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**Jyoti Joshi**

Assistant Professor, UOU,  
Haldwani, Uttarakhand, India

**Manisha Gahlot**

Professor, GBPUAT, Pantnagar,  
Uttarakhand, India

## A survey research on the use of protective clothing by pesticide sprayers of Tarai region (Uttarakhand)

**Jyoti Joshi and Manisha Gahlot**

### Abstract

India is basically an agrarian country with approximately 70 per cent of its population dependent on agriculture and allied industries for livelihood. There is an exponential increase in the use of chemical sprays (pesticides) for the control of diseases, insects and pests in the agricultural fields that affects the crops and induces the health hazard in human beings. The present study is an endeavor to know the clothing practices of the farmers during farm activities mainly at the time of pesticide spraying. A survey was conducted to collect the above information through interview schedule.

**Keywords:** Survey research, protective clothing, pesticide sprayers

### Introduction

The pesticides are poison for plants and animals of all kinds including human beings. That is why they are effective in controlling rodents, insects, mites, nematodes, weeds, fungi and other pests. One of the drawbacks of the chemical approach to pest control is the general effect on the whole fauna of the plant and soil besides the target. Pesticides also destroy the many parasites and predators living with in the area of application of the insecticides besides pests and insects. The pesticides are used by farmers primarily to protect their crops to increase crop yield. Pesticide formulation may exist in various forms viz. powder (dust) for dusting, granulated preparations for treatment of plants and for application to the soil, wetttable powder which yield a suspension in water for spraying, solution in water and organic solvents, emulsive concentrates, which on dilution with water form emulsions for spraying and aerosols that on combustion are sublimed and form smokes or clouds, poisonous to insects, fungi and bacteria. The present study is clear indictment of the pesticides used during field operation and clothing practices of farmers during spraying. In the present investigation an attempt has been made to comprehend information about clothing practices of pesticide applicators during their work in the field.

### Methodology

#### Locale of the study

The study was aimed to assess clothing practices of pesticide applicators during pesticide spraying in Tarai region of Uttarakhand, therefore, farms of Crop Research Center of G.B. Pant University of Agriculture and Technology, Pantnagar and nearby villages namely Ganeshpur, Jainagar, Netanagar and Kalinagar were selected for sample collection.

#### Selection of respondents

Total fifty farmers were interviewed and sample of 10 farmers were taken from each village namely Ganeshpur, Jainagar, Netanagar, Kalinagar and Crop Research Centre Pantnagar.

#### Preparation of research tool and pre- testing of interview schedule

An interview schedule was prepared for collection of information on clothing practices of pesticide applicators during pesticide spraying. Pre-testing of interview schedule was carried out on 10 farmers of Aanandpur village to check whether the framed questions were easily understood by the farmers or not. Further interview schedule was reframed by omitting irrelevant and difficult to understand questions.

**Corresponding Author:**

**Jyoti Joshi**

Assistant Professor, UOU,  
Haldwani, Uttarakhand, India

### Data collection

Corrected Interview schedule was used to elicit the information from fifty respondents of Tarai region of Uttarakhand. The information collected was comprised of general information of respondents, field information, clothing aspects, care and maintenance of the clothing used for pesticide application. The data was collected using both close ended and open ended types of questions.

### Results and Discussion

Survey was conducted to know the clothing practices of pesticide applicators and care and maintenance of the clothing after pesticide application. The results of the survey were discussed under following sub-headings.

#### 1. Crops grown

This part presents the information on types of crops grown by the farmers.

**Table 1:** Distribution of respondents according to the crops grown

S. No.	Crop grown	Frequency	Percentage
1.	Wheat	50	100
2.	Paddy	50	100
3.	Mustard	50	100
4.	Sugarcane	30	60
5.	Vegetables	50	100

N: 50

Table 1 reveals that wheat, paddy and mustard were the major crops as they were cultivated by 100 per cent respondents. Vegetables were also grown by all the respondents. Majority of respondents grew vegetables for self consumption. Sugarcane was cultivated by 60 per cent respondents.

#### 2. Activities performed during crop cultivation

Table 2 provides information on various activities performed by farmers themselves and through hired labourers during crop cultivation.

