Pesticide Storage, Disposal and Protective Methods Adapted by the Vegetable Farmers in the Manmunai South and Eruvilpattu Divisional Secretariat Division of Batticaloa District, Sri Lanka

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Abstract

Batticaloa district is in the Eastern Part of Sri Lanka. Vegetables except up-country vegetables sold in Batticaloa district are mainly grown in villages in the district. Manmunai South and Eruvilpattu divisional secretariat (DS) division is a predominantly vegetable cultivating area in the Batticaloa district. Farmers in this region use variety of synthetic pesticides to protect vegetables. Recently public concern related to health risks associated with pesticide residues in the vegetables has been increased substantially. Therefore, a study was conducted to find out pesticide storage, disposal and protective methods adapted by the farmers on vegetable cultivation in Manmunai South and Eruvilpattu DS division. Stratified random sampling method was used to select respondents for the survey and collected data were analyzed statistically. It was observed that the usage of pesticides is higher in the study area. There are no any proper storage methods practices by farmers and they are highly negligent in proper disposal of empty containers. The farmers in the survey area never use any protective measures before or during the spraying operations of pesticides. It was found that awareness related to pesticide usage, storage and disposal methods by farmers were very low. Further, they are unaware of the ill effects of pesticides on human beings as well as the environment itself. Awareness programmes are essential and recommended to change the attitudes of farmers to shift them from traditional to environmental friendly pest control methods.

Keywords: pesticides, health risks, protective measures, storage

Introduction

Sri Lanka is an agricultural country as majority of the rural people is still engaged in agriculture for their livelihood (Vidanapathirana, 2008). In the agricultural sector of Sri Lanka, vegetables are the second most important sub-sector next to rice. Vegetables except up-country vegetables sold in Batticaloa District are mainly grown in villages in the district and are harvested and sold fresh. Manmunai South and Eruvilpattu divisional secretariat (DS) division is a predominantly vegetable cultivating area among the 14 DS divisions in the Batticaloa district.

Farmers in this region use variety of synthetic pesticides to protect vegetables from pest and diseases. Safe disposal and storage of pesticides and protection while application are essential to prevent potential ill effects caused by pesticide usage. However, awareness of the farmers for safe level of pesticide usage and related issues are at minimum. Therefore, this study was carried out to find the pesticide storage, disposal and protective methods adapted by the vegetable farmers in the Manmunai South & Eruvilpattu DS division of Batticaloa district.

Methodology

Manmunai South and Eruvil pattu DS division is located in the coastal side of Batticaloa district. There are 45 Grama Niladari (GN) divisions included under this divisional secretariat. Total agricultural land extent in this DS division is 3,555 ha in which 330 ha is used for vegetable cultivation. Kaluthavalai, Mankadu, Thettativu and Cheddipalayam are some villages in this DS division where agricultural practices are high. This survey was carried out from February to April 2013. A number of 387 respondents were selected among the vegetable farmers through a stratified random sampling method from the study area. In each GN division, about 10% of the farm families were randomly selected as sample.

Structured questionnaires were used to collect information, after pre-test of the questionnaire for their suitability. Selected respondents were interviewed at their door steps and field observations were also made. The questionnaires were checked for completeness and the data were analyzed using SPSS 11.0. Data were confined to estimate frequencies and descriptive statistics.

Results and Discussion

1. Storage of pesticides

There are no any proper storage methods practiced by farmers. Most of the farmers store the agrochemicals inside the cottage where they eat, sleep, and take rest. Moreover, it also can easily be reached by the children. Some farmers even store the pesticide under the trees without any protection (Table 1).

Table 1: Pesticides storage places by the farmers

Places of storage	Percentage of the respondent
1. Cottage	56.07
2. Under the tree	31.00
3. Other places (Not safer)	12.91

Several studies (Konradsen *et al*., 2003) have documented that restricting the availability of toxic pesticides can reduce the total death rates from self-harm. This could be achieved through the phasing out of more hazardous pesticides and improved safe storage in the houses of farmers (Eddleston *et al*., 2002). Therefore, pesticides storage methods should be improved in the study area.

