

The Use of Pesticides in Agriculture Area, Cameron Highlands

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Abstract - A research use of pesticides in vegetables production has been conducted in Cameron Highlands. A total of 40 farmers who used pesticides were involved in this study. Information of type, scope and the extent to which the use of pesticides were obtained using field study and questionnaire approaches. Available data from the farmers were used to explain the status of pesticides used in vegetables plantation in Cameron Highlands. The introduction of training programmers on understanding the need for safe use of pesticides practices for farmers are advocated.

Keywords: pesticides, pest control, pest, vegetables.

I. INTRODUCTION

Food demand, which is growing higher in Malaysia have caused many region to opt for vegetables plantation to meet the demand. However, traditional system in vegetable's plantation (without any chemicals input) cannot fulfil the growing demand. As example, pests and diseases which pose the big problem in vegetables production need intensive pest management to control them. Uses of chemical pesticides are common practice to control the pests and diseases in vegetables plantation in Cameron Highlands, Malaysia. Despite the advantages of using pesticides, it also causes harm to the environment and public health. If not use properly, the pesticides can be poisoning toward humans directly, which it can accumulate as residual in food and environment or bring resistivity to pests [1]. These problems may arise due to pesticides abuse or too dependent on them, especially if the consumer not realizing the problems. In intensive vegetables production area in Cameron Highlands, there are some pesticides contamination in water, sediment, plantation and human fluids reported [2, 3, 4]. There are also aphids species which already immune to some pesticides, and maybe some pests that already immune toward another pesticides, but has yet to be traced [1].

Although pesticides generally considered as problem solution to pests for farmers, farmer's perception and chemical use were not given full attention. In Cameron

Highlands, comprehensive study toward these problems is yet to discover. However, farmer's perception particularly, the risks of pesticides to human health are important thing for some reason: [5] (1) it can influence the results of pesticides use; (2) if the perception was different from expert opinion, it is useful to know why and how far the farmers willing to take more risks than they realize; (3) it can influenced the methods of protection use for pesticides; (4) technical advice were given to farmers on use of pesticides and plant protection maybe not appropriate and not relevant if it is not same with their opinion in health effects due pesticides [2]. This study was conducted to determine the extent of pesticides use, which is the type of chemicals used by farmers and practice guide of pesticides.

II. MATERIAL AND METHODS

Diagnostic survey, formal and informal interview and field view were used to get the information of pesticides use by farmers. Formal interview was done to determine the system of vegetable farming in general and pest control practices.

In formal interview, structure questionnaire were used to collect information from farmers. Four data group were asked for such as: (1) socio-demographic information, (2) employment history and details of farm, (3) plant information, (4) pesticides practices and management. There were some questions in the questionnaire that were not related to the chapter. All questions were closed ended question in multiple-choice format, so the respondent can choose suitable answers. In all cases the farmers were informed that the interview will be done by chief or other farmer. Objectives of this study were explained to the chief and farmers in identified areas, and agreement of participation in this study were obtained. Main researcher translates the questionnaire into local language and makes it easy to understand, but still keeping the purposes of questionnaire. In certain situation, main researcher got help from other farmers to translate the questionnaire into local

language of the farmers. Some of the interviews were recorded in video. Most of the time, pen and papers were used to record all interviews. Other information on farmers and their farms were obtained from field observations. Besides the interview, field observations survey and farmer's respondent spraying practices were observed. The farmers were not informed in advance to prevent modification of behavior in pesticides control to reduce the biased (interviewer / respondent).

Data were entered two times for quality control. Cases with missing values were not included in analysis. Questionnaire data were analyzed using SPSS (version 2.1) software. To start, the analysis was summarized into all population (we calculated the frequency of feedback). This study calculated for age, gender, marital status, agricultural year and acre plot owned, and means and standard deviations for age and years of farming. Farm size was divided into four categories: living = <1 acre, small scale = 1-5 acre, medium = 6-10 acre and big scale = >10 acre.