**Table 2:** Distribution of respondents according to the types of activities performed during crop cultivation

S. No.	Farm Activities	Performed by			
		Self		Hired labourers	
		F	%	F	%
1.	Preparation of formulation	50	100	-	-
2.	Seed Treatment	40	80	-	-
3.	Land preparation	50	100	-	-
4.	Sowing	50	100	-	-
5.	Fertilizer application	50	100	-	-
6.	Irrigation	50	100	-	-
7.	Pesticide application	50	100	-	-
8.	Weeding	20	40	30	60
9.	Harvesting	50	100	-	-
10.	Thrashing	50	100	-	-
11.	Cleaning	20	40	30	60
12.	Drying	50	100	-	-

F: Frequency, N=50

Table 2 depicts that most of the activities were performed by the farmers themselves. Respondents (60 %) hired labourers for weeding and cleaning purposes only. All the respondents were involved in preparation of formulation, land preparation, sowing, fertilizer application, irrigation, pesticide application, harvesting, thrashing and drying.

#### 3. Special protection for pesticide spraying

Survey showed that respondents (100 per cent) required protection of face, hand and feet during preparation of formulation. All the respondents required protection of face, head, neck, feet and upper body during seed treatment. Respondents (60 per cent) required protection of face and 80 per cent respondents required protection of hand during fertilizer application. All the respondents required protection of face, neck, hand, feet and upper body and 60 per cent also required protection of head during pesticide application. None of the respondents required protection of any body part during land preparation, sowing, harvesting, thrashing, cleaning, drying, picking, transplanting, storage and vegetable plucking.

#### 4. Stages of pesticide application

It is evident from Table 3 that only 40 per cent respondents used pesticide for seed treatment where as 100 per cent respondents used pesticide for soil preparation and plant protection.

**Table 3:** Distribution of respondents on the basis of stages of pesticide treatment

S. No.	Farm activities	Pesticide application	
		Frequency	Percentage
1.	Seed Treatment	20	40
2.	Soil Preparation	50	100
3.	Plant Protection	50	100
4.	Any Other	-	-

N: 50

#### 5. Use and storage of pesticide

It is evident from Table 4 that 60 per cent respondents stored the pesticide half used and 40 per cent did not store pesticide at all. All the respondents used both spraying and broadcasting methods according to the type of pesticide. 100 per cent respondents used manual method of spraying using low volume sprayer. All the respondents sprayed in early morning, towards the wind direction for 3 hours. 10 per cent respondents got pesticide spills at the upper part of the garment, 60 per cent respondents got pesticide spills at the centre part of the garment and 30 per cent respondents got pesticide spills at lower part of the garment. Only 40 per cent respondents followed precautionary information given on containers.

**Table 4:** Distribution of respondents according to the use of pesticides and their storage

S. No.	Activities	F	%
<b>I</b>	<b>Storage of the pesticide</b>		
1.	Store the stock required for the entire crop	-	-
2.	Store the half used	30	60
3.	Do not store at all	20	40
<b>II</b>	<b>Method of pesticide application</b>		
1.	Dipping	-	-
2.	Spraying	50	100
3.	Broadcasting	50	100
<b>III</b>	<b>Method of spraying</b>		
1.	Manual spraying	50	100
2.	Power spraying	-	-
3.	Tractor spraying	-	-
<b>IV</b>	<b>Type of sprayers used</b>		
1.	High Volume	-	-
2.	Low Volume	50	100
3.	Ultra Low Volume	-	-
4.	Any other	-	-
<b>V</b>	<b>Time of spraying</b>		
1.	Early morning	50	100
2.	Morning	-	-
3.	Evening	-	-
4.	Whole day	-	-
<b>VI</b>	<b>Person position while spraying</b>		
1.	Against the wind direction	-	-
2.	Towards the wind direction	50	100
<b>VII</b>	<b>Area of the clothing get most of the pesticide spill</b>		
1.	Upper part of the garment	5	10
2.	Centre part of the garment	30	60
3.	Lower part of the garment	15	30
<b>VIII</b>	<b>Duration of spraying at a time</b>		
1.	One hour	-	-
2.	Two hours	-	-
3.	Three hours	50	100
4.	Four hours	-	-
5.	Five hours	-	-
6.	Six hours	-	-
7.	Seven hours	-	-
8.	Eight hours	-	-
<b>IX</b>	<b>Follow-up of precautionary information given on container</b>		
1.	Yes	20	40
2.	No	30	60

F: Frequency, N: 50

### 6. Common problems faced by farmers while spraying and after spraying

Table 5 reveals that 40 per cent sprayers felt dizziness while spraying and only 20 per cent sprayers used first aid.

