A PROPOSAL ON ISSUES CONCERNING PESTICIDE IN CONTEXT OF CHITWAN

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ANNEX 18

Proposal on issues concerning pesticides in context of Chitwan.

Abstract

Indiscriminate use of chemical pesticide is increasing in order to increase the productivity which is becoming big problem as general farmers lack awareness and knowledge on the dire consequences of use of these pesticide. Lack of government regulation and monitoring policy is only adding to the problem of action of pesticide due to which there is adverse effect on consumer and farmers' health. This paper shows the adverse health effect, environmental effect of the injudicious use of chemical pesticide. For this study descriptive research and qualitative data collection, use of questionnaire is done with regard to the amount of pesticide used by farmers and their knowledge about its harmful effect. This study shows general farmers are still using hazardous pesticides that were banned a long time ago without any precautionary measures. Farmers lack the knowledge of IPM, bio-pesticide but it seems they are open to change as long as the new adoption method is effective on their field. This study shows that an immediate step to decrease the use of these harmful pesticide and shift the focus towards the use of bio-pesticide, eco-friendly use of chemical pesticide and IPM. These mentioned steps mitigate the severe effect of pesticides on the farmers and the consumers and it also brings about positive change in soil fertility, soil microbes, flourishing of other organism (non-targeted

species) while getting the if not same similar result as that of chemical pesticides.

1. Introduction:

1.1 Background:

Pesticides are chemical substances used to kill animals, plants, insects and pests in agricultural, domestic and institutional settings. The main groups of commonly used pesticides include herbicides, insecticides, fungicides, fumigants and rodenticides. Organochlorine, organophosphate and carbamate insecticides are of major concern because of their toxicity and persistence in the environment. Organochlorine insecticides are banned for agricultural and domestic use in most of the developed countries, but they are still in use in developing countries like Nepal. Most of the pesticides are broad spectrum and kill both the target and non-target organisms.

Majority of the farmers are unaware of pesticide types, level of poisoning, safety precautions and potential hazards on health and environment. Pesticides that are in use today have carcinogenic effects on human health. The resultant effects on human health include cancer, birth defects, reproductive problems, tumors, and damage of liver, kidney and neural organs. In many developing countries like Nepal, most pesticides are associated with adverse effects on human health and environment due to inappropriate use and handling of pesticides by inadequately trained farm workers. Majority of pesticides users, being unaware of pesticide types, their mode of action, potential hazards and safety measures.

Acute and chronic health effects are resulted due to exposer of pesticides; the acute poisoning has found a most recognized form of effects.1 About 25 million cases of mild pesticides poisoning occur annually among agricultural workers in developing regions of Asia. Developing countries are using about 20% of pesticides and this use of pesticides is in increasing trend. In Nepal, the establishment of Department of Agriculture was in 1952 AD and after onwards the use of pesticides for crop protection has increased steadily in Nepal. More than 66 % of Nepalese are working in the agricultural sector. Pesticides use has increased in tremendous manner in the last 5 decades to increase the agricultural production where highly toxic pesticides increase the risk among farmers in low income countries including Nepal.

1.2 Statement of the Problem:

In order to prevent crop loss due to pests many farmers are diverted towards the use of chemical control measures. This is where pesticides comes in. Pesticide in itself in not that big of a problem than the way and amount it is used in. This is mainly due to lack of awareness and knowledge of farmers, lack of alternatives of IPM other than chemicals, lack of governmental regulation and monitoring policy and actions for pesticide use. All of these elements are leading to severe short term and long term effects in the health of the farmers and consumers of the food that is raised using pesticides.

1.3 Objectives:

1.3.1 General Objectives:

The objective of this study was to reveal the health effects among agricultural farmers and associated factors with the health and environmental problems due to the use of pesticides.

1.3.2 Specific Objectives:

- To gain knowledge about pesticides impact on human health.
- To study about trend and application pattern of pesticides.
- To study about level of awareness of farmers regarding use of pesticides.
- To study about effect of pesticides on soil fertility, productivity and crop yield.
- To attain a degree of understanding on which of the gender is more exposed to the addressed problem.

1.4 Significance of the study:

Approximately, 2 million tons of pesticides are utilized annually worldwide, where China is the major contributing country followed by the USA and Argentina, which is increasing rapidly. However, by the year 2020, the global pesticide usage has been estimated to increase up to 3.5 million tons. According to UNICEF, 2018, demand of pesticide is increasing in many developing countries, which together account for a quarter of global pesticide use.

