

CHAPTER 1

INTRODUCTION

There are seven different agro-ecological regions identified as Mountain region of Northern Vietnam, Red Delta region of Northern Vietnam, Northern region of Central Vietnam, Southern region of Central Vietnam, Western high plateau region of Vietnam, Eastern region of Southern Vietnam and Mekong Delta region of Southern Vietnam. Of which Northern region of Central Vietnam has high population which depend on mainly agricultural production. Living conditions are considered as low standard. It stretches from Thanh-Hoa to Thua-Thien-Hue province (Figure 1). This region has the highest annual rainfall and its rainy season begins from September to February of following year. Thua Thien Hue province is considered as economic, agricultural presentation of the region with a vast hilly area. Geographically, Thua Thien Hue is divided into three distinct agro-ecological zones, which are coastal sandy soil, delta plain and hilly, mountainous zone (Figure 1).

In general, arable land in hilly