

A Cross Sectional Survey of Knowledge, Awareness and Practices Related to the use of Pesticide among Farmers in Agra District of Uttar Pradesh

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Abstract

The Present survey was undertaken in the year 2021- 22 with objective to measure the Knowledge, Awareness and Practices related of farmers about in Agra district. Out of 15 blocks in the Agra district, six blocks and four villages from each block were randomly selected. During the farmer meet in each selected village, farmers presented themselves voluntarily, were registered as the respondent farmers for the survey. In all 2588 farmers from all the selected villages were studied. Out of total farmers most of them belonged to 30-50 years age group, having holding size up to 2 hectares. The maximum number of farmers were having knowledge of identified pest, spraying time, intake of food and drinks while spraying. They are not much aware about use of bio-pesticides, pesticide residues in crops and counterfeit pesticides. no use of personal protective equipments, and the inappropriate storage and disposal of pesticides and empty containers were common practices.

Keywords: Use, pesticides, awareness, survey.

Introduction

Pesticides have become an integral part of present-day farming and play a major role in increasing agricultural productivity. However, the indiscriminate and extensive use of pesticides represents one of the major environmental and public health problems all over the world. If improperly used, pesticides can lead to secondary pest outbreaks^[3], destruction of non-target species^[1], soil, water, and air contamination^[2], and residues in primary and derived agricultural products that endanger both the environment and human health. Although the unsafe and indiscriminate use of pesticides in agriculture represents a major hazard to the human and environment^[4], the pesticides are considered a vital component of modern farming, playing a major role in maintaining high agricultural productivity. By their nature, many pesticides may pose some risk to humans, animals, and the environment. At the same time, pesticides

are often useful because of their ability to control disease causing organisms.

Farmers, and especially those directly involved in the handling of pesticides, are at a high risk of exposure to pesticides through contact with pesticide residues on treated crops, unsafe handling, storage and disposal practices, poor maintenance of spraying equipment, and the lack of protective equipment or failure to use it properly^[5]. These risks may be exacerbated by lack of information on pesticide hazards, the perception and attitude of farmers regarding risk from pesticide exposure, and to lack of education and poor knowledge and understanding of safe practices in pesticide use, including storage, handling and disposal^[4]. However, concerns over pesticides' effects on human health and the environment have grown in recent years. As a result, it is critical that everything possible is done to ensure that pesticides are used correctly to provide the greatest benefit while posing the fewest

risks to humans and the environment. Careless handling of pesticides usually due to ignorance, lack of information or lack of training can pose a serious health risk for farmers, who are the major pesticide users and are regularly exposed to pesticides in their day-to-day life. Thus, the present investigation was conducted to assess the levels of knowledge, attitude and practices of the farmers of Agra District regarding

Material and Method

The present study is confined to Agra district of western U.P. Out of 15 blocks in the Agra district, six blocks viz. Jagner, Akola, Bichpuri, Fatehabad, Fatehpur Sikri and Shamsabad and four villages from each block were randomly selected. During the farmer meet in each selected village, farmers presented themselves voluntarily, were registered as the respondent farmers for the survey. In all

Results and Discussion

Socio-demographic characteristics of the study participants

Among all the 2588 respondent farmers, 96.21% were male and only 3.79% were female and most of the farmers (70.79%) belonged to the middle age group *i.e.* 30 to 50 years, while 7.88 and 21.33 per cent were in the age groups young (20-30 yrs.) and old (>50 yrs.), respectively. The overall majority of farmers (55.56%) belong to OBC, while General, SC and ST farmers are comparatively having low percentage *i.e.* 24.57, 16.85 and 3.01 per cent, respectively. The literacy among the respondent farmers was about 90 per cent as there was only 10 per cent farmers were illiterate. Among the literates, many of the farmers (58.8%) were having education

the use of pesticides. Understanding farmers' knowledge of pesticides and safety practices is vital not only for identifying exposure situations and knowledge gaps, but also to provide valuable information that can contribute to educational and policy recommendations aimed at preventing or reducing the health and environmental hazards associated with pesticides.

2588 farmers from all the selected villages were studied. The study was based on primary data collected with the help of pre-tested schedules and questionnaires by survey method through interviewing the farmers personally during the year 2021-22. The statistical methods used in the analysis of data were frequency distribution and percentage.

from primary to high school while farmers having education up to intermediate and graduation or above graduation were 23.0 and 8.0 per cent, respectively. Farmers having nuclear family were about 57 percent while about 43 per cent live in joint family. Most of the respondent (72.5%) were either marginal or small farmers having holding size below 2hectares for the cultivation of crops. Although a considerable number of farmers having mobile phone but most of them were not the members of any Agri-WhatsApp group. Nearly 70 percent of the farmers cultivating their own land while 27.0 percent were cultivating both own & leased land and only 3.4 percent were cultivating leased land.

