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

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ABSTRACT In the present study, a test was developed to measure the knowledge level of women farmers of Himachal Pradesh in vegetable cultivation practices. A preliminary test of twenty-eight knowledge items was initially administered to 42 women farmers who were involved in vegetable farming for item analysis. Finally, fourteen knowledge items were included in the final format of the knowledge test based on the difficulty index (30 to 80), discrimination index (> 0.20) and point-biserial correlation coefficient (≥ 0.236). The reliability of the knowledge test was measured with the help of split-half method and Kuder-Richardson Formula 20 and reliability coefficients were found to be 0.82 and 0.81, respectively, which indicates that this knowledge test is quite reliable. The test was further administered to 100 respondents and it was found that majority of the respondents (66.00 %) had moderate level of knowledge about vegetable farming.

INTRODUCTION

In India, women play a pivotal role in all types of household, farm and allied activities and are deprived from most of the privileges of life. Their work is not recognized in any statistical terms. Several research studies over the years have confirmed that women work for long hours of manual work daily on farming operations, livestock raising, fetching fodder, fuel and water from distant places and expending more total energy daily. Study conducted by Monga et al. (2008) reported that women farmers showed high extent of participation during and post harvesting farm operations while poor participation has been observed in handling the farm chemical inputs and other miscellaneous activities. They are deprived from the right of decision-making in important household affairs, adequate food, proper education and recognition in household and social affairs.

Women have traditionally been playing a very important role in sustainable agriculture development and the need of the hour is to strengthen their participation by empowering them with gender friendly technologies. It is generalized that sustainability cannot be achieved without the partnership between men and women. The agricultural growth can be further accelerated only by harnessing all resources including the human resource, fifty percent of which is women.

Himachal Pradesh is relatively a small and hilly state of India with the population of 60.57 lakh. Majority of the state's population is rural with a sex ratio of 974 females per thousand males and rural female population accounts for about 45 per cent of the total population. The women's contribution in performing agricultural operations is quite high in the state but still they are considered as non workers. The study conducted on time use pattern of hill women farmers in Himachal Pradesh revealed that women spent maximum time in farming activities followed by kitchen activities and management of animals and animal shed in both peak and slack periods (Kanwar et al. 2003). Since women are intricately linked to farming activities, their role in farming has thus become an important policy issue. In this regard, the major policy emphasis is now on the options that could promote women's active and effective participation in commercial farm-

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ing as well their empowerment. The income generating commercial farm activities like vegetable farming involve greater use of new technology. It is thus important that women should be exposed to these technologies in a systematic manner as their participation in vegetable cultivation practices is quite high. Knowledge is one of the basic components that greatly affect the extent of adoption of scientific practices. By enhancing women's knowledge and capabilities for applying new scientific techniques in farm sector will help them to reduce their burden, drudgery and maximization of farm profit.

Therefore, in order to formulate a strategy to develop skill and competency among women farmers, there is need to use suitable test to assess their knowledge level. Keeping this in view the present study entitled "Development of test for measuring knowledge level of women farmers in vegetable cultivation practices" was under taken.

Objectives

- To develop the valid and reliable tool for assessing the knowledge level of women farmers in vegetable cultivation.
- To assess the knowledge level of women farmers about vegetable farming.

METHODOLOGY

For the development of test for assessing the knowledge level of women farmers for vegetable cultivation practices, the procedure followed by Sharmah and Sithalakshmi (2001) with slight deviation was used:

i) Collection of Items

A list of 35 knowledge items that reflect various aspects of vegetable cultivation practices were collected for construction of the test. These items were collected through package of practices of CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur as well as other relevant literature besides the concerned scientists of the university.

ii) Preliminary Selection of Items

This list of 35 knowledge items was given to the concerned scientists of the CSK HPKV, Palampur to check the suitability of each question (knowledge item) for its inclusion in the preliminary test. They were also asked to add, delete, or modify any item, if they feel so. Finally, keeping in view the opinion of these scientists, 28 items were retained for item analysis.

iii) Item Analysis

The preliminary test containing 28 knowledge items (Table 1) was administered to 42 women farmers of different development blocks of Mandi district (HP). For this purpose, the score of one was assigned to the correct response and zero to each incorrect response. Thus, the range of obtainable score was 0-28.

iv) Final Selection of Items

Three objective criteria namely difficulty index, discrimination index and point biserial correlation were considered for the final selection of items in the knowledge test.

