INTRODUCTION

Intensive rice-soybean cropping system is widely practiced in the lowland irrigated areas of Northern Thailand. In the long term, soil productivity may decline as lands are used intensively for cropping but no proper replenishment of plant nutrients are developed. The yield decline in both farmers' field and in long term experiments has been reported (Rerkasem and Gypmantasiri, 1981) especially that in less fertile soils which are deficient in nitrogen and organic matter. Besides the depletion of nutrients, unfavorable physical changes occur in the paddy field due to puddling and soil compaction.

Soil productivity under such condition should be maintained by replenishing organic matter to the soil since organic matter not only provides nitrogen but it also improves the physical and chemical conditions of the soil. To replenish organic matter for maintaining soil productivity in this cropping system, an understanding of the available sources of organic matter, farmers' resources and environment, as well as the organic matter management of farmers are required. This knowledge will also assist in identifying the constraints and designing the alternative solutions for farmers. This study was initiated with informal and formal surveys followed by field experiment with three objectives:

To study existing farmers' management of crop residues and organic matter in rice-soybean cropping system in order to identify potential constraints in increasing soil productivity through organic matter replenishment.

To evaluate alternative sources of nitrogen for maintaining soil productivity of rice in rice-soybean cropping system.

To determine the contribution of crop residues and green manure on soil organic matter and N-uptake of two rice varieties.