Table 1 Socio-demographic characteristics of study participants of Agra district (n = 2588)

	Variables	Frequency	%
Gender	Male	2490	96.21
	Female	98	3.79
Age in years	20-30	204	7.88
	31-40	926	35.78
	41-50	906	35.01
	>50	552	21.33
Social group	OBC	1438	55.56
	SC	436	16.85
	ST	78	3.01
	General	636	24.57
Level of education	Illiterate	264	10.2
	Up to Primary	782	30.2
	Middle school	528	20.4
	High school	212	8.2
	Intermediate	594	23.0
	Graduation &above	208	8.0
Type of Family	Nuclear	1472	56.9
	Joint	1116	43.1
Possession of Mobile phone	Yes	2240	86.6
	No	348	13.5
Holding size	<1 ha.	848	32.8
	1-2 ha.	1028	39.7
	2-4 ha.	560	21.6
	>4 ha.	152	5.9
Member of any Agri-WhatsApp group	Yes	174	6.7
	No	2414	93.3
Land occupancy status	Cultivating own land	1802	69.6
	Cultivating leased land	88	3.4
	Cultivating both own & leased land	698	27.0
Testing of Soil	Yes	454	17.5
	No	2134	82.5
Source of Irrigation	Bore-well	1548	59.8
	Canal	1012	39.1
	Tank	28	1.1

Knowledge of respondents regarding pesticides use

	Variables	Frequency	%
Able to identify pest	Yes	2236	86.4
	No	352	13.6
Able to identify beneficial insect species	Yes	756	29.2
	No	1832	70.8
Not to spray in*	Rainy days	1188	45.9
	Bad climate	1166	45.1
	Fog time	1022	39.5
	High wind	1446	55.9
Whether one should smoke or eat or drink while spraying	Yes	80	3.1
	No	2491	96.3
	Don't aware	17	0.7
Knowledge of farmers on advantages of pesticides	Pest and disease control	1532	59.2
	More yield	998	38.6
	Do not know	58	2.2
Knowledge of farmers on disadvantages of pesticides	Yield loss	332	12.8
	Reduce soil fertility	2080	80.4
	Do not know	176	6.8

Knowledge of pesticide labels and information	Yes	978	37.8
	No	1610	62.2
Source of information about pesticides	Dealer	1958	75.7
	Representatives	360	13.9
	Extension Services	254	9.8
	Others.	16	0.6

**More than one option responded by the farmers so that percentage exceed 100*

Awareness

Variables		Frequency	%
Use of bio-pesticides and fertilizers	Yes	418	16.2
	No	2170	83.8
Consultation for pesticide use	Dealer	2210	85.4
	Extension Officer	284	11.0
	Other farmer	94	3.6
Awareness of farmers regarding poison in pesticides	Yes	2196	84.9
	No	392	15.1
Awareness of pesticide residues on crops	Yes	568	21.9
	No	2020	78.1
Farmers' action for treatment of poison due to pesticides	Go to the doctor with container	682	26.4
	Go to the doctor and tell the name of pesticide	1740	67.2
	Do not know	166	6.4
Awareness of the re-entry times after spraying	Yes	2176	84.1
	No	412	15.9
Awareness of the pre-harvest intervals	Yes	2012	75.4
	No	656	24.6
Awareness of counterfeit pesticides	Yes	246	9.5
	No	2342	90.5
Farmers awareness of any Agricultural Apps	Yes	104	4.0
	No	2484	96.0

Practice

Variables		Frequency	%
Personal protection while mixing/loading & spraying	Wear Normal clothing	2010	77.7
	Protective wears	578	22.3
Farmers are willing to pay for protective equipment.	< Rs.100	1776	68.6
	Rs.100-200	730	28.2
	>Rs.200	82	3.2
Farmers do with the clothing after spraying	Wash after every spray	1878	72.6
	Store separately	710	27.4
Maintenance of spraying equipment	Check for leaks	968	37.4
	Replace nozzles	1210	46.8
	Replace Rubber seals	756	29.2
Frequency of washing and cleaning of own spraying equipment (N=1228)	Washed/cleaned after every spray	980	79.8
	Occasionally Washed/Cleaned	233	19.0
	Never Washed/Cleaned	15	1.2
Place of storing own spraying equipment (N=1228)	With household items	30	2.4
	Keep separately	960	78.2
	Locked in store/cupboard	224	18.2
	Elsewhere	14	1.1
Place of storage for pesticides	With household items	64	2.5
	Locked away in store	2034	78.6
	Locked in a box	26	1.0
	In store/ box with no lock	144	5.6

	In house	320	12.4
Use of empty plastic pesticide containers	Puncture	232	9.0
	Bury	96	3.7
	Burn	454	17.5
	Throw in field	314	12.1
	Re-Use	984	38.0
	Sell	508	19.6
Use of empty Aluminum pesticide containers	Throw in field	240	9.3
	Re-Use	352	13.6
	Sell	1996	77.1
Use of other empty pesticide containers	Bury	140	5.4
	Burn	1984	76.7
	Throw in field	360	13.9
	Sell	104	4.0

Farmers' knowledge associated with pesticide use.

