ADOPTION BEHAVIOUR AND CONSTRAINTS FACED BY FARMERS REGARDING RECOMMENDED PLANT PROTECTION PRACTICES IN PIGEON PEA IN KHUNTI DISTRICT OF JHARKHAND

ABSTRACT

Plant protection practices is an important aspect to get healthy plant, healthy seed and maximum crop yield. Less knowledge and adoption of recommended plant protection practices is one of the important reasons for low yield of the crop. Hence, the study was undertaken to determine the level of adoption of the recommended plant protection practices that would help farmers to increase the yield. The study was conducted in Khunti district of Jharkhand. A total of 120 respondents were selected randomly from six villages (two each) under three blocks namely, Khunti, Torpa and Arki because area had less productivity than production. The data were collected by interviewing respondents with the help of pre-structured interview schedule and appropriate statistical analysis was done. Descriptive research design was used for the study. The study revealed that majority of respondents (57.5%) belong to middle age group, 71.70% of the respondents were marginal farmers with less than one hectare land as they had fragmented lands, majority of the respondents (56.7%) had low annual income and majority of the respondents mainly interacted with each other on a personal level. The findings also revealed that majority of respondents (46.67%) had low level of adoption towards recommended plant protection practices followed by 35.83 % and 17.5 % medium and high level, respectively. Age, occupation, family size, land holding, annual income, material possession, extension contact and rate of utilization of sources were positive and significantly correlated towards adoption level of the plant protection practices. The study also enlightened the major constraints faced by the farmers of the study area. Some of the major constraints were lack of trainings of scientific cultivation, poor extension contacts, high cost of insecticides and pesticides, unavailability of information and lack of good quality insecticides and pesticides.

Key word: Adoption behaviour, farmers, plant protection, pigeon pea

1. INTRODUCTION

Pigeon pea (*Cajanus cajan*), also known as red gram, toor, arhar is a grain legume that can be used for multiple purposes, mostly consumed in the form of split dal. Major source of protein, constitute an integral component of Indian's dietary basket and are grown under diverse agro-climatic conditions of the country. It is the IInd important pulse crop after the gram and a major kharif crop in the country. India ranks Ist in area and production in the world with 80% and 67% of world's acreage and production respectively[2]. Highest production of Pigeon pea is from Maharashtra which is around 30% of National Production [DES (DAC & FW)]. About than 97 per cent of Arhar production of the country during the period under report has been realized by 10 states of Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Uttar Pradesh, Telangana, Jharkhand, Odisha, Andhra Pradesh and Tamil Nadu[1]. During 2016-17, the country recorded the ever-highest production of this crop (3rd Adv. Estimates). With its ability to adapt to poor agro-ecological conditions, it provides farmers with multiple opportunities to enhance their livelihoods.

At the national level, Jharkhand ranks seventh in pigeon pea (arhar) cultivation [10]. Jharkhand's contribution in area wise is 1.94 lakh hectare with 4.37 per-cent contribution and 2.22 lakh tonnes production which is 5.22 per-cent contribution [DES, Ministry of Agri. & FW (DAC&FW), Govt. of India; 2017-18- IVth Adv. Est.] [1]. In Jharkhand pigeon pea production comes mainly from the districts of Palamu (27,256 ha), Latehar (25,986 ha), Garhwa (23,455 ha), and Ranchi (10,764 ha) and productivity is highest in the district of Simdega (1,930 kg/ha). Jharkhand's major pigeon pea varieties under cultivation are NDA-2, Malviya -13, ICPL-87119, 85063, UPAS 120 etc. [6].

Khunti district has 8.02 thousand hectares area under pigeon pea cultivation with 1.8 thousand tonnes (Source – Agricultural Contingency Plan for District: Khunti). Presently, Khunti has mono-cropping system mainly due to inadequate irrigation sources, insufficient and erratic supply of inputs, and lack of awareness about modern agriculture equipment, plant protection practices, markets and good quality seeds. 88% of the producers have faced crop damage during last year in Khunti. In view of a wide variety of pest and diseases, long reproductive phase and socioeconomic constraints, the managements of pests in pigeon pea is relatively difficult [8]. Therefore, proper plant protection practices are to be adopted. The main aim of each grower is to protect his crop from pests and diseases to get higher yield.

Hence this study is implemented to ascertain the level of adoption of recommended plant protection practices of pigeon pea.

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2. RESEARCH METHODOLOGY

A descriptive study design was adopted for the study as it describes the nature or characteristics of the phenomenon that is being studied. The present study was conducted in Khunti district of Jharkhand. Out of 6 blocks, 3 blocks were selected purposively and 6 villages were selected purposively based on the maximum area over production. A total of 120 respondents were selected randomly from the list provided by Agricultural Technology Management Agency, Khunti. The information was elicited from the respondents with the help of structured interview schedule, pen, pencil; camera was also used during the data collection. The information was elicited from the respondents with the help of pre – structured interview schedule. The primary data was collected through personal interview and secondary data was collected from journals, books, papers and other material of study. The entire data collected was transformed into score for tabulation. Various statistical tests Mean, Frequency, Percentage, Correlation coefficient and multiple regression was used in the study which was then used to interpret the results and to show the relationship between independent variables and dependent variables.

