



The Study on Conventional Farming Practice - A Case Study of Farmers' Practice in Samroung Village, Cambodia

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Abstract Agrochemicals application has been rapidly popularized in Cambodia due to agricultural development technologies. Although agrochemicals utilization has significantly increased crop production, it has negative impact on human health, sustainability of land use and ecosystem. Therefore, this study has been focused on conventional farming practice in Samroung village of Kampong Cham province, Cambodia. The main objectives of this study are 1) to understand current situation of farming practices in the village and 2) to identify the condition of agrochemicals applied at farmlands. To access the objectives of this study, various participatory researches, both quantitative and qualitative have been conducted. Semi-structured interviews, in-depth interviews, focus-group discussion were conducted, and secondary data were used in this study. Data was summarized and analyzed to observe the significant difference and high confident correlation of these variables by using One-way ANOVA and Regression Analysis. The result of the study showed that rice and vegetable production is main sources of farmers in Samroung village. In addition, chemical fertilizer and pesticide are applied for increasing crop production. The amounts of chemical fertilizer and pesticides applied did not correlate with the level education of famers, also with the size of farmland as well ($P > 0.05$). In addition, the amounts of pesticide applied did not correlate with the total annual household income. However, the amounts of chemical fertilizer applied showed slight correlation with the total annual household income from agriculture ($P < 0.05$). Also, increasing expenses of agrochemicals application, especially chemical fertilizer application, affects to the farmer's annual income. Moreover, it affects to their life that depends on low income from their agricultural products. Furthermore, the survey indicated that 92% of farmer in the village want to change their practice to sustainable practice in the future. Therefore, agricultural education such as providing technical training, workshop is necessarily required for promoting sustainable use of agrochemicals as well as alternative ways based on organic farming practices and farming practice with low chemical input.

Keywords conventional farming practice, agricultural education, agrochemical application, Cambodia

INTRODUCTION

Cambodia is located in the Southeast Asia region, and its topography has enormous potential for agriculture development. Agriculture is vitally important for economic growth and eradicating poverty of the people. According to the statistics of Ministry of Agriculture, Forestry and Fisheries of Cambodia in 2009, agriculture productions share 34.4% of total GDP, in which rice and vegetable represented 54% and 8% of total annual crop production. Increasing crop productivity is

a main factor that increases farmer's income as well as national economy. In view of this, farmers apply agricultural chemicals, such as chemical fertilizers, herbicide or pesticide, to maintain high levels of crop yields. In 2001 chemical fertilizer and pesticide were imported into Cambodia, which represented 45,335 tons and 200 tons respectively (MoE, 2004). The tendency of agrochemicals application has been rapidly popularized in the country. In 2010, 245,854 tons of chemical fertilizer was imported into the country (MoE, 2010).

Kampong Cham province is a main agricultural development zone in Cambodia. The major activity of the people in this area is agriculture, mainly cultivating rice and vegetable. Agricultural history of this area tends to change from traditional farming to conventional farming, and the amounts of agricultural chemicals applied to farmlands are increasing every year. According to Ngo and Siriwattananon (2009) more than 60% of farmers in Prey Chhor district, Kampong Cham province, have applied agricultural chemicals without understanding their impact. Although agrochemicals utilization has significantly increased crop production, it has negative impact on human health, sustainability of land use and ecosystem.

This study has been focused on conventional farming practice in Samroung village of Kampong Cham province. The main objectives of this study are 1) to understand current situation of farming practices in the village and 2) to identify the condition of agrochemicals applied at farmlands.

METHODOLOGY

Study site

The study was focused in Samroung village consisting of 196 households in Samroung commune, Prey Chhor district, Kampong Cham province about 17 km from Prey Chhor Centre. Samroung commune consists of 11 villages with 8,111 people in 1,714 households which account for 93 % of total population, all of whom depends on agricultural sector, mainly on rice cultivation and cash crops for living (CDB, 2010). Most farmers in Samroung village cultivate rice and vegetable. The agriculture situation in the village converted from traditional practice to conventional farming system.

