



## Research Article

### PESTICIDE USE PATTERN AMONG FARMERS IN HARYANA

SINDHU NITU, SHEHRAWAT P.S.\*, SINGH JOGINDER AND GHANGHAS B.S.

Department of Extension Education, CCS Haryana Agricultural University, Hisar-125001, India

\*Corresponding Author: Email-psshehrawat1965@gmail.com

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**Abstract-** The present study was conducted in two district of Haryana state i.e., Karnal and Sirsa. Both the districts utilized the highest percentage of agrochemicals in the state. From both the districts a total number of 140 farmers were interviewed and the result revealed that they had low mass media exposure and extension contact. Almost 100 percent of the farmers used different types of pesticides and herbicides. Most of the farmers (89.28 %) of farmers used the agrochemicals according to the dealer's prescription. Most of the farmers applied pesticides once in a week (72.14 %), harvested vegetables next day of spraying (43.57 %) and wore only full sleeves shirt as the protective clothing (100 %). It was also observed that most of the farmers didn't handle the agrochemicals safely which can have adverse impact of human health and environment. Thus it is required to educate the farmers for safe and clean environment.

**Keywords-** Farmers, Agrochemicals and Use pattern.

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#### Introduction

Agrochemicals have played a significant role in producing large quality of food for today's hungry world. These chemicals are widely used all over the world to raise agricultural production, to control pests, diseases, weeds, and other plant pathogens. Unsurprisingly, a significant portion of applied agrochemicals may be lost to the surrounding environment, where they can adversely affect human and environmental health (Abhilash and Singh, 2009) [1]. Researchers have shown that agrochemical residues are continuously persisting and accumulating in human, animal body and environment causing harmful diseases. A study was conducted in Pakistan (Menon et. al. 2011) [4] showed diseases in the study area such as gastroenteritis, diarrhea, vomiting, kidney, and skin problems. Both Karnal and Sirsa consume very high amount of agrochemicals thus, it is imperative to study the pesticide use practices among farmers in order to know various health problems they might suffer and also for developing package and practices regarding the use and handling of agrochemicals to eliminate health hazards.

#### Materials and Methods

The study was conducted in Haryana state. Haryana is geographically located at 30.73° N and 76.78° E, it has a very fertile land and is called the Green Land of India. The study was conducted in two districts namely Karnal and Sirsa, these two districts were selected purposively as they consumed highest amount of agrochemicals in entire state. From each districts seven villages were selected. From Karnal Pabana Hassanpur (Gharaunda), Padhana (Nilokhedhi), shyamgarh (Nilokhedhi), Gangar (Nilokhedhi), Chapra Kheda Rasoolpur (Karnal), Phoosgarh (Karnal), Sohana (Karnal) were selected. From Sirsa district Rupana Khurd (Chopta), Bakriyawali (Chopta), Panihari (Sirsa), Kheja Kheda (Sirsa), Shahpur begu (Sirsa), Farwain khurd (Sirsa), Bajekan (Sirsa) were selected. From each village ten farmers were selected randomly. Thus, a total number of fourteen villages and one hundred forty farmers were selected for the study. The collected data was analyzed by using statistical tools like percentages, weighted mean

score and rank order to draw meaningful inferences.

#### Result

##### Extension contact and mass media exposure

The study revealed that among the extension contact of farmers for getting information about the use of agrochemicals, they had familiarity with progressive farmers (100 %) followed by scientists (20.71 %) and field functionaries (3.57 %) of private companies like Bayers, Monsanto and Dupont as presented in [Table-1].

**Table-1** Extension Contact among farmers

S/No.	extension contact	Percentage
1	ado	0
2	sdao/sms	0
3	scientists	20.71
4	progressive farmers	100
5	others	3.57

Farmers did not getting information about agrochemicals from ADOs and SMSs. This was also supported by a study of Ogunjimi and Farinde (2012)[6] revealing that in Osun State (65%) and Edo state (96.6 %) of farmers had no contact with extension agents to discuss chemicals usage and precautionary measures. Similar findings was reported by Williams et. al.(1984) [7] who found that in Nigeria there were many farmers that are not reached by extension agents and are therefore not exposed to new technology in agriculture.