2.1 Objectives of the Study

2.1.1 To analyse the adoption of the respondents regarding the recommended plant protection practices.

2.1.2 To know the constraints in the adoption of the recommended plant protection practices by the respondents.

3. RESULTS AND DISCUSSION

Table 1 depicts the various parameters for adopting recommended plant protection practices regarding pigeon pea cultivation. From the table, it is concluded that 63.33% and 60% of the respondents have fully adopted washing equipment after use and buying pesticides from licensed dealers respectively. A significant number of respondents 63.33%, 62.5%, 59.17% have partially adopted equipment of good condition, use of good quality pesticide and identifying pests and diseases before choosing control practices, respectively. Maximum of the parameters were still not adopted. The similar findings were reported by Vijay *et al*. [11].

Table 2 reveals that majority of respondents, that is, 46.67 per cent had low level of adoption towards recommended plant protection practices, followed by

35.83 per cent were found having medium level of adoption and 17.5 per cent high level of adoption, respectively. Similar result was reported by Singh *et al*. [8].

The probable reason for the low level of adoption would be due to the lack of knowledge of seed treatment, non-availability of fungicides and high cost of labour. The above findings were supported by Vijay *et al*. [11] and Sharma *et al*. [8].

From Table 3, it is concluded that independent variables age, occupation, family size, land holding, housing pattern, annual income, material possession, extension contact and rate of utilization of sources were positive and significantly correlated towards adoption level of the plant protection practices. The variable media exposure was found to be positively correlated but not significant. Whereas, the variable education showed negative and significant correlation towards adoption. Similar results were reported by Melkeri *et al*. [4].

Table 1. Distribution of respondents on the basis of parameters of adoption level of recommended plant protection practices

S. No.	Particulars	Fully adopted	Partially adopted	Not adopted
1	Use of right equipment for practice selected	37(30.83)	49(40.83)	34(28.33)
2	Equipment is in good condition	24(20.0)	76(63.33)	20(16.66)
3	Read the label on pesticide	36(30.0)	32(26.67)	52(43.33)
4	Wash equipment after use	76(63.33)	28(23.33)	16(13.33)
5	Safe storage of pesticides	20(16.66)	25(20.83)	75(62.5)
6	Use of Integrated Pest Management	26(21.67)	66(55.0)	28(23.33)
7	Identify the pest before choosing control practice	38(31.67)	71(59.17)	11(9.17)
8	Use of quality pesticide	27(22.5)	75(62.5)	18(15.0)
9	Cover body during pesticide application	42(35.0)	68(56.67)	10(8.33)
10	Usage of PPE kit	7(5.83)	12(10.0)	101(84.17)
11	Read pesticide manual before application	34(28.33)	47(39.16)	39(32.5)
3412	Buy pesticides from licensed dealers	72(60.0)	31(25.83)	17(14.17)
13	Burning of residues	18(15.0)	24(20.0)	78(65.0)

14	Deep ploughing	26(21.67)	59(49.17)	35(29.17)
15	Crop rotation	47(39.17)	51(42.5)	22(18.33)
16	Resistant variety	29(24.16)	34(28.33)	57(47.5)
17	Inter cropping	27(22.5)	19(15.83)	74(61.67)
18	Handpicking of larvae / eggs	31(25.83)	14(11.67)	75(62.5)
19	Usage of neem oil	26(21.67)	45(37.5)	49(40.83)
20	Seed treatment before sowing	19(15.83)	26(21.66)	75(62.5)

(Figures in parenthesis show percentage)

Table 2. Distribution of respondents according to the level of adoption towards recommended plant protection practices

S. No.	Adoption level	Frequency	Percentage
1	Low (28 – 35)	56	46.67
2	Medium (36 – 43)	43	35.83
3	High (44 - 51)	21	17.5
	Total	120	100.0

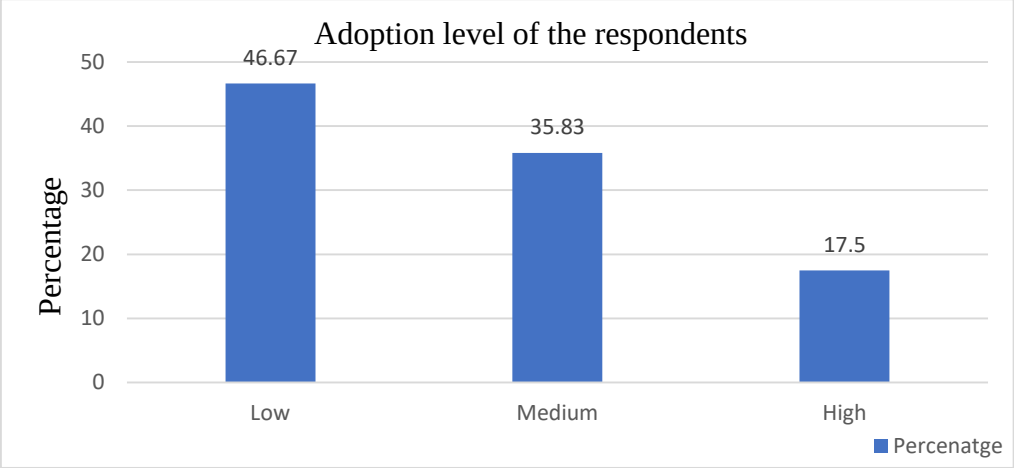

Fig. 1. Distribution of the respondents according to the level of adoption towards recommended plant protection practices

