



Insecticide Use and Its Effect on Sustainable Agriculture: A Study on the Farmers of Cooch Behar District

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Abstract

Insecticides are essential to control harmful insects of different crops. But there may be some times recommended dose of insecticides were not applied by the farmers which may affect the sustainability of crop and soil. There is heterogeneous perception for the use of insecticides among the farmers of studied area even after certain awareness programmes of Krishi Vigyan Kendra, Cooch Bihar. This study was conducted at Cooch Behar district, West Bengal to know the farmer perception on insecticide use and sources of information utilize for insecticide application. The data were collected during August, 2016 at the time of awareness programme of Pesticide use. The research design was followed in the study was descriptive research deigned. There perception was correlated with independent variables as age, gender, number of family member, caste, land holding, education, annual income and sources of information. The descriptive statistics like frequency, percentage, Pearson's product moment correlation and other statistical tools were used for the investigation It was found from the study that the majority of the respondent perception were positive in case of "Prescribed dosages of Insecticide application is best for control of insects infestation" and negative perception were high in case of "Chemical Insecticide is environmentally friendly" and "Only used of Insecticide can control the entire insects' infestation".

Keywords: Insecticide, Perception, Information, Aware, Sustainable

Introduction

Harmful insects control without any insecticide cannot meet the increasing crop production in India. It may due to the increasing infestation of different types insects. Use of chemical insecticide is one of the popular and effective ways to control the insect infestation. Farmers may use one or more insecticide. Farmers' preference of the insecticide may not be equal. There are several types of insects on crop field. Some sociological and economical factor may influence on the perception on use of insecticides. Farmers of Cooch Behar district were more interest to use insecticide in agriculture field. Agriculture production of Cooch Behar district was increased due to use of insecticide and other modern technology. However, besides the benefits that it brings, insecticides potentially affect the health of users and the surrounding environment. If not used properly, insecticide cause human poisoning and is accumulated as residues in food and the environment, which subsequently results in the variety of human diseases, environmental pollution and loss of biodiversity. Different government and private organisation took initiative to aware the farmer aware on safe use of insecticide by organizing several awareness and training programmes. But farmer Perception about insecticide is quite different. Coochbehar Krishi Vigyan Kendra given so many

awareness and training programmes to the farmers on safe use of Insecticide at both on campus and off campus. A number of review studies were found for the present investigation. Anonymous concluded from their study that consumers' attitude is associated with the knowledge and personal experience they possess [1]. Farmers' perceptions about modern rice varieties significantly affected adoption decisions. There are other variables including sex, age, education, and household size while institutional factors include farm size, membership to association, access to information, access to credit, and access to infrastructure such as roads or storage [2]. Educated farmers were believed to have higher ability to perceive, interpret and respond to new information about improved technologies than their counterparts with little or no education [3, 4]. It was found from most of the studies that a positive relationship exist between access to credit and use of improved technologies and access to extension services and use of improved technologies [5-7]. Anonymous concluded from their study that most of the vegetable farmers perceived that frequency of insects and disease infestation had increased over the past 10 years and most of the pesticides belonged to high and moderate risk chemicals [8]. Anonymous found that farmer perceptions of toxicity level of chemicals they handle had not been found in conformity with the actual situation and they handle toxic chemicals thinking them to be safe [9] and greater number of the literate farmers had strong perception on the negative impacts of pesticides on soil, water, air and beneficial organisms [10].

Perception is the process by which an individual maintains contact with the environment [11]. Land ownership and agricultural credit had positively impacted on pesticide use [12] and younger farmers were the most pesticides-effected group oriented to well-targeted training programs [13]. The vegetable farmers in Tanzania were lack of appropriate knowledge on safe use of pesticides [14]. Anonymous showed that Non-Integrated Pest Management farmers used twice as many pesticides as IPM farmers and integrating rice-fish farming with IPM practices was a sustainable alternative to intensive rice mono-cropping in terms of an economic and an ecological point of view [15].

So a study was needful to know the farmers' perception on insecticide use with respect to their socio-economic and other variable. The study was conducted during August, 2016. The purpose of this study was to identify the farmer Perception on insecticide use with respect to their socio-economic variable.

