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**Gaurav Kumar**

Ph.D. Research Scholar,  
Department of Agriculture  
Extension, ANDUA&T,  
Kumarganj, Ayodhya,  
Uttar Pradesh, India

**RK Doharey**

Professor & Head, Department of  
Agriculture Extension,  
ANDUA&T, Kumarganj,  
Ayodhya, Uttar Pradesh, India

**NR Meena**

Assistant Professor, Department of  
Ext. Edu., ANDUA&T,  
Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Amrit Warshini**

Ph.D. Research Scholar,  
Department of Agriculture  
Extension, ANDUA&T,  
Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Aman Verma**

Ph.D. Research Scholar,  
Department of Agriculture  
Extension, ANDUA&T,  
Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Anurag Shankar Singh**

Ph.D. Research Scholar,  
Department of Agriculture  
Extension, ANDUA&T,  
Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Yogesh Kumar**

Ph.D. Research Scholar,  
Department of Agriculture  
Extension, ANDUA&T,  
Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Corresponding Author:**

**Gaurav Kumar**

Ph.D. Research Scholar,  
Department of Agriculture  
Extension, ANDUA&T,  
Kumarganj, Ayodhya,  
Uttar Pradesh, India

## Constraints faced by commercial vegetable growers in uses of chemical pesticides on central part of Uttar Pradesh

**Gaurav Kumar, RK Doharey, NR Meena, Amrit Warshini, Aman Verma,  
Anurag Shankar Singh and Yogesh Kumar**

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### Abstract

The present study was conducted in 2023-24 to scrutinize the Constraints faced by commercial vegetable growers in uses of chemical pesticides Uttar Pradesh state comprised of seventy-five districts, there are 21 districts in central Part of Uttar Pradesh out of these 4 district were selected by table randomly sampling. Etawah, Kanpur Nager, Unnao and Jhansi district were selected randomly for the study to understand the ground reality of commercial vegetable growers in uses of chemical pesticides in these districts. Data for the study was collected from a sample of 400 vegetable growers. The findings of the study reveal with knowledge level, an overwhelming majority of the respondents (74.43%) were agreed with the statements that 'Lack of training of scientific vegetable production technology', followed by 'Lack of information sources of vegetables production technology at village level.' (72.55%) at ranked second. The III, IV and V ranks were ascribed to the constraint 'Lack of awareness campaign organized by Govt./ NGOs'(71.25), 'Lack of need assessment about safe plant protection measures (70.55)' and 'Lack of social awareness of side effects of pesticides'(68.50). Adoption level an overwhelming majority of the respondents (77.50%) were agreed with the statements that 'Lack of credit facility for vegetable growers' ranked at 1st place was the common problem, followed by 'Plant protection equipment can be expensive' (75.24%) at ranked second. The III, IV and V ranks were ascribed to the constraint 'Lack of government training programs regarding scientific use of pesticides' (72.00), Lack of transportation facilities' (69.50) and Lack of good quality of pesticides (68.25) respectively. The constraints of knowledge level and adoption level of commercial vegetable growers in chemical pesticides.

**Keywords:** Constraint vegetable growers, knowledge level, adoption level

### Introduction

In organic terms, "vegetable" designates members of the plant kingdom. The non-biological definition of a vegetable is largely based on culinary and cultural tradition. In culinary terms, a vegetable is an edible plant or its part, intended for cooking or eating raw.

Vegetables are good sources of nutrients, dietary fiber, phytochemicals and vitamins. Vegetables with shorter durations and higher productivity have resulted in greater economic returns for farmers. Vegetables are reported to be a rich source of carbohydrates (sweet potato, potato, onion, garlic and methi), proteins (leguminous vegetables, leafy vegetables and garlic), vitamin A (tomato, carrot, drumstick, leafy vegetables), vitamin B (garlic, tomato and peas), vitamin C (drumstick leaves, cole crops, leafy vegetables, green chillies and leaves of radish) and minerals (leafy vegetables, drumstick pods). They can be grown throughout the year in different seasons and have medicinal, importance especially for people suffering from heart diseases and diabetes. Additionally, they improve soil health and provide fodder for cattle.

The total area and production of vegetables in India are 11374 thousand hectares and 209143 thousand metric tons. West Bengal, Uttar Pradesh, Maharashtra and Madhya Pradesh, are among the major vegetable producing states. West Bengal stands first with a total area of 1511.19 thousand hectares, followed by Uttar Pradesh with a total area of 1324.91 thousand hectares. Uttar Pradesh is the first largest producer of vegetables viz., 29584.06 thousand metric tonne followed by West Bengal with 28229.16 thousand metric tons. (National Horticulture Board

2021-22) <sup>[1]</sup>.

