Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
www.phytojournal.com
JPP 2020; 9(2): 1795-1797
Received: 04-01-2020
Accepted: 06-02-2020

Chandan Kumar Panda
Department of Extension Education, Bihar Agricultural University, Sabour, Bihar, India

Rashmi Kumari
Department of Extension Education, Bihar Agricultural University, Sabour, Bihar, India

Anil Paswan
Department of Extension Education, Bihar Agricultural University, Sabour, Bihar, India

Deepak Kumar Patel
Department of Extension Education, Bihar Agricultural University, Sabour, Bihar, India

RK Sohane
Director of Extension Education, Bihar Agricultural University, Sabour, Bihar, India

Corresponding Author:
Rashmi Kumari
Department of Extension Education, Bihar Agricultural University, Sabour, Bihar, India

Pesticide usage by the smallholder vegetable farmers: A case study in Bhagalpur District of Bihar

Chandan Kumar Panda, Rashmi Kumari, Anil Paswan, Deepak Kumar Patel and RK Sohane

DOI: https://doi.org/10.22271/phyto.2020.v9.i2ad.11114

Abstract
In this study, pesticides commonly used by the smallholders vegetable farmers were discussed. Data were collected from the vegetable farmers at the outpost of Bhagalpur district. A random sampling technique was employed to collect data from 100 smallholder vegetable farmers, who use pesticide in vegetable cultivation. Frequency, mean, percentage were used to narrate the data. Investigation revealed that a wide range of pesticides were used by the farmers. A low level of awareness was found related the use of pesticides. Finding disclose that majority of farmers did not follow any safety measures during handling and application of pesticides. Farmers' age, education and extent of contact with private and public extension functionaries had positive effects on the pesticides selection and usage for use in vegetable production. A need to educate farmers about safe and judicious use of pesticides was recommended.

Keywords: Pesticides, vegetable farmers, extension functionaries

Introduction
The majority of economy of Bihar depends on agriculture. It provides employment around 60% of the population of Bihar. The increasing demand of agricultural products to feed the raising population is the pioneer of use of chemicals in agriculture. As like other crops, the use of pesticides in vegetables can't be denied. The presence of various stress in agriculture has made it impossible to do agriculture without chemicals. It can be observed from the case of Bihar, were the pesticide use rose from 787 MT in 2014-15 to 981MT in 2018-19. Smallholder farmers generally use high dosages of pesticides due to lack of knowledge or lack of training.
Fertile alluvial soil, prominence of water resources and congenial weather condition provides strong foundation for agriculture. The total vegetable production is 184394 MT for 2017-18. In Bihar, the usage of pesticides have increased from 787 MT in 2014-15 to 981 MT in 2018-19.Pesticide usage helps to improve productivity, provides protection against diseases and pests, etc. But indiscriminate use of the pesticide have become a prominent danger for the sustainability of agriculture. It affects air, water, soil. As, there is over use of pesticide use in vegetable, the residue level of pesticide in food have increased. Thus, affecting human life too. The present study is an attempt to reveal various issues related to pesticide usage by the smallholder vegetable farmers.

Materials and Methods
Bhagalpur district of Bihar was purposively selected for study because of commercial cultivation of vegetables and respondents were selected through random sampling method. Two villages Usmanpur and Nawada were selected under Kharik block as there was extensive cultivation of vegetables in the area. A sample of 50 respondents from each village was randomly selected. Thus total sample size was 100 for study. The study was based on both primary and secondary data. The required secondary data was collected from various published sources and government database. The primary data was gathered from smallholder vegetable farmers with the help of pre-tested schedule by Personal interview.

Results and Discussion
A. Socio-economic profile of farmers
The data of Table 1 reveals that majority of the vegetable farmers belonged to middle age group (45%), followed by old age group (30%). A small proportion of 25% of the vegetable farmers were of young age group.

It was revealed by the information collected from the vegetable growers that majority of the vegetable farmers were having higher secondary level of education (30%), followed by illiterate (25%). It was also found that 10% of the respondents had graduation and above level of education while 10% of respondents only bear functional literacy. Only very few (5%) respondents had primary school level of education and rest 5% had high school level of education.