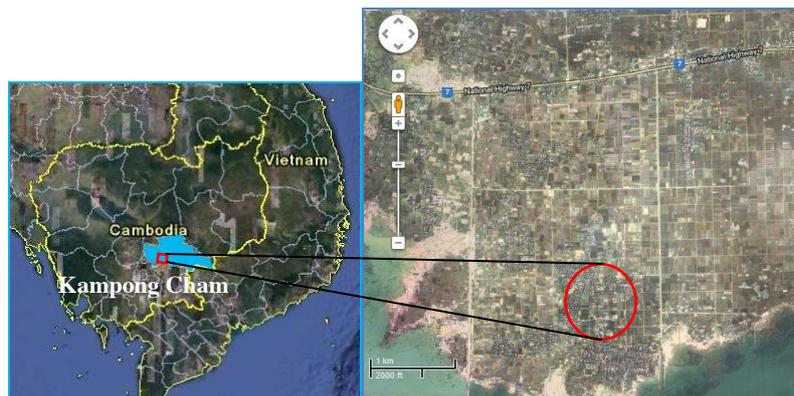


Fig. 1 Location of Samroung village

Data collection and analysis

Secondary data collection: Existing relevant documents were collected from research institutions, journals and reports of experts who had carried out studies in the project area to better understand the issues involved.

Primary data collection: Two steps were used in primary data collection. Firstly, focus group discussion was carried out among 7 key persons from the village. A semi-structured questionnaire (a) was used for key informant interviews; a structured-questionnaire (b) was designed for a

household survey on 51 farmers who were selected randomly for interview. This method focused mainly on socio-economic and agricultural situations of the households, cultivation techniques and farmers' perception on the tendency of converting from conventional farming to sustainable farming practices.

Data analysis: The data was summarized; and descriptive statistics, including percentages, mean and standard deviations were used to analyze the data. Also, inferential statistic, including One-way ANOVA and Regression Analysis were used to analyze the significant difference and high confident correlation of these variables.

RESULTS AND DISCUSSION

The current situation of conventional farming practices in Samroung village

According to the result of focus group discussion, it was included that rice is a main crop in Samroung commune and is cultivated 2 to 3 times a year. Besides rice cultivation, cash crops are cultivated rotationally for the whole year depending on the water sources. The main cash crops in the village are cultivated for additional income (Table 1). These vegetables are planted in 4 rotations at upland fields all year round, and a peak season of harvest is from August to October.

The results of the household survey showed that 63% of the households cultivate rice, 34% cultivates rice and vegetable, and 3% does not conduct farming. The average total paddy fields and vegetable fields are 1.5 ha (SD = 1.05) and 0.04 ha (SD = 0.08), respectively.

Table 1 Crop calendar in Samroung village

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1) Rice		
2) Onion		
3) Lettuce		
4) Chinese Kale		
5) Cucumber		
6) Chinese cabbage		
7) Bitter melon		
8) Long bean		
9) Tomato		
10) Eggplant		
11) Chili		

