Original Research Article

A Test To Measure The Knowledge Level Of Cardamom Growers About The Eco-friendly Cultivation Practicesfrom a study carried out in the state of Kerala, India

ABSTRACT

The present study contemplates to construct a knowledge test to measure the knowledge level of cardamom growers with regards to various eco-friendly cultivation practices in cardamom. Ex- post facto research design was used for the study. Kerala state was chosen as the locale of the study. . Ex-post facto research design is widely used in social as well as behavioral sciences. It has strong points that make it the most appropriate research design in a number of circumstances as well as limitations that make it weak from the point of view of its internal and external validity.The study was conducted in the year 2021. The study was carried out in two taluks namely Udumbanchola and Devikulam of Idukki district as cardamom crop is grown extensively here. The knowledge test was conducted outside the sample area. The content of the test was composed of questions called items. The test consists of 65 items and can be applied to the cardamom growers. Finally after the knowledge test 37 items were selected and included in the interview schedule.Scientific knowledge about eco-friendly cultivation practices is very much important for enhancing the organic cardamom production. Out of 65 items 37 were selected to measure the knowledge level of eco-friendly cardamom growers. Overall knowledge was measured by using a knowledge test comprising of these 37 items.

Keywords: Knowledge test, pre-testing, item analysis, discrimination index

1. INTRODUCTION

Indian spices are famous all over the world and Cardamom known as the 'Queen of spices' produced mainly in the Kerala state which lies in the Western ghats.It is a spice withhigh export orientation in the global market hence, the usage of chemicals should be minimized to meet the international standards. In this context, eco-friendly farming is the most promising approach to attain the high quality produce to attract the importers all over the globe. Knowledge is defined as "all those behaviours and test situations which emphasizes the remembering either by recognition or by recall of ideas and material on some phenomena" (Bloom *et al.* 1958). A field study was conducted to measure the knowledge level of cardamom growers. The test was conducted for 60 respondents outside the sample area. The main objective of this study was to test the knowledge of farmers about the eco-friendly practices followed in the cardamom crop cultivation in the state of Kerala, India.

2. METHODOLOGY

Initially knowledge test was constructed and standardized. The content of the test was composed of questions called items. A comprehensive list (65) of knowledge questions on eco-friendly cultivation practices in cardamom crop was prepared. Items were framed in the objective form of questions namely

multiple choice, yes or no, true or false, fill in the blanks, and answer the following type. Pre-testing of the items was done as suggested by Gonard (1948). The Item analysis was carried out to yield two kinds of information *viz*., indices of 'Item difficulty' and 'Item discrimination'.

To analyze the items undertaken for item analysis, each response for multiple-choice, yes or no, true or false, fill in the blanks and answer the following type. Each question was given a score of one and zero for correct and incorrect responses respectively. After computing the individual total score for the 60 respondents, the respondents were arranged in descending order based on the total score. These 60 respondents were then divided into 6 equal groups named G1, G2, G3, G4, G5, and G6 with 10 respondents in each group. For item analysis, the middle two groups G3 and G4 were eliminated keeping only 4 extreme groups with high scores namely, Gl and G2, and low scores namely, G5 and G6. After getting the four extreme groups for item analysis, the responses for each of the items were subjected to calculate difficulty index, discrimination index, and point biserial correction as shown below.

Selection of the items for final knowledge test was done on the following criteria.

- The item difficulty index was worked out as the percentage of the respondents answering an item correctly.

$$\text{Item difficulty Index } (\text{P}) = \frac{\text{No. of respondents answered correctly}}{\text{Total no. of respondents}} \times 100$$

The items with difficulty index ranging from 20 to 80 were considered for the final selection for the knowledge test to avoid extremely simple and difficult items.

- The discrimination index of each of the items was computed by using the following formula.

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

Where, S1, S2, S5, and S6 are the frequencies of correct answers in groups G1, G2, G5, and G6, respectively, and N=Total number of respondents in the sample selected for item analysis (60). The value of the discrimination index for the knowledge items on production technology with special emphasis on eco-friendly cultivation practices in cardamom. The items with $E^{1/3}$ value ranging from 0.2 to 0.8 were considered for the final selection of knowledge test for the same reasons explained under the item difficulty index.