Table 1: Distribution of Respondents according to their age. n=100

Categories	Frequency	Percent
Young Age (>35 years)	25	25
Middle Age (35-50 years)	45	45
Old age (> 50 years)	30	30
Total	100	100

Table 2: Distribution of Respondents according to their educational level, n=100

Categories	Frequency	Percent
Illiterate	25	25
Graduation and above	10	10
Higher secondary school	30	30
High school	5	5
Middle school	15	15
Primary school	5	5
Functional literacy	10	10
Total	100	100

The perusal of Table - 3 reveals that 65% of the vegetable farmers had more than 5 members in their family while 35% of the farmers have family size upto 5 member. This means there is prevalence of joint family in the area under study.

Table 3: Distribution of Respondents according to their family size, n=100

Categories	Frequency	Percent
>5 members	65	65
Upto 5 members	35	35
Total	100	100

The data presented in Table - 4 from study reveals that majority of the farmers (45%) had upto 10 years of farming experience, followed by 25% with 11-20 years of farming experience, 20% of respondents had 20-30 years of farming experience and only few (10%) were having above 30 years of farming experience.

Table 4: Distribution of respondents according to number of years of experience in vegetable cultivation, n = 100

No. of years of experience in vegetable cultivation	Frequency	Percent
Upto 10 years	45	45
11-20 years	25	25
20-30 years	20	20
Above 30 years	10	10
Total	100	100

B. Sources of information farmers rely on pesticide selection and use

The study reveals that farmers mainly rely on Agri-input dealers (45%), followed by progressive farmers 15%, neighbors 5% and friends 5%and rest 10% by public extension functionaries.

Table 5: Farmers rely on Pesticide usage Recommendation by different sources, n=100

Sources of information	Frequency	Percent
Agri-input dealers	45	45
Progressive farmers	15	15
Neighbours	5	5
Friends	5	5
Public extension functionaries	10	10
Total	100	100

C. Vegetables commonly grown by vegetable farmers

Table 6: Vegetables commonly grown by vegetable farmers in Bhagalpur

Rabi season	Kharif season	Zaid season
Cauliflower *(Brassica oleracea var. botrytis)*, Cabbage *(Brassica oleracea var. capitata)*, Brinjal *(Solanum melongena)*, Tomato *(Lycopersicon esculentum)*, Onion *(Allium cepa)*	Okra *(Abelmoschus esculentus)*, Chilli *(Capsicum annuum)*, Bottle gourd*(Lagenaria siceraria)* Bitter gourd *(Mimordica chinensis)*, Pointed gourd *(Trichosanthes dioica)*,	Cucumber *(Cucumis sativus)*, Pointed gourd *(Trichosanthes dioica)*

Table 7: Pesticides commonly used by vegetable growers in Pest Management

Trade name	Chemical name	Label indicating toxicity	Crops	Intensity of Use		
				High	Medium	Low
Barood Super	Profenofos 40%, Cypermethrin 4%EC	Yellow	Brinjal		Medium	
Allbor	20% B, Di- sodium octaborate tetrahydrate		Brinjal		High	
Kyoto fungicide	Azoxystrobin 11%, Tebuconazole18.3%w/w	Blue	Cauliflower Cabbage		High	
Cabrio top fungicide	Metiram 55%, Pyraclostrobin 5%WG	Green	Pointed gourd		Medium	
Omite insecticide	Propargite 57%EC	Yellow	Brinjal		High	
Shukra insecticide	Deltamethrin, Triazophos	Yellow	Brinjal		High	
Sumiprept insecticide	Pyriproxyfen 5% EC, Fenpropathrin 15%EC	Yellow	Brinjal, Tomato		Medium	
Merivon Fungicide	Pyraclostrobin 250 G/L	Blue	Pointed gourd, Bottle gourd		Medium	
Conika fungicide	Kasugamycin 5%, Copper Oxychloride 45%WP	Blue	Cauliflower		High	
Sartaz fungicide	Carbendazim 12%, Mancozeb 63%WP	Green	Cauliflower, Cabbage, Tomato		Medium	
Saaf fungicide	Carbendazim, Mancozeb	Green	Cauliflower, Cabbage, Tomato		High	
Dayal Herbosef	Plant growth regulator		All vegetables		Low	

D. Problems faced by vegetable farmers while applying pesticides

In the study area, most of farmers do not read the instructions present at the backside of the bottle or on the leaflet provided. They use to smoke or chew tobacco while application of pesticides. Agri-input dealers are main sources of information on which the farmers rely for the selection and use of pesticides. The study revealed that majority of farmers do not follow any safety measures while apply pesticides as a result they face difficulties which are depicted in the Table 8.