III. RESULT

Demographic Information

Table 1 shows the demographic data for the 40 respondents. The average age was 30 years, 31(77.5%) of the respondents were male and 24(60%) of farmers still unmarried. On average, at least 7 years respondents had worked as a farmer and used pesticides, with the majority (60%) had a farm between 1 and 5 acres plot of land.

Table 1 Demographic information for the 40 respondents

Variables	Mean (\pm SD) (Range) or %
Age(years)	30.18 (\pm 10.3) (22-60)
Gender(male)	77.5%
Marital status (not married)	60%
Agricultural year (working as a farmer)	7 (\pm 6.62) (1-35)
Acres owned(1-5)	60%

Pesticide

A total of 23 pesticides have been found in agricultural areas of Cameron Highlands. This figure is obtained by per total

direct use in the farm, but it is likely higher than the actual use of pesticides. Pesticide consists of insecticides, herbicide and fungicides. Fungicides (53%) are the most abundant class of pesticides found in the survey conducted, followed by insecticides (44%) and herbicide (3%). Table 2 shows the classification by type of pesticide active ingredient and chemical hazard category according to WHO. Insecticides and fungicide used mostly falls under the category of danger class III, and some under category II hazard class. This category includes organochlorine, organophosphate and phytheroid.

Table 2: Type of pesticide used at agriculture area

Type	Active Gradient	Chemical Hazard Category (WHO)
Insectide (44%)	Lambda-cyhalothrin	II
	Diafenthuron	III
	Acetampirid	III
	Chlorpyrifos+cypermethrin	II
	Cypermethrin	II
	Cyromazine	III
	Abamectin	IV
	Dicofol	II
	Permethrin	II
	Trichlorfon	II
Chlorfenapyr	II	
Herbicide (3%)	Betaines, auxin, cytokinis, gilaberelin	
Fungicide (53%)	Cymoxanil Mancozeb	U
	Mancozeb	U
	Hexaconazole	III
	Tribasic copper sulfate	III
	Propamocarb	U
	Tebuconazole	II
	Azoxystrobin	U
	Difenoconazole	II
	Mancozeb	U
Chlorothalonil	U	

IV. DISCUSSION

Pests and plant diseases pose a major problem in agricultural production. This damage causes the farmers to use pesticides. All respondents in this study spray pesticides to control pests and diseases of crops. In fact, the intensive use of pesticides on plants are common either in small or large

gardens. Farmers use a variety of chemicals such as fungicides, insecticides or herbicide. The ratio of the pesticides used are shown in Fig. 1.

Compared with other pesticides, fungicides are the dominant pesticides used in Cameron Highlands. The influence of the use of pesticides, fungicides higher than others is likely due to the perception of farmers in the control of plant diseases. From the survey, we found that the main way to control plant diseases is to use different types of pesticides fungicides. Generally, farmers do not correlate with the disease in nurseries disease problems in the garden. However, pesticides (including fungicides) used during plant growth by most farmers.

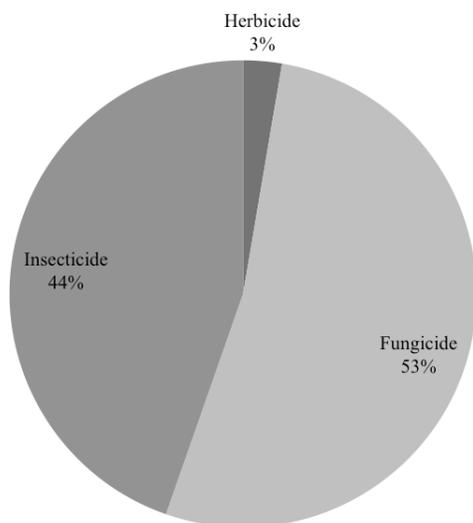


Fig. 1 Type of pesticide used

Farmers remove seedlings that have symptoms of disease varied, but did not realize that it is a land-borne diseases. They do not know that the disease can spread through the land, even seedlings planted do not have symptoms. However, farmers consider fungicides to control the disease for a long time and be more effective. With the trend of increasing use of pesticides, fungicides farmers prefer to yield than thinking of ways to control the disease is more complicated. Fungicides are used to control not only the disease but also to produce lush vegetative growth. For example, some farmers use Mancozeb to accelerate the ripening of the crop. They use pesticides to control disease and error method because they cannot identify the type of pest damage on crops [6].