**Table-2** Mass Media exposure among farmers

S/No.	Media	weighted mean square	Rank
1	TV	0.53	1
2	KVK	0.20	2
3	radio	0.15	3

[Table-2] shows that from all the mass media TV ranked first with weighted mean score of 0.53, followed by KVK and radio ranking second and third with weighted mean score of 0.20 and 0.15 respectively. Magazine was ranked fourth with weighted mean score of 0.10, newspaper was ranked fifth with weighted mean score of 0.03 and internet was ranked last with 0.01 as weighted mean score. This implies that modern ICTs tools are not well harnessed by farmers to bring the evergreen revolution in agriculture.

The data in [Table-3] regarding protective clothes worn by the farmers and farm workers while application of agrochemicals revealed that all the farmers wore full Sleeves shirt and pants while applying pesticides but it was seen that most of the farmers fold their sleeves and pants while application, thus the answer given by them was not valid. 4.28 percent farmers wore gloves; 2.85 percent wore mask and only 1.42 percent wore boots every time they use agrochemicals. In less developed countries, adequate protective clothing is often neglected for reasons of discomfort or high cost as studied by Wilson and Tisdell, 2001 [8].

**Table-3 Protective clothing used by farmers**

S/No.	Statement	Percentage
1	Full sleeves shirt and full pants	100
2	Gloves	4.28
3	Mask	2.85
4	boots	1.42

### Practice of Pesticide Usage among the Farmers

The data pertaining to different pesticides used by the farmers presented in [Table-4] narrates that farmers used many different types of pesticides, most probable reasons being the severe infestation of white fly in cotton and land hopper in paddy. The study revealed that among the pesticides namely Dimethoate, Dichlorvos, Buprofezin, Bifenthrin, Thiamethoxam, Deltamethrin, Carbofuran, Chlorpyrifos, Paraquat dichloride, Acephate, Malathion, Monocrotophos, Cypermethrin, Phorate and Quinalphos were used by 100 percent farmers. Followed by Imidacloprid (95%), Fenvalerate (90%), Triazophos (90%), Methyl parathion (90%), Profenofos (75%), Chlorantraniliprole (70%), Ethion (32%) and Permethrin (8%). It was seen that almost all the pesticides were either extremely toxic or highly toxic in nature and hardly 2–4 percent of the farmers wore mask, gloves and boots as protective clothing.

**Table-4 Pesticides used by farmers**

S/No.	Statement	Percentage
1	Dimethoate	100
2	Dichlorvos	100
3	Buprofezin	100
4	Bifenthrin	100
5	Thiamethoxam	100
6	Deltamethrin	100
7	Carbofuran	100
8	Chlorpyrifos	100
9	Paraquat dichloride	100
10	Acephate	100
11	Malathion	100
12	Monocrotophos	100
13	Cypermethrin	100
14	Phorate	100
15	Quinalphos	100
16	Imidacloprid	95
17	Fenvalerate	90
18	Triazophos	90
19	Methyl parathion	90
20	Profenofos	75
21	Chlorantraniliprole	70
22	Ethion	32
23	Permethrin	8

All the farmers used herbicide namely 2,4-D, Atrazine, Glyphosate and Pendimethalin. Butachlor N and Sulfosulfuron was used by 90 percent and 81.42 percent of farmers respectively.

**Table-5 Herbicides used by the farmers**

S/No.	Herbicide	Percentage
1	2, 4-D	100
2	Atrazine	100
3	Glyphosate	100
4	Pendimethalin	100
5	Butachlor N	90
6	Sulfosulfuron	81.42

Data pertaining to prescriptions followed by the farmers presented in [Table-6] clearly indicate that 89.28 percent of farmers applied the agrochemicals on their crops based on the dealer's prescription, 7.14 percent of farmers applied based on the prescription on the packet/ bottle and 3.57 percent of the farmers said that they apply agrochemicals less than the prescription. None of the farmers mentioned that they apply according to the expert's advice. The main reason for the adoption of prescription of dealer was to input supplied them on credit basis.