Material and Method

The study was conducted in Cooch Behar district, West Bengal during August, 2016. Survey research design was used in this study. The data was collected by pretested well structured interview schedule. The respondents for this study were included from the farmers and farm women. Purposive sampling method was used for selection of District and respondent. The sample size for the study was 100. The dependent variables of this study was perception and independent variables were age, gender, number of family member, caste, land holding, education, annual income and sources of information. There were fifteen number of perception statement were selected but after pre-test finally nine number of perception statement were selected. The variables were selected based on past study. The descriptive statistics like frequency, percentage and Pearson's product moment correlation were used for the investigation.

Results and Discussion

It was shown from the study that a majority of the respondent were male (65%) farmer followed by female (35%) farmer. It was shown that the majority percentage of the respondent age group belonged to 35yrs to <50yrs (40%) followed by 25yrs to <35yrs (25%). This type of age group may take more initiative to safe use of insecticide (Ntow et al. 2006). It was found that majority of respondent land holding size were 2 to 5 acre (40%) followed

by less than 2 acre (30%). It was shown that majority of respondent were SC (50%) category followed by ST (20%) and GEN (20%) category. It was observed that the majority percentage of the respondents Annual income level were Rs.1,00,001 to Rs.2,00,000 (35%) followed by Rs.60,001-Rs.1,00,000 (25%). It was observed that the majority percentage of the respondents educational level were primary school (30%) pass followed by middle school(20 %) pass and can read and write only (20%). It was found from the study that majority of the respondents family size were less than 5 (65%) followed by more than 5 (35%). It was shown after investigation that majority of the respondent perception agree with the statement of “Prescribed dosages of insecticide application is best for control of insects infestation” (80%) followed by “Mixing of insecticide is more effective” (45%).

Table no. 1: classification of the respondent on the basis of different independent variable

		n=100
Sl. No.	Variable	Number of respondent
A. Gender (x_1)		
1.	Male	65
2.	Female	35
B. Age (x_2)		
1.	18yrs to <25 yrs	20
2.	25 yrs to<35 yrs	25
3.	35 yrs to <50 yrs	40
4.	>50 yrs	15
C. Education (x_3)		
1.	Illiterate	10
2.	Can read only	-
3.	Can read and write only	20
4.	Primary school	30
5.	Middle school	20
6.	High school	15
7.	Pre-university	-
8.	Graduate and above	5
D. Caste (x_4)		
1.	GEN(General)	20
2.	SC(Scheduled Caste)	50
3.	ST(Scheduled Tribe)	20
4.	OBC(Other Backward Classes)	10
Land holding (acre) (x_5)		
1	Less than 2	30
2	2-5	40
3	5-10	20
4	More 10	10
Annual income level (INR) (x_6)		
1	Less than Rs. 30,000	10
2	Rs. 30,001-Rs. 60,000	15

3	Rs.60,001-Rs.1,00,000	25
4	Rs. 1,00,001-Rs. 2,00,000	35
5	Rs. 2,00,001-Rs. 3,00,000	10
6	Rs. 3,00,001 and above	5
Number of family member (x_7)		
1	Less than 5	65
2	More than 5	35

Table no.2: Perception of the farmer on Insecticide use **n=100**

Perception	Yes		No		Don't Know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Bio diversity is affected by excess use of insecticide (y_1)	40	40	20	20	40	40
Mixing of insecticide is more effective (y_2)	45	45	20	20	35	35
Prescribed dosages of insecticide application is best for control of insects infestation (y_3)	80	80	17	17	3	3
Only used of insecticide can control the entire insects infestation (y_5)	26	26	72	72	2	2
Insecticide applied at the time of above ETL (Economic Thresh hold level) (y_5)	5	5	0	0	95	95
Chemical insecticide is environmentally friendly (y_6)	12	12	88	88	0	0
Liquid form of insecticide is less affected the environment than dust form of insecticide (y_7)	34	34	13	13	53	53

Insecticide is applied on the basis of agro climatic condition (y ₈)	20	20	10	10	70	70
frequency of insects infestation has increased over the past 10 years (y ₉)	34	34	6	6	60	60

Table no.3: Insecticide dosage information used by the respondent n=100

Sources of information	Frequency	Percentage
Agriculture office	70	70
Own experience	25	25
Other farmer	22	22
Insecticide Retailer	95	95
Insecticide company representative	12	12

