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DEVELOPMENT OF SCALE TO MEASURE OF FARMERS REGARDING IPM PRACTICES IN TOMATO CULTIVATION

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ABSTRACT
Pesticides may be used to remove or prevent the target organism, but only when assessment with the help of monitoring and scouting indicates that they are needed to prevent economic damage. Pest control tactics, including pesticides, are carefully selected and applied to minimize risks to the human health, beneficial and non-target organisms and environment. The slowing down of growth in agricultural productivity paved way to promote use of alternative pest control technologies such as bio-agents, bio-pesticides and plant-based pesticides in an IPM mode to control the pest menace effectively. Hence, the present study is designed with the following specific objective to develop a scale and measure the perception of farmers towards IPM practices in tomato cultivation.

KEYWORDS: IPM, Perception and Tomato cultivation.

INTRODUCTION

Integrated Pest Management (IPM) is an ecologically based strategy that focuses on long-term solution of the pests through a combination of techniques such as biological control, habitat manipulation, modification of agronomic practices and use of resistant varieties. Embracing a single tactic to control a specific organism does not constitute IPM, even if the tactic is an essential element of the IPM system. Integration of multiple pest suppression techniques has the highest probability of sustaining long-term crop protection.

METHODOLOGY

Perception is operationalised as understanding and interpretation of farmers about IPM practices in tomato cultivation. The method suggested by Likert (1932) and Edwards (1967) in developing summated rating scale was followed in the construction of perception scale. The procedure followed in construction of the scale is depicted in separate headings.

1. Collection of items: The first step in the construction of scale was to collect exhaustive statements or items pertaining to the farmers perception about IPM practices in tomato cultivation. Tentative list of 51 statements pertaining to the perception about IPM practices in tomato cultivation was prepared based on the available literature and discussion with experts from selected areas.

2. Editing of the items: The statements were edited as per the 14 criteria suggested by Thurstone and Chave (1929) and Edwards (1967). As a consequence 18 statements were eliminated and the remaining 33 statements were included for the study.

3. Relevancy analysis: Thirty three statements were mailed to 110 experts in the agricultural extension and other related fields working in SAUs and ICAR institutions to critically evaluate the relevancy of each statement viz, Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR), Less Relevant (LR) and Not Relevant (NR) with the score of 5,4,3,2,1, respectively. The judges were also requested to make necessary modifications and additions or deletion of statements, if they desire so. A total of 56 judges returned the questionnaires, duly completed were considered for further processing. From the data gathered, 'relevancy percentage" and "mean relevancy score" were worked out for all the 33 statements. Using these criteria individual statements were screened for relevancies using the following formulae:

$$\text{Relevancy weightage} = \frac{\text{MR X 5 + R X 4+ SWR X 3 + LR X 2 + NR X 1}}{\text{No. of judges responded x Max. possible score}}$$

$$\text{Mean relevancy score} = \frac{\text{MR X 5 + R X 4+ SWR X 3 + LR X 2 + NR X 1}}{\text{No. of judges responded}}$$

Accordingly statements having 'relevancy percentage' of 75 per cent and above mean relevancy score of 3 and above were considered for final selection. Twenty three statements were retained after relevancy test and these statements were suitably modified and written as per the comments of the judges wherever applicable.

4. Item analysis: To delineate the statements based on the extent to which they can differentiate the perception statements about IPM practices as lower or low

perception, item analysis was carried on the statements selected in the first stage. For item analysis, were arranged in ascending or descending order based on relevancy score. Twent-five per cent of the subjects with the highest total score and 25 per cent with the lowest total scores. These two groups provided the criterion group for which item analysis was conducted and critical ratio was calculated by using the following formula.

$$t = \frac{\dot{X}_H - \dot{X}_L}{\sqrt{\frac{\sum X^2_H - \frac{(\sum X_H)^2}{n} \times \sum X^2_L - \frac{(\sum X_L)^2}{n}}{n(n-1)}}}$$

Where,
X_H = The mean score on given statement of the high group
X_L = The mean score on given statement of the low group
$\sum x^2_H$ = Sum of squares of the individual score on a given statement for high group
$\sum x^2_L$ = Sum of squares of the individual score on a given statement for low group
N = Number of respondents in each group
$\sum$ = Summation
T = The extent to which a given statement differentiate between the high and low group.

