Impact of Knowledge on Adoption of Integrated Pest Management Practices by Paddy Growers

H.C. Singh[1], Rajesh Kumar[2] and Surjit Singh[3]

1. Asso. Prof., College of Agril. Engg. &Technology (CSAUA&T, Kanpur), Etawah, (U.P.)
2. Lecturer, R. S. M. P. G. College, Dhampur, Bijnour (U. P.), 3. Ph.D. Scholor, CSAUA&T, Kanpur,
Corresponding author e-mail:hcsingh65@gmail.com

ABSTRACT

The study was carried out during 2010-2011 in Etawah district of Uttar Pradesh state to focus on the paddy growers regarding impact of knowledge on adoption Level of IPM practices. The 80 contact farmers were selected as respondents. The study revealed that the maximum knowledge gap was found to be existing in removal of previous crop residues, light and pheromone trap, hand picking of insect and their destructions, pest monitoring, use of rope in standing crop, use of bio-agents/ bio-fertilizers/ bio-pesticides/ natural enemies, resistant varieties, application method and name of pesticides etc. The maximum adoption gap was found to be existing in crop rotation, seed rate, proper spacing, removal of previous crop residues, use of mixed cropping, light and pheromone trap, hand picking of insect and their destructions, pest monitoring, use of rope in standing crop, bio-agents, bio-fertilizers, bio-pesticides, resistant varieties, application method and name of pesticides etc. The results imply that paddy growers with more knowledge have more adoption level of cultural, mechanical, biological & chemical methods of IPM practices.

Key words: *Paddy growers; Knowledge; Adoption level; Impact; IPM practices;*

Rice is one of the most important food crops in the world. It provides staple diet of 2.7 billion people in different parts of the world. It is grown in the entire world, except Antarctica. It is occupying 150 million ha of area, producing 573 million tones rice with an average productivity of 3.83 tones ha. It's cultivation of immense importance to food security of Asia, where more than 90.00 percent of the global rice is produced and consume. (*FAO, 2010*). In fact IPM is based on the optimization, not maximization of chemical pesticides. The IPM approach encompasses all available control measure techniques to contain and combat pest infestation with the aim to minimize the pesticides load in the environment. Farmers' adopted improved integrated pest management (IPM) practices depend on many factors, such as their socioeconomic conditions and technical skill of respondents. There is always a distorted view of IPM as pest control without chemical, or biological control. In fact IPM is based on the optimization, not maximization of chemical pesticides. The IPM approach encompasses all available control measure techniques to contain and combat pest infestation with the aim to minimize the pesticides load in the environment. The study was conducted with the following objectives-

1. To study the knowledge and adoption of IPM practices by paddy growers.
2. To study the impact of knowledge on adoption of IPM practices by paddy growers.

METHODOLOGY

The study was conducted in Etawah District of Uttar Pradesh state. The study is based on the primary data, collected for the year 2010-11 from the total 8 community development blocks out of which two blocks namely Bharthana and Mahewa were purposively selected, because these blocks have more area under the rice crop. Four villages were selected purposively from each block; ten respondents from each village were randomly selected, thus making a total size of 80 respondents for the study. A structured and pre-tested interview schedule was used to collect data from the respondents by personal interview method. The obtained data were analyzed with the help of frequency, percentage and correlation coefficient (r). The Karl Pearson's following formula of correlation coefficient

was used to find out the relationship between knowledge and adoption level of paddy growers regarding IPM practices. Formula of correlation coefficient (r) are as follow:

$$r = \frac{\sum XY}{\sqrt{(\sum X)^2 (\sum Y)^2}}$$

Where,

$X = X - \bar{X}$

$Y = Y - \bar{Y}$

RESULTS AND DISCUSSION

Relationship between Knowledge and adoption of cultural methods of IPM practices: Table 1 shows that majority of the respondents (83.75%) belonged to fully known category about summer deep ploughing. The 52.50 per cent respondents belonged to partially known category about removal of previous crop residues. The 58.75 per cent respondents belonged to partially known category about recommended seed rate. The 61.25 per cent respondents belonged to partially known category about proper spacing of crop plants. The 53.75 per cent respondents belonged to fully known category about crop rotation. The 58.75 per cent respondents belonged to partially known category about mixed cropping.

