Chapter 1

INTRODUCTION

The Northern mountainous region of Viet Nam, which is located at 21°N - 23°N and 103°E - 107°E, covers about 10.3 million hectare. Arable land is 1.5 million ha with 78 % as upland. The climate in the area is monsoonal, with high rainfall, mainly distributed during May to November. The population size is 11.8 million people (Statistic book, 1992). Most of them are ethic minorities which consist of about 43 groups.

Since these remote upland regions are unaccessible by modern mean of communication, the upland people have to continue their simple age-old practice of shifting cultivation or monoculture (Xuan, 1991). With increasing population density, land use becomes more intensive and results in shortening of fallow periods. At the same time, deforestation for increasing cultivated land in steep areas in high rainfall condition have led to increasing soil degradation and erosion.

In the region, upland rice, cassava, corn, sweet potato, peanut are commonly grown as monocropping. These existing farming practices are erosion prone and would not be able to provide sustained food production.

Due to the resource-poor condition of the farmers in the areas, a cropping pattern could be suitable if it includes, firstly, main food crops which are necessary for consumption and requires simple cultural practice that farmers can adopt easily. Secondly, it must maintain and enhance soil fertility.

Upon present conditions, domination of genetic diversity of plants should be taken into account under the low input conditions. Therefore, an alternative cropping systems for these areas which may generate high productivity as well as farmers' income and reduce soil erosion need to be evaluated.

In the agro-forestry system, hedgerow intercropping is considered to be a suitable conservation farming practice on sloping land in the tropical zone (Lal, 1986; Watson et al., 1988). Mixing of crops with brush woody trees (hedgerows) allows coexistence of both form of cultural practice, cultivating (crops) and fallow (brush woody leguminous trees). Simultaneously, it also permits superiority of diversified crops. In Viet Nam, some research was done on intercropping *Tephrosia candida* with cassava and leguminous crops which showed a high potential as providing *in situ* green manure and reducing soil erosion (Dau and Tien, 1987). However, incorporation of alley cropping in food crop based systems have not been studied. Competition between components of crops and hedgerow trees for resources is an important issue that need to be studied.

At present, however, the practice of aley cropping is still new to the area. The evaluation of various cropping systems with respect to the advantages of each system based upon two criteria: productivity improvement and soil conservation. The assessment of the combinations of crops with time and space will be necessary to make a scientific base for immediate policy implementation and further studies.

The objectives of this study are:

1. To measure the effect of hedgerows on soil conservation in various cropping systems.
2. To evaluate productivity and economic return of various cropping systems with and without hedgerows.