The pesticides are widely used in agriculture mainly to increase crop yields to cater huge supply of food products for increasing world population as well as to protect crops from pests and control insect-borne diseases. The increased use of pesticides results in contamination of the environment and the excess accumulation of pesticide residues in food products, which has always been a matter of serious concern. The pesticide residues in food and crops are directly related to the irrational application of pesticides to the growing crops. The accumulated pesticide residues in food products have been associated with a broad variety of human health hazards, ranging from short-term effects to long term toxic effects. The preventive measures for pesticide residues in the developing countries are limited due to a shortage of funds and lack of defined government regulations. The impact of pesticide residues can be minimized by taking certain measures such as the rational use of pesticides, promoting organic farming, exploit natural and bio pesticides, and proper implementation and amendment of pesticide related laws. (Grewal *et. al.*, 2017) <sup>[4]</sup>. Among the different classes of pesticides used in India, the percent share of insecticides (60%) is the highest followed by the shares of fungicides (19%), herbicides (16%), biopesticides (3%) and others (3%). It is estimated that around 13-14% of the total pesticides used in the country is applied to fruits and vegetables, of which insecticides accounted for two-thirds of the total. Among different vegetable crops the maximum pesticide usage is in chilli (5.13 kg a.i./ha) followed by brinjal (4.60 kg a.i./ha), cole crops (3.73 kg a.i./ha) and okra (2-3 kg a.i./ha) (Kodandaram *et al.*, 2013) <sup>[5]</sup>. The total pesticides consumption in India 52466 Metric tonnes in year 2022-23. The ratio for 2022-23 reveals that Uttar Pradesh consumed the highest quantity of pesticides 11824 Metric tonnes followed by Maharashtra (6814), Punjab (5130), Telangana (4920) and Haryana (4066) etc, Per hectare consumption of pesticides was highest in Punjab (0.74 kg), followed by Haryana (0.62 kg) and Maharashtra (0.57 kg) during 2016-17 (MoA&FW, 2021) <sup>[9]</sup>. (Industry reports, Analysis by Tata Strategic 2021-22).

### Pesticide Use: World and Indian Scenario

The global pattern of pesticide usage can be observed in Herbicides comprise the largest share of pesticide consumption worldwide, accounting for 53%, followed by fungicides at 23%, insecticides at 18%, and other types of pesticides at 6%. The

illustrates the pattern of pesticide usage in India. In India, insecticides constitute the largest portion of pesticide consumption, accounting for 51%, followed by fungicides at 32%, herbicides at 16%, and other types of pesticides at 1% (including nematicides, rodenticides, fumigants, biopesticides, plant growth regulators, etc.). When considering crop-wise consumption of pesticides in India, fruits and vegetables account for 14%, plantation crops for 8%, cereals, millets, and oilseeds for 7%, sugarcane for 2%, and other crops for 1%. (Source:<http://www.fao.org/faostat/en/#/data/RP>)

### Research Methodology

The present study was conducted in 2023-24 to scrutinize the socio-economic traits of vegetable growers Uttar Pradesh state comprised of seventy-five districts, there are 21 districts in central Part of Uttar Pradesh out of these 4 district were selected by table randomly sampling. Etawah, Kanpur Nager, Unnao and Jhansi. district were selected randomly for the study to understand the ground reality of commercial vegetable growers in uses of chemical pesticides in these districts. Data for the study was collected from a sample of 400 vegetable growers. Another consideration for selecting this district was the close familiarity of investigator with this area, people, official, non-official and local dialect which enabled investigator to carry out the work more efficiently. Eight blocks was selected through random sampling method. District Etawah is comprised of 8 community development blocks, two community development block i.e. saifai and Basrehar was selected randomly. Out of 10 Community Development blocks in Kanpur nagar, Kakwan and shivrajpur blocks were selected randomly. Unnao district has total sixteen blocks, Out of these two blocks Safipur and Bangarmau were selected randomly. Jhansi district has eight blocks, out of these two Babina & chirgaon blocks were selected randomly for the investigation. Considering all the facts mentioned above five villages were selected from the each block. thus makes a total number of 40 villages. To select sample units, stratified random sampling method was adopted. The data was classified, tabulated and analyzed to make the findings meaningful for interpretation various statistical methods were used accordingly.