Table 8: Distribution of respondents on problems faced by the vegetable farmers while applying pesticides, n=100

Problems faced by vegetable farmers	Frequency	Percent
Headache	18	18
Fever	14	14
Burning sensation	8	8
Blurred vision	12	12
Nausea and vomiting	26	26
Redness in eyes	22	22
Total	100	100

The data revealed that 26 % faced nausea and vomiting after pesticide application, followed by 22%farmers had redness in eyes. It was noted that 18% of the vegetable farmers reported headache, 14% of respondents reported fever after apply pesticides in the field while 12% of the farmers complained about blurred vision. 8% of the respondent faced problem of burning sensation.

Safety measures applied

The information obtained from study as depicted in Table9. reveals that most of the farmers (45%) don't follow any safety measures while applying pesticides in vegetables. It was reported that 22% of the respondents reported using gloves, 12% of the farmers used masks and 7% of them reported of using goggles. It was noted that only 4% of the farmers used boots. The data reveals that vegetable growers were unaware of the side effects of pesticides on human health.

Table 9: Distribution of farmers based on safety measures followed, n=100

Safety measures followed	Frequency	Percent
Using gloves	22	22
Using masks	12	12
Using googles	07	07
Using boots	4	4
No safety measures	55	55
Total	100	100

Disposal of pesticides cans

Proper disposal of the pesticides is very important. The data depicted in Table 10 reveals that majority of farmers (40%) of the respondents use to disposal the empty pesticide cans at barren isolated area while 25% of the respondents prefer washing and reusing the empty pesticide cans. The data reported that 20% of the respondents use to bury and burn the empty cans and 15% of the respondents use to throw the empty cans anywhere.

Table 10: Distribution of farmers based on disposal of empty pesticide cans, n=100

Disposal of pesticides	Frequency	Percent
Burning and burying in depth	20	20
Wash and reuse	25	25
Throw away	15	15
Barren isolated area	40	40
Total	100	100

Conclusion

The study reveals that majority of the respondents were of middle group, had high literacy level, and have larger family size. Most of the respondents depend on agri-input dealers for selection and use of pesticides. There is a need of public extension functionaries to be improved for establishing rapport with the farmers. There was need of generating awareness among vegetable growers about the side effects pesticides have on environment as well as on aquatic animals, beneficial microorganisms, non target vegetation and human beings. Most of the respondents faced difficulty while apply pesticides in vegetables. Therefore, there is need of government institutions for creating awareness among the vegetable farmers for the safe usage of pesticides in vegetable production.

References

1. Adeola RG. Perception of Environmental Effects of Pesticide Use in Vegetable Production By Farmers in Ogbomso, Nigeria. Global Journal of Science Frontier Research Agriculture and Biology. 2012, 12:74-77.
2. Afrad MSI, Barau AA, Naznin M, Zakaria M. Perception of rural farmers on pesticide use in vegetable production. Agricultural Science & Technology. 2018; 10(2):115-120.
3. Belay Mengistie T, Arthur Mol PJ, Dosterveer P. Pesticide use practices among smallholder vegetable farmers in Ethiopian Central Rift Valley. Environ Dev Sustain. 2017; 19:301-324.
4. Chaubey D, Ved Prakash, Yadav T, Garima Singh. Doubling of Farmers Income through Integrated farming System Approach in Bihar–A Review. International Journal of Current Microbiology and Applied Sciences. 2018; 7:1602-1614.
5. Md. Wasim Aktar, Sengupta D, Choudhary A. Impact of pesticides use in agriculture: their benefits and hazards. Interdisciplinary Toxicology. 2008; 2(1):1-12.
6. Lavanya Kumari P, Giridhar Reddy K. Knowledge and Practices of Safety use of Pesticides among Farm Workers. IOSR Journal of Agriculture and Veterinary Science. 2013; 6:01-08.
7. Indira P, Judy Thomas, Rajesh Raju K. Pesticide Consumption in India: A Spatiotemporal Analysis. Agricultural Economics Research Review. 2017; 30(1):163-172.
8. Rajinder Jutla S. Pesticide Use in Northern India. Agricultural Research and Technology. 2018; 18:01-02.
9. Kundu, Suman Kumar. Spatio-temporal dynamics of Vegetable crop production in India. International Multidisciplinary Research Journal. 2012; 2(7):54-57.
10. Suman RS, Sandeep GS. Problems of Usage of Pesticide by Vegetable growers of Kullu Valley in Himachal Pradesh. Journal of Agri Search. 2015; 2(2):126-129.