Table no. 4: Association between personal and socio-economic traits with Perception of respondent

n=100

S. N.	Variable	*r ² value																	
		Y ₁	LOS *	Y ₂	LOS	Y ₃	LOS	Y ₄	LOS	Y ₅	LOS	Y ₆	LOS	Y ₇	LOS	Y ₈	LOS	Y ₉	LOS
1.	x ₁	0.49 1	.01	0.60 1	.01	0.12	NS*	0.41 7	.01	0.07 2	NS	0.20 6	.05	0.504	.01	0.17 4	NS	0.03 1	NS
2.	x ₂	0.06 9	NS	0.01 1	NS	0.01	NS	0.26 1	.01	0.07 0	NS	0.03 1	NS	0.307	.01	0.24 7	.05	0.54 6	.01
3.	x ₃	- 0.78 1	.01	0.01 5	NS	- 0.54	.01	0.11 3	NS	- 0.44 9	.01	0.52 6	.01	- 0.715	.01	- 0.47 1	.01	0.33 2	.01
4.	x ₄	- 0.02 1	NS	- 0.02 2	NS	- 0.10	NS	- 0.05 9	NS	0.05 0	NS	0.15 1	NS	0.034 7	NS	- 0.02 4	NS	0.06 8	NS
5.	x ₅	- 0.45 8	.01	- 0.59 0	.01	0.21 1	.05	0.68 3	.01	- 0.46 2	.01	0.47 0	.01	- 0.601	.01	- 0.70 2	.01	0.53 5	.01
6.	x ₆	- 0.19 6	.05	0.01 4	NS	- 0.04 4	NS	0.44 9	.01	0.06 8	NS	0.20 5	.05	- 0.089	NS	- 0.11 2	NS	0.41 7	.01
7.	x ₇	- 0.68 8	.01	- 0.62 1	.01	- 0.05 4	NS	0.41 7	.01	- 0.31 2	.01	0.29 6	.01	- 0.450	.01	0.10 5	NS	0.41 0	.01

*LOS: Level Of Significance

** NS : NON Significance

It was found from the survey that majority of respondent perception were not agree with the statement of “Chemical insecticide is environmentally friendly” (88%) followed by “Only used of insecticide can control the entire insects infestation” (72%). It was also found from the study that majority of respondent perception unknown with the statement of

“Insecticide apply at the time of above ETL” (95%) followed by “Insecticide is applied on the basis of agro climatic condition (70%)”.

It was revealed from the survey that there exist a positive and significant association between the variable of land holding (x_5) and perception statement of y_3 , y_4 , y_6 and negative and significant association of the perception statements of y_1 , y_2 , y_5 , y_7 , y_8 and y_9 . The findings are in agreement with the statement found by Rahman (2003). The variables caste (x_4) had no significant association with any of the perception statements.

The variable gender (x_1) had positive and significant association with the statements of y_1 , y_2 , y_4 , y_6 and y_7 . The variable age (x_2) had positive and significant association with the statements of y_4 , y_7 and y_8 and negative and significant association with the statement of y_9 . The findings are line with the statement found by Adesina and Zinnah 1993.

The variable education (x_3) had negative and significant association with the statements of y_1 , y_3 , y_5 , y_7 and y_8 and positive and significant association with the statements of y_6 and y_9 . The findings are line with the statement found by Lanyintuo and Mekuria 2005; Tabi *et al.* 2010.

The variables Annual income (x_6) had positive and significant association with the statements of y_4 , y_6 and y_9 and negative and significant association with the statement of y_1 . The findings are line with the statement found by Feder *et al.* 1985. The variables family size (x_7) had positive and significant association with the statements of y_4 and y_6 and negative and significant association with the statements of y_1 , y_2 , y_5 , y_7 and y_9 . The findings are line with the statement found by N. Mahantesh *et al.* 2009. It was observed from the study that majority percentage of respondent used insecticide retailer (95%) as sources of information of Insecticide dosages followed by Agriculture office (70%).

Conclusion, Limitation and Opportunity

It can be concluded from the investigation that the majority of the respondent perception were positive in case of “Prescribed dosages of Insecticide application is best for control of insects infestation” and negative perception were high in case of “Chemical Insecticide is environmentally friendly” and “Only used of Insecticide can control the entire insects’ infestation”. It may due to more involvement of the respondent on agriculture activity and contact with different govt. and private organisation or other factor. The limitation of the study were (1) Perception may different on the different insecticide which was not included (2) Short time study, (3) Perception of insecticide use may different on different crop, (4) There are only nine number of perception statement included which was may not sufficient to judge the farmers perception on insecticide use. The opportunity of the future study is (1) Comparative analysis of the farmer perception of insecticide use on different crop, (2) Comparative analysis of the farmer perception among the different insecticide uses, (3) Role of different organisation for sustainable environment generation and biodiversity conservation.

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