	60*	1*	**S**
17	**2nd split (urea)**	36.7*	1*	**S**
18	**What is the recommended age of seedlings for transplantation?**	100	0	**R**
19	**What is the recommended number of seedlings per hill?**	73.4*	0	**R**
20	**What is the recommended spacing between the hills for better tillering?**	46.7*	0.9*	**S**
21	**For late transplanting or water logged conditions what is the recommended number of seedlings in a hill?**	23.4	-0.7	**R**
22	**Do you know the recommended weedicides for the notorious weeds? If yes name**	100	0	**R**
23	**After transplanting, within how many days weedicides should be applied?**	100	0	**R**
24	**What is the recommended water & nutrient management strategy at mid-tillering (18-22 DAT)**	70*	0.8*	**S**
25	**What is the recommended water & nutrient management strategy at panicle initiation (35-40DAT)?**	40*	0.7*	**S**
26	**What should be level of water at pre-heading stage (50-55DAT) to initiate heading?**	40*	0.7*	**S**
27	**Do you know in order to avoid water stress a thin level of water should be maintained from flowering to milk stage?**	20	0.6*	**R**
28	**At semi-dough stage (85-90DAT) what is the recommended water management strategy?**	0	0	**R**
29	**Do you witness seed rot and pre-emergence Damping off in seed beds? the symptoms? If yes, what are**	0	0	**R**
30	**Dark colored rot on the base of plants and white moldy growth on lower plant parts are symptoms of which disease?**	23.4	-0.7	**R**
31	**Which disease symptoms appear on all areal parts of the plant?**	83.4	-0.2	**R**
32	**Typical oval or circular spots on leaves and leaf sheath are a symptom of which disease?**	23.3	-0.5	**R**
33	**Which disease appears only after flowering, infecting grain/florets of panicle and producing greenish spore balls of velvety appearance?**	0	0	**R**
34	**What are the crop stages for fungicides applications?**	0	0	**R**
35	**What are the recommended fungicides?**	20	0	**R**
36	**What should be the interval between each pesticide spray?**	0	0	**R**

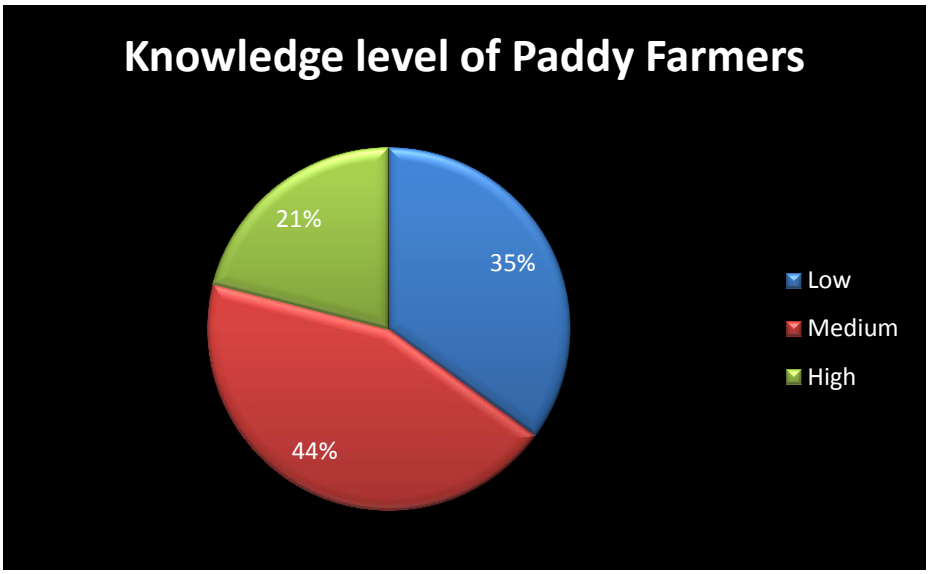
RESULT AND DISCUSSION

From 36 knowledge items, 13 items having difficulty index ranging from 30-80, discrimination index above 0.3 and significant was selected as shown in the Table 1.

The final knowledge items were administered on new 150 respondents. When the knowledge scores were analyzed, it was observed that only 21 per cent of the respondents had high level of knowledge, 35 per cent had lower level of knowledge and about 44 percent of the respondents had medium level of knowledge Yadav *et al*[7] and Divakar *et al*[3] also made similar observations using standardized knowledge test in their respective studies.

Table 2: Level of respondent's knowledge on paddy cultivation (N=150)

Levels of knowledge	*Details of respondents (%)*
Low	35
Medium	44
High	21



CONCLUSION

The test developed was scientifically tested for its validity and hence, it can be very well used to measure the knowledge level of farmers on scientific technologies related to rice farming in similar conditions with necessary modification. The result obtained would help to derive appropriate strategy for technology innovation, refinement and dissemination with respect to scientific technologies in rice farming.

REFRENCES

1. Anastasi, A., Psychological Testing. The Macmillan Company. *New York.* (1961).
2. Anonymous., *Digest of Statistics* (2012-13)
3. Divakar, S., Prema, L., Ajith Kumar C.E., Health and nutritional knowledge assessment scale for workers in cashew industry. *J Hu, Ecol,* **37(3):** 185-188 (2012).
4. Mehta, P., A Study of communication of Agricultural Information and the Extent of Distortion Occurring from District to Village Level Workers in Selected IADP Districts. Ph.D Thesis, *The University of Udaipur, Rajasthan.* (1958).
5. Sengupta, T., Developing Job Chart and Rating Scale for measuring Effectiveness of village Level Workers in the Intensive Agricultural District Programme. Phd. Thesis, Division of Agricultural

Extensoin, *Indian Agricultural Research Institute, New Delhi.* (1967).

6. Singh, A. K., Tests, measurements and research methods in behavioural sciences. 5th edn. *Bharati Bhawan. New Delhi*. (2013).
7. Yadav, D.S., Singh, U., Kumar, A., Development of a test for measuring the knowledge level of omen farmers in vegetable cultivation. *J Hum Ecol,* **41(2):** 113-117 (2013).
8. Guilford, J.P., Fruchter, B., *Fundamental Statsitics in Psychology and Education.* Singapore: McGrawhill Book Co. (1978).
9. Kaloo Mysir Jeelani & Prof. Tapan Choure., Present Status and Future Prospectus of Agriculture in Jammu and Kashmir. *IOSR Journal Of Humanities And Social Science (IOSR-JHSS)* PP **62:** (2015).