### Results and Discussion

#### Constraints being faced by knowledge level of chemical pesticides in commercial vegetable growers

**Table 1:** knowledge level

S. No.	Constraints	Percent	Rank
1.	Lack of literacy in society	61.50	X
2.	Lack of need assessment about safe plant protection measures	70.55	IV
3.	Lack of social awareness of side effects of pesticides.	68.50	V
4.	Lack of awareness campaign organized by Govt./ NGOs	71.25	III
5.	Less emphasis about agrochemical toxicity	63.70	VIII
6.	Less importance to health hazards due to failure of crops	62.52	IX
7.	Lack of awareness camps, campaign and demonstrations about safe plant protection measures	67.56	VI
8.	Lack of interest about safe use of plant protection/recommended package of practices.	65.50	VII
9.	Avoidance of reading the labels on the package/container	60.70	XI
10.	Lack of interpersonal communication of farmers regarding pesticide	52.50	XIV
11.	Lack of agricultural information broadcasted through radio/TV	58.50	XII
12.	Poor extension contact.	55.54	XIII
13.	Lack of information sources of vegetables production technology at village level.	72.55	II
14.	Lack of knowledge about bad effects of pesticides on consumer health.	51.25	XV
15.	Lack of training of scientific vegetable production technology.	74.43	I

It is obvious from the Table 1 that an overwhelming majority of the respondents (74.43%) were agreed with the statements that 'Lack of training of scientific vegetable production technology' ranked at 1<sup>st</sup> place was the common problem, followed by 'Lack of information sources of vegetables production technology at village level.' (72.55%) at ranked 2<sup>nd</sup>. The III, IV and V ranks were ascribed to the constraint 'Lack of awareness campaign organized by Govt./ NGOs' (71.25%), 'Lack of need assessment about safe plant protection measures' (70.55%), 'Lack of social awareness of side effects of pesticides' (68.50%), 'Lack of awareness camps, campaign and demonstrations about safe plant protection measures' (67.56%) rank VI, (65.50%) 'Lack of interest about safe use of plant protection/recommended package

of practices' ranks VII, Less emphasis about agrochemical toxicity (63.70%) rank VIII, 'Less importance to health hazards due to failure of crops' 62.52 percent rank IX, 'Lack of literacy in society' 61.50 percent rank X, 'Avoidance of reading the labels on the package/container' 60.70 percent rank XI, 'Lack of agricultural information broadcasted through radio/TV' (58.50%) rank XII, 'Poor extension contact' (55.54%) rank XIII, 'Lack of interpersonal communication of farmers regarding pesticide' (52.50%) rank XIV and 'Lack of knowledge about bad effects of pesticides on consumer health' (51.25%) rank XV respectively. The rest of the constraints were in descending order as mentioned in the same table.

**Table 2:** Adoption level

S. No.	Constraints	Percent	Rank
1.	Lack of credit facility for vegetable growers	77.50	I
2.	Plant protection equipment can be expensive.	75.24	II
3.	Lack of transportation facilities	69.50	IV
4.	Less use of personal protective gears such as gloves and overall clothing during pesticides application	61.25	VIII
5.	Operational difficulties in application of the plant protection measures	60.50	IX
6.	Insufficient organizations for demonstrations of pesticides	58.50	X
7.	Lack of good quality of pesticides	68.25	V
8.	High risk in vegetable production	65.50	VI
9.	Lack of government policies related to agriculture marketing	62.25	VII
10.	Lack of government training programs regarding scientific use of pesticides	72.00	III

It is obvious from the Table 2 that an overwhelming majority of the respondents (77.50%) were agreed with the statements that 'Lack of credit facility for vegetable growers' ranked at 1<sup>st</sup> place was the common problem, followed by 'Plant protection equipment can be expensive' (75.24%) at ranked second. The III, IV and V ranks were ascribed to the constraint 'Lack of government training programs regarding scientific use of pesticides' (72.00%), 'Lack of transportation facilities' (69.50%), 'Lack of good quality of pesticides' (68.25%), 'High risk in vegetable production' (65.50%) rank VI, 'Lack of government policies related to agriculture marketing' (62.25%)

rank VII, 'Less use of personal protective gears such as gloves and overall clothing during pesticides application' (61.25%) rank VIII, 'Operational difficulties in application of the plant protection measures' (60.50%) rank IX and Insufficient organizations for demonstrations of pesticides (58.50%) rank X respectively. The rest of the constraints were in descending order as mentioned in the same table. The constraints of adoption level of chemical pesticides in commercial vegetable growers.