The maximum 82.50 per cent respondents reported under high level adoption of summer deep ploughing. The 52.50 per cent respondents were medium level adopters followed by 32.50 per cent high level about the removal of previous crop residues. The 50.00 per cent respondents were medium level adopters followed by 35.00 per cent high level category about the recommended seed rate in rice crop. The 56.25 per cent respondents were reported under medium level of adoption of the line to line and plant to plant distance followed by 25.00 per cent high level of adoption category. The 51.25 per cent respondents were medium adopters of the mixed cropping followed 31.25 per cent respondents belonged to low level of adoption.

It is evident from the results that all the six cultural methods of knowledge regarding IPM practices were positively and highly significantly correlated with the adoption level of paddy growers at 5% level.

Relationship between Knowledge and adoption of mechanical methods of IPM practices : Table 2 reveals that the maximum 60.00 per cent respondents belonged to partially known category about rouging practices of crop. The 81.25 percent respondents belonged to not known category about pest monitoring through pheromone trap. The 65.00 per cent respondents belonged to unknown category followed by 30.00 per cent belonged to partially known about use of dummy in crop. The 80.00 per cent respondents belonged to fully known category about hand picking of insect & their destructions. The 63.75 per cent respondents belonged to not known category followed by 32.50 per cent belonged to partially known about use of light traps. The 68.75 per cent respondents belonged to not known category followed by

Table 1: Correlation co-efficient between Knowledge and adoption of cultural methods of IPM practices

Recommended IPM practices	Knowledge			Adoption Level			Correlation co-efficient
	Fully known	Partially known	Not known	High Level	Medium Level	Low Level	
Summer deep ploughing	67	12	01	66	12	02	0.999*
	83.75	15.00	1.25	82.50	15.00	2.50	
Removal of previous crop residues.	35	42	03	26	42	12	0.924*
	43.75	52.50	3.75	32.50	52.50	15.00	
Recommended seed rate.	26	47	07	28	40	12	0.994*
	32.50	58.75	8.75	35.00	50.00	15.00	
Proper spacing/crop	18	49	13	20	45	15	0.939*
(line-line or plant-plant)	22.50	61.25	16.25	25.00	56.25	18.75	
Use of crop rotation.	43	35	02	32	41	07	0.903*
	53.75	43.75	2.50	40.00	51.25	8.75	
Use of mixed cropping.	26	47	07	15	40	25	0.619*
	32.50	58.75	8.75	18.75	50.00	31.25	

*Significant at 5% level

Table 2: Correlation co-efficient between Knowledge and adoption of mechanical methods of IPM practice

Recommended IPM practices	Knowledge			Adoption Level			Correlation co-efficient
	Fully known	Partially known	Not known	High Level	Medium Level	Low Level	
Rouging practices of crop.	12	48	20	04	22	54	
	15.00	60.00	25.00	5.00	27.50	67.50	0.053
Monitoring pest through	03	12	65	04	25	51	
Pheromone traps.	3.75	15.00	81.25	5.00	31.25	63.75	0.947*
Use of the Dummy.	04	24	52	52	25	03	
	5.00	30.00	65.00	65.00	31.25	3.75	-0.988
Hand picking of Pest and their	64	13	03	03	31	46	
destructions.	80.00	16.25	3.75	3.75	38.75	57.50	-0.980
Use of light traps.	03	26	51	01	08	71	
	3.75	32.50	63.75	1.25	10.00	88.75	0.918*
Use of rope in standing crop.	05	20	55	-	03	77	
	6.25	25.00	68.75	-	3.75	96.25	0.966*