Based on the item analysis (t value), 18 statements which were statistically significant at 5 per cent and 1 per cent were finally retained in the scale to measure the perception of tomato cultivators towards IPM practices.

5. Reliability and validity of the scale:
Pilot study was conducted in non-sample area in Tumkur district of Karnataka state where 32 tomato growing farmers were selected from Hurdigere hobli of Tumkur taluk. Split half method employed to test the reliability of the perception scale. The value of correlation coefficient was 0.8124 and this was further calculated by using Spearman brown formula and obtained the reliability coefficient for the whole test. The value of the scale was 0.896 which was highly significant at one per cent level indicating high reliability of the scale.

TABLE 2. Final perception scale

Sl. No.	Statements	t value
1	IPM is eco-friendly sustainable practice	1.7561*
2	Deep summer ploughing is not an effective method for management of the soil borne diseases and pests	1.8071*
3	Certified seeds prevent the carryover of pest species through seeds	1.7657*
4	Seed treatment is one of the best preventive methods of reducing pest population	3.5374**
5	Selection of disease resistant and tolerant varieties is a better method than treating the disease and pest attacked crop	1.7619*
6	Removal of previous crop residues reduces the incidence of diseases and pests	1.7935*
7	Use of light and pheromone traps reduces the disease and pest attack	1.8715*
8	Collection of pests and their destruction is a major activity in IPM	1.9215*
9	Maintenance of proper pest and defender ratio is not required to keep the pest population below economic threshold level (ETL)	1.9259*
10	Use of bio-pesticides/bio-fertilizers/bio-agents is detrimental to crop growth	1.6170*
12	It is important to spray the recommended quantity of chemicals to manage the pest effectively	2.0464*
15	Large scale use of pesticides causes consequent resurgence of pests	1.7937*
16	Spraying of bio-pesticides controls the harmful pests and diseases	1.5923*
18	IPM technology protects the beneficial insects in the field	1.7810*
20	IPM requires intensive knowledge which only a qualified person can carryout	1.7549*
21	IPM is not suitable for tomato cultivation	2.5877**
22	IPM is a cost effective	1.6502*
23	IPM could be adopted by all types of farmers	1.8801*

The validity coefficient of the scale was 0.9465 which was also statistically significant at 1 per cent level of probability indicates the higher validity of the developed scale. Hence the scale is said to be valid. Thus the developed scale to measure the perception of tomato cultivators towards IPM practices was feasible and appropriate.

6. Administering the scale: The final scale consists of 18 statements for determining the perception of farmers towards IPM practices in tomato cultivation. Of which, eleven are positive statements and the remaining seven statements are negative. The response were collected on a five point continuum namely, strongly agree, agree, undecided, disagree and strongly disagree with assigned score of 5, 4, 3, 2, and 1, respectively for positive

statements and vice versa for negative statements. Thus the minimum and maximum score one could get is 18 and 90, respectively. Higher the score indicates the high level perception of farmers towards IPM practices in tomato cultivation and lesser the perception score indicates lower perception level of farmers.

Further, the respondents were classified into three categories based on mean and standard deviation as follows:

Category	Criteria	Score
Average	Below (mean – 0.5SD)	<65.79
Good	Between (mean ± 0.5SD)	65.80-76.02
Better	Above (mean + 0.5SD)	>76.03

The statements were ranked based on the total perception score to know the extent to which the respondents have understood the each practices in IPM. The procedure followed in calculating is as follows;

1. For positive statements

Perception score=SA(n1)X5+A(n2)X4+UD(n3)X3+DA(n4)X2+SDA (n5)X1

Where
n1=number of respondents strongly agreed
n2=number of respondents agreed
n3=number of respondents Undecided
n4=number of respondents Disagreed
n5=number of respondents strongly disagreed

2. For Negative statements

Perception score=n1X5+n2X4+n3X3+n4X2+n5X1

Where
n1=number of respondents strongly disagreed
n2=number of respondents dis agree
n3=number of respondents Undecided
n4=number of respondents agreed
n5=number of respondents strongly agreed

CONCLUSION

The scale developed to measure the perception of the farmers towards IPM practices was found reliable and valid hence, it can be used to measure the perception of farmers towards IPM in vegetable crops.

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