Difficulty Index (P)

The difficulty index indicates the extent to which an item is difficult. An item should not be so easy that all persons can pass it, nor should be so difficult that none can pass it. The item difficulty index was worked out in this study as P; that is, the percentage of respondents answering an item correctly. The difficulty index was calculated bv the following formula.

$$P = \frac{NC}{N} X 100$$

Where, P = Difficulty index, NC = Number of respondents who answered correctly and N is total number of respondents. The items with P values ranging from 30 to 80 were considered for the selection in the final knowledge test.

Discrimination Index (DI)

The second criterion applied for item selection was the discrimination index. The function of item discrimination index is to find out whether an item really discriminates a well informed respondent from a poorly informed respondent. In order to work out the discrimination index among the respondents for each question, the total score of the 42 respondents for the 28 knowledge items were ranked. The scores obtained were arranged in descending order of total

scores and the respondents were divided into six equal groups – G1, G2, G3, G4, G5, and G6 with 7 respondents in each group. The middle two groups namely G3 and G4 were eliminated and the four terminal groups; that is, high score groups (G1 and G2) and low score groups (G5 & G6) were retained for further analysis. The following formula was used to calculate the discrimination index of each item.

$$D1 = \frac{(S1+S2) - (S5 = S6)}{N13}$$

Where, DI =Discrimination index, S1, S2, S5, and S6 are the frequencies for correct answers in the group G1, G2, G5, and G6, respectively. N is total number of respondents in the sample selected for item analysis. In the present study, the item with DI value more than 0.20 was considered for final selection for inclusion in the knowledge test.

Point-biserial Correlation (r_{pbi})

For establishing internal consistency of the each item, point biserial correlation coefficient (r_{pbi}) was estimated. It was worked out by using the formula (Guilford and Fruchter 1978)

$$r_{pbi} = \frac{\bar{X}_p - \bar{X}_q}{S_t} \times \sqrt{pq}$$

Where, r_{pbi} = Point-biserial correlation coefficient, $\bar{X}_p$ = Mean score on continuous variable of successful group on dichotomous variable, $\bar{X}_q$ = Mean score on continuous variable of unsuccessful group on dichotomous variable, S_t = Standard deviation on continuous variable for total groups, p = Proportion of respondents who answered correctly on dichotomous variable and q = 1-p or the second group. The item with r_{pbi} value equal to or more than 0.236 was considered for the selection in the final knowledge test. Finally, 14 items were selected in the knowledge test by considering the objective criteria as stated above.

Reliability of the Test

The reliability of the knowledge test was determined by the following two methods:

i) Split-half Method

The final knowledge test was administered to a new sample of 90 women farmers of Seraj, Gohar and Sundernagar development blocks of the Mandi district. Thereafter, the test was divided into two equal halves. The reliability of the test was calculated by the Spearman-Brown formula (Guilford and Fruchter 1978). The reliability coefficient of the test was found to be 0.82, which was found to be highly significant.

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

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

ii) The Kuder-Richardson Method

The Kuder-Richardson method was also used to estimate the reliability of the knowledge test by using their formula known as Kuder-Richardson Formula 20 (Guilford and Fruchter 1978). The reliability coefficient of the test was found to be 0.81, which was also found to be highly significant.

$$r_{tt} = \left(\frac{n}{n-1}\right)\left(\frac{S_t^2 - \sum pq}{S_t^2}\right)$$

Where, r_{tt} = reliability coefficient of the test, n = number of items in the test, p = proportion of respondents who answered a test item correctly, q = 1-p and s_t^2 = variance of the test.

Both these reliability coefficients provide an estimate of the internal consistency of the test and thus the dependability of the test scores. On the basis of reliability coefficients determined by these two methods indicate that this knowledge test is quite reliable.

Content Validity

The knowledge items in the preliminary test were representing entire universe of the relevant behavioural aspects of the women farmers with respect to knowledge about vegetable farming as these were collected from package of the practices. The care was taken to include items which must cover every major practice of the vegetable farming and the same was validated by the concerned scientist of the university. The items in the final knowledge test were also covering every major practice of vegetable farming. Therefore, it was assumed that the scores obtained by administering this test measured knowledge of the respondents as intended.

The standardized knowledge test was administered to the selected 100 respondents. The

results were interpreted by giving '1' score for each correct response and '0' for incorrect answer respectively. The maximum obtainable score of a respondent was '14'. The sum of all the scores on each item was the total knowledge score of the individual respondent about the vegetable farming. The total score of each respondent was calculated and based on the mean and standard deviation; the respondents were grouped as low, medium and high knowledge categories.