*Significant at 5% level

25.00 per cent belong to partially known about use of rope in standing crop. The 67.50 per cent respondents were not adopting the roughing practices of crop. The 63.75 per cent respondents were not adopting pheromone trap crop followed by 31.25 per cent belonged to medium about the use of rope in standing paddy crop. The 65.00 per cent respondents were reported under high adoption of dummy in field followed by 31.25 per cent belonged to medium about the using of dummy in field. The 57.50 per cent respondents were reported under non adopter category followed by 38.75 per cent belonged to medium level of adoption about the using hand picking of pest and their destructions. The 88.75 per cent respondents were reported under non adopter category of light trap in crop. The Majority (96.25%) of respondents were not adopting rope in standing paddy crop.It is evident from the results that out of six the three mechanical methods of IPM practices regarding knowledge were positively and highly significantly correlated with the adoption level of paddy growers at 5% level.

Relationship between knowledge and adoption of biological methods of IPM practices : Table 3 reveals that the 50.00 per cent respondents belonged to not

Table 3: Correlation co-efficient between Knowledge and adoption of biological methods of I PM practice

Recommended IPM practices	Knowledge			Adoption Level			Correlation co-efficient
	Fully known	Partially known	Not known	High Level	Medium Level	Low Level	
Bio-pesticides.	04	36	40	02	22	56	
	5.00	45.00	50.00	2.50	27.50	75.00	0.842*
Bio-agents.	01	18	61	02	10	68	
	1.25	22.50	76.25	2.50	12.50	85.00	0.986*
Bio-fertilizers	02	25	53	02	19	59	
	2.50	31.25	66.25	2.50	23.75	73.75	0.985*
Natural enemies.	-	09	71	01	05	74	
	-	11.25	88.75	1.25	6.25	92.50	0.998*
Resistant varieties.	07	32	41	03	24	53	
	8.75	40.00	51.25	3.75	30.00	66.25	0.937*
Neem- based products.	36	42	02	39	34	07	
	45.00	52.50	2.50	48.75	42.50	8.75	0.959*

*Significant at 5% level

Table 4: Correlation co-efficient between Knowledge and adoption of chemical methods of IPM practice

Recommended IPM practices	Knowledge			Adoption Level			Correlation co-efficient
	Fully known	Partially known	Not known	High Level	Medium Level	Low Level	
Seed treatment.	29	41	10	18	44	18	
	36.25	51.25	12.25	22.50	55.00	22.50	0.794*
Balance dose of fertilizer.	09	46	25	04	48	28	
	11.25	57.50	31.25	5.00	60.00	35.00	0.992*
Recommended dose of pesticides.	03	41	36	03	30	47	
	3.75	51.25	45.00	3.75	37.50	58.75	0.871*
Soil treatments.	02	34	44	12	37	31	
	2.50	42.50	55.00	15.00	46.25	38.75	0.895*
Judicious use of Pesticides	23	35	22	02	28	50	
	28.75	43.75	27.50	2.50	35.00	62.50	-0.210
Judicious use of Plant hormones.	02	35	43	-	01	79	
	2.50	43.75	53.75	-	1.25	98.75	0.659*

*Significant at 5% level

known category followed by 45.00 per cent partially known about bio-pesticides. The 76.25 per cent respondents belonged to not known category about bio-agents. The 66.25 per cent respondents belonged to not known category followed by 31.25 per cent belonged to partially known category about bio-fertilizers. The Majority of 88.75 per cent respondents belonged to not known category about natural enemies. The 51.25 per cent respondents belonged to not known category followed by 40.00 per cent respondents belonged to partially known category about resistant varieties. The 52.50 per cent respondents belonged to partially known category followed by 45.00 per cent respondents belonged to fully known category about neem- based products in rice crop.

The 75.00 per cent respondents were not adopting bio-pesticides in rice crop. The 85.00 per cent respondents were reported under non adopter category of using bio-agent in rice crop. The 73.75 per cent respondents were not adopting bio-fertilizer in rice crop followed by 23.75 per cent to medium level of adoption about the use of bio-fertilizer in rice crop. The Majority (92.50%) of respondents were not adopting natural enemies in paddy crop. The 66.25 per cent respondents were not adopting resistant varieties in paddy crop followed by 30.00 per cent respondents belonged to medium level of adoption.The 48.70 per cent respondents were high adopter of neem based product followed by 42.50 per cent belonged to medium level of adoption about the use of neem based product in paddy crop.