In Nepal, 500 different brands of insecticides, 7 acaricides, and 229 brands of fungicides, 6 bactericides, 88 herbicides, 10 rodenticides and 19 bio-pesticides are currently used. Most common insecticides in Nepal are organochlorine (chemical group: endosulfan), organophosphate (Dichlorovos, Malathion, Dimethoate, Chloropytifos), synthetic pyrethrids (Cypermethrin) and carbamates (carbofuran).

Through this study we will emphasize on awareness and knowledge of farmers regarding use and negative impacts of pesticides and use of alternatives of IPM other than chemicals. This study will provide a representative data of using trend of pesticides which is useful in commercial pocket areas where growers are using pesticides exceedingly higher than needed. This study also provide wider perception to the farmers regarding use of safe dose of pesticides and its negative impact. This study also gives us an overview on which type of crop is sprayed with higher dose of pesticides.

1.5 Limitations of the study:

- Field of research is small due to which only limited representative data can be collected.
- There is a possibility that some of the participants may overstate or understate their opinion, which may result in unreliable data for the research.
- Lack of previous studies in the research area.
- Time constraint.

2. Literature review:

The use of insecticides started in Nepal in early 1950s with intention of control of malaria, especially to eradicate the disease transmitted by mosquitoes for the Gandaki Hydropower Project. First introduced chemicals to Nepal were Paris green, gramaxone, nicotine sulfates, Dichloro-diphenyl –trichloroethane (DDT), and these all were brought from the USA.

Nepal does not produce any insecticides till now but imported primarily from six countries, that is, India, China, Malaysia, Singapore, Italy, and Japan. Till now, 54 types of insecticides were introduced to Nepal with 14 bio-pesticides, insecticides were registered in 1787 commercial names by Plant Quarantine and Pesticide Management Center (PQPMC) under the Department of Agriculture, Nepal. In Nepal, there are altogether 16,110 retailers, 5 pesticide formulators, 37 pesticide applicators, and 286 pesticide importers. Traders of pesticides are mainly concentrated in the commercial agricultural areas such as in plain regions, in the valley, and in and around the major cities of the country. Still, pesticide business has not penetrated the mid-hills, hills, and larger rural areas of the country.

It is reported that 25% of farmers of plain regions, 9% of mid-hills, and 7% of mountains use pesticides in their fields. It is also reported that insecticides application is significantly higher in cotton and tea plantation in Nepal and it is worthwhile to mention that, compared to the cereal crops, use of insecticides and other pesticides is significantly higher in vegetables and other commercial/cash crops.

Some farmers have also malpractice of dipping green vegetables in insecticide solutions such as malathion, mancozeb, etc. for a shiny and fresh look to fetch a good price in the market. Farmers are very unaware and they hardly care for the waiting period to pick their harvest before they take it to the market. And, these products are purchased by the consumer and immediately taken for their food requirement and this makes the case more worsen.

Insecticides can be used in a variety of forms, including liquid, concentrated, powder, dust, particle, aerosol, and fog, to control various insect pests of various crops. Those chemicals sprayed in a crop’s field will move and transfer to the environment via water, wind, and absorption. It can be transferred to long distances and in various forms. A large part of the most commonly used insecticides do not reach their target insect and may be affecting non-target organisms or polluting the environment.

Since the import of pesticides including insecticides is increasing every year. The import of pesticides in the year 2013/14 was 454 tons but now, in the year 2019/20, import has been increased to 681 tons. Various biotas inhabiting the soil such as bacteria, fungi, nematodes, earthworms, soil-inhabiting insects, and other arthropods with the presence of other organisms help to maintain the quality of soil and provide major ecosystem services for maintaining soil health and ultimately the quality of food production. The malpractices of insecticides along with other hazardous pesticides could have a detrimental effect on those organisms and ultimately deteriorate the quality and quantity of food production.

These insecticides exposure to humans causes detrimental health defects such as hormonal imbalance, immune suppression, lower intelligence, reproductive anomaly, damage on kidney, liver, neural regions, and cancer. Farmworkers who have also exposure to insecticides get the symptoms of headache, drowsiness, dizziness, skin irritation, muscular twitching, respiratory discomfort, etc.

