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ADOPTION LEVEL OF SUGARCANE GROWERS REGARDING IPM PRACTICES IN WESTERN UTTAR PRADESH, INDIA

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ABSTRACT

This study was conducted in western Uttar Pradesh in which two districts Saharanpur and Muzaffarnagar were selected purposely. A total number of 240 sugarcane growers were selected through random sampling from sixteen villages. The structured schedule was developed keeping in view the objectives and variable to be studied. The respondents were contacted personally for data collection. The majority of the respondents 49.79 per cent were partially adopted the overall cultural method of IPM practices. Among the total sample size 54.03 per cent respondents were not adopted the mechanical methods of IPM practices. The most of the respondents *i.e.*. 47.85 per cent were partially adopted biological methods of IPM practices. The majority 42.15 per cent of the respondents were partially adopted the chemical methods of IPM practices.

Keywords : Adoption, IPM (Integrated Pest Management), sugarcane etc.

Introduction

Sugarcane is grown in diversified climatic conditions, tropical and subtropical. Out of 115 countries of world where sugarcane is cultivated. India is the only one in which both types of climate found. Amongst 115 countries in sugarcane cultivation, India ranks first in terms of area 5.09 million hectare, production 357.67 million tonnes and its productivity 70.31 tones /hectare. Among different states of the country Uttar Pradesh occupies first place in area 2.16 million hectare, production 128.82 million tonnes and productivity 59.583 tonnes /hectare of sugarcane, followed by Maharashtra, Tamil Nadu, Karnataka, Gujarat, and Andhra Pradesh occupying second third fourth and fifth places, respectively but in terms of productivity U.P. ranks seventh. In Uttar Pradesh, Meerut district occupies an important place in terms of area and production of sugarcane cultivation. It is grown on area 12.754 thousand hectares, production 8044.83 thousand tonnes) and productivity 630.76 quintal per hectare. (Source: Directorate of Economics & Statistics, DAC&FW (2016-17).

The most of the respondents followed cultural operations followed by mechanical practices. In distributional analysis, it was concluded that majority of the respondents (60 per cent) had medium level of adoption of IPDM practices. In relational analysis it was observed that education, land holding, area under sugarcane, annual income, socio-economic status and sources of information were positively and significantly correlated with adoption level Patel and Supe (2011).

Materials and Methods

Out of 26 districts of Western Uttar Pradesh, two districts were selected purposively on the basis of production and productivity (namely Saharanpur and Muzaffarnagar) and from the each district two community development blocks were randomly selected and from the every community development blocks, four village were selected randomly and from every villages 15 respondents were selected randomly. A complete list of all sugarcane growers in each selected village was prepared. From the list a total number of 240 sugarcane growers were selected through random sampling technique. The data were collected with the help of pre-tested interview schedule. Level of the respondents was measured in related to IPM practices and about each practice a definite question was set. The answers of each question given by the sugarcane growers were measured by three point scale *i.e.* high adoption, medium adoption and low adoption.

The extent of Integrated Pest Management practices in sugarcane crop was worked out for individual respondent for all practices. This procedure was applied for all the 240 respondents to get individual extent of adoption on the basis of 'Adoption quotient index/score developed by Chattopadhya, 1963. Sample's percentage and mean scores was calculated, respectively.

Results and Discussion

Adoption level regarding Integrated Pest Management practices

Table-1 indicates that the majority of the respondents 45.83 per cent respondents were belonging to the 'medium level' adoption, 27.92 per cent were low level and remaining 26.25 per cent were comes under high level of adoption of the deep summer ploughing. The majority of the respondents *i.e.* 54.17 per cent were having medium level of adoption, 24.17 per cent were having high level of adoption and 21.67 were having low level of adoption about the proper spacing in the sugarcane crop.

The most of the respondents 49.58 per cent respondents were having medium level of adoption, 26.75 per cent were having high level of adoption and 21.67 per cent were belongs to the low level of adoption about the recommended seed rate in sugarcane crop. The majority 51.67 per cent of the respondents were belongs to the medium level of adoption category, 24.58 per cent were having high level of adoption and 23.75 per cent were found the low level of adoption about the removal of the previous crop residues in sugarcane crop.

The above table-1 clearly indicates that the most of the respondent *i.e.* 54.17 per cent of the respondents were having medium level of adoption, 25.83 per cent were belongs to the low level of adoption and 20.00 per cent were reported to the high level of adoption about the crop rotation in sugarcane crop. The majority 43.33 per cent of the respondent were have medium level of adoption, 38.75 per cent were comes under high level of adoption and remaining 17.92 per cent were having low level of adoption about intercropping in sugarcane crop.

