

Research on the status of chemical pesticide uses in agricultural activities in Phan Me commune, Phu Luong district, Thai Nguyen province

Nghiên cứu thực trạng sử dụng thuốc bảo vệ thực vật trong sản xuất nông nghiệp trên địa bàn xã Phấn Mê, huyện Phú Lương, tỉnh Thái Nguyên

Research article

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Phan Me is a midland-mountainous commune of Phu Luong district, Thai Nguyen province, Vietnam where the agricultural activities are predominant occupation. The investigation on the use of plant protection products in here showed that chemical pesticides have been commonly used in agricultural activities. Although some local people have a good attitude in using plant protection products, the status of using chemical pesticides that were not recommended (like Vofatox) has been quite popular due to the old cultivation customs. The local people have not applied any measures for wastewater treatment, or plant protection product package treatment. Besides, the use of plant protection products in higher concentration than recommendation for vegetables or crops caused the residues of toxics in agricultural products as well as in cultivation soil. The accumulation of toxic residues in the environment is a serious matter of concern because of their significant impact on the environment, agricultural ecosystem and human health.

Phấn Mê là một xã trung du miền núi của huyện Phú Lương, tỉnh Thái Nguyên, Việt Nam với hoạt động sản xuất nông nghiệp là chủ yếu. Qua thực tế điều tra tình hình sử dụng thuốc bảo vệ thực vật (BVTV) tại đây cho thấy hầu hết các loại hình sản xuất nông nghiệp đều sử dụng thuốc BVTV. Một số người dân đã có ý thức trong việc sử dụng thuốc BVTV tuy nhiên do tập quán canh tác từ lâu đời nên việc sử dụng các loại thuốc bị khuyến cáo, chẳng hạn như Vofatox, vẫn còn khá phổ biến. Người dân chưa tiến hành các biện pháp để xử lý nước thải, bao bì, vỏ chai thuốc BVTV sau khi sử dụng. Bên cạnh đó, họ còn sử dụng thuốc BVTV không đúng liều lượng cho một số loại cây rau để lại dư lượng thuốc trên nông sản cũng như đất canh tác. Sự tích lũy dư lượng của những chất độc hại này trong môi trường là vấn đề đáng lo ngại do sự ảnh hưởng nghiêm trọng của chúng đối với môi trường sống, hệ sinh thái nông nghiệp và sức khỏe con người.

Keywords: plant protection, agriculture, accumulated toxins, pesticide, environment, ecosystems

1. Introduction

Nowadays pesticides have been used popularly to control the diseases and pests whenever they appear in plants and crops. Using pesticides under right instruction as well as technical procedure will bring a good effect in plant protection. In some cases, it is the sole solution due to the fast eradication, easy use, high efficiency in anywhere and anytime and the convenience in buying or exchanging from the local stores. With these advantages, chemical

pesticides seem to be the best cure for crops whenever diseases appear and they have been used by farmers themselves in a large quantity. The use of chemical pesticides brings the efficiency in controlling pest and diseases for crops, but it also causes the unpredictably serious consequences for plants and human health. Even it may lead to phenomenon of “un-controlling”, so that pests and diseases may widespread in large areas with much more serious consequences such as environmental pollution, adverse effect on the health of consumers and

producers as well as disruption of the agricultural ecosystem (Nguyen, 2007). The scope of the paper is to present the results of research on the status of using chemical pesticide in agricultural activities in Phan Me commune, Phu Luong district, Thai Nguyen province.

2. Material and methods

2.1. Materials

Research materials are the issues related to plant protection products (chemical pesticides) and agricultural activities of farmers in Phan Me commune - Phu Luong District - Thai Nguyen province - Vietnam.

The survey with 100 questionnaires was designed to get information from local agricultural households.

2.2. Methods

Primary data and documents on natural resources and eco-social conditions were collected and then analyzed statistically by using Microsoft Office (Excel) software. The agricultural households and stores selling the agricultural products in studied areas were chosen randomly.

Based on soil conditions, terrain and farming systems in the Phan Me commune, studied areas were divided into 3 locations: First location was on the west of the commune where forestry, tea and fruit plants were abundant. Second location was the center of the commune, where annual crops were mainly cultivated. The third location was the east of the commune with many different kinds of crops.

3. Results and discussion

3.1 The situation of using chemical pesticide in agricultural activities in Phan Me commune

The crops were controlled by spraying with chemical pesticides regularly from 7-10 days/times. The number of chemical pesticides spraying for rice plants is the highest with 6 times per one cultivation crop. The different types of chemical pesticides were used depending on pest species. It is realized that the chemical pesticide named "Vofatox" that was banned by the government still has been using by farmers, and it is hardly used with biological pesticides. This caused environmental impacts, especially in water and land environment.

