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Impact of Integrated Pest Management Programs on Knowledge of Tribal Farmers of Karnataka

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ABSTRACT

ICAR-National Research centre on Integrated Pest Management, New Delhi and University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka, India were organising various training programs to cater felt needs of the remote tribal farmers. The training programs focus on integrated pest management technologies which make use of locally available material for managing pests. The present study was conducted during the year 2020 and a total of 85 tribal farmers and women were selected from Sirsi district of Karnataka. The ex-post facto evaluation of training programmes revealed that there was an overall increase of 45.9 per cent in knowledge level of respondents regarding various plant protection activities. However, 23.0 per cent gaps indicated that tribal men farmers and women were not well conversant of IPM activities. More technical gaps were recorded on identification of pest and natural enemies, use of bio control agents. Socio-economic attributes of tribal farmers had not much influence in improving their knowledge on plant protection strategies and hence, a number of training programmes were organised need-based training IPM training programmes to enhance their knowledge and skill of these farmers to modify their plant protection strategies for enhancing the crop yield and income for their lively-hood.

Key Words: Knowledge gain, IPM, Training, Tribal Farmers.

INTRODUCTION

ICAR-National Research Centre for Integrated Pest Management (NCIPM), India was established in February 1988 to cater to the plant protection needs of different agro-ecological zones of the country. In spite of a large expert workforce across different plant protection disciplines, there are still epidemics of pests on different crops and in the recent past with the chronic pest problems assuming serious proportions. ICAR-NCIPM, New Delhi in active collaboration with scientists and extension functionaries of University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka had selected Yellapur, a town panchayat city in Uttara Kannada district of Karnataka and was conducting regular training programmes on IPM for tribal community of this area.

The main aim of the training programmes was to provide hand on experience regarding pest management to tribal farmers who are actively engaged in agriculture. The training schedule was prepared or tailored to felt needs of the tribal farmers, their human and physical resources for improving their agricultural practices. The efforts were made to teach these tribal neglected farmers regarding IPM practices and training methodology emphasized learning by doing and by practicing the learned techniques. This programme was developed to safeguards and for the upliftment of neglected remote and weaker communities like tribal farmers.

Initially, a number of efforts were made by the two partners involved in the project to improve the socio-economic status of the tribal farmers. However, these farming community neither rely on scientists nor the have better communication. But after lot of discussion and deliberations scientists,

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extension functionaries and tribal farmers had developed communication media and they learnt the Good Agricultural practice by interactive approach Slowly the tribal farmers were well equipped with adequate agricultural practices and these farmers started adopting IPM practices and made a paradigm shift in agronomic decisions. After lot of motivation few lady farmers got actively involved in all the programmes and learnt plant protection strategies and later also became ambassador and started imparting training, group meetings, interactions with nearby villages. A number of follow up actions were also carried out through their exposure visits to Shivamogga IPM fields, UAHS, greenhouses, group discussions and quizzes etc., which helped these tribal farmers to change their mind and alter the agronomic and plant protection practices. In present study, effort has been made to assess the improvement in knowledge of tribal farmers on Good agricultural practices.

MATERIALS AND METHODS

Locale and brief description of the study area

The present study was carried out in tribal districts of Uttara Kannada Karnataka in the Yellapur panchayat. The Yellapur town panchayat has a population of 20,452 of which 10,250 are males while 10,202 are females. The literacy rate of Yellapur city is 89.6 per cent which is higher than the state average of 75.4 per cent. In Yellapur, male literacy is around 93.3 per cent while female literacy rate is 85.8 per cent. Yellapur town panchayat has total administration over 4,805 houses to which it supplies basic amenities like water and sewerage facilities (Ravindra *et al,* 2019)

Selection of respondents and data collection

With the help of State Agriculture Department of Karnataka 85 tribal farmers involved in the agriculture were identified. In the beginning of training programme the knowledge of these farmers was assessed through a well-structured pre-course evaluation test prepared jointly by ICAR-NCIPM, New Delhi and UAHS Shivamogga, Karnataka. The answers of these participants were recorded on scale point and scored accordingly. The scores were assigned according to knowledge of tribal farmers in identification and management of pests. A tribal farmer having excellent knowledge was awarded 5 scores, for fair knowledge, 4, good (3), little knowledge (2) and very little knowledge (1) and '0' for no knowledge. Thus, knowledge of tribal farmers was measured on interval scale of 0-5.

