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Adoption and factors affecting on adoption of integrated pest management among vegetable farmers in Sri Lanka

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Abstract

The overuse and misuse of chemical pesticides has widely been reported in vegetable cultivation in Sri Lanka. While safer and environmental friendly pest and disease management methods such as Integrated Pest Management (IPM) are popular around the world, only little effort has been taken to promote IPM in Sri Lankan vegetable cultivation. Furthermore, farmers have not shown much interest on practicing IPM in vegetable cultivation. However, the level of IPM adoption by vegetable farmers and the factors influencing the adoption and strategies to promote IPM in vegetable cultivation have not been identified. Accordingly, this study was conducted to identify the level of IPM adoption and factors influencing the adoption of IPM in vegetable cultivation and to understand the strategies for promoting vegetable IPM in future. Primary data was collected by interviewing 290 farmer households. 'Level of adoption' and 'farmers' knowledge' on nine practices used in IPM technique were tested and nine socio-economic variables were analyzed to identify the factors influencing the IPM adoption. Findings indicated that the main income source of the majority (68%) of respondents was from vegetable farming from which at least half of their household income was secured. A total of 47% farmers apply chemical pesticides before pests or diseases appear in the field as a routine activity, and without considering the 'economic threshold level'. Although the majority (60%) of farmers have used the recommended dosage in spraying, mixing several pesticides when applying was common. According to the findings, although the term IPM was familiar to 44% of respondents, only 20% s had a certain level of understanding on the IPM technique. The adoption of IPM practices among farmers was not at a satisfactory level. Practices known and followed for a long time were better adopted compared to the practices which are relatively novel. Results also showed that despite the adoption of these practices, understanding of farmers regarding the benefits and the appropriate use of such practices was not at a satisfactory level. "Farmers' knowledge on IPM" had a positive impact while the "proportionate income from vegetable cultivation" was negative on the level of IPM adoption. In addition, the results showed that gaps in policy and institutional setup, negative attitudes of farmers and officers on IPM were conduce for the lower adoption level of IPM in the vegetable cultivation.

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1. Introduction

Vegetable production is one of the important agri-business ventures in Sri Lanka where the overuse and misuse of chemical pesticides in vegetable cultivation has widely been reported. According to[1], vegetable sector consumes a significant amount of chemical pesticides in Sri Lanka and the amount indicates a growing trend in the recent years. According to[2], due to farmers being reliant on chemical pesticide than non-chemical methods, many negative consequences including development of resistance, resurgence of pest populations, emergence of secondary pests, hazards to human and other beneficial organisms have been resulted. In addition, this has led to increased cost of production. With the understanding the consequences, safer and environmental friendly pest and disease control methods become popular in food crop production. Integrated Pest Management (IPM) is one such approach. Under Sri Lankan conditions, it has shown that, 50% reduction in pesticide application in chili[1] and 80% reduction in the cost of pest control while a 20% increase in profit from cabbage[3] production could be achieved through IPM.

Together with the FAO funded 'IPM promotion programmes for rice' conducted in the late 1980s, there were few efforts taken towards promoting IPM in vegetable cultivation in Sri Lanka. Nevertheless, farmers have not displayed much interest to follow IPM or other non-chemical pest controlling methods in vegetable farming. On the other hand, factors controlling the usage of IPM, possibility and strategies to promote IPM concept/technique in the vegetable sector have not been either identified or recorded. Therefore, narrowing of the information gap by documenting the current status and understanding the lessons of past experiences are important moves for future vegetable IPM interventions. The main objective of the study was to find out the level of usage of IPM in vegetable cultivation and factors influenced on adoption of IPM in vegetable cultivation; and to draw recommendations to promote the use of IPM in vegetable cultivation in Sri Lanka.

2. Methods

2.1. Study locations and sample

The study was conducted in 2013 yala season focusing the Kurunegala and Anuradhapura districts, where low country vegetables are prominent and; Nuwara Eliya and Badulla districts where upcountry vegetables are prominent. The sample was drawn using the multistage sampling technique. At the first stage, four districts; in the second stage, two Agrarian Development Centers (ADC) from each district (based on the cultivated extent); in the third stage, three Grama Niladhari Divisions (GND) from each ADC; and in the last stage, 12 vegetable farmers from each GND (accordingly, total of 292 farmers) were randomly selected. Key informants were interviewed and a literature review was conducted.

2.2. Level of IPM adoption and factors affected

By reviewing the empirical evidence[4], nine practices underlying IPM approach namely, destruction of crop residues, practice of crop rotation, protection of natural enemies, practice of soil treatment, use of recommended dosage of chemical fertilizer, practice of non-chemical weed management, control of pests by physical methods, use of traps/baits, and practice of mixed cropping were considered for the analysis.

Pattern of use of each practice was identified and scored (Table 1) and *Adoption Score* (the dependent variable)