Table 1. Status of using chemical pesticide in agriculture in Phan Me commune

| No. | Crops | Number of sprays / crop | Periodic spraying (days / times) | Chemical pesticides | Isolation time (days) | Harvest time/crop (weeks) |
|-----|----------------|-------------------------|----------------------------------|---|-----------------------|---------------------------|
| 1 | Rice plants | 6 | 10 | Bassa50SD Satrunngdan95BTN Rigell 80WG Sofit 300EC Ferim 18,5WP Baran 50EC | 15 | 12 |
| 2 | Vegetables | 2 | 15 | Ridomil 68 WP Vofatox | 14 | 6 |
| 3 | Corn, peanut | 4 | 12 | Baran 50EC | 7 | 12 |
| 4 | Fabrics, label | 5 | 10 | Reasgant 1.8EC, 2WG, 3.6EC, 5EC, 5WG, Butan 60EC | 15 | 15 |
| 5 | Tea plants | 3 | 7 | Genol 0.3DD,1.2DD Actara 25WG,350FS | 7 | 5 |

3.2. The status of chemical pesticide use on crops and recommendation

The results of investigation on use of plant protection products in agricultural activities showed that chemical

pesticides are even over used widely. Most crops are sprayed at least 1 time/crop, especially 2-3 times /crop for vegetables.

Table 2. The amount of pesticides and practical recommendations on plant

| Crops | Chemical Pesticides | Farmer uses | | Recommendation | |
|-------|---------------------|---------------------|------------------|---------------------|------------------|
| | | Dosage (Kg/ha/time) | Isolation (Date) | Dosage (Kg/ha/time) | Isolation (Date) |
| Rice | Bassa50SD | 0.75 | 10 | 0.8 | 14 |
| | Satrunngdan 95BTN | 0.8 | 8 | 0.60-0.83 | 15 |
| | Delfin WG | 0.5 | 4 | 0.60-0.70 | 1 |
| | Sotoxo 3SC | 0.5 | 15 | 0.5-0.8 | - |

| Crops | Chemical Pesticides | Farmer uses | | Recommendation | |
|------------------------------------|--|-------------------|-----------|--------------------------|-----------|
| | | Dosage | Isolation | Dosage | Isolation |
| | | (Kg/ha/time) | (Date) | (Kg/ha/time) | (Date) |
| Vegetables | Rigell 80WG | 0.1 | 10 | 0.03 | 14 |
| | Neptoxin 95WG | 0.5 | 10 | 0.5-0.75 | 14 |
| | Baran 50EC | 0.2 | 5 | 0.08-0.17 | 7 |
| | Vofatox | 0.5 | 10 | - | - |
| | Ridomil 68 WP | 1.2 | 7 | 0.8-1.3 | 7 |
| | Anvil 5SC | 0.9 | 10 | 0.5-1 | 14 |
| | Dacomil 75WP | 0.5 | 7 | 0.6-0.8 | 10 |
| Corn, peanuts | Baran 50EC | 0.5 | 7 | 0.3-0.6 | 7 |
| Fruit trees (fabric, label ...) | Reasant 1.8EC, 2WG, 3.6EC, 5EC, 5WG | 0.6 | 30 | 0.15-0.5 (li- ter/ha) | 15 |
| | Ketomium 1.5 x 1000000 cfu/g | - | - | - | - |
| | Tea | Actara 25WG,350FS | 0.1 | 10 | 0.03-0.08 |
| | Genol 0.3DD,1.2DD | 0.8 | 10 | 0.6-0.8 (li- ter/ha) | 7 |

3.3. The way of spraying chemical pesticides of farmers

The way of spraying pesticides plays a very important role in controlling pests and diseases for crops. The knowledge on selecting the time of spraying based on the weather and wind direction of farmers in Phan Me is shown in Table 3.

All farmers who participated in the answering to the questionnaire in Phan Me commune usually sprayed pesticides in cool weather, downwind conditions. These were the suitable conditions that reduced the influence of chemical pesticides to user's health, improved the efficiency of pesticides. However, there were 80% of the households surveyed have fully understanding of this knowledge. Thus farmers need to improve more knowledge on using pesticides properly in order to efficiently protect environment and human health.