Source: ERECON, 2012

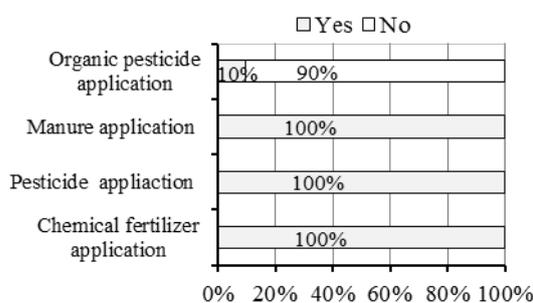


Fig. 2 Percentage of farmer's applying agrochemicals and organic materials

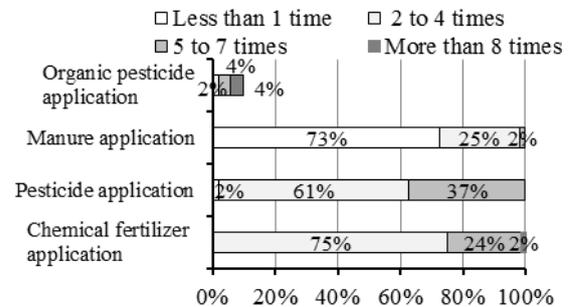


Fig. 3 Time of applying agrochemicals and organic materials

The result of study also showed that cow manure, compost, and waste from bio-gas are applied to improve soil condition as well as agrochemicals, fertilizers and pesticides to increase crop production. According to the result of the survey, 100% of famers in the village have applied chemical fertilizer, pesticide, and manure on both paddy fields and vegetable fields. Also, 10% of the respondents applied organic pesticide, and 90% does not apply organic pesticide (Fig. 2).

Besides, organic materials have been applied on their farmland such as manure with 8510 kg a year and only 10% of farmers applied organic pesticide with 44000ml a year. In addition, 75% of respondents applied chemical fertilizers with 2 to 4 times a year and 61% of farmers applied pesticide 2 to 4 time a year (Fig. 3). However, organic fertilizer and bio-pesticide is limited source for the farmers to apply on their farmlands. In addition, most farmers said organic pesticide is less effective than chemical one.

Markets of agricultural products in Samroung village

Main agricultural products, especially rice and vegetable are sold to the markets through middlemen who come from inside or outside the commune. The middlemen come to buy some kinds of vegetables almost all day. Some middlemen sell vegetables to local market such as Skun market, Prey Torteng market and Kampong Cham market or other markets in Siem Reap province. Before selling vegetable to the middlemen, farmers clean and sort their produce without grading by size and classification. In addition, some vegetable farmers are collecting the vegetable from their village and neighboring villagers and selling it to the local market.

The results of the survey showed that 98% of farmers in the village sell their rice production to the middlemen, and 93% of vegetable growers also sell the vegetable to the middlemen; only 7% bring their vegetable production to the local market directly (Fig. 4). In addition, price of the products depend on middleman.

The survey also indicated that price information sources of farmers in the village are obtained from the middlemen, farmers in the village, mobile phone, radio/TV and NGO officers, representing 62%, 16% and 10%, 6% and 4%, respectively (Fig. 5)

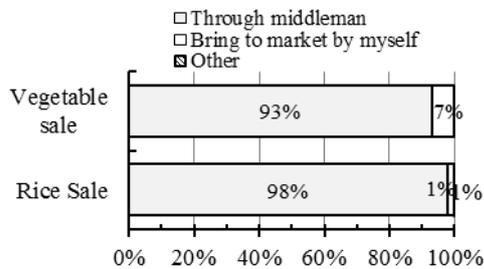


Fig. 4 Percentage of farmers' selling the agricultural products to market

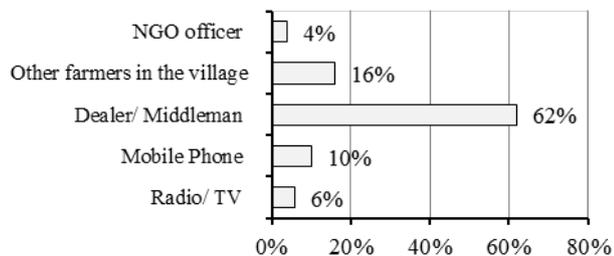


Fig. 5 Farmers' sources of price information for selling the products

Linkage between socio economic conditions and agrochemical application

The main indicators of socio economic such as the level of education, the size of farmland, and the total annual household income were selected to determine the significant difference of amounts of chemical fertilizer and pesticide application by using one-way ANOVA. Also, the relationship of each variable were analyzed by regression analysis.

