

CHAPTER 1

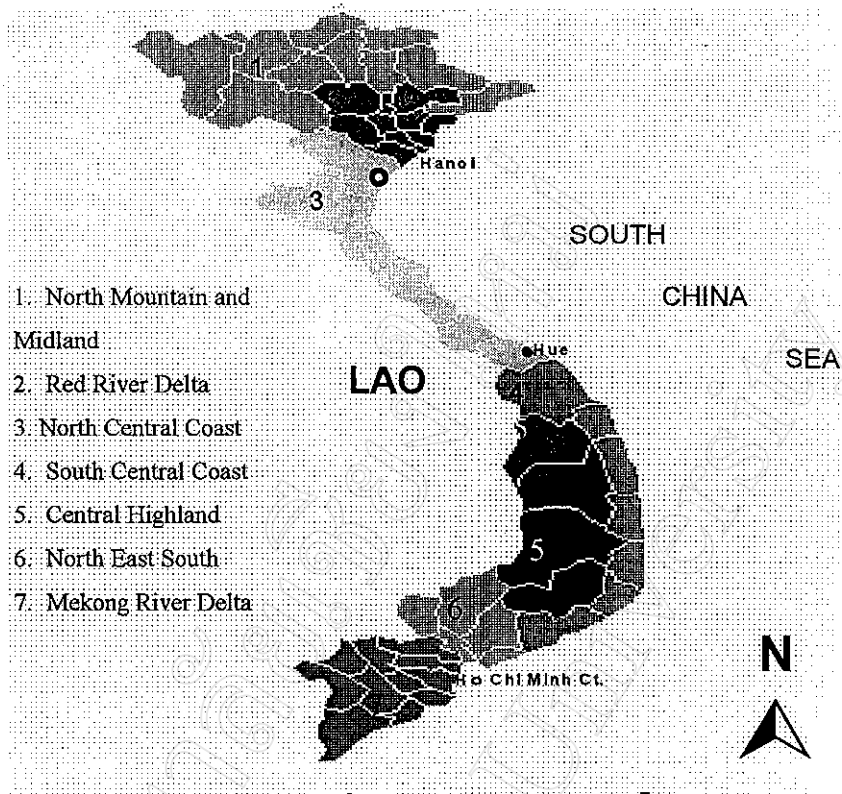
INTRODUCTION

Due to rapid increase in world population, nutrients requirement for human especially the requirement for protein has led to a significant problem for the socio-economic development of many developing countries in the world. Next to soybean (*Glycine max* L.), peanut or groundnut (*Arachis hypogaea* L.) is the second most important source of vegetable oil and protein at the global as well as the regional level. Peanut is highly efficient producer of protein and oil, both of which are very well adapted for the nourishment of humans and animals (Bunting *et al.*, 1985).

In Vietnam, peanut plays a very important role both in the nutrition of human and animals and as an important component of ecologically sound farming systems. This is especially so in central Vietnam where there are many problems associated with human malnutrition and soil degradation (Dau *et al.*, 1991). The planting area of peanut in the central Vietnam is 73% of total area of annual industrial crops. Since peanut is considered as essential crop both in human nutrition and in farming systems, the Vietnam government has set production plan which aim to achieve 280,000 ha under cultivation, with an annual growth rate of 3.2% during the year 1994 to 2000. Although the planting area of peanut had increased from 201,400 ha in 1990 to 269,400 ha in 1998 (General Statistical Office, S.R. Vietnam, 1999), however the peanut yield in the central Vietnam is still low. Therefore, peanut production does still not meet consumption requirements. Hence, efforts in research and development in order to improve yield per area of peanut were given high priority.

Thua Thien Hue province which is the representative of the central agro-ecological regions of Vietnam consists of three distinct dominant agroecological zones namely coastal sandy, delta plain and hilly zones (Figure 1). The hilly zone comprises approximately 329,609 ha occupying more than 70% of total land area in the whole region. In the province, most of the peanut growing area is located in the hilly zone. However soil in hilly zone is very poor in organic matter and plant nutrition. It is also low pH and is especially poor in both total phosphorous and available phosphorous resulting in low yield of crops (Cong, 1996; Phien and Vinh, 1997). The average yield of peanut in central Vietnam is 1.31 tons ha⁻¹. It is quite low as compared with Red River and Mekong River Deltas which have an average peanut yield of 1.51 tons ha⁻¹ and 1.96 tons ha⁻¹, respectively (General Statistical Office, S.R. Vietnam, 1999). Generally, peanut yield in Vietnam is very low achieving only about 20-60% in comparison with the average yield in the developed countries in the world. It was reported that low peanut and soybean yield in Asia was due to soil nutrient limitations, especially phosphorous deficiency (Mc William *et al.*, 1986, Syarifudin and Darimijati, 1987). Phosphorous fertilizer and lime were reported with high potential to increase peanut yield (Pandey and Mc Instosh, 1988). However, the magnitude of responses of crops to phosphorous application and lime are different and determined largely by soil conditions.

