

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study shows that 18% of the sugarcane farmers in my study area possessed high knowledge level on ISNM, while 60% of them belonged to medium level on ISNM and 22% of farmers had low level on ISNM. The farmers who had high and medium knowledge levels were familiar with the use and advantages of green manure, farmyard manure and compost, the advantages of intercropping with legumes, crop rotation, fallowing, composting and biocomposer, the amount, application time and methods of chemical fertilizers and micro-nutrients of sugarcane plantation.

According to thesis result, most of those with low knowledge level on ISNM did not adapt to ISNM practices while almost of farmers with medium knowledge level and all of farmers with high knowledge level adapt to ISNM practices. Therefore, government policy makers and agricultural extension officers should emphasize promptly on the cane farmers with low and medium knowledge levels.

Apparently, sugarcane farmers adapted a range of soil nutrient management practices such as inorganic fertilizer, biocomposer, FYM and crop rotation methods to improve soil fertility and sugarcane yield while they have not adapted other soil nutrient management practices like green manuring, composting, fallowing and intercropping technologies.

All sugarcane farmers practiced crop rotation with groundnut, sesame, and

bean, green gram after and before sugarcane plantation. Farmers were well aware that this practice could improve soil productivity and choose which crops to grow in rotation with sugarcane according to how they adapt to the soil and the rainfall pattern. Personal preference and economic considerations such as the price of the crop also influenced the farmers' choice.

The farmers in the study area did not adopt the following technology because they owned small scale plot area and it was difficult to fallow their land. Population is growing over the years and land holding sizes decline and fallowing technique becomes impossible. Application of compost manure for soil fertility improvement, was affordable and easy to make, however, compost was bulky and labor intensive.

Therefore, it was difficult to produce enough compost for large sugarcane plots and transport it to distant plots.

Use of FYM for soil fertility improvement was limited by the small livestock holding sizes in the study area. FYM was mostly used for rice. Green manure and cover crops had an important place in sugarcane plantation and their nutrient values could be considered as an external input to cane.

The positive and significant relationship between membership of farmers' organization and farmers' knowledge level about ISNM suggested that efforts should be made to encourage greater and longer membership of farmers' groups. Farmers' organizations provide farmers with information and technology. It is easier for government assistance to reach widely dispersed small holders when they organize themselves properly into coherent groups such as cooperatives and these also serve as media for wider and cheaper dissemination of information on new technologies.

The positive and significant relationship between farmers' participation in the

field demonstration and farmers' knowledge level about ISNM in the results indicated that field demonstration about ISNM should be practiced for disseminating ISNM and agricultural technologies to the farming communities, extension services, researchers, NGOs, local authorities and policymakers at different levels.

Having result of the positive and significant relationship between the level of experience of sugarcane farmers and farmers' knowledge level about ISNM, it would be expected that the longer a farmer had been operating, the more skills he or she would have acquired and the higher the knowledge would be. This study suggests that farmers' experience in sugarcane cultivation could provide farmers with certain knowledge to maintain soil fertility sustainability, to improve their family living and increase their sugarcane yield and successful farm operation.

The positive and significant relationship between the education level of sugarcane farmers and farmers' knowledge level about ISNM made the education of the rural farmers particularly necessary. The improvement of the literacy skills of farmers will improve their knowledge level. Education raises the cane productivity of farmers, increases the profitability of production and soil conservation technologies.

The positive and significant effect of extension contact on farmers' knowledge level about ISNM indicated that extension systems would be modernized and strengthened to increase farmer knowledge and understanding of mineral and organic fertilizer sources and other related technological options. The technology and information obtained from researchers is passed over the extension services which in turn disseminate to the cane farmers in the field.

According to the results of this study, the sugarcane farmers in study area accepted that sugarcane cultivation was a high risk crop with increases unit cost of

production. Thus, they were reluctant to grow sugarcane compared to other cash crops such as sesame, groundnut and green gram. It was difficult to compete to those crops with sugarcane by its low profitability. Moreover, they were not satisfied with the profit of sugarcane production.

