

## Knowledge and Attitude among Vegetable Growers Regarding Pesticide Application: A Case Study in Matara District, Sri Lanka

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### Abstract

The present study was carried to understand the knowledge and attitude on pesticide application among commercial scale vegetable farmers in Matara District, Sri Lanka. Data were collected from a sample of fifty Brinjal and Cucurbitaceous vegetable cultivating farmers, using pre-tested questionnaire and focused group discussions with agricultural instructors and, representatives of farmer's organization and pesticide dealers. Farmers were selected from the five agricultural service centers, using stratified sampling technique. For control pests and diseases a majority of farmers (80%) used synthetic pesticides while only a few farmers (20%) used both synthetic and botanical pesticides. About 72% of farmers always apply pesticides prior to the appearance of any symptoms of pest or disease, as a precautionary measure. The percentage of pesticide overdosing farmers was 58%. They believe that that recommendations and instructions given in the pesticide product labels are ineffective. About 48% of vegetable farmers wear protective garments during the pesticide spraying, but only 32% of the farmers used gloves and boots. Most of the issues at the user's level are associated with lack of awareness, poor attitudes and behaviours of farmers and weaknesses in the extension system. Thus, there is a need to change farmer's attitudes through awareness campaigns and, to empower the farmer organizations to tackle the issues at farm level.

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### Introduction

Low country vegetables cultivation is most popular among the farmers in Southern province in Sri Lanka. Brinjal, luffa, snake gourd, bitter gourd, and leafy vegetables are the major vegetable crops cultivated in the area. The use of high-yielding varieties, synthetic pesticides and fertilizers (agro chemicals) has led to a significant increase in agricultural production. The climatic conditions of the Matara District combined with high yielding varieties of crops and the increasing use of chemical fertilizers provide a suitable environment for the development and multiplication of pests and diseases. Therefore, most farmers in the Matara District tend to use high quantities of pesticides and fertilizers.

However, indiscriminate use of agro chemicals, especially of synthetic pesticides has caused negative externalities such as health hazards to human and other beneficial organisms, pollution of the environment, development of insect resistance against pesticides, and outbreaks of secondary pests (Dutcher, 2007).

Although various chemical and, mechanical and biological methods are available to reduce crop losses from pest and diseases, the use of agro-chemical is convenient, effective and gives quick results control and are able to reduce pests to significantly low levels.

Pesticide use in vegetable has become a usual feature in farming. However, most farmers do not fully understand the systematic handling and appropriate use of pesticides (Ahyeyar et al., 2014). As farmers often lack in accurate knowledge about pests and their control, spraying decisions are sometimes not-optimal. Farmers with sufficient capital invest in chemical control measures assuming that using lower than recommended dosages is better than no control at all. In addition, farmers generally lack knowledge about proper pesticide management, including safe pesticide handling and storage. Though studies on pesticide productivity are relatively common, few researchers have assessed the farmer's pesticide adoption behaviour. In fact, there have been no recent studies on the socio-economic impacts of use of chemical pesticides for vegetables in Matara District. Therefore, the general objective of this study was to understand the knowledge and attitude about pesticides application among vegetable growers in Matara District.

### Materials and methods

The survey was conducted in 2016; five Agricultural Service Centres (ASC) of Matara district (Weligama, Matara, Malimbada, Denipitiya, and Akuressa) were selected as the main research sites. The study was carried out using pre-tested questionnaire with a sample of

fifty Brinjal and Cucurbitaceous vegetables cultivating farmers. Stratified sampling technique was employed to select farmers from the five ASC. Pre-tested structured questionnaire was used to interview the randomly selected farmers from selected localities. The information pertaining to certain socio economic aspects of farmers, such as family size, education level, size of land holdings, cropping pattern; details on vegetable cultivation; namely, the area under cultivation, land preparation, inputs use and the outputs obtained were collected from the questionnaire survey. In addition, data on prices of inputs and outputs, method of sale, handling of pesticides, awareness of farmers on the toxicity level of pesticides, safety measures followed during applications of chemicals also collected with reference to the nearest harvesting season in 2015. Key informant interviews, focus group discussions, and direct field observations, published and unpublished reports were also used in the study. Tabular and descriptive analysis was used to examine different socio-economic factors of the vegetable farmers and the use of pesticides.

