

Farmers Perception on Herbicide use for conservation of natural resources: a study at Gopalpur Village of Cooch Behar District

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Abstract

Herbicide was essential for control of infestation of weeds on different crop. Farmers were use different type of herbicide on crop field. Their perception on herbicide use may be different. Different government and private organisation took initiative to aware the farmer about the use of herbicide. But still a problem was found by Cooch Behar Krishi Vigyan Kendra that farmer perception of herbicides use were not homogeneous and the different sources of information may be use by the farmers for herbicide application. So a study was conducted at Gopalpur village in Cooch Behar district, West Bengal to know the farmer perception on herbicide use and sources of information utilize for herbicide application. The data were collected during August, 2016. The research design was followed in the study was survey research method. The sample size of the study was 100. The dependent variable 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. The descriptive statistics like frequency, percentage, Pearson's product moment correlation and other statistical tools were used for the investigation. This study had shown the relation of the perception of herbicide use with the different independent variable and the role of different extension mechanism for herbicide information providing.

Key Words: *Herbicide, Perception, Information, Aware*

Introduction

Harmful weeds control without any herbicide cannot meet the increasing crop production in India. One of the reasons is due to the increasing the infestation of weeds attack on crop filed.

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So requiring weeds management effectively to increase the amount of producing crop can satisfy a large demand in the Indian market. Use of chemical herbicide is one of the popular and effective ways to control the weeds infestation. Farmers may use one or more herbicide. Farmers' preference of the herbicide may not be equal. There are several types of weeds on crop field. Some sociological and economical factor may influence on the perception on use of herbicides. Farmers of Cooch Behar district were more interest to used herbicide on agriculture field. Agriculture production of Cooch Behar district was increased due to use of herbicide and other modern technology.

However, besides the benefits that it brings, herbicides potentially affect the health of users and the surrounding environment. If not used properly, herbicide cause human poisoning and is accumulated as residues in food and the environment, which result 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 herbicide by arranging different awareness and training programme. But farmer Perception about herbicide used may be different. Coochbehar Krishi Vigyan Kendra organized so many awareness and training programmes on safe use of Herbicide at both on campus and off campus. Farmers' perception of herbicide used was not homogeneous in Coochbehar district. So a study was conducted to know the farmers' perception on herbicide use with respect to their socio-economic and other variable. As herbicides comes under pesticide. So 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 of the characteristics of modern rice varieties significantly affected adoption decisions. Farmer characteristics among others include 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 as 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-affected group and 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]. The study was conducted during June, 2016. The purpose of this study was to identify the farmer Perception on herbicide use with respect to their socio-economic variable.

Material and method

The study was conducted at Gopalpur village, Cooch Behar district, West Bengal during June, 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 of Gopalpur village. Purposive sampling method was used for selection of village. Random sampling method was used for selection of the 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 recommendation of the scientist of Uttar Banga Krishi Viswavidyalaya, Cooch Behar, West Bengal. 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 herbicide (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 herbicide application is best for control of weeds attack on crop field” (80%) followed by “Mixing of herbicide is more effective” (45%).

It was found from the survey that majority of respondent perception were not agree with the statement of “Chemical herbicide is environmentally friendly” (88%) followed by “Only used of herbicide can control the entire weeds attack of the field” (72%). It was also found from the study that majority of respondent perception unknown with the statement of “Herbicide apply at the time of above ETL” (95%) followed by “Herbicide 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 line 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 *etal.* 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 herbicide retailer (95%) as sources of information of Herbicide 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 high in the statements of “Prescribed dosages of Herbicide application is best for control of weeds attack on crop field”, “Chemical Herbicide is environmentally friendly” and “Only used of Herbicide can control the entire weeds attack of the field”. It may due to more involvement of the respondent on agriculture activity and contact with different govt. and private organisation or other factor. It was also concluded from the survey that respondent perception were low in case of “Herbicide applied at the time of above ETL” and “Herbicide is applied on the basis of agro climatic condition”. It may due to majority of the respondents were low education status, low income or other factor. It was concluded from the study that there exist a positive and significant association between the variable of land holding (x_5) and perception statements 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 . It may due to more involvement on agriculture activity. 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 . It may due to more involvement of male farmer on herbicide application.