So, it was concluded that the sugarcane farmer will be able to maintain the high yield and obtain reasonable profitability in sugarcane production by carrying out an adequate, balanced supply of nutrients and other soil nutrient managements.

Therefore, ISNM technology was feasible and profitable for cane farmers and was a strategy for higher cane productivity, prevents soil degradation, and there by helps to meet future food supply needs and economic status level.

5.2 Recommendations for low and medium farmers' knowledge level groups

According to the thesis results, about 22% and 60% of the selected sugarcane farmers belonged to low and medium knowledge level groups. Therefore, in order to upgrade their knowledge levels into the higher levels, the following recommendations are proposed.

Farmers' local organizations should be organized to access various sources to gain knowledge and information from public and private sectors and to share knowledge by implementing joint activity program with extension services. By entering as members of farmer organizations, these farmers could gain information and knowledge with farmer to farmer knowledge exchange and develop their farm experience and in addition improve their knowledge levels. Farmers' organizations and networks should be empowered with active involvement of farmers to share farming experience and information, to make their decision and to their problems by

mutual assistance and supporting.

Field demonstration is a long term learning activity conducted in farmers' fields to show a new technology or practices and educates cane farmers through results of researchers. Therefore, the cane farmers should be organized to participate in field demonstrations of ISNM technologies and practices to improve their knowledge levels. Local sugarcane farmers should be motivated and encouraged to participate in field demonstrations, field days, farmer field schools and they should be trained and strengthened to improve their knowledge level and to get techniques and information.

There are some weaknesses and limitations in the existing extension services, very little participation of farmers in local field demonstrations and absence of farmers' organizations. The study highlights that these facts are particularly the major driving forces of medium and high knowledge levels of farmers.

Therefore, agricultural extension stations should be revitalized and extension service would be modernized so that an effective transmitting system in which from research to sugarcane farmers to facilitate increased productivity and better application of modern sugarcane technology should be stated and a swift and active communication system of problems, news ideas and technology should be established with the sugarcane farmers in their fields.

5.3 Recommendations for all farmers' knowledge level groups

Based on the results and conclusions of this study, the following recommendations are proposed to improve soil fertility in the study area and sugarcane yield and sugar production of all sugarcane farmer knowledge level groups

in the study area.

To improve soil fertility in the study area, farmers should institute crop rotation systems using leguminous crops and soil fertility improving species. Additionally, extension staffs should put more effort in extending messages and information on integrated soil fertility management practices and the benefits of rotating crops and effective fertilizer application technology.

In order to achieve ISNM implementation, the combined efforts of farmers, researchers, extension agents, governments, and NGOs should be practiced. Providing chemical fertilizers and biocomposer by sugar mills is not enough to support ISNM implementation. The production cost and the return to the sugarcane farmers, expected trend of price of alternative crops, market structure and marketing channel, financial assistance to sugarcane farmers and the equity and equilibrium between sugarcane farmers and sugar mills should be taken account of to develop a sound sugarcane production system with ISNM implementation plan.

To develop the sugarcane yield and sugar production, improved sugarcane varieties are the backbone of Myanmar Sugar Industry. Therefore, the evaluation and selection of new varieties that are suitable for particular local conditions from both introduction and hybridization should be implemented. Sugarcane research and development centers seem to be very important and thus these centers and other outreach stations all over the sugarcane growing areas around Myanmar should be established and adaptive sugarcane researches and programs should be carried out.

5.4 Recommendation for further study

The study of the impact of different soil fertility improvement and nutrient

management practices on sugarcane yield and household income should be conducted to determine the possible technique that reduce the production cost and improve yield and profitability of sugarcane production. For the further study, the economic and technical efficiency of sugarcane production (where new plantation and ratoon) should be conducted to find out the factors affecting economic and technical inefficiency in sugarcane production.

Furthermore, it would be more interest to study the relationship between sugarcane farmers' knowledge and attitudes towards climate change and variability and the role of carbon on their sugarcane farms to investigate and benchmark the attitudes and knowledge of farmers towards climate change, climate variability and greenhouse gas emissions on their farming enterprises using system approach as demonstrated in this thesis.