

# Pesticide Use In Agriculture And Its Socio-Economic Contexts, A Case Study of Panchkhal Area, Kavre, Nepal

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**Abstract:-** Panchkhal area is the potential area for the agricultural production and serves as pocket for the vegetables for Kathmandu valley < Nepal. So for increasing the yield, maximum percentage of farmers are using the pesticides knowingly or unknowingly. In the study site, farmers use pesticides mostly on standing crops in the field. Maximum percentage of farmer also uses the manure in their fields besides chemical pesticides. But the rate of use in the area has been increasing. According to the respondents they spent low amount of money for pesticides in the beginning of their initiation of the agricultural practices since very low amount of the pesticides are used but as the time goes on the amount of the pesticides also increases due to change in climate. Maximum respondents complained about the discomforts regarding the health problems such as the respiration and the increase in the breathing rate and some have the problems of skin rashes, burns and irritation,

**Key words:-** Panchkhal, Nepal, Pesticides, Climate change, Pesticides treadmill, Aware

## 1 INTRODUCTION

According to FAO (Food and Agricultural Organization), "A pesticide is any substance or mixture of substances that are intended for preventing, destroying, controlling and mitigating any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies".

## 2 OBJECTIVES

The general objective of the study was to assess scenario of the pesticides use in the area and its impact on the socioeconomic status. The specific objectives are listed as under:

- i. To assess the amount of pesticide used in that area.
- ii. To document different types of pesticides that are being used in the study areas.
- iii. To provide the scientific data to the government body for further researches.
- iv. To assess and predict climate change and its impacts on agriculture
- v. To raise awareness and seek solutions of agriculture related environmental issues for ensuring a safe (minimizing the use of environment prone chemicals, pesticides, etc) and sustainable agricultural development.

## 3 METHODOLOGY

### 3.1 Study Area

Panchkhal VDC lies in the Kavre District. It covers an area of 20.19 square kilometer. Vegetable production has become very popular in many parts of Nepal, especially near the highway corridors. Panchkhal VDC is very popular pocket for growing different vegetable crops, which are sold at high prices in Kathmandu and other nearby towns. Many people who are concerned about the abuse of pesticides, are frightened to consume the crops (especially vegetables) grown in Panchkhal area. Since there is very limited facility for pesticide residue analysis in the country, it is difficult to judge the amount of pesticide residue present in the plants, soil and water around the treated area.

### 3.2 Method of Data Collection

#### 3.2.1 Literature Review

Different literatures regarding the study areas and other relevant documents were reviewed. The library of Central Department of Environmental Science and Central Library of Tribhuvan University was consulted for different relevant research papers and journals regarding the pesticides and agriculture including the study area.

#### 3.2.2 Preliminary Field Visit

Preliminary field visit was conducted so that the general scenario of the environment can be studied. In the preliminary field visit, the general background of the study area was also obtained and different personalities in the study area including the head of the VDC were also conducted. The research was conducted in coordination with the local people as well as local authorities.

#### 3.2.3. Questionnaire Survey

A field survey was conducted during which a questionnaire was developed and administered to a total of 23 farmers who were heads of randomly selected households from agricultural area in Panchkhal area. No sophisticated instruments are used for the purpose of study, as the study was confined in the management system no laboratory analysis was carried out. Only the questionnaire survey, informal discussions, unstructured questions and field visit was done. The format of

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questionnaire survey is in annex. The questionnaire survey was conducted in two stages: In first stage, the sample survey was conducted in order to evaluate the efficiency of questionnaire and some modifications were made. After that the second phase questionnaire survey was conducted. The questionnaire focused on the assessment of knowledge, attitudes and practices of these farm workers regarding the safe use of pesticides, practices of pesticide handling and spraying and the identification of the most prominent health related issues in the area.