It is reported that the estimated health cost of the pesticide user individual who has got exposure to pesticides is Nepalese Rupee (NPR) 287. Of the total household expenditure, pesticide-induced health costs take 0.2% of annual household expenditure and 10.32% of annual health care expenditure.

Sweden has reduced pesticide use by 68% and public health poisonings by 77%. Their cutoff to the pesticides did not cause increased crop losses by the various pest species including insects. Indonesia also has reduced pesticide use by 65% and on the contrary, their production of rice has increased by 12%. India is also practicing the same and reducing the use significantly over the past years. But, Nepal is doing the opposite. We are quite increasing the pesticide use for the sake of higher production, but, we are not aware of the fact that we are using unwarranted pesticides.

It is also reported that Nepalese farmers are willing to pay higher prices (53–79%) than the current pesticide costs to mitigate the detrimental effect on their health and environment, and this clearly shows that they are willing to adopt alternative measures of pest management. But, the IPM programs of Nepal do have a contribution to the reduction of pesticide use but do not have a significant contribution to the reduction of health damages associated with the pesticides.

For the first time in Nepal's history, the pesticide act was enacted in 1991, regulations were approved in 1993, and pesticide board was formulated in 1994. Currently, Pesticides Management Act, 2019 was enacted which provisioned registration of bio-pesticides and also included the provision of facilitating warehouses for storing the date expire, band, and obsoleted pesticides in seven provinces of Nepal. Overall, the pesticide act regulates the manufacture, import, sale, transport, distribution, and use of pesticides in the country. This enabled the registration of pesticides, monitoring and inspection of pesticides, registration of importers and traders, and banning of highly toxic pesticides to minimize the exposure to humans, livestock, and other associated environmental components. Government of Nepal (GON) is the signatory of Stockholm Convention, Basel Convention and Rotterdam Conventions to minimize environment pollution and to manage agro-chemicals, including pesticides. The Joint Secretary responsible for environment division at the Ministry of Agriculture Development has been assigned as the Designated National Authority (DNA) of Rotterdam Convention to look after agro chemicals, pesticides and pesticide waste management in the country. In the new pesticide act, the government of Nepal has made it easier to register the bio-pesticides compared to conventional pesticides, and obviously that would have positive impacts in the days to come.

3. Research methodology:

3.1 Research site:

Our research will be conducted in Chanauli, Chitwan. The reason for the selection of this area is due to high number of commercial farmers and easy accessibility moreover use of pesticides is higher in this area (as suggested by more number of agro-vets) than other nearby areas and lastly there is wide varieties of crops.

3.2 Research design:

The research to be conducted will be descriptive and qualitative (talks about general questionnaires). Data collection for the research will be based on oral information and ideas of the respondents.

3.3 Universe and sampling:

Out of around 120 household present in our targeted area, we will be selecting 10 households
on a random basis.

3.4 Source and nature of data:

Among the different data collection techniques interviews and questionnaires method will be chosen for the data collection. We will ask relevant question as per the prepared questions. The only primary data that will be used is going to be collected by face to face interviews from farmers. These data will be collected by individual method of data collection which involves visit of individual household of farmers.

3.5 Data Collection tools

Among the various data collection techniques, we will be using questionnaire and interview methods as it is easier, convenient and suitable to use. We will be asking them questions according to our prepared questionnaires.

3.6 Data Collection Techniques

Only primary will be taken into account. For primary data, face to face interview will be taken, questionnaire is prepared and farmers will be enquired accordingly.

3.7 Data Analysis

We will be using basic tools like Ms-Excel.

4. Time schedule

Activities/Time (2022 A.D.)	**March 25**	**April 1**	**April 5**	**April 7**	**April 10**	**April 15**	**April 22**	**April 29**
Literature review								
Questionnaire design								
Pretesting of questionnaire								
Editing and re-drafting of questionnaires								
Field work and data collection								
Analysis and interpretation of data								
Report writing								
Presentation of study finding								

5. Tentative budget

S.N.	Description	Amount (Rs.)
1	Proposal preparation	500
2	Literature review	500
3	Transportation cost	1000
4	Data validation	100
5	Data collection	300
6	Draft preparation	100
7	Report printing and binding	500
Total		3000

6. Expected Outcome of research

The expected outcome of this study will be:-

- To increase the knowledge or awareness level of farmers regarding the use of chemicals.
- Enhanced use of IPM approaches.
- To aware people about adverse effect of pesticide and encourages farmers to organic farming

7. Conclusion:

Injudicious and indiscriminate use of pesticides and presence of pesticide residues in food, fruits, vegetables and environment is a matter of grave-concerns. Banned and highly hazardous pesticides have been used without any precautionary measures. Exposure of farm families to pesticides and intake of pesticides and intake of pesticides by consumers are a major health threat. Biotic and abiotic systems have been affected entirely. Based on this review work the following recommendations have been drawn.