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 . It may due to that younger respondent have more perceived on exact way of herbicide application and environmental conservation and older respondent more perceived on weeds infestation scenario in previous ten years. 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 . It may due to that educated respondent more perceived on safe use of herbicide. 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 . It may due to high perceived on biodiversity conservation and low perceived on previous weeds infestation scenario at Gopalpur village.

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 . It may due to higher involvement on agriculture activity and contact with different organization of the respondent belong to small size family. It was also clear from the study that herbicide retailer was play major role for herbicide dosage information provider to the respondents. The limitation of the study were (1) Perception may different on the different herbicide which was not included (2) Short time study, (3) Perception of herbicide use may different on different crop, (4) There are only nine number of perception statement

included which may not be sufficient to judge the farmers' perception on herbicide use. The opportunity for the future study is (1) Comparative analysis of the farmer perception of herbicide use on different crops, (2) Comparative analysis of the farmer perception among the different herbicide uses, (3) Role of different organisations for sustainable environment generation and biodiversity conservation.

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List of Tables

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 Herbicide use n=100

Perception	Yes		No		Don't Know	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Bio diversity is affected by excess use of herbicide (y ₁)	40	40	20	20	40	40
Mixing of herbicide is more effective (y ₂)	45	45	20	20	35	35
Prescribed dosages of herbicide application is best for control of weeds attack on crop field (y ₃)	80	80	17	17	3	3
Only used of herbicide can control the entire weeds attack of the field (y ₅)	26	26	72	72	2	2
Herbicide applied at the time of above ETL (Economic Thresh hold level) (y ₅)	5	5	0	0	95	95
Chemical herbicide is environmentally friendly (y ₆)	12	12	88	88	0	0
Liquid form of herbicide is less affected the environment than dust form of herbicide (y ₇)	34	34	13	13	53	53
Herbicide is applied on the basis of agro climatic condition (y ₈)	20	20	10	10	70	70
frequency of weeds infestation has increased over the past 10 years (y ₉)	34	34	6	6	60	60

Table no.3: Herbicide 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
Herbicide Retailer	95	95
Herbicide company representative	12	12

Table no. 4: Association between personal and socio-economic traits with Perception of respondent**n=100**

S L N o	Variable	"r" 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	0.491	.01	0.601	.01	0.12	NS**	0.417	.01	0.072	NS	0.206	.05	0.504	.01	0.174	NS	-0.031	NS
2	X ₂	0.069	NS	0.011	NS	0.01	NS	0.261	.01	0.070	NS	-0.031	NS	0.307	.01	0.247	.05	-0.546	.01
3	X ₃	-0.781	.01	0.015	NS	-0.54	.01	0.113	NS	-0.449	.01	0.526	.01	-0.715	.01	-0.471	.01	0.332	.01
4	X ₄	-0.021	NS	-0.022	NS	-0.10	NS	-0.059	NS	0.050	NS	0.151	NS	0.0347	NS	-0.024	NS	-0.068	NS
5	X ₅	-0.458	.01	-0.590	.01	0.211	.05	0.683	.01	-0.462	.01	0.470	.01	-0.601	.01	-0.702	.01	-0.535	.01
6	X ₆	-0.196	.05	0.014	NS	-0.044	NS	0.449	.01	0.068	NS	0.205	.05	-0.089	NS	-0.112	NS	0.417	.01
7	X ₇	-0.688	.01	-0.621	.01	-0.054	NS	0.417	.01	-0.312	.01	0.296	.01	-0.450	.01	0.105	NS	-0.410	.01

- *LOS: Level Of Significance
- ** NS : NON Significance