Table 3. Time selection based on the weather and wind direction when spraying pesticides (100 questionnaires)

| No. | Content | Survey results (number of farmers) | | Rate (%) | |
|-----|---|------------------------------------|----|----------|----|
| | | Yes | No | Yes | No |
| 1 | Sparaying in good weather, cool, no sunny | 100 | 0 | 100 | 0 |
| 2 | Backward Spraying | 60 | 40 | 60 | 40 |
| 3 | Downwind Spraying | 100 | 0 | 100 | 0 |
| 4 | Full understanding of Spraying | 80 | 20 | 80 | 20 |

Some farmers were aware of the impact of pesticides. Therefore, when mixing and spraying chemical pesticides they equipped themselves with protection clothes, masks and gloves. However, others are not interested in use of

these safety working closings. Most of the people answered that they were difficult to use. The frequency of use of protective equipment is shown in Table 4.

Table 4. The situation of using protection equipment when spraying chemical pesticides in Phan Me commune

| No. | Villages | Using protective equipment when spraying chemical pesticides | |
|-----|----------|--|--------|
| | | Yes (%) | No (%) |
| 1 | My Khanh | 75 | 25 |
| 2 | Lang Tro | 100 | 0 |
| 3 | Gia 2 | 77.78 | 22.22 |
| 4 | Bau 2 | 100 | 0 |
| 5 | Tan Hoa | 75 | 25 |
| 6 | Phu Son | 80 | 20 |
| 7 | Hoa 2 | 66.67 | 33.33 |
| 8 | Lan 1 | 75 | 25 |
| 9 | Bo 1 | 80 | 20 |

In two villages Lang Tro and Bau 2 of Phan Me commue, 100% of the surveyed households were fully equipped with protection wearing when spraying

chemical pesticides. In the others such as Gia 2, Tan Hoa, Lan 1, My Khanh, Phu Son and Hoa 2, from 66.67% to 80% of surveyed households were equipped with safety

working closings when spraying pesticides. From 20% to 33.33% of the households were not equipped. This affected directly the health of who sprayed chemical pesticides.

The situation of waste collection, storage and treatment was as follows:

- Solid waste:

The result of our survey on use and disposal of waste after spraying pesticides by farmers are shown in Table 5.

Table 5. The using and disposing of pesticide waste from farmers

| No. | Villages | Using river water, canal water to wash spray | | Collection of package, pesticide bottle after using | |
|-----|----------|--|--------|---|--------|
| | | Yes (%) | No (%) | Yes (%) | No (%) |
| 1 | My Khanh | 100 | 0 | 75 | 25 |
| 2 | Lang Tro | 75 | 25 | 100 | 0 |
| 3 | Gia 2 | 88.89 | 11.11 | 100 | 0 |
| 4 | Bau 2 | 75 | 25 | 75 | 25 |
| 5 | Tan Hoa | 100 | 0 | 100 | 0 |
| 6 | Phu Son | 100 | 0 | 80 | 20 |
| 7 | Hoa 2 | 83.33 | 16.67 | 83.33 | 16.67 |
| 8 | Lan 1 | 75 | 25 | 100 | 0 |
| 9 | Bo 1 | 100 | 0 | 90 | 10 |

Local farmers had the habits of using river and canal water to wash sprayers directly. The packings of pesticide were burned or thrown at the field. And the bottles of pesticide were sold or reused for other purposes. Many pesticide packages and bottles which were not treated properly were found in some villages such as My Khanh, Bau 2, Phu Son and Hoa 2. However, in the other villages such as Lang Tro, Gia 2, Tan Hoa and Lan 1, 100% of the surveyed households collected packages, pesticide bottles after using. Thus, there was still an uncontrollable number of packages and bottles of pesticides that contained potential harmful effect on environmental quality.

- Wastewater

Wastewater caused by cleaning and washing process after spraying may contain high concentration of pesticides. However, this water source was not collected but discharged directly into rivers near the field by 100% interviewed households.

4. Conclusions

- Pesticides that were used largely in Phan Me commune include 19 types mainly originated from chemicals. Biological products were rarely used. Pesticides named "Vofatox" was prohibited but still used by the local farmers.

- Many farmers accounting for 10% - 25% did not have measures for treatment of sewage, packages and bottles after using pesticide.

- There were from 66.67% to 80% of surveyed households equipped with protective clothes when spraying pesticides. The others who did not equip were in the danger of being affected by toxic compounds from pesticides.

- Some chemical pesticides named Rigell 80W, Baran 50EC, Vofatox, Ridomil 68 WP, which were used with incorrect dosage and not following the instructions for some crops, such as vegetables, beans might leave residues on agricultural products and cultivation soil. The accumulation of toxins in the environment is a matter of concern about the future impact on the environment, agriculture and ecosystem as well as human health.

5. References

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