40 per cent sprayers suffered from headache after spraying but only 30 per cent used first aid. 20 per cent sprayers had

the problem of vomiting after spraying and 10 per cent sprayers used first aid. 20 per cent sprayers suffered from skin allergies after spraying but none of them used first aid. None of the respondents faced problems of diarrhea, loss of appetite, eye irritation, excessive sweating, chest discomfort and any other while spraying and after spraying.

**Table 5:** Distribution of respondents according to the problems faced while spraying and after spraying

S. No.	Common Problems	While spraying		First aid used		After spraying		First aid used	
		F	%	F	%	F	%	F	%
1.	Headache	-	-	-	-	20	40	15	30
2.	Dizziness	20	40	10	20	-	-	-	-
3.	Vomiting	-	-	-	-	10	20	5	10
4.	Diarrhea	-	-	-	-	-	-	-	-
5.	Loss of appetite	-	-	-	-	-	-	-	-
6.	Eye irritation	-	-	-	-	-	-	-	-
7.	Skin allergies	-	-	-	-	10	20	-	-
8.	Excessive sweating	-	-	-	-	-	-	-	-
9.	Chest discomfort	-	-	-	-	-	-	-	-
10.	Any other	-	-	-	-	-	-	-	-

F: Frequency, N: 50

### 7. Long term health hazards faced by the farmers after spraying

Table 6 shows that none of the respondents faced any of the long term health problems such as gastro intestinal problems, kidney problems, deformed finger tips, deformed hands and gradual loss of vision.

**Table 6:** Distribution of respondents according to the long term health hazards faced by the farmers after spraying

S. No.	Long term problems	Frequency	Percentage
1.	Gastro intestinal problems	-	-
2.	Kidney problems	-	-
3.	Deformed finger tips	-	-
4.	Deformed hands	-	-
5.	Gradual loss of vision	-	-

N: 50

### 8. Existing dress pattern of male farm workers during pesticide spraying

It is evident from Table 7 that in case of upper garments 40 per cent respondents used full sleeve shirts and 60 per cent used half sleeve shirts frequently. 20 per cent respondents used *kurta* most of the time. All the respondents used full sleeve T-shirt occasionally and half sleeve T-shirts frequently. None of the respondents wore coat, jacket and vest.

In case of lower garments 40 per cent respondents wore pant frequently and 20 per cent respondents used *pyjama* frequently as well occasionally at the time of spraying. 20 per cent respondents used *dhoti* at the time of spraying. All the respondents used turban at the time of pesticide spraying. Gloves, mask, face cover and goggles were used by none of the respondents during pesticide spraying. All the respondents used *chappals* and only 40 per cent respondents used gum boots frequently at the time of pesticide spraying.

**Table 7:** Distribution of respondents according to the clothing worn during pesticide spraying

S.N.	Dresses	Frequently		Occasionally		Never	
		F	%	F	%	F	%
<b>I</b>	<b>Upper garment</b>						
1.	Shirt						
(i)	Full sleeves	20	40	-	-	-	-
(ii)	Half sleeves	30	60	-	-	-	-
2.	<i>Kurta</i>	10	20	-	-	-	-
3.	T-shirt						
(i)	Full sleeves	-	-	50	100	-	-
(ii)	Half sleeves	50	100	-	-	-	-
4.	Coat	-	-	-	-	50	100
5.	Jacket	-	-	-	-	50	100
6.	Vest	-	-	-	-	50	100
<b>II</b>	<b>Lower garment</b>						
1.	Pant	20	40	-	-	-	-
2.	<i>Pyjama</i>	10	20	10	20	-	-
3.	Shorts/Half pant	-	-	-	-	-	-
4.	<i>Dhoti/Lungi</i>	10	20	-	-	-	-
<b>III</b>	<b>Hands</b>						
1.	Gloves-cotton/canvas	-	-	-	-	50	100
2.	Any other	-	-	-	-	-	-
<b>IV</b>	<b>Head</b>						
1.	Cap	-	-	-	-	-	-
2.	Hat	-	-	-	-	-	-
3.	Turban/saffa	50	100	-	-	-	-
4.	Any other	-	-	-	-	-	-
<b>V</b>	<b>Face</b>						
1.	Mask	-	-	-	-	50	100
2.	Face cover	-	-	-	-	50	100
3.	Goggles	-	-	-	-	50	100
4.	Any other	-	-	-	-	-	-
<b>VI</b>	<b>Feet</b>						
1.	<i>Chappal</i>	50	100	-	-	-	-
2.	Shoes	-	-	-	-	-	-
3.	Gum boots	20	40	-	-	-	-