The data shown in table-2 indicate that a vast majority of the farmers (86.4%) were able to identify the pest but most of them did not identify the beneficial insect species. The spraying of pesticides should not be done in high, Rainy days, bad whether and fog time as reported by 55.9, 45.9, 45.1 and 39.5, respectively. Among all the respondent farmers a few of them (3.1%) avoid of eating, drinking, or smoking while spraying pesticides while majority of them did not care of this. As the advantage of pesticide use is concerned, majority of the farmers (59.2%) knew that Pest and diseases can be controlled by using pesticides and nearly 39 percent considered that more yield can be achieved with the application of pesticides while very few of the respondents (2.2%) did not have any

Awareness towards pesticide use among the farmers.

Only 16.2 percent surveyed farmers were aware of bio-pesticides and bio fertilizers and often use them while majority of the farmers (83.8%) were not using bio-pesticides and bio fertilizers as they were not aware of the use of bio products. Most of the farmers (84.9%) were aware of that pesticides contain poison, only about 15 per cent farmers were not aware of this fact. Concerning awareness about pesticide residues in crop,

knowledge about it. About 80 percent of respondents perceived that reduction in the soil fertility is the main disadvantage of pesticide use while according to 12.8 percent respondent farmers, use of pesticide cause yield loss.

Over 62 percent of the farmers did not read or follow instructions on pesticide labels, because they were unable to read and understand the meaning of the labels and rest of the farmers (37.8%) were able to read, understand, and follow pesticide label instructions correctly. This behaviour might be due to illiteracy, or they are just ignorant or not interested to read it. Pesticide dealer is the person with whom most farmers (85.4%) consult for pesticides application while Extension workers and other farmers were consulted by nearly 11 and 4 per cent of the farmers.

most of the participants investigated in the present study (78.1%) did not know about pesticide residues in crops. Overall majority (67.2 %) farmers stated that they would go to the doctor and tell the name of pesticide for treatment of poison due to pesticides, while 26.4 percent stated that they would go to the doctor with container for treatment of poison due to pesticides, and only 6.4 percent farmers stated that they do not know what to do for treatment

of poison due to pesticides. Many of the surveyed farmers (84.1%) were aware of re-entry time after spraying while only about 16 per cent farmers were not aware in this regard. Most farmers (75.4%) were aware of pre harvest intervals while 24.6 per cent farmers reported that that they

Pesticide use practices among the farmers.

Table 4 shows farmers' practice on the personal protection, storage and disposal of pesticides. Regarding the wearing of protective wear, a majority of the respondents (77.7%) never wears it, but instead wear their regular clothes while mixing/loading & spraying of pesticides; only about 22 percent of the farmers use protective wear at this time. Most of the farmers were willing to pay less than Rs.100 for protective equipment during the pesticide use. When it was enquired about the maintenance of spraying equipment, 37.4 percent farmers check for leak while 46.8 per cent replace nozzles and 29.2 percent farmers replace rubber seal of spraying equipment. 79.8 percent farmers wash or clean the spraying equipment after every spray, while 19.0 percent farmers occasionally wash or clean the spraying equipment and only a few (1.2%) farmers never wash or clean the spraying equipment. Most of the farmers (78.2%) who own spraying equipment store the equipment separately while nearly 18 per cent keep locked in a store or cupboard.

Conclusion

The assessment results of present survey showed that farmers lack sufficient knowledge of pesticides and practices among the farmers, so they regularly adopt risky behaviours when using pesticides. Lack of knowledge included no use of personal protective equipments, and the inappropriate storage and disposal of pesticides and empty containers were common practices. These may result in a

were not aware of pre-harvest intervals. Overall, most of the farmers (90.6%) do not have awareness on counterfeit pesticides (duplicate) and a large number of farmers (96%) were not aware of any agriculture apps a large number of farmers were not aware of any agriculture apps.

Only a few of them keep spraying equipment with household items or elsewhere. It was found that the majority of the surveyed farmers (78.6%) keep pesticides and fertilizers locked away in store while 12.4 percent store in house, 5.6 per cent farmers keep in store/box with no lock and 2.5 percent with household items. Across the study area, empty plastic pesticide containers reused at home for other purposes was the most practiced method as reported by the majority (38.0%) of respondents. This was followed by participants who reported sell, burying and through in the field empty plastic containers. Most of the farmers (77.1%) sell the empty aluminium pesticide containers and about 14 percent re-use them. Only 9.3 percent of farmers consider them a waste and through in field. A vast majority of the farmers (76.7%) burn the other empty pesticides containers after use. Only a few of them sell these pesticides containers while the rest of the farmers either bury or through them in field after use.

danger of acute intoxications, chronic health problems, and environmental degradation. Therefore, increase farmers' knowledge about pesticides and creating awareness by giving them training on health-related effects from exposure of pesticides, the impact of pesticides on the ecosystem, proper disposal and storage of pesticides, and teaching of farmers in IPM methods. Training pesticide vendors to

improvetheir awareness of pesticides is also important as they are farmers' key

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