An annual total household income is 606.93 USD (SD=55.20), and annual average of chemical fertilizer and pesticide application is 321.76 kg (SD=154.81) and 1.12 L (SD= 0.95) respectively. The result of analysis indicated that the amounts of chemical fertilizer and pesticides applied did not have significant difference between each level of farmer's education as well as size of farmland and total annual household income ($P > 0.05$). Moreover, the amounts of chemical fertilizer and pesticide application did not correlate with the level of education of farmers and with

the size of farmland as well ($R^2=0.0926$, $P > 0.05$). However, the amounts of chemical fertilizer application correlated slightly with size of farmland ($R^2=0.1913$, $P < 0.05$) as well as with total annual household income ($R = 0.1913$, $P < 0.01$) (Figs. 6, 7).

Fig. 8 showed that the total income from agriculture is not significant difference between each group of farmers' expense on chemical fertilizer application. As a result, it could be concluded that farmers need to buy chemical fertilizer very year to increase their crop production. Therefore, the annual household income from agriculture will be low if the farmers increase expense of agrochemical application every year.

Possibility of changing from conventional farming practice to sustainable farming practice

According to the result of the survey, 53% of respondents did not know about sustainable agriculture, and 39% knew less about sustainable agriculture (Fig.9). In addition, responding to the question "do you want to convert conventional farming to sustainable farming practice?" The results indicated that 92% of the farmers want to change to sustainable farming practice (Fig.10).

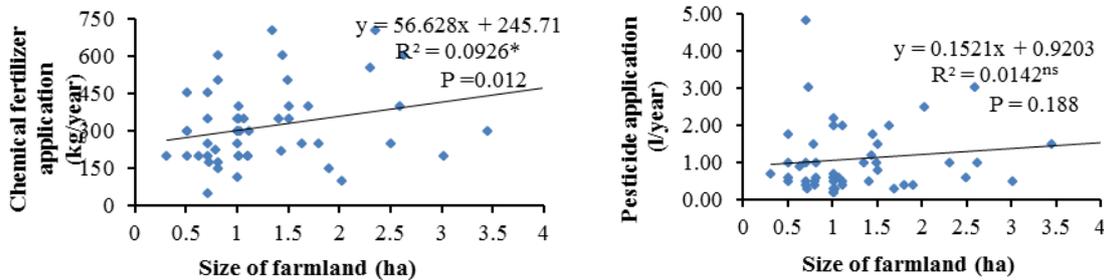


Fig. 6 Correlation of size of farmland with chemical fertilizer and pesticide application

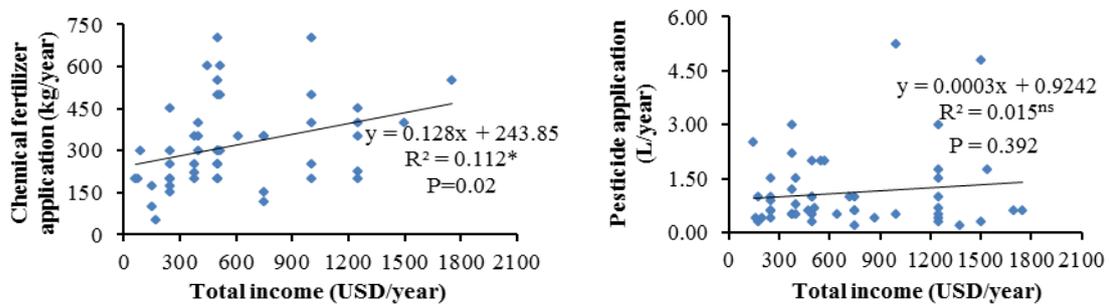
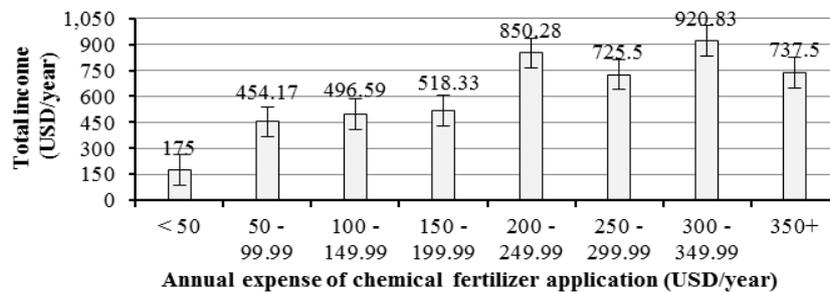