Statistical Analysis

$$\% \text{ increase in knowledge} = \left(\frac{post\ test\ score - pre\ test\ score}{post\ test\ score}\right) X\ 100$$

T-test was used to study the significance of difference in knowledge between pre and post knowledge tests. Similarly, correlation coefficient (r) was employed to study the effect of socio-personal characteristic on knowledge gain in tribal farmers.

$$\text{T-test} = \frac{x-\mu}{\sqrt{s2}/n}$$

Where x is the sample mean, s^2 is the sample variance, n is the sample size, μ is the specified population mean and t is a student t quantile with n-1 degrees of freedom.

$$\text{Correlation coefficient} = \frac{\Sigma\ (\Sigma xy - (\Sigma x)\ \Sigma\ (y)/N}{[(\Sigma x2) - (\Sigma x2)N] - [(\Sigma y\ 2)\ /N]}$$

Where r = Coefficient of co-relation

x = independent variable

y = dependent variable

N = Total number of respondents

RESULTS AND DISCUSSION

The tribal farmers of the studied area were growing crops *viz.,* paddy, vegetables (eggplant and tomato) and areca nut. ICAR-NCIPM, New Delhi UAHS, Shivamogga, Karantaka and Tribal IPM ambassador regularly organised the training programme at least one in each month to orient them about the Good Agricultural Practices (GAP) and the impacts were analysed (Table 1). A number of these programme were also conducted on seed selection, seed treatment, weed management, use of various types of traps, use of label claim pesticides, preparation of *neem* seed kernel extract and line cultivation etc.

Table 1. Percent increase in knowledge of tribal farmers regarding integrated pest management technology

Sr. No.	Knowledge	Mean Score		Increase %
		Pre-Training	Post Training	
1	Seed selection	1.0	3.2	44
2	Seed treatment	0.0	2.9	58
3	Raising healthy nursery	0.5	1.7	24
4	Seedling treatment	0.0	1.9	38
5	Land preparation	1.2	1.9	14
6	Weed management	0.5	1.1	12
7	Vermi-compost	0.0	1.7	34
8	Bio-fertilisers	0.0	1.4	28
9	Diseases	1.1	2.8	34
10	Nematodes control	0.0	1.6	32
11	Chemical pesticides	2.1	3.2	18
12	Trap crops	0.0	1.6	32
13	Use of traps	0.0	0.8	16
14	Average	0.6	2.14	31.8

Data revealed that there was significant increase in knowledge of tribal farmers after participation in IPM training programmes. Pre-training knowledge score tribal farmers ranged from 0.0 to 2.1 while post training knowledge score of participant tribal farmers ranged from 0.8-3.2. The knowledge score of tribal farmers increased from 1 to 3.2 in case of seed selection and from 'nil' to ~3 in case of seed treatment (On a scale of 0-5). Tribal framers had pre-test knowledge score of 'zero' on various dimension viz seed and seedling treatment, vermin-compost and bio-fertilizer etc. While post-test knowledge score increased substantially. Mean knowledge score of participants increased from 0.6 to 2.14 with knowledge gain of 31.8 per cent. Knowledge of participating tribal farmers increased in all the areas, however, percent increase in knowledge was maximum in case of seed treatment (58%) followed by seed selection (44%), disease identification (34%), nematode identification(32%), use of trap crop (32%); insect pest identification (28%), raising healthy nursery (24%), IPM (22%), use of chemical pesticides (18%), use of trap (16%) land preparation (14%) and weed management (12%). Overall % increase in knowledge varied from 12-58%. However, it is also pertinent to note that still there were tribal farmers who need more interactions and group discussion on vermin-compost and use of bio-fertilisers and bio-pesticides to enhance their knowledge etc.