In Thua Thien Hue province, few farmers started to incorporate various crops in their farming systems in which peanut plays an important role in terms of household income as well as hilly soil fertility improvement. Peanut is an important component of the cropping systems in 80 countries where it is planted either as mono-crop, inter-crop or relay crop on 20 million hectares of land (Rao, 1980).



Source: UNFPA Vietnam, 1991

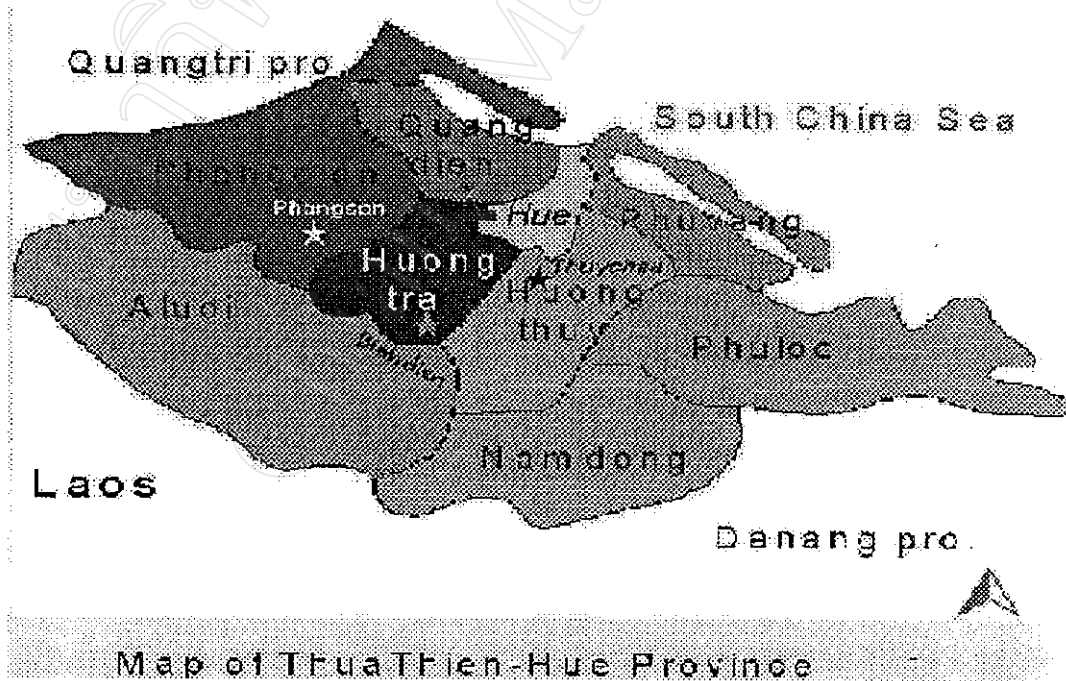


Figure 1: Agroecological regions of Vietnam and study site at Thua Thien Hue province

In some cropping systems such as peanut – rice, peanut - cassava, peanut – sweet potato – sweet potato, phosphorous fertilizer and lime application for peanut may reduce nitrogen requirement for the next crop. Because legumes have benefit effects on soil fertility by improving nitrogen and organic matter status in the soils (Whyte *et al.*, 1969). Although peanut appearance in some cropping patterns has resulted in high gross margin and soil fertility improvement, but it has been considered as a minor crop in cropping systems and its growing area was only utilized the remaining bare land. Therefore, intensification level and advanced technology applying for peanut is still limited. Hence, increasing rate of average peanut yield in the province is still low as compared with other crops i.e. rice, corn and other legumes. Besides adverse climatic conditions, mismanagement of farmers' practices, there remain important problem which potentially lead to low yield of peanut is the application of unbalanced proportions of chemical fertilizer (eg. low phosphorous fertilizer with high nitrogen fertilizer and low lime amount application for crops). Thus, managing phosphorous fertilizer and lime in peanut planting area in the hilly zone aim to enhance its yield and improve income for hilly people which is the necessary work. So far, researchs on critical levels of phosphorous and lime in the soil for enhancing peanut yield is still limited in central Vietnam. Therefore, this study is intended to evaluate of effect of phosphorous fertilizer and lime on peanut yield improvement in the hilly zone of Thua Thien Hue province in Vietnam. The objectives of this study are:

1. To investigate current farmers' practices in peanut production in the hilly zone of Thua Thien Hue province.

2. To examine responses of peanut to lime and phosphorous fertilizer application levels in hilly zone conditions.
3. To evaluate the effectiveness of lime and phosphorous fertilizer in improving yield and economic return from peanut.