Fig. 7 Correlation of household income with chemical fertilizer and pesticide application



Non-significant difference between each group of annual expenses of chemical fertilizer application ($P > 0.05$)

Fig. 8 Comparison of annual expense of chemical fertilizer application and total income

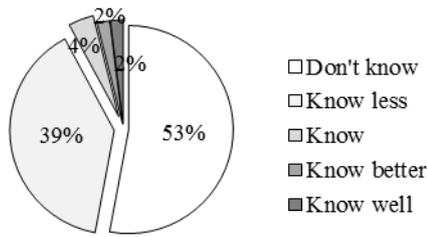


Fig. 9 Percentages of farmers know about sustainable agriculture practice

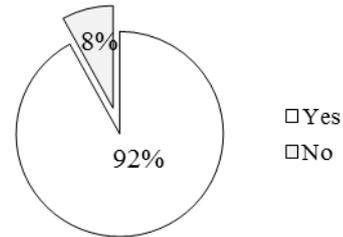


Fig. 10 Percentages of farmers want to change conventional to sustainable practice

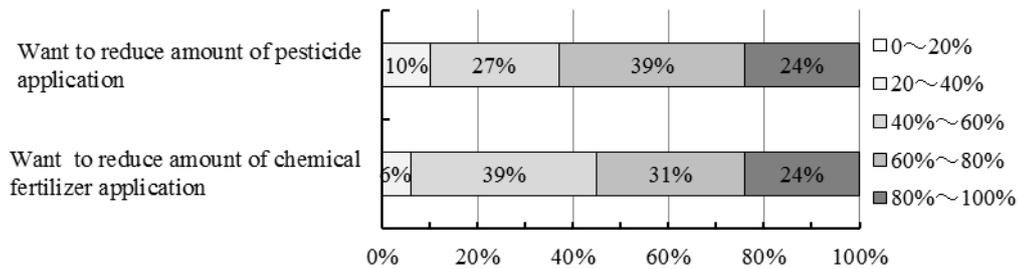


Fig. 11 Percentages of farmer want to reduce amount of agrochemical application

Figure 11 showed the expectation of farmers who wants to reduce chemical fertilizer and pesticide through alternative agriculture. 40% of respondents want to reduce chemical fertilizer by 40% to 60%, 30% wants to reduce by 60% to 80% and 23% wants to reduce by 80% to 100%. In addition, 40% of respondents want to reduce pesticide by 60% to 80%, 23% wants to reduce by 80% to 100%.

CONCLUSION

The study found that rice and vegetable production is main sources of farmers in Samroung village. In addition, chemical fertilizer and pesticide are applying for increasing crop production. The amounts of chemical fertilizer and pesticides applied did not correlate with the level education of famers, also with the size of farmland as well. The amounts of pesticide applied did not correlate with the total annual household income. On the other hand, the amounts of chemical fertilizer applied showed slight correlation with the total annual household income from agriculture. In addition, increasing expense of agrochemicals application, especially expense of chemical fertilizer application, affects to the farmer's annual income. Moreover, it affects to their life that depends on low income from their agricultural products. Furthermore, the survey showed that 92% of farmer in the village want to change their practice to sustainable practice in the future. Therefore, agricultural education such as providing technical training, workshop is necessarily required for promoting sustainable use of agrochemicals as well as alternative ways based on organic farming practices and farming practice with low chemical input.

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