#### 4 4RESULT AND DISCUSSION

The number of households surveyed during the first survey comprised 1320 persons. This can be translated into a family size of 6.5 persons per household. At the aggregate level, there are more female than male i.e., 55% of female and 45% of male. However, sex ratio is more unbalanced i.e., 93.4 male for every 100 female. The sample populations have been grouped into four classes: less than 15 years, 15 - 25 years, 30-59 year and 60 years and above. The percentage of economically active population (15 - 59 years) for Panchkhal area was 58.82 and that of younger age population (less than 15 years) is 30.39. However, the percentage of elderly population (aged 60 and above) is least i.e., 10.78%. Similarly, maximum percentage of the people are illiterate i.e., 33% of the total respondents and 32% of them are at secondary level, 31% are in the primary education level and only 4% are at university level. The major crops in the area are Wheat, Rice, Maize and vegetables such as Potatoes, Tomatoes, Karela, Gourd (lauka), and Beans (Bori), Chillies etc. These crops are cultivated in different seasons for specific interval of time. The cropping patterns of different crops are enlisted as under:

**Table 1: Crop Pattern of Panchkhal Area**

Crops	Seasons	Planting Time	Harvest Time
Rice	Monsoon	Ashar/Shrawan	Ashoj/Kartik
Potatoes	Spring	Kartik/ Mangsir	Magh/Falgun
Maize	Winter	Falgun/Chaitra	Jestha/Ashar
Vegetables			

There are three distinct cropping seasons in the project area: Summer or Monsoon (June - October), winter (November - February) and spring (March - May). In Khet, the dominant crop during monsoon is rice followed by potato, wheat, vegetables and mustard during winter and summer seasons. In Bari, the dominant crops during monsoon are maize and tomato followed by wheat, mustard, potato and vegetable crops during winter and summer seasons. The major source of irrigation in the Khet is Jhikhu Khola and its tributaries and for their irrigation purpose, groundwater (lifted with either motor pumps or rower pumps). Almost all farmers irrigate their land from the Jhikhu Khola stream. Few farmers also use water pumps to lift groundwater for irrigating their crops.

#### 4.1 Pesticides Concern

##### 4.1.1. Pesticides Use in the area

In the study site, farmers use pesticides mostly on standing crops in the field. Maximum percentage of farmer also uses the manure in their fields besides chemical pesticides. Similarly, 68.75% of the farmers apply the pesticides regularly, only 25% apply occasionally and 6.25% do not apply any pesticides in the fields. In the study area, farmers use pesticides mainly on the following crops for controlling various insect pests (Neupane, 2002) and diseases (Shrestha, 1996): potato, tomato, rice, cauliflower, brinjal (eggplant), chilli, beans, gourds, wheat and mustard. In the areas, potato, tomato and rice are the important crops followed by different vegetable crops in terms of pesticide use.

##### 4.1.2. Marketing of Pesticides

The farmers buy pesticides from the following retailer: agro-vet shop, local agro-shop, and farmers' cooperatives in consultation of JTA or local agro vet shopkeepers. So the pesticides are locally available.

##### 4.1.3. Farmer Perception on Pesticides

Almost all the respondents reported that the use of pesticides and chemical fertilizer in the crops has increased the crop production. They complain that without the use of the pesticides, the crops in this area cannot be grown well and the disease namely "Daduwa" is prevalent in the area which destroyed all the crops. This compelled them to use the pesticides. Similarly, all of them said that along with increase in the crop production, the amount of pesticides and investment on pesticides has also increased.

##### 4.1.4. Use of Protective Measures and Practices

The adoption of safety measures during and after pesticide application is very important factor for preventing against harmful impacts of pesticide. The various safety options could be use of gloves, masks, long sleeved cloth, glass, long boots etc. The present study showed that 43% of total interviewed farmers (23) used none of the safety measures 50% of the respondents use the mouth covers such as masks and cloths on mouth, 6.25% of them use the gloves, no one use both the mouth cover and gloves in combination. This may put them in the risk of pesticides and the health of these people is not secure of the disease caused by the inhalation, ingestion and absorption via skin. This may lead to occupational health hazards. On the other hand; they also do not use any protective measures during the preparation of pesticides in pump. Similarly, most of the respondents wash the hands with the soap of water. The people are conscious about the hand washing but the procedure of the hand washing is not satisfactory. 93.33% of them use the soap and water for hand washing. Also only 6.77% if them use simple water for hand washing. This may clean up the pesticides traces in the hands but cannot clean up completely.