- Point biserial correlation (r_{pbis}) is the test validation in which the criterion of validity is considered to be internally consistent. That is the relationship of the total score to a dichotomized response to any given item. An item-by-item computation of point biserial correlation was calculated by using the formula.

$$r_{pbis} = \frac{MP - MQ}{SD} \times \sqrt{PQ}$$

Where

r_{pbis}= Point biserial correlation

MP = Mean of the total scores of the respondents who answered the items 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 items 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 items

Q= Proportion of the respondents giving incorrect answer to the items

(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.

Out of 65 items, 37 items were finally selected based on the criteria. The finally selected 37 knowledge test items comprised of four types of questions *viz*., Multiple choice (10 Nos.), Yes or no (5 Nos.), True or False (8 Nos.), Fill in the blanks (8 Nos.) and Answer the following (10 Nos.).

Reliability of the Test

The split half method was used to compute the reliability of the test. The test administered to 60 respondents was divided into two halves based on odd and even-numbered statements. Two sets of scores were derived on half forms of the test and the scores were correlated for the reliability of the half test. The self-correlation of the whole test was then estimated by the Spearman Brown Prophecy formula. The calculated value of reliability co-efficient (0.78) for the whole test was found to be highly significant, hence it was concluded that the test was reliable.

Validity of the test

Knowledge test developed on eco-friendly cultivation practices in cardamom was subjected to content and construct validity. The construct validity of the test items was tested by the method of point biserial correlation (r pbis). The items have significant values at 1 per cent and 5 per cent level indicated the validity of the test.

The content validity of the knowledge test was derived from a large pool of test items separately. The test items represented the whole universe of production technology with special emphasis on eco-friendly cultivation practices in the cardamom crop. It was thus assumed that the scores obtained by administering the knowledge test of this study measure what intended to measure.

Thus, the knowledge test developed in the present study can measure the knowledge of the farmers on production technology with special emphasis on eco-friendly cultivation practices and showed a greater degree of reliability and validity indicating that the test items were valid.

Practicability of the Test

Each item was read out to the respondents by the investigator and the response was recorded with a score of one for correct answer and zero for the wrong answer. The possible maximum and minimum possible scores that an individual respondent would get were 37 and 0 respectively.

3. RESULTS AND DISCUSSION

Scientific knowledge about eco-friendly cultivation practices is very much important for enhancing the organic cardamom production. Out of 65 items 37 were selected to measure the knowledge level of eco-friendly cardamom growers. Overall knowledge was measured by using a knowledge test comprising of these 37 items. The difficulty index, discrimination index and point biserial correlation for knowledge test is shown in Table 1.

The items with difficulty index ranging from 20 to 80 were considered for the final selection for the knowledge test to avoid extremely simple and difficult items.

The items with $E^{1/3}$ (discrimination index) value ranging from 0.2 to 0.8 were considered for the final selection of knowledge test for the same reasons explained under the item difficulty index. Items having significant point biserial correlation either at 1 per cent or 5 per cent level was selected for the final test of the knowledge.

Out of 65 items, 37 items were finally selected based on the criteria. The finally selected 37 knowledge test items comprised of four types of questions *viz*., Multiple choice (10 Nos.), Yes or no (5 Nos.), True or False (8 Nos.), Fill in the blanks (8 Nos.) and Answer the following (10 Nos.).

TABLE 1 SHOWING DIFFICULTY INDEX, DISCRIMINATION INDEX AND POINT BISERIAL CORRELATION FOR KNOWLEDGE TEST ITEM

Q	Frequencies of correct answers in four extreme groups	(P)	(E1/3)	(rpbis)
1	Which is the best suited soil for cardamom cultivation?	50.00	0.03	0.403NS
2	Which method is used for cardamom propagation in Kerala?	72.00	0.5	0.552NS
3	What is the important reason for adopting eco-friendly practices?	**80.00**	**0.6**	**0.231****
4	Which planting material used for cardamom propagation?	**71.00**	**0.5**	**0.207***
5	What is the annual rainfall requirement of cardamom crop?	67.00	0.5	0.4817NS
6	Which propagation method is earlier in bearing?	**42.00**	**0.4**	**0.4083***
7	What is the width and depth of trench used for rhizome multiplication?	90.00	0.2	0.4190NS
8	The eco-friendly mulching used for cardamom is	**50.00**	**0.5**	**0.3617***
9	Which is the resistant variety of Katte disease in cardamom?	50.00	0.05	0.269NS
10	Which is the resistant variety of Rhizome rot in cardamom?	42.00	0.02	0.013NS
11	Which cardamom cultivar is suitable for areas from 600 m to 1200 m elevation?	55.00	0.1	0.3348NS
12	Which is the most common variety of cardamom used in Idukki district?	**72.00**	**0.4**	**0.4817***
13	What is the management practice of cardamom specially done in hard soils?	**42.00**	**0.5**	**0.4083****
14	When is the mulching operation done in cardamom?	**50.00**	**0.6**	**0.4190***
15	What is the spacing of Mysore and Vazhuka cultivars?	50.00	0.1	0.4116NS
16	When is the planting done in cardamom?	10.00	0.5	0.3617NS
17	Fertilizer requirement(NPK) for rhizome multiplication in cardamom is (in Kg/ha)	16.00	0.01	0.4385NS