The data analysis revealed that training imparted to tribal farmers has made significant impact in enhancing the knowledge levels of tribal farmers on a number of agricultural operations, this impact is due to regular farmer field schools, pest identification guide, regular field visits, group discussions and quizzes, however it was also noticed that tribal farmers need more such programmes this due to remoteness of their living place, no regular coordination among themselves, neglected by the nearby extension functionaries, language barrier, literacy , no exposure visits to nearby areas. It is also revealed that these tribal farmers are not much aware of market strategies. These farmers were earlier only interested in producing as per their own demand. It was therefore, suggested the local extension

Table 2. Correlation of socio-personal characteristic with knowledge gain.

Sr. No	Independent variable (X)	Value of correlation coefficient (r)
1	Age	-0.21 N.S.
2	Gender (Female)	0.53 N.S.
3	Education	0.59**
4	Primary occupation (Agriculture)	0.62**
5	Family type	0.23 N.S.
6	Family size	-0.15 N.S.
7	Social participation	0.31 N.S.
8	Attendance in trainings	0.67**
9	Social aptitude	0.45*
10	Economic status	0.51 N.S.
11	Resources	0.49*
12	Marketing knowledge	0.36 N.S.
13	Holding size	0.48*
14	Scientific aptitude	0.41 N.S.

*Significant at level 0.05

** Significant at level 0.01

functionaries, state Department of Agriculture etc to organise more need base trainings, exposure visits, farmer field school, marketing strategies, as these tribal are highly receptive and have less resources but willing to adopt the information disseminated to them to enhance their socio-economic status. Further, such training also provides an opportunity to learn indigenous knowledge of tribal farmers which can be integrated to further strengthen IPM knowledge. Earlier, Kaur *et al* (2008) reported that various indigenous practices are useful for pest management and are relevant even in modern agriculture and used in integrated pest management practices.

Factors effecting knowledge gain among tribal farmers

The relation of selected socio-economic characteristic of tribal farmer on knowledge gain about IPM was studied using correlation coefficient (Table 2). The coefficient of correlation between the selected socio-personal and economic characteristics of the demonstrating, farmers, and their knowledge scores are presented in Table 2.

It appears from Table 2 that education (r=0.59**), size of holding (r=0.48*), primary occupation (r=0.62**), social aptitude (r=0.45*), resources (r=0.49*) and attendance in trainings (r=0.48*) was positively and significantly associated with the gain in knowledge regarding IPM. However, age and family size were found to have a negative and non-significant association whereas gender, family type, social participation, economic status and marketing knowledge of the respondents were having a positive but non-significant association with the knowledge level of the farmers. A significant and positive association between size of holding, education, resources and primary occupation with the knowledge level of respondents about IPM showed that farmers with a higher size of holdings and higher academic qualification gained more knowledge than those who were inferior in these characteristics. The findings were in line with those of Bhupender and Singh (2019) reported negative bearing of age on interest of farmers to learn new things. Knowledge of tribal farmers had influence on knowledge gain. These results were in accordance to earlier works of Kaur (2016)

CONCLUSION

From the results of the study, it can be concluded that tribal farmers need training on integrated pest management technologies. Tribal farmers lack knowledge on seed treatment, bio-fertilizer, nematode control and various other aspects. IPM training programme should be based on training needs of tribal farmers. Moreover, training methodologies should be designed in a way that provides opportunity for participation of tribal farmers. Further education, land holding size and social aptitude has influence on knowledge gain. Therefore, efforts should also be made for overall upliftment of tribal farmer through formal education and access to land resources.

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