Table-2 shows that the most of the respondents 49.58 per cent respondents were having high level of adoption, 30.00 per cent were comes under low level of adoption and 20.42 per cent were found as medium level of adoption about the blind hoeing practice in sugarcane crop. The majority 50.83 per cent of the respondents were having low level of adoption, 30.83 per cent were comes under medium level of adoption and 18.33 per cent were having high level of adoption about the use of pest monitoring in sugarcane crop.

Table-2 clearly indicates that majority 50.00 per cent of the respondents were having low level of adoption, 28.33 per cent were having medium level of adoption and remaining 17.92 per cent comes under high level of adoption about the use of the barriers such as screens in the sugarcane crop. The most of the respondents *i.e.* 70.84 per cent respondents were having low level of adoption, 20.33 per cent were having medium level of adoption and remaining 8.33 per cent were belongs to the high level of adoption about the sett treatments in the sugarcane crop.

The table-3 shows that the majority 55.83 per cent of the respondents were belonging to the medium level of adoption, 28.75 per cent were having high level of adoption and remaining 15.42 per cent were having low level of adoption about the use of bio-pesticides in sugarcane crop. The most of the respondents *i.e..* 41.67 per cent of the respondents were having medium level of adoption, 30.00 per cent were comes under the low level of adoption and

remaining 28.33 per cent were belongs to the high level of adoption about the use of Neem-based product in sugarcane crop.

Table-3 clearly indicates that the majority 46.67 per cent of the respondents were belonging to the medium level of adoption, 27.08 per cent were having low level of the adoption and remaining 26.25 were reported to the high level of the adoption about the use of the bio-fertilizers in sugarcane crop. The most of the respondents *i.e.* 45.83 per cent respondents were having medium level of adoption, 30.00 per cent were found low level of adoption and 24.27 per cent were having high level of adoption about the natural enemies in the sugarcane.

The table-3 clearly indicates that the majority 49.58 per cent of the respondents were belonging to the medium level of the adoption, 26.25 per cent were having low level of the adoption and remaining 24.17 per cent were comes under the high level of adoption about the resistant varieties in sugarcane crop. The most of the respondents *i.e.* 47.50 per cent respondents were having medium level of adoption, 36.67 per cent were comes under the low level of adoption and only 15.83 per cent were having high level of adoption about the microbial control in sugarcane crop.

The table-4 shows that the majority 57.92 per cent of the respondents were belonging to the medium level of adoption, 22.08 per cent were having high level of adoption and only 20.00 per cent were comes under the low level of adoption about the seed treatment in sugarcane crop. The most of the respondents *i.e..* 52.08 per cent respondents were having medium level of adoption, 28.33 per cent were having high level of adoption and remaining 19.58 per cent were comes under the low level of adoption about use of pesticides in sugarcane crop.

Table-4 clearly indicates that the majority 58.33 per cent respondents were belonging to the medium level of adoption, 26.25 per cent were having high level of adoption and 15.42 per cent were having low level of adoption about balance dose of fertilizers in sugarcane crop. The most of the respondents *i.e..*52.08 per cent respondents were having medium level of adoption, 26.25 per cent were having high level of adoption and 21.67 per cent were belonging to the low level of adoption about the recommended dose of pesticides in sugarcane crop.

Table-4 clearly indicates that the majority 46.25 per cent of the respondents were belonging to the low level of adoption, 26.25 per cent were having high level of adoption and 25.83 per cent were having medium level of adoption about soil treatment in sugarcane crop. The most of the respondents *i.e.* 93.33 per cent were having low level of adoption, 6.67 per cent were having medium level of adoption and there were no one having high level of adoption about the use of hormones in sugarcane crop.

Table-5 clearly indicates that the most of the respondents were having more adoption of mechanical method among the other IPM practices methods was ranked 1st as followed by the cultural method was ranked 2nd, chemical method was ranked 3rd and biological method was ranked 4th, respectively.

Table 1 : Cultural methods of IPM practices.