RESULTS AND DISCUSSION

From 28 knowledge items, 14 items having difficulty index ranging from 30 – 80, discrimination index above 0.20 and significant bi-serial correlation was selected as shown in the Table 1.

When the knowledge scores were analysed, it was observed that only 14 per cent of the respondents were high scorers, 66 per cent were medium scorers and 20 per cent were low scor

Table 1: Item analysis of statements selected for testing knowledge about vegetable farming practices

S. No.	*Knowledge items*	*Difficulty index(P*	*Discrimination index (DI)*	*Point-biserial correlation co-efficient (r_{pbi})*	*S=Item Selected/ R=Item Rejected*
1	Name early sown variety of green pea ?	83.33	0.21	0.181	R
2	What is the seed rate of pea required for one *bigha* of area	45.24	0.86	0.416	S
3	What is the recommended spacing for the sowing of peas ?	66.67	0.11	0.207	R
4	Which fungicide is used before sowing for seed treatment?	59.52	0.32	0.197	R
5	What quantity of N:P:K (12:32:16) per *bigha* should be added in soil before sowing pea crop ?	61.90	0.43	0.272	S
6	What is the recommended weedicide used for controlling weeds in pea crop ?	35.71	0.43	0.168	R
7	How much quantity of water is required for making spray solution for one *bigha* area ?	30.95	0.75	0.475	S
8	Which one is disease of green pea that effects its yield drastically ?	50.00	0.32	0.120	R
9	Which one is recommended chemical used for the control of leaf minor in pea ?	54.76	0.21	0.082	R
10	Which one recommended chemical is used for the control of fruit borer ?	50.00	0.21	0.225	R
11	Name the improved late blight resistant variety of potato ?	38.10	0.64	0.285	S
12	What is the seed rate required for sowing potato in one *bigha* ?	40.48	0.96	0.476	S
13	What should be the idle weight of potato seed for sowing purpose ?	57.14	0.00	0.028	R
14	Which is the recommended chemical used for seed treatment in potato ?	40.48	0.43	0.293	S
15	What is the spacing for sowing of potato?	50.00	0.00	0.120	R
16	Which recommended pre-emergence herbicide is used in potato ?	61.90	0.86	0.519	S
17	What should be the weight of A grade potato ?	66.67	0.64	0.318	S
18	Which chemical is recommended for the management of cutworm ?	47.62	0.43	0.236	S
19	Which fungicide is recommended for control of Late blight of potato ?	52.38	0.11	0.011	R
20	What should be the idle size of nursery ?	73.81	0.21	0.139	R
21	What should be the seed rate per *bigha* required for raising nursery of cauliflower ?	35.71	0.96	0.606	S
22	What quantity of vermi-compost per *bigha* should be applied for growing vegetables ?	54.76	0.86	0.625	S
23	What is the recommended weedicide used for controlling weeds in cole crops ?	30.95	0.00	0.037	R
24	Early crop of cauliflower should be transplanted at a spacing of..... ?	45.24	0.32	0.310	S
25	Main season crop of cauliflower should be transplanted at a spacing of ..... ?	52.38	0.43	0.251	S
26	Which one is the variety of cabbage ?	47.62	0.11	0.049	R
27	Damping off disease in nursery is caused due to..... ?	59.52	0.11	0.044	R
28	Which chemical is recommended in cole crops for management of caterpillars ?	35.71	0.21	0.262	S

Table 2: Level of respondent's knowledge on vegetable cultivation (N=100)

Level of knowledge	*Details of respondents (%)*
Low	20 (20.00)
Medium	66 (66.00)
High	14 (14.00)

ers (Table 2). Divakar et al. (2012) and Yadav et al. (2009) also made similar observations using standardized knowledge test in their respective studies.

CONCLUSION

It is concluded from above findings that the developed knowledge test was found to be valid and a reliable tool which could be used for assessing the knowledge level of women farmers about scientific practices of vegetable farming. Further, specific findings of this knowledge test revealed that majority of respondents possessed moderate level of knowledge about vegetable cultivation.

RECOMMENDATIONS

Extension functionaries should organise training programmes for women farmers about vegetable farming for harnessing the full potential of this technology. Further, the researchers can make use of this knowledge test in Himachal Pradesh or in other areas where similar condition exists.

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