- Selection of appropriate pesticides and their handling and use as per the label are the most important steps for safe use of chemical pesticides. For this, the Government needs to develop mechanisms for enforcing the regulations for the overall management and use of pesticides, adopting FAO guidelines with adequate educational and training interventions.
- Strong science-based and research-supported intensive IPM program is required.
- Research and development on the use of bio-pesticides and eco-friendly measures are highly recommended to minimize the use of hazardous pesticides. For this, research laboratories must be strengthened in terms of both human resources and physical infrastructure.

- Long-term implications of pesticide use on human health and environment need to be studied for sustainable agriculture, safety to human health and the environment as a whole.
- A central authority for chemical safety needs to be formed to work on chemical safety and risk management for coping with pesticide problems.

8. References:

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3. Rijal JP, Regmi R., Ghimire R., Puri KD., Gyawaly S., Poudel S. Farmers' Knowledge on Pesticide Safety and Pest Management Practices
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5. Dhaliwal G.S., Aurora Ramesh. Principles of Insect Pest Management. Kalyani Publications.

ANNEX

Questionnaire for effects of use of pesticides in the context of nepal

We the students of agriculture andd Forestry University we have come to your village to study on the topic of effects of us of pesticides in the context of Nepal. We are going to ask you some questions related to our topic that will help us in our study. We hope that you will provide us answers sincerely

Information about respondents:

1. Name: ....
2. Age : ....
3. Gender:
   a. male b. female c. other
4. Ethnicity: ....
5. Main Occupation: ....
6. Contact number: ....
7. Religion: ....
8. Family Size : ....

i. no of males.....   ii. No of females.......

Information on Research:

1. Land size: ....
2. Ownership of land
   a. a) Own   b) rented

3. Farming type:
   a. subsistence b) Commercial

4. Cropping Pattern: ....

5. Productivity per year: ....

6. What is the rate of infestation of insects and pests in your field?
   a. Very high
   b. High
   c. Medium
   d. Low
   e. Very low

7. What do you use to control pests and insects in your field?

a) Biological b) chemical c) both d) none

8. If chemical,

what are the major insecticides and pesticides do you use to control the pests?

....

9. From where do you purchase these pesticides?

a) Market b) agrovet c) others

10. On what basis do you apply the pesticides?

a) Agrovet recommendation b) imitation from other

c) As per you own will

11. How often you use pesticides on your field?

a) As per availability b) after appearance of pests

c) As per suggestions of the technician d) sometimes

e) Never

12. Your opinon in effectiveness of the pesticides

....

13. Have you found any difference on yield after using pesticides?

a) Yes b) no

14. How much money do you spend on purchasing pesticides per year?

....

15. Why do you prefer chemical pesticides over biological method of controlling pests?

....

16. What do you think are the advantages of using pesticides and insecticides?

....

17. What do you think are the disadvantages of using pesticides and insecticides?

....

18. Are aware about the adverse effects of pesticides on human health?

a) Yes b) no

19. Have you heard about any safety measures while applying pesticides?

a. a) Yes b) no

20. If yes, what are the measures do you follow?

....

21. Do you feel any health abnormalities like nausea, headache, and irritation immadiately after the application of pesticides?

a) Yes b) no

22. Have you ever attended any training on use of pesticides?

a) Yes b) no

23. Are you aware about the adverse effects of pesticides on environment?

a) Yes b) no

24. Even you were aware about the adverse effects of pesticides use why are you stil using it?

....
.

25. What are the major biopesticides you use in your field?

a. ....
.

26. Have you heard about IPM?

a) Yes b) no

27. What is your opinion regarding IPM?.

....

28. Are you willing to substitute pesticides by IPM method?

....