#### Results and discussion

According to the sample selected male involvement (80%) was higher in vegetable cultivation in Matara district. Most of vegetable growers involved in agriculture sector as main occupation. Age of the responded population varied between 42 to 76 years and most of the farmers (64%) were in the age group of 51-70 years followed by 31-50 year age categories. The age category indicates a considerable proportion of elder farmer involvement in vegetable cultivation.

Most of vegetable growers cannot identify harmful insect, diseases and weeds. Vegetable farmers in the study area used a total of 15 commercially available branded pesticides. The trade names of the pesticides include 12 insecticides 3 fungicides and 3 weedicides. Almost all farmers used insecticide to control insect pest and almost all farmers used fungicides to control fungus and 56 % of farmers used herbicide to control weeds. Only 20 % of farmers used botanical pesticide (Neem extract) and other cultural practices (bagging, protein bait application, light trap, pheromone application etc.) to control pest and disease.

Forty-eight percent of farmers used the measuring device which comes with the pesticide bottle to measure the pesticide for mixing, but some of the farmers (26%) used the

bottle cap to measure the chemical and 20 percent of them measured quantity according to their past experience. About 72% of the farmers always apply pesticide as a precautionary measure prior to the appearance of any symptoms of pest or disease, though it is needed for only for selected pests and diseases. They frequently apply pesticides without considering the significant appearance of pests and diseases. However, 16 percent of farmers apply pesticides only after the appearance of the symptoms of pest or disease.

According to the findings, 26% of farmers rely on extension officers as the first source of information to choose a pesticide for a given pest or disease. Nearly 52% of farmers depend on their own experience to select a suitable pesticide and another 26% of vegetable farmers depend on pesticide dealers to select pesticides. Very few (12%) selected pesticides from the information distributed through printed leaflets.

Pesticide label contains information to guide the user for the correct and safe use of the pesticide including recommended dosage and type of suitable crops, toxicity level, symptoms of pesticide poisoning, first aid measures. According to the survey results, 90% of farmers in the Matara District read the instructions given in the label before use it. The main reason for not reading the label is that, they do not feel the necessity of reading as they have long period of experience in pesticide use as well as experience in the use of the same pesticide several times. More than 66% of the farmers did not pay attention to the expiry date of the product. Around 80% of the farmers were not aware about the colour band of the pesticide they purchase.

The survey findings indicate that most of the farmers (58%) use overdoses without following the instructions on the recommended dosage given on the pesticide label. About 42 % of farmers who overdose the pesticides believe that, it is essential to overdose chemicals as pesticides available in the market do not have the strength as per the specifications given in the label. Also farmers apply more dosages based on their past experience of non-effectiveness of applying the recommended dosage.

Majority of the farmers (66%) spray chemicals towards the wind direction in order to prevent the wind effect directly on chemical applicator, but 14% of farmers do not consider the wind

direction during the application which has serious health effects on the spraying farmer. Approximately 56% of the farmers usually apply pesticides early in the morning while 14% apply in the evening and another 32% farmers not consider time period when apply pesticide.

The survey found that 84% of farmers store pesticide bottles in a safe location within or outside the house to make them inaccessible to children. The rest of the farmers mostly place the bottles in unsafe locations in the house without considering safety precautions. Many farmers (66%) dispose empty glass bottles with the garbage and another 16% of the farmers sold empty glass bottles to collectors and another 26% of the farmers threw empty glass bottles to irrigation channels and to outside the houses. In case of plastic bottles and polyethylene packing materials, 70% of the farmers burnt them and another 25% placed them in the garbage and 9% of the farmers reused the empty plastic bottles to feed pets, bathing etc. but, 5 % of the farmers have threw their empty plastic/polythene containers to the irrigation channels and to outside the house without any concerns on the consequences of their actions. The majority of them wash the sprayers in the irrigation channels and reservoirs (78%) and another 22% of farmers use domestic water sources such as domestic well and tap to wash the sprayers. The number of farmers who do not wear protective garments was also found to be is high.

### Conclusion

Majority of vegetable growers in Matara District are small holders and use of pesticide is the main method adopted to control pest attacks. They use various commercially branded pesticides but do not use herbicides for weed control. To satisfy higher demand, pesticides are used prior to the economic threshold level or with the absence of attack.

Most of the farmers select pesticides by their own experiences and use higher doses than recommended. Further, most of the farmers follow good habits in pesticide storage, preparation, application etc. However, they do not have much concern on health and environmental issues of pesticide usage. Therefore, it is important to introduce and popularize eco-friendly, healthy and convenient methods for pest control of vegetable.

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