2. Disposal of empty containers

Results of this survey highlighted that farmers are highly negligent in proper disposal of empty containers. No any safe disposal methods are practiced by most of the farmers in the surveyed area. Most of the farmers (around 45%) leave the empty containers in the fields itself. It is recommended that burying is the safest method (Nagenthirarajah and Thiruchelvam, 2008) consider a different position for this sentence, However very few number of the vegetable farmers do practice safe disposal of methods such as burying the containers, while some farmers sell the bottles to the bottle collectors (Table 2).

Table 2: Disposal methods of used pesticide containers by the farmers

Method of Disposal	Percentage of Respondents
1. Store in cottages	4.65
2. Store under trees	32.04
3. Throwing on field	44.96
4. Burying in soil	9.56
5. Other (re-use, selling etc.)	8.78

The pesticide containers are not reusable as described in the pesticide manuals. Therefore, after usage of pesticides, the empty containers should be disposed in proper safe way. When empty containers left on the field, during rainy season the remaining content of the bottles will be wash out and reached water bodies. Pesticide residues can reach aquatic ecosystems and affect aquatic biota even at low levels (Lakshmi, 1993) and hence to the human beings. Further the left outs could give chances for accidental intake of pesticides, especially by children and pets of the farmers.

Generally, water bodies near the farms are often polluted . The pesticide concentration of water bodies can reach the magnitude of dozens of milligrams per liter (Zhang *et al*., 2011). Long-term low-level of exposure to pesticides by aquatic systems is mainly from pesticide washout from crop land (Lakshmi, 1993). Safe disposal of pesticide containers is therefore important to reduce environmental pollution and in turn it will eventually protect the human health. Therefore, farmers in the survey area should be educated with regards to proper methods of disposal through awareness programs and group discussions.

3. Protective measures adapted by farmers

From the survey it was found that the farmers of the survey area never use any protective measures such as, using mask, goggles, respirator, gloves, hat and/or boots before or during the spraying operations of pesticides. It could be due to lack of knowledge on the ill effects of the agro-chemicals they use or ignorance of farmers on the safety measures adapted during pesticide usage. However, during mixing and application of pesticides only they do not eat or smoke.

Health and safety of the workers engaged in agriculture is of vital important for the continuous supply of food. Farmers are exposed to pesticides in many different situations such as mixing, application, disposal etc. (Fait *et al*., 2001). From research and surveys it is found that most of the farmers in developing countries are reluctant to adapt protective measures when handling and using poisonous pesticides. Plianbangchang *et al.* (2009) reported that small scale farmers in Thailand did not wear suitable personal protection, apply pesticides inappropriate fashion and discard the wastes unsafely. In Sri Lanka, some farmers have a genuine problem of insufficient knowledge and information on the pesticide usage. They are exposed to pesticides during application and suffer from numerous morbidity effects ranging from headaches, nausea to cramps and body tremors (Nagenthirarajah and Thiruchelvam, 2008). According to World Health Organization (2005), the estimated

occupational pesticides poisoning affected are as many as 25 millions of the agricultural work force each year in developing countries.

Therefore, it is essential to educate the farmers in the study area regarding safety measures adapted during pesticide usage. It is essential not only to protect the health and safety of the farmers but also their neighbours who are residing close to the agriculture plots and vegetable consumers. This will ensure the sustainable crop production in the study area. Taiti (2010), reports that farmers should be educated on appropriate and safe use of pesticides to enable them control and prevent chemically caused ailments and deaths. This could be done through government efforts of establishing and strengthening extension services in the rural areas to educate the farmers for the safe use of pesticides and to introduce technical know-how and do-how of modern agricultural practices.

Conclusions and recommendations

Findings of this survey highlight the pesticide usage pattern in vegetable production in Manmunai South and Eruvilpattu Divisional Secretariat of Batticaloa district, which is the major vegetable producing area of Batticaloa District. From this study, it was found that awareness of farmers related to pesticide application, storage and disposal methods were at very minimum. Further, they are unaware about the ill effects of pesticides to human health as well as to the environment. Many of them did not adopt any protective measures while handling pesticides. Therefore, awareness programmes are essential to change the attitudes of farmers to shift them from traditional methods to environment friendly pest control methods. It is essential for the sustainability of vegetable production in the study area and to safe guard the health of the people and the environment. Furthermore, farmers in this study area should be educated through field demonstrations regarding the recommended pesticide usage, methods of spraying, safety storage and disposal methods of pesticide and the needs and ways of the reduced usage of synthetic pesticides on the concepts of natural and organic farming for better food and better life.

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