Table 3. Association between independent variables and level of adoption of the respondents

S. No.	Independent variables	Correlation coefficient (r)
1	Age	0.572*
2	Education	-0.989**

3	Occupation	0.673*
4	Family size	0.812*
5	Housing pattern	0.158**
6	Land holding	0.911*
7	Annual income	0.999*
8	Media exposure	0.095^{NS}
9	Material possession	0.982*
10	Extension contacts	0.837*
11	Rate of utilization of sources	0.251*

*Significant at 0.01% level of probability
**Significant at 0.05% level of probability
^{NS} – Not Significant

Table 4. Multiple Regression Analysis of selected independent variable with the adoption level of the respondents.

S. No.	**Independent Variable**	**Multiple Regression Coefficients**	
		'b' values	**'t' values**
1	Age	0.360	0.691*
2	Education	-0.673	-0.703**
3	Occupation	0.543	0.912*
4	Family size	0.473	1.39*
5	Housing Pattern	0.066	0.160**
6	Landholding	0.392	2.305*
7	Annual income	0.55	7.73*
8	Media exposure	0.134	0.095
9	Material possession	3.303	6.421*
10	Extension contacts	0.340	1.53*
11	Rate of the utilization of sources	-0.82	-0.735**

∗Significant at 0.01% level of probability F value = 1.50
∗∗Significant at 0.05% level of probability $R^2 = 0.74$

From table 4, it is evident that variables like age, occupation, family size, landholding, annual income, housing pattern, material possession and extension contact were positive and significantly contributed towards adoption level of plant protection practices. Variables namely education and rate of utilization of sources depicted negative and significant contribution towards plant protection practices.

The R^2 value was 0.74 revealed 74.0 percent of the variation in the adoption of the recommended plant protection practices by 11 independent variables selected for the study.

Table 5. Constraints faced by the respondents in adopting recommended plant protection practices

S. No	Constraints	Respondents		
		Frequency	Percent	Rank
1	Lack of literacy in society	81	67.5	VI
2	No concern for social hazard when it comes to plant protection practices	59	49.16	X
3	Difficulty in operating Plant protection practices	62	51.66	IX
4	Lack of good quality insecticides and pesticides	82	68.33	V
5	Costly plant protection equipment	68	56.66	VIII
6	Lack of trainings for scientific cultivation	112	93.33	I
7	High cost of insecticides and pesticides	92	76.67	III
8	Poor extension contacts	95	79.17	II
9	Unavailability of information	89	74.17	IV
10	Lack of awareness camps regarding plant protection practices	80	66.66	VII

From the above Table 5, it is concluded that maximum number of the respondents 93.33% agreed to the statement - ‘Lack of trainings for scientific cultivation’ was the common constraint followed by ‘Poor extension contact’ (79.17%). The constraint ‘High cost of insecticides and pesticides’ was ranked

III, ‘Unavailability of information’ as IV and ‘Lack of good quality insecticides and pesticides’ as V. ‘Lack of literacy in society’ ranked VI. ‘Lack of awareness camps regarding plant protection practices’ 66.66% ranked VII, ‘Costly plant protection equipment’ (56.66%) ranked VIII followed by ‘Difficulty in operating plant protection practices’ (51.66%) at IX rank and ‘No concern for social hazard when it comes to plant protection practices’ ranked X with 49.16%, respectively.

Prasad *et al.* [5] and Bansilal *et al.* [2] and Singh *et al.* [7] reported similar results in his study.

4. CONCLUSION

It is concluded that majority of the respondents had low level of adoption towards recommended plant protection practices due to constraints faced by the farmers such as lack of trainings for scientific cultivation, poor extension contacts, high cost of insecticides and pesticides, unavailability of information and low extension contact. It was also found that independent variables like variables age, occupation, family size, land holding, housing pattern, annual income, material possession, extension contact and rate of utilization of sources were positive and significantly correlated towards adoption level of the plant protection practices. Whereas, the variable education showed negative and significant correlation towards adoption. The study also revealed 74.0 percent of the variation in the adoption of the recommended plant protection practices by 11 independent variables selected for the study. It was therefore, suggested by the respondents that frequent visits must be made by the extension personnel and trainings must be provided for improving their knowledge towards adoption.

Consent

As per international standard or university standard, respondents’ written consent has been collected and preserved by the author(s).

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