##### 4.1.5. Pesticides Appliances

In Nepal, pesticides are applied using very simple manual appliances such as sprayers and dusters. But in this area, the hand compression (usually 9-litre capacity) and the knapsack sprayer (16-litre capacity) are very commonly used. In the absence of a sprayer, locally made brooms are used. Similarly, in the absence of a duster, pesticide dust is spread over plants and soil surface by hand. The river water and well is used for

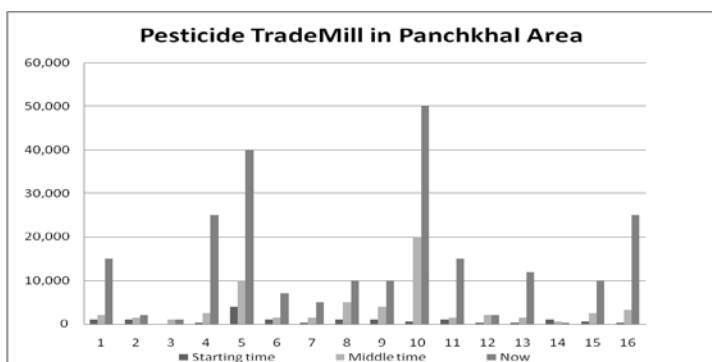
the preparation of pesticides.

#### 4.1.6. Pesticides Trade Mill

Pesticide use in Panchkhal area has been increasing. According to the respondents they spent low amount of money for pesticides in the beginning of their initiation of the agricultural practices since very low amount of the pesticides are used but as the time goes on the amount of the pesticides also increases due to change in climate.

#### 4.1.7. Impacts of Pesticides

68.75% of the respondents complained about the discomforts immediately after the application of chemical fertilizer and pesticides. Only 31.25% of them reported no any such kinds of discomforts and the reason may be their ignorance or maybe



they do not apply the pesticides. Sometimes in medium scale farm and large scale farms, the people used to hire the labor and the complaints of the labours sometimes are ignored. 28.57% of the respondents complained that they feel discomforts in the respiration and the increase in the breathing rate causes the problem immediately after the pesticides applications. Similarly, 19.05% of them reported that they have the problems of skin rashes, burns and irritation, 14.29% have the problems of muscle pains and 38.10 % of them complained other health disorders such as repeated headache, back pain etc. The pesticides can also have severe effect after some years of continuous and unprotective application.

#### 4.1.8. Training

Majority of the respondents had not taken any training regarding the pesticide handling and modern agriculture. The data of the government sector shows that huge amount of money has been spent in the training of local people in the modern agriculture and pest handling. Our research on this has shown the negative record. Majority of them focused on the field based training that should increase the production and should be practicable.

#### 4.1.9. General Perception

Respondents of that area are highly affected by environmental problems. The scarcity of the water is the main problem of that area. They are facing the massive problem of the water scarcity. They use the wells for drinking as well as other purposes. Majority of the respondents are willing to pay more for its betterment.

## 4.2 Conclusion

Farmers in the research site have started growing cash crops such as vegetables in place of traditionally grown cereals. To get high yield from the cash crops, more pesticides and fertilizers are being used. Hence they have started using pesticides lavishly. The other reasons for high use of pesticides are their cheapness and very low share in the total cost of production of the crops. The farmers have very low knowledge on pesticides and the pesticide regulations have not been enforced properly. For improving this situation, the awareness of the farmers needs to be raised towards pesticides, their alternatives and IPM and enforcing the regulation by the government as well as several developmental agencies. The awareness level of interviewed farmers regarding pesticide use and health safety was very less. From the field study, as expressed by farmers themselves, it was difficult for them to change their behavior in which they were adopted. This was the reason that they were careless regarding the adoption of safety measure during and after pesticide application. As announced by different media in the past, the findings of the present study also showed that pesticides are used in the area in an intensively due to either compulsion or due to lack of knowledge. Similarly, most of the respondents are not aware of the pesticides and its effects as a result of which they do not practice the personal hygiene and sanitation. This made them in the verge of hazards which may be long term or short term. In this context, there is urgent need of the awareness among the farmers and the community regarding the pesticides issues.

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