18	The recommendation of nutrient (NPK)for cardamom in Kerala under rain fed situation is(Kg /ha)	100.00	0.15	0.4190NS
19	The main pollinating agent in cardamom is	**57.00**	**0.5**	**0.1960***
20	How many honeybee colonies are kept in one hectare area?	**70.00**	**0.3**	**0.087***
21	Do you know the crop residues can be recycled into compost that boosts the soil fertility?	**57.00**	**0.6**	**0.4190***
22	Do you know about removal or reduction of crop residues to break the life cycle of pests and diseases?	25.00	0.1	0.338NS
23	Do you know about the collection and destruction of pest and disease affected plant parts and shoot?	**73.00**	**0.5**	**0.4885***
24	Do you know to prevent the major fungal disease Azhukal we can do incorporation of *Trichoderma* can be used along with cow dung for controlling this disease?	70.00	0.15	0.1960NS
25	Do you know to facilitate honeybee mulch should be removed during May-June after pre-monsoon showers	**62.00**	**0.6**	**0.3645***
26	Do you know regular roughing of virus affected plants should be made to reduce the spread of Azhukal disease?	95.00	0.4	0.413NS
27	Do you know forking is done to promote root penetration?	**79.00**	**0.6**	**0.2908***
28	Do you know about IPM practices and how they are helpful in pest control?	**60.00**	**0.4**	**0.3683***
29	Do you know about seed treatment in cardamom before planting in nurseries?	40.00	0.3	0.3761NS
30	Do you know that mulching is done to conserve moisture and to control weeds?	100.00	0.85	0.2033NS
31	Selection of pest and disease free rhizome is important for healthy crop and good yield.	**72.00**	**0.7**	**0.4990***
32	Thrips population is high during December to May when the temperature is high.	10	0.3	0.164NS
33	Shade regulation is an important activity in cardamom	**50.00**	**0.7**	**0.3645****
34	The condition “Cardamom itch” is caused by thrips.	**63.00**	**0.4**	**0.1960****
35	Spade weeding should be avoided because it can loosen the soil.	**79.00**	**0.4**	**0.231***
36	Application of 0.5% neem oil on the under surface of the leaves helps to prevent Whitefly (*Singhiellacardamomi*).	88.00	0.05	0.2908NS
37	Deep planting of rhizome should be avoided as it results in suppression of the growth of new shoots that may cause decaying of underground stem.	82.00	0.8	0.3645NS
38	Contour bunding may be resorted in sloppy lands to conserve soil and water	**73.00**	**0.5**	**0.167***
39	Trashing is done before onset of monsoon.	**64.00**	**0.8**	**0.013***
40	Earthing up is recommended during October- December	**45.00**	**0.5**	**0.2159***
41	Application of Neem oil helps to prevent insect pest	**55.00**	**0.9**	**0.3288***
42	Cardamom is a ……. plant.	**46.00**	**0.7**	**0.404****
43	..... cultivar is suitable for areas from 900 to 1200 m elevation	10.00	0.4	0.552NS
44	The temperature range suitable for cardamom is ……..	83.00	0.4	0.317NS
45	Application of FYM in pits while planting helps in ……..	**73.00**	**0.6**	**0.362***
46	The spacing of Malabar cultivar of cardamom is ……..	95.00	0.5	0.3288NS
47	Trashing is.....	**77.00**	**0.5**	**0.5459***