Vegetable farmers spraying pesticide on a variety of their crops. For example, insecticides such as lambda cyhalothrin (Karate 2.5 EC / Alert 2.8 Ec), diafenthiuron

(Agus 24Sc), and cypermethrin (Cyperin 550) are sprayed on tomato, eggplant, cabbage and lettuce. Pesticides can be found in retail stores agriculture, and will usually merchant, has adopted the widespread practice of measuring the quantity of pesticides with a large container. Most small-scale farmers come from modest community, so pesticides are expensive for them and they can only be bought in relatively small quantities. Farmers also buy cheaper products, although it is less suitable for pest control needs. Information on pesticide application rates come mainly from Agricultural Extension Officers and / or label on a bottle of pesticide. In limited circumstances, the information also comes from other farmers, pesticide dealers or advertisement (radio, TV, newspapers). To measure pesticides, farmers usually use a spoon, measuring cylinders, cans and bottles, or use a dose or rate "(ie, the amount contained in the packet or bottle for a given volume of water, or for a given area). The wide range of rates (both reduced and excess) was used at some plants. For example, application on tomato and pepper rate are lambda cyhalothrin (Karate 2.5 CE) 4.13 g active ingredient ai / ha, whereas for chlorpyrifos (Dursban 4E) it varied from 20 to 40 g ai / ha. Rate recommended for lambda cyhalothrin (Karate 2.5 CE) is 12.5 g ai / ha. For chlorpyrifos (Dursban 4E) the recommended rate of 24 g ai / ha. While it is undeniable that pesticides were used in large quantities to control pests and diseases, but it is doubtful whether all the spray is really necessary. Integrated pest management (IPM) and organic farming strategies produce comparable results, but this approach is still used for a variety of reasons low.

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REFERENCES

- [1] Siti Humaira Haron, B.S. Ismail and Mohd Talib Latif. 2012. Composition of Insectidal Residual in Total Suspended Particulate and Rain Water at an Agricultural Area in Kedah, Malaysia. *Research Journal of Environmental Sciences*, 1-17.
- [2] Ntow, W. J., Gijzen, H. J., Kelderman, P. and Drechsel, P. 2006. Farmer Perceptions and Pesticide Use Practices in Vegetable Production in Ghana. *Pest Manag Sci* 62(4): 356-365

- [3] Mazlan, N. and Mumford, J. 2005. Insecticide Use in Cabbage Pest Management in the Cameron Highlands, Malaysia. *Crop Protection* 24(1): 31-39.
- [4] Haron S. H., Ismail B. S., Mispan M. R., Rahman N. F. A., Khalid K. and Mohd M. S. F. 2015. Comparison of Pesticide Residu in the Surface Water of Bertam River in Cameron Highlands, Pahang. *ARPN Journal of Engineering and Applied Sciences* 10(15):6623-6627.
- [5] Warburton H., Palis FG and Pingali P.L. 1995. Farmer perceptions, Knowledge and pesticide use practices. In: *Impact of pesticides on farmer health and the rice environment*, ed by Pingali PL and Roger PA, Kluwer Academic Publishers, Massachusetts, 59-95.
- [6] Ismail B. S., Siti Humaira Haron and Mohd. Talib Latif. 2012. Pesticide Residue Levels in the Surface Water of the Irrigation Canals in the Muda Irrigation Scheme Kedah, Malaysia. *International Journal of Basic & Applied Sciences* 12(06):85-90.