Sl. No	Suggested IPM practices	Adoption rate					
		High		Medium		Low	
		R	P	R	P	R	P
1.	Deep summer ploughing in sugarcane	63	26.25	110	45.83	67	27.92
2.	Proper planting distance in timely and late sowing in sugarcane	58	24.17	130	54.17	52	21.67
3.	Recommended seed rate in timely sowing and late sowing in sugarcane	69	28.75	119	49.58	52	21.67
4.	Removal of previous crop residues in sugarcane	59	24.58	124	51.67	57	23.75
5.	Use of crop rotation in sugarcane	48	20.00	130	54.17	62	25.83
6.	Use of inter cropping in sugarcane	93	38.75	104	43.33	43	17.92

Table 2 : Mechanical methods of IPM practices.

Sl. No	Suggested IPM practices	Adoption rate					
		High		Medium		Low	
		R	P	R	P	R	P
1.	Blind hoeing in sugarcane	119	49.58	49	20.42	72	30.00
2.	Pest monitoring	44	18.33	74	30.83	122	50.83
3.	Use of the barriers such as screens to keep birds or insects out	52	21.67	68	28.33	120	50.00
4.	Sett treatments with moist hot air at 54 °C for 2-2.5 hours for the control of RSD and GSD in sugarcane?	20	08.33	50	20.33	170	70.84
5.	Avoid the planting of sugarcane under and around trees in sugarcane	64	26.66	52	21.67	124	51.67
6.	Growing of arhar around the fields to prevent root borer attack in sugarcane	16	06.67	54	22.50	170	70.83

R= Respondents, **P=** Percentage, **RSD=** Ratoon Stunt Disease, **GSD=** Grassy Shoot Disease

Table 3 : Biological methods of IPM practices.

Sl. No	Suggested IPM practices	Adoption rate					
		High		Medium		Low	
		R	P	R	P	R	P
1.	Bio-pesticides in sugarcane	69	28.75	134	55.83	37	15.42
2.	Neem-based product	68	28.33	100	41.67	72	30.00
3.	Bio-fertilizers in sugarcane	63	26.25	112	46.67	65	27.08
4.	Natural enemies in sugarcane	58	24.17	110	45.83	72	30.00
5.	Resistant varieties of sugarcane	58	24.17	119	49.58	63	26.25
6.	Microbial control in sugarcane	38	15.83	114	47.50	88	36.67

R= Respondents, **P=** Percentage

Table 4 : Chemical methods of IPM practices

Sl. No	Suggested IPM practices	Adoption rate					
		High		Medium		Low	
		R	P	R	P	R	P
1.	Seed treatment in sugarcane	53	22.08	139	57.92	48	20.00
2.	Judicious use of pesticides in sugarcane	68	28.33	125	52.08	47	19.58
3.	Balance dose of fertilizer in sugarcane	63	26.25	140	58.33	37	15.42
4.	Recommended dose of pesticides in sugarcane	63	26.25	125	52.08	52	21.67
5.	Soil treatments in sugarcane	63	26.25	62	25.83	111	46.25
6.	Judicious use of hormones in sugarcane	00	0.00	16	06.67	224	93.33

R= Respondents, **P=** Percentage

Table 5 : Overall Adoption level regarding IPM practices.

Sl. No.	Suggested Methods	Response			Mean	S.D.
		T.S.	M.S.	Ranks		
1.	Mechanical methods	2989	12.45	I	48.13	12.31
2.	Cultural methods	2937	12.24	II		
3.	Chemical methods	2929	12.20	III		
4.	Biological methods	2874	11.98	IV		

T.S. = Total score, **M.S. =** Mean score, **S.D. =** Standard deviation

Conclusion

The results shows that in the research area majority of the farmers were having much knowledge about cultural methods among the IPM methods but they were adopted mechanical methods more. So it can be said that the there is need to make them aware about the other IPM practices viz. biological, chemical, cultural and its benefits, there are also lack of education. Result also shows that the majority of the people were not adopted the biological and chemical methods of IPM practice, so the time requirement is that aware them about the IPM methods through social media or by the help extension personnel and Kisan sahayak etc. RAEOs can arrarnge a training programme at village level in which many types of activities should be done viz. method demonstration, exhibition, result demonstration etc. Sugar industry can take a step to meet the farmers problem at village or block level, it will be very effective reason behind this is all farmers are connected with the sugar industry according to area. Muzaffarnagar and Saharanpur district both are having large number of sugarcane growers, so there is need to focus on them. Majority of the growers also facing the financial problem because sugar industry not paying the payment of the sugarcane growers properly. Due to delay in the payments growers can't adopt the new technologies due insuffiecient fund, so govt. should enact a strict rules for the sugar industry. Govt. can start a programme with the collaboration of the NGOs to trained the farmers.

Acknowledgement

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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