Suggest the suitable strategy for overcoming the constraints

S. No.	Suggestions	Percent	Rank
<b>A</b>			
<b>Knowledge level</b>			
1.	The government ought to offer both young individuals and adults access to education that is both free and mandatory.	58.70	XII
2.	Governmental bodies and agencies are required to conduct evaluations regarding effective methods for safeguarding plants.	55.50	XIII
3.	Government/ social organizations should provide Sufficient knowledge about side effects of pesticides.	74.70	III
4.	Government/NGOs must organize awareness campaigns about safe plant protection measures.	73.40	IV
5.	Farmers must follow the instruction given on labels of the Package/container then use.	53.50	XIV
6.	Government should emphasis in knowledge about agrochemical toxicity and health hazards.	69.76	V
7.	Extension agencies should organize training programme about vegetable growers technologies	66.45	VI
8.	The government/Agencies should provide sufficient knowledge regarding recommended dose of fertilizer, pesticides etc.	64.35	VII
9.	Government/Agencies should organized awareness camps, campaigns and demonstrations about safe plant protection measures	62.50	VIII
10.	Farmer's field schools can be opted where growers can learn practical skills and best practices directly in the field.	50.25	XV
11.	Government should provide information about TV/Radio Programme available as per requirement at suitable time for vegetable farmers	61.50	IX
12.	Information should be provide timely with the help of extension personal.	60.25	X
13.	Government/Agencies should provide training on new technologies to the vegetable growers	78.25	I
14.	The Government should be provided technical knowledge of IPM technologies	59.50	XI
15.	The Government should be established agricultural information Centre at village level.	75.75	II
<b>B</b>			
<b>Adoption level</b>			
1.	Governments can establish specialized loan programs specifically for vegetable growers, offering them low-interest loans or subsidies to support their operations.	65.70	III
2.	Plant protection equipment's should purchase in groups & farmers can get benefits of govt. subsidies etc	65.30	IV
3.	Foster partnerships between government agencies, private sector companies, and farmers' cooperatives to jointly invest in transportation infrastructure and services.	52.25	X

4.	Provide comprehensive training programs on pesticide safety and handling practices, including the correct use of PPE.	63.25	V
5.	The development and dissemination of improved equipment and technology for the application of plant protection measures.	55.50	IX
6.	Explore the use of digital platforms, such as webinars, online tutorials, and video demonstrations, to reach a wider audience with pesticide training materials	60.80	VII
7.	Identify reputable suppliers or distributors for authentic and good quality seed seeds & pesticides	58.25	VIII
8.	Growing of disease and pest resistant variety for vegetable viz. Hisar annal (tomato), Pant Rturaj (brinjal), Arka Anamika (okra) etc	61.50	VI
9.	There should be good market facility for vegetable growers.	68.25	II
10.	Government agencies should collaborate with agricultural experts and extension services to develop comprehensive training modules on the scientific use of pesticides	70.50	I

It is obvious from the Table 3 suggestions divides into two parts namely A. knowledge level and B. adoption level. In case of knowledge level, suggest that the an overwhelming majority of the respondents (78.25%) were agreed with the statements that Government/Agencies should provide training on new technologies to the vegetable growers ranked at 1st place was the common suggestion, followed by The Government should be established agricultural information Centre at village level (75.75%) at ranked second.

The III, IV and V ranks were ascribed to the suggestions 'Government/ social organizations should provide sufficient knowledge about side effects of pesticides'. 'Government/NGOs must organize awareness campaigns about safe plant protection measures.' and 'Government should emphasis in knowledge about agrochemical toxicity and health hazards.' respectively. The rest of the suggestions were in descending order as mentioned in the same table. The score value for each suggestion indicates the seriousness which had considerable effect towards chemical pesticides in commercial vegetable growers.

In case of adoption level suggest that the an overwhelming majority of the respondents (70.50%) were agreed with the statements that 'Government agencies should collaborate with agricultural experts and extension services to develop comprehensive training modules on the scientific use of pesticides' ranked at 1st place was the common suggestion, followed by 'There should be good market facility for vegetable growers.' (68.25%) at ranks second.

The III, IV and V ranks were ascribed to the suggestions 'Governments can establish specialized loan programs specifically for vegetable growers, offering them low-interest loans or subsidies to support their operations', 'Plant protection equipment's should purchase in groups & farmers can get benefits of govt. subsidies' and 'Provide comprehensive training programs on pesticide safety and handling practices, including the correct use of PPE.', respectively. The rest of the suggestions were in descending order as mentioned in the same table.

### Conclusion

Study focuses on Constraints being faced by knowledge level of chemical pesticides in commercial vegetable growers. The study indicated, knowledge level the statements that 'Lack of training of scientific vegetable production technology', 'Lack of information sources of vegetables production technology at village level, Lack of awareness campaign organized by Govt./ NGOs', 'Lack of need assessment about safe plant protection measures' and 'Lack of social awareness of side effects of pesticides',. Adoption level that an overwhelming majority of the respondents the statements that 'Lack of credit facility for vegetable growers' ranked at 1st place was the common problem, followed by 'Plant protection equipment can be expensive'. 'Lack of government training programs regarding scientific use of pesticides' Lack of transportation facilities' and Lack of good quality of pesticides respectively.

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