Study on Factors Affecting the Farmers' Decision to Practice Proper Safety Measures in Agro Chemical Applications

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Introduction

Food safety has become an important issue in the world today. There is a direct link between the inputs used in agriculture and the quality of food and safety aspects of food. Due to intensification of agriculture, farmers have no option but to use chemicals in controlling pest and diseases in agriculture Those chemical substances are called agrochemicals. Further, pesticides play a significant role by making agriculture safe from many dreadful pests (Abhilash and Singh, 2009). Globally, about 4.4 to 6.6 billion pounds (2 to 3 billion kilograms) of pesticides are being used every year, at a total cost of about $20 billion (Badruddin, 2010). During the past 50 years, the use of agro-chemicals in Sri Lanka has increased 30 times (Amarakoon, 2004). Farm workers and their families are exposed to pesticides through multiple pathways (Strong *et al.* 2008). Poisoning is a major health concern in Sri Lanka, where there is a very high morbidity and mortality from pesticide poisoning (Fernando, 2002). Further, pesticides and other agrochemicals have made some adverse effects on environment including, pollution of water, soil, destroying the beneficial organisms and air pollution. Accordingly, number of detrimental effects occurr due to the misuse of agrochemicals by the users and due to the lack of scientific knowledge about the agrochemicals and correct usage. Therefore, this research study was undertaken to identify the major factors which influence the farmers to make use of safety measures in agrochemical applications.

Methodology

Up country area was selected as the area for the study. Cropping frequency is high in this area than the other areas in the country. Due to high frequency of cropping, probability for farmers to use and handle agrochemicals is very much high compared to the farmers of other parts of the country. The Cluster sampling technique was used to select 100 respondents from three divisional secretariat divisions in the up country area. Those areas are Welimada, Bandarawela, and Nuwara Eliya.

Semi-structured questionnaire was prepared to collect information from agrochemical users about the use of safety practices. Adoption decision of safety practices are influenced by number of factors so that the following empirical model was used where the current use of safety practices was taken as the dependent variable against some 16 independent variables identified through a comprehensive literature review process. Descriptive statistical techniques were used in describing the sample population.

Empirical model:

$USP = \beta_1 AGE + \beta_2 EDL + \beta_3 INL + \beta_4 FKHL + \beta_5 SPBA + \beta_6 SPDA + \beta_7 SPAA + \beta_8 AASP + \beta_9 TC + \beta_{10} TF + \beta_{11} AL + \beta_{12} PP + \beta_{13} FP + \beta_{14} PTS + \beta_{15} UA + \beta_{16} T + \epsilon$

Y =Use of safety practices (USP)
X_1=Age of farmer (AGE)
X_2=Education level (EDL)
X_3=Income level (INL)
X_4=Farmer knowledge about hazardous level of agro chemicals (FKHL)
X5=Farmer knowledge about safety precautions before application (SPBA)
X6=Farmer knowledge about safety precautions during application (SPDA)
X7=Farmer knowledge about safety precautions after application (SPAA)
X_8=Attitudes towards safety practices (AASP)
X_9=Type of cultivation (TC)
X_{10}=Type of farming (TF)
X_{11}=Area of living (AL)
X_{12}=Peer pressure (PP)
X_{13}=Family pressure (FP)
X_{14}=Participation for training sessions (PTS)
X_{15}=Usage amount (UA)
X_{16}=Time needed to apply the agrochemicals (Hours) (T)

Results and discussion

In the sample, 75% of the agrochemical users were found as fulltime farmers and 25% of agrochemical users involved in agriculture on part time basis. 33% of respondents have reached the G.C.E O/L and about 2% of farmers have not even attended to school and only 2% of farmers have completed their higher education. According to the income level analysis, 41% of farmers fall into the category of seasonal income level of less than Rs. 50,000 and average income level was revealed as about Rs. 74,290 per season.

The survey revealed that 7% of farmers didn't use any safety measures or accessories at all during the period of agrochemicals application. Further, 44% farmers disagreed with the statement reinforced the need of using safety practices in fertilizer applications and 29 farmers were strongly disagree to the same. 43% of farmers in the sample used to throw the empty containers to anywhere near to the field and only 25% of farmers buried the empty containers but they didn't adopt the standard practice of burring at least 1m depth.

Out of 16 independent variables, only seven were identified as significant factors as given below.

USP = 0.98262* + 0.17522 SPBA* + 0.21116 SPDA* + 0.18652 SPAA** + 0.24010 DTC2** + 0.26464 DAL1** + 0.40135DAL2 * - 01306 UA**

* = 5% significant level

** = 10% significant level

According to the analysis, knowledge of Safety Practices before (SPBA), during (SPDA) and after (SPAA) the application were significant at 5%, 5% and 10% significant levels, respectively. Accordingly, these factors have high impact on promoting safety practices. Enhancing the knowledge related to above two factors positively affect the decision of practicing proper safety measures in agro chemical application. Further, the type of

cultivation, for instant vegetable cultivation, and the area tends to have an influence of the use of safety measures. (DTC2, DAL2 and DAL1 were significant at 10% significant level. Usage amount (UA) is significant but shows a negative correlation. This implies that when increases the usage amount of agrochemicals, it negatively affects on the use of safety measures and this may be due to the difficulties to wearing those protective equipments for long hours.

Conclusions

Majority of farmers perceived that safety precautions are not needed for the fertilizer application. Increasing the farmer Knowledge about safety precautions during application (SPDA) and before application (SPBA) is mostly helpful to promote the use of safety practices when they deal with agrochemicals. Enhancing farmer knowledge about safety practices after application (SPAA), knowledge related to safety usage of agrochemicals in vegetable cultivation has a positive relationship to the decision of safe use of agrochemicals.

Enhancing the knowledge about safety handling of agrochemical in the Bandarawela and Welimada has positive effect for promoting the safe use of agrochemicals. Farmers tend to show low level of interest to wear protective equipments when they have to apply large amount of chemicals.

References

Amarakoon A.M.D.R. 2004. Adoption of safe handling and usage practices for pesticides by farmers in Kurunegala and Nuwara Eliya Districts. Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka.

Badruddin K. 2010. Environmental Effects of Agrochemicals. University of Kashmir, Srinagar, India.

Strong L.L., *et al.* 2008. Factors associated with pesticide safety practices in farm workers, School of Public Health and Community Medicine, University of Washington, USA.

Abhilash P.C. and N. Singh 2009. Journal of Hazardous Materials 165 (1-3):1-12.

Fernando R. 2002.The National Poisons Information Centre in Sri Lanka: the first ten years, Faculty of Medicine, National Poisons Information Centre, National Hospital of Sri Lanka, Colombo.