**Table-6 Prescription followed by the farmers**

S/No.	Prescription followed	Percentage
1	According to dealer's prescription	89.28
2	According to label on bottle	7.14
3	Less than instructions	3.57

Data regarding frequency of pesticide spraying presented in [Table-7] shows that 72.14 percent of farmers applied pesticides once in a week, 22.14 percent farmers applied pesticides twice in a month and 5.71 percent farmers applied pesticides whenever it was required. The study also revealed that 43.57 percent of farmers harvested the vegetables next day, 33.57 percent harvested after two days, 12.85 percent harvested after three days and 10 percent harvested after a week of pesticide application. The main reason for higher residual effect of insecticide was non adoption of waiting period by farmers.

**Table-7 Frequency of pesticide spraying and time of harvesting**

S/No.	Frequency of application	Percentage
1	Once in a week	72.14
2	Twice in a month	22.14
3	whenever required	5.71
S/No.	Time of harvesting	Percentage
1	next day	43.57
2	after two days	33.57
3	after three days	12.85
4	after one week	10

Data presented in [Table-8] reveals handling of agrochemicals by the farmers. In spite of being well aware about the harmful effect of agrochemicals, farmers did not use the chemicals safely but they knew that they must carry pesticide container in case of poisoning, keep pesticide bottles away from food items and they always keep agrochemicals out of the reach of children. All the farmers washed the sprayer/bottle in the pond/canal/river/other sources of drinking water, which contaminated the water bodies. Pesticides empty containers were used by 73.57 percent of farmers for storing food and water, 65.71 percent of farmers used to eat, drink or smoke while applying pesticide on their farm. According to the study conducted by Ogunjimi and Farinde (2012) [6], majority of cocoa farmers in Osun (61.7%) and Edo (68.3%) states were in the habit of eating during spraying of chemicals, and 75.0% and 75.8% of cocoa farmers in Osun and Edo States respectively, were drinking during application of chemicals. Similarly 51.7% and 59.7 were smoking during spraying of chemical in Osun and Edo States respectively. 25.71 percent of farmers check weather report before applying agrochemicals, 16.42 percent farmers followed the safety intervals between two consecutive applications. Only 8.57 percent of farmers disposed the empty containers safely, most of the farmers sold the empty containers or threw them in garbage. Proper pesticide waste disposal is also an important part of responsible pesticide use. Accidental release or uncontrolled discharge of pesticide waste into the environment can harm people and contaminate the environment (Damalas et.al. 2008)[2].

**Table-8** Handling of agrochemicals by the farmers

S/No.	Practices	Percentage
1	Wash sprayer/bottle in pond/canal/river	100
2	Agrochemicals away from children's reach	100
3	Carry pesticide container in case of poisoning	100
4	Keep pesticides away from food	100
5	Using pesticide containers for keeping food	73.57
6	Eat, drink or smoke while spraying	65.71
7	Check weather forecasting before application	25.71
8	Maintaining safe frequency of pesticide application	16.42
9	Disposing the empty containers safely	8.57
10	Read labels on the containers/packets	7.14
11	Seek help, if can't read	7.14
12	Follow instructions on the label	7.14
13	Understand symbols and signs on containers	5
14	Take bath right after spraying	0.71

Disposal of the empty containers in the field or by throwing them near or into local waste containers is a very unsafe practice and has been reported as a major problem in studies conducted by Hurting et.al. (2003) and Recena et.al. (2006) [3,5]. Only 7.14 percent of farmers read the label on the containers, asked for help, if they couldn't read and followed the instruction printed on the containers. A very small percentage i.e. 5 percent partially understood the symbols and signs on the containers and only 0.71 percent of farmers took bath immediately after spraying.

### Conclusion

This study provides important information about the different types of agrochemicals used, frequency of application, prescription followed by farmers and various practices adopted while using the agrochemicals. It is clear from the study that the farmers did not get enough information about agrochemicals from ADOs and SMSs thus there is need of better extension services. It is also seen that the farmers without any protective measures are using a large variety of agrochemicals. This may result in different types of ocular, respiratory, digestive and skin diseases along with other chronic diseases. It was also seen that the farmers didn't follow the instructions regarding the safe handling and use of agrochemicals thus there is a urgent need of creating awareness among farmers regarding the adverse affects of these chemicals on their health and on environment. It is also required to educate them regarding the residual effect on human beings and animals. This will help the farmers to use agrochemicals safely, reduce its use and shift to bio-fertilizers and bio-pesticides leading to clean and safe food and environment.

**Conflict of Interest: None declared**

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