It is evident from the results that all the six biological methods of knowledge regarding IPM practices were positively and highly significantly correlated with the adoption level of paddy growers at 5% level.

Relationship between Knowledge and adoption of chemical methods of IPM practices : Table 4 reveals that the 51.25 per cent respondents belonged to partially known category followed by 36.25 per cent belonged to fully known category about seed treatment. The 57.50 per cent respondents belonged to partially known category followed by31.25 per cent belonged to not known category about balance dose of fertilizer. The 51.25 per cent respondents belonged to partially known category followed by 45.00 per cent belonged to not known category about recommended dose of pesticides. The 55.00 per cent respondents belonged to not known category followed by 42.50 per cent belonged to partially known category about the soil treatments. The 43.75 per cent respondents belonged to partially known category followed by 28.75 per cent and 27.50 per cent respondents belong to fully known and unknown category respectively about the judicious use of pesticides. The 53.75 per cent respondents belonged to not known category followed by 43.75 per cent belonged to partially known category about the judicious use of plant hormones.

The 55.00 per cent respondents were medium adopters of seed treatment followed by 22.50 per cent

each in the category of high and low level of adoption. The 60.00 per cent respondents were medium adopter of the balance dose of fertilizer in rice crop cultivations. The 58.75 per cent respondents were non adopter of the use of recommended dose of pesticides in paddy crop followed by 37.50 per cent belonged to medium level of adoption. The 46.25 per cent respondents were medium adopters of the soil treatment followed by 38.75 per cent belonged to low adoption category. The 62.50 per cent respondents were not adopters of the judicious use of pesticides in paddy crop followed by 35.00 per cent belonged to medium level of adoption about the judicious use of pesticides. The Majority 98.75 per cent of respondents were not adopting judicious use of plant hormones in paddy crop.

It is evident from the results that out of six the five mechanical methods of IPM practices regarding knowledge were positively and highly significantly correlated with the adoption level of paddy growers. Similar results were also reprted by *Singh et. al.(2008), Singh et. al. (2009)* and *Yadav et.al. (2010)* were in the same line of the present findings.

CONCLUSION

The study revealed that due to the maximum knowledge gap in removal of previous crop residues, light and pheromone trap, hand picking of insect and their destructions, pest monitoring, use of trap in standing crop, use of bio-agents/ bio-fertilizers/ bio-pesticides/ natural enemies, resistant varieties, application method and name of pesticides etc., the maximum adoption gap was found in crop rotation, seed rate, proper spacing, removal of previous crop residues, use of mixed cropping, light and pheromone trap, hand picking of insect and their destructions, pest monitoring, use of rope in standing crop, bio-agents, bio-fertilizers, bio-pesticides, resistant varieties, application method and name of pesticides etc.

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REFERENCES

FAO (2010). Food and Agricultural Organizational Statistical Yearbook/ USA.

Singh, A.; Vasisht, A.K.; Kumar, R. and Das, D.K. (2008). Adoption of Integrated Pest Management Practices in Paddy and Cotton: A Case Study in Haryana and Punjab. *Agricultural Economics Research Review*, **21**(2): 221-226.

Singh, D.K.; Singh, A.K.; Yadav,V.P.; Singh, R.B.; Baghel, R.S. and Singh, M. (2009). Association of Socio-economic Status with Economic Motivation of the Farmers. *Indian Res. J. Ext. Edu.*, ***9*** (2):53-56.

Yadav, R.N.; Singh, D.; Singh, D.K.; Singh, V.K. (2010). Assessment of knowledge and adoption to IPM in rice cultivation. *Annals of Plant Protection Sciences*, **18** (1): 127-130.

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