48	The widely cultivated local varieties of cardamom are …… and ……	20.00	0.1	0.5431NS
49	Name a shading tree in cardamom ……..	**63.00**	**0.7**	**0.621***
50	Trashing is commonly done in the month ……..	10.00	0.5	0.1960NS
51	The main organic manures used in cardamom……..	**33.00**	**0.6**	**0.3012***
52	Fertilizers are mainly applied in.....splits.	82.00	0.7	0.1960NS
53	Honey bee colonies are maintained for ……..	**48.00**	**0.4**	**0.013***
54	Cardamom plants normally start bearing capsules from the .....year of planting.	**39.00**	**0.4**	**0.318***
55	What is the interval of picking in cardamom?	**72.00**	**0.4**	**0.410****
56	What is the culture used for seed treatment for managing nursery rot diseases?	45.00	0.03	0.439NS
57	What is the amount of neem cake and vermicompost used per plant in a year?	**68.00**	**0.2**	**0.4817**
58	What is erected for the pest surveillance in cardamom crop?	**56.00**	**0.3**	**0.100***
59	What is the colour of cardamom capsules which fetch a premium price in foreign countries?	17.00	0.1	0.329NS
60	What is the pit size of cardamom in the main field?	98.00	0.8	0.693NS
61	Which is the viral disease that spreads when vegetative propagation is done?	82.00	0.45	0.20NS
62	Why do you avoid planting of jack, mango, fig etc as shade trees?	**53.00**	**0.55**	**0.4116***
63	Which variety is more tolerant to infestation by thrips?	83.00	0.4	0.4083NS
64	Why do we apply Methanobacterium or pseudomonas during summer?	**66.00**	**0.65**	**0.3683****
65	Why do you think it's better to use biological pest control than chemical pest control?	**78.00**	**0.5**	**0.4116***

4. CONCLUSION

Scientific knowledge about eco-friendly cultivation practices is very much important for enhancing the organic cardamom production. Out of 65 items 37 were selected to measure the knowledge level of eco-friendly cardamom growers. Overall knowledge was measured by using a knowledge test comprising of these 37 items shown in table 1. From the study conducted it was clear that the knowledge level of the farmers can be uplifted by improving the effectiveness of agricultural extension services and capacity building of the farmers.

References

Bloom, B.S., Engelhardt, M., Frust, E., Hill, W and Rathwal, D.R. 1956. *Taxonomy of educational objectives Vol. 1: The cognitive domain*. Orient Longmans, New York.

Gonard, H.S. 1948. *Characteristics and uses of item analysis of data.*Psychological monograph.

Chetan, M.G. 2011. A study on knowledge and adoption of cardamom cultivation practices by the farmers of Chikmagalur district. *M.Sc. (Ag) Thesis.*University of Agricultural Sciences, Dharwad.

Midame, A and Pyasi, V.K. 2020.A study on knowledge about organic farming practices possessed by the farmers and their adoption in selected blocks of Balaghat district (M.P.).*Plant Archives*. 20 (2): 4621-4626.

Muralikrishnan, L. 2015. Eco–friendly conservation practices in the Nilgiris district of Western Ghats – an analysis.*Ph.D Thesis.*Tamil Nadu Agricultural University, Coimbatore.

Muthukumar, R. 2016. A study on knowledge, adoption and marketing behaviour of medicinal plant growers.*Ph.D Thesis.*Annamalai University, Annamalainagar.

Prasad, H.D.V., Singh, P and Venkataramulu, M. 2018. Study on farmers level of knowledge towards vegetable cultivation. *The Journal of Research, ANGRAU.*46(2): 75-82.

Sivaraj, P. 2017. Impact of organic farming on livelihood security of farmers- an analysis.*Ph.D. (Ag) Thesis*.Tamil Nadu Agricultural University, Coimbatore.

Supe, S.V. 2007.*Measurement techniques in social sciences*.Agrotech publishing academy, Udaipur.

Suji, B.D and Kumar, A.M.S. 2020.A study on adoption of eco-friendly technologies and constraints*.Plant Archives.* 20 (1): 42-46.

Vashishtha, U., Sharma, F.L and Jain, H.K. 2012.Adoption of chilli production technology among the farmers.*Rajasthan Journal of Extension Education.*20(1): 69-73.

Verma, S. K. 2009. A study on knowledge and adoption of organic farming practices in paddy cultivation among the tribal farmers of Kanker district. *M.Sc. (Ag.) Thesis.*Indira Gandhi Krishi Vishwavidyalaya. Raipur.

www.indiastat.com

www.indianspices.com