F: Frequency, N: 50

### 9. Awareness about protective clothing while using pesticide

Table 8 reveals that only 40 per cent respondents were aware about protective clothing. 10 per cent respondents accessed information on protective clothing from leaflet in which information regarding use of gloves, hat and boots were given and 30 per cent from television and communication media.

60 per cent respondents did not use protective clothing due to the cost factor. 40 per cent respondents used protective clothing sometimes and 60 per cent respondents never used protective clothing. 100 per cent respondents used cotton fabric and medium fitting clothes for protective clothing. A leaflet was prepared and given to the farmers to make them aware about protective clothing.

**Table 8:** Distribution of respondents according to the use of protective clothing while spraying pesticide

S. No.	Information	F	%
<b>I</b>	<b>Awareness about protective clothing for pesticide application</b>		
1.	Yes	20	40
2.	No	30	60
<b>II</b>	<b>Access of information</b>		
1.	From the container	-	-
2.	From the leaflet	5	10
3.	Land lord	-	-
4.	Scientist	-	-
5.	Shop keeper	-	-
6.	Television and communication media	15	30
<b>III</b>	<b>Use of protective clothing while using pesticide</b>		
1.	Yes	20	40
2.	No	30	60
<b>IV</b>	<b>Reasons for not using</b>		
1.	Discomfort	-	-
2.	Dislike	-	-
3.	Lack of aesthetic appeal	-	-
4.	Cost factor	30	60
5.	Protective clothing is too hot	-	-
6.	For no reason	-	-
7.	Any other reason	-	-
<b>V</b>	<b>Frequency of using protective clothing</b>		
1.	Sometimes	-	-
2.	Always	20	40
3.	Never	30	60
<b>VI</b>	<b>Types of fabrics used for protective clothing</b>		
1.	Cotton	50	100
2.	Polyester	-	-
3.	Polyester/Cotton	-	-
4.	Polyester/Viscose	-	-
5.	Any other	-	-
<b>VII</b>	<b>Fit of clothing used as protective clothing</b>		
1.	Loose fitting	-	-
2.	Medium fitting	50	100
3.	Tight fitting	-	-

N: 50, F: Frequency

### 10. Care and maintenance of the clothing after pesticide application

Survey revealed that respondents (60 percent) did not observe any change in their clothes after pesticide application. 40 per cent respondents observed change in clothes used during pesticide application out of them, 20 per cent respondents observed change in colour of clothes and 20 per cent respondents observed reduction in the strength of clothes. None of the respondents used same clothes for the pesticide application without washing. 100 per cent respondents wash their clothes immediately after application of pesticide and store the clothes at home. 40 per cent respondents washed their clothes themselves and 60 per cent respondents got their clothes washed by other family members. 60 per cent washed their clothes in river and 40 per cent respondents washed their clothes at home. 60 per cent respondents followed the practice of presoaking with detergents prior to washing, 20 per cent respondents used beating, rinsing and drying practice and 20 per cent respondents washed their clothes with soap and water. All the respondents used soap or detergent for washing clothes such as Nirma, Ghari, Farishta, wheel and surf. None of the respondents washed their working clothes with other clothing. All the respondents disposed their clothes as per the need.

### Conclusion

The present study was carried out to know the clothing practices of pesticide applicators and care and maintenance of

the clothing after pesticide application. Pesticide spraying is a vital farm activity but Tarai region farmers were found unaware of health hazards due to spraying. Farmers below the age of 40 used full sleeve shirts, half sleeve T-shirts and pants and farmers above the age of 40 used *kurta*, *dhoti* and *pyjama* but turban was used by both the farmers. Most of the sprayers suffered from headache and vomiting after spraying and only few of them used first aid. Some of sprayers suffered from skin allergies after spraying but none of them used first aid.

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