



# A survey of farmers knowledge and management practices adopted in cruciferous vegetables in Kanpur, Central Uttar Pradesh

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## ABSTRACT :

The survey was conducted during October 2015 to January 2016 among the farmers of four villages, viz., Bithoor, Pukharayan, Ghatampur and Kalyanpur in Kanpur region, Central Uttar Pradesh. The study revealed that maximum 75 per cent farmers were engaged in cultivation of cruciferous vegetables viz., cauliflower, cabbage, radish, turnip with other crops in Bithoor, Kalyanpur and Ghatampur whereas only 60 per cent were cultivating these crops in Pukharayan. Out of total respondents of farmers from Kanpur districts, 82 per cent farmers were using chemical pesticides (mainly carabryl 50WP, Malathion 50EC, Cartap hydrochloride 0.5 % and dichlorvos 100EC) whereas 16 per cent used indigenous methods (chili powder spray, fly ash powder spray) along with chemical pesticides and 2 per cent were using biopesticides (azadirachtin, 5%). This paper explores potentials and limitations of different approaches to study pesticide use in agriculture from the farmers' perspective. In contrast to the reductionist and mono-disciplinary approaches often adopted, this paper calls for integrative methodological approaches to provide a realistic and thorough understanding of the farmers' perspective on pesticide in four sites of Kanpur.

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## INTRODUCTION

Farmers across the geographical regions of the world have been using a good number of plant protection measures to control pests and diseases in their cultivated crops. Insect pests cause heavy losses to crops especially production of vegetables. Curative control measures are practiced to protect them. Among them, synthetic

insecticides have long been used which have serious drawbacks (Sharaby, 1988) and affect non-target organisms and environment (Islam *et al.*, 2003). The crucifers are important *Rabi* season vegetable crops consisting of cabbage, cauliflower, broccoli and radish. Crucifers are widely grown in many parts of Uttar Pradesh. They are frequently attacked by a number of

important insect pests. Considering the importance of farmer's knowledge based practices in pest management the present investigation was undertaken to explore documents and encourage the local farmers for the practices in the locality of Kanpur (U.P.). Farmers of this region practice intensive vegetable cultivation with high yielding varieties of cabbage, cauliflower, radish and turnip integrated pest management in vegetables mainly centered on use of pesticides. Research and development in pest management may not always lead to improved practices among the farmers. Also farmer's pest management practices represent the direct results of their decision making which is mainly influenced by their perceptions of the problems and related control actions. The farmers choose pest management options that appear to meet their objectives an assessment based on their beliefs and attitudes of pest damage and control. Cultural practices and other non-chemical pest management methods derived from traditional knowledge have also been shown to be common among some subsistence farmers in developing countries (Poswal *et al.*, 1993; Morales and Perfecto, 2000). Therefore, a farmer survey is an important data- gathering process for assessing the needs of intended beneficiaries to determine their knowledge and perception their constraints in dealing with problem of pest management and their attitude.

The present study is an effort to understand the pest management perception, Knowledge and practices adopted by farmers of Kanpur, Central Uttar Pradesh region.

## MATERIAL AND METHODS

### Sample size and sampling procedures:

Systematic sampling technique was used to select four sites (Bithoor, Pukharayan, Ghatampur and Kalyanpur) in Kanpur region according to their awareness of environmental issues and the amount of utilization of the pesticides.

80 participants (farmers) were determined using Single population Proportion Formula in the survey study.

The questioner was collected from villages and 20 participants were selected from each sites of Kanpur district.

Attempts were made to measure the differences in pesticide use, number of applications and against which pest, by asking questions on how they assess the degree of damage and apply pesticide.

Each respondent was asked about perception of specific pesticide application by asking about five reference groups which were neighbors, other farmers, village pradhan, spouse etc. For the measure of normative knowledge, each respondent was asked the questions, what do you think each reference group expected you to do for pests observed in your crops.

### Identification of pests and predators:

Farmers were asked as to how they decide to spray pesticides on crops. Samples of pests and predators were collected from the field and brought to the laboratory for identification with the help of experts in the University.

## RESULTS AND DISCUSSION

The survey among the farmers of four villages in Kanpur district revealed that maximum respondents were involved in cultivation of cruciferous crops (Cabbage, Cauliflower, and Radish) along with other crops in Pukhrayan, Ghatampur, Kalyanpur and Bithoor. An interviewing the using of agricultural practices by the farmers towards pest management, information was collected and data regarding this are presented in Table 1. The results indicated that majority 82.0 per cent of the farmers using chemical pesticides (carabryl 50WP, Malathion 50EC, Cartap hydrochloride 0.5% and dichlorvos 100EC) towards pest management, followed by 16 per cent with indigenous methods (chili powder spray, fly ash powder spray) and 2.0 per cent with biopesticides (azadirachtin, 5% ).

Insect pests mentioned by the farmers interviewed included diamond back moth *Plutella xylostella*, Tobacco caterpillar, *Spodoptera litura*, Cabbage butterfly, *Pieris*

**Table 1 : The farmers using pest management practices in cruciferous crops in Kanpur region**

Sr. No.	Management practices	Number	Per cent
1.	Chemical pesticides	65-66(65.6)	82
2.	Indigenous + Chemical pesticides	12-13 (12.8)	16
3.	Biopesticides	1-2 (1.6)	2
	Total	80	100

*brassicae*, and *Heliothis armigera* (Table 2). Farmers interviewed cited *Plutella xylostella* as the most important insect pest in Pukhrayan, Ghatampur, Kalyanpur and Bithoor. *Spodoptera litura* was considered the main insect pest in Pukhrayan and Bithoor. *Pieris brassicae* was cited as the main insect pest in Bithoor. *Helicoverpa armigera* was mentioned only in the location visited in Kalyanpur. Farmers in all four cites grow cruciferous vegetables almost throughout the year and insecticide resistance in *Plutella xylostella* occurs frequently (Lal and Kumar, 2004).

All farmers relied on pesticides as their main pest management method. The main pesticides mentioned were Cartap hydrochloride and Malathion 50 EC of the farmers in the Pukhrayan and Ghatampur, respectively and Carabryl 50 WP used in only Bithoor while Dichlorovos 100 EC used by farmers in Bithoor and Kalyanpur. A few farmers mentioned traditional practices

for pest management as neem based pesticides, Fly ash powder and Chilli powder, Similarly to other studies (Mazlan and Mumford, 2005).

Some farmers also believe in role of beneficial insects (Table 3), *Coccinella septumpunctata*, Spider and dragon fly were found in every sites of Kanpur district while predator, *Coccinella transversalis* found only Pukhrayan site and *Chrysoperla carnea* was considered in Bithoor and Kalyanpur location. Praying mantis was mentioned in Ghatampur and Bithoor site of Kanpur district. The collection of natural enemies along with their prey in cruciferous crops ecosystem and subsequently their identification is an important task for initiation of research on biological control of pest management (Ali and Rizvi, 2008 and Ali and Rana 2011 and 2012).

A view to interviewing the tendency of attitude of the farmers towards integrated pest management tactics,

**Table 2 : Farmer participation and adopted management practices against pests of cruciferous crops during Rabi (2015-16)**

Sr. No.	Village	Number of farmers	Crops	Management practices used		Against which pest
				Conventional	Traditional	
1.	Pukhrayan	20	Cabbage, cauliflower, radish	Cartap hydrochloride, Malathion 50 EC	Neem based pesticides,	Diamond back moth ( <i>Plutella xylostella</i> ), Tobacco caterpillar ( <i>Spodoptera litura</i> )
2.	Bithoor	20	Cabbage, cauliflower	Carabryl 50 WP, Dichlorovos 100EC	fly ash powder	Cabbage butterfly ( <i>Pieris brassicae</i> ), Tobacco caterpillar
3.	Ghatampur	20	Cabbage, cauliflower	Cartap, Malathion	-----	Diamond back moth ( <i>Plutella xylostella</i> )
4.	Kalyanpur	20	Cabbage, radish	Dichlorovos 100EC	Chili powder	Diamond back moth ( <i>Plutella xylostella</i> ), <i>Helicoverpa armigera</i>

**Table 3: Insect –predators found during the survey of different villages of Kanpur district in cruciferous crops during Rabi 2015-2016**

Sr. No.	Common name	Scientific name	Order: family	Location/ site			
				Pukhrayan	Ghatampur	Kalyanpur	Bithoor
1.	Lady bird beetle	<i>Coccinella septumpunctata</i>	Coleoptera: Coccinellidae	+	+	+	+
2.	Lady bird beetle	<i>Coccinella transversalis</i>	Coleoptera: Coccinellidae	+	-	-	-
3.	Green lace wing	<i>Chrysoperla carnea</i>	Neuroptera: Chrysopidae	-	-	+	+
4.	Praying mantis	<i>Mantis religiosa</i>	Mantodea: Mantidea	+	+	-	+
5.	Sider	-----	Arcnida	+	+	+	+
6.	Dragon fly	<i>Anax junius</i>	Odonata: Aeshnidae	+	+	+	+

**Table 4: The farmers according to their level of attitude towards integrated pest management tactic**

Sr. No.	Level of attitude toward IPM tactics	Number	Per cent
1.	Highly favorable attitude	10	12.5
2.	Medium favorable attitude	50	62.5
3.	Low favorable attitude	20	25.0
	Total	80	100

information was collected and data regarding this are presented in Table 4. The results indicated that majority 62.5 per cent of the farmers had medium favourable attitude towards IPM tactics, followed by 25 per cent with low favourable and 12.5 per cent with high favourable attitude towards IPM tactics.

Studied showed that it is common for farmers to use high amount of pesticides in Kanpur locations. Even though adoption of IPM, allow farmers to significantly reduce pesticides use, it is observed that farmers continue to use high amount of pesticides in cruciferous crops. This study shows that improving farmer's knowledge of pest management and pesticide use has a significant negative impact on the amount of pesticide that farmers spray. However, the agricultural extension service in rural areas is still very weak. As shown in this study, on average there is great room for farmers to improve their knowledge and reduce pesticide use in cruciferous crops.

This study provides valuable insight into pest management and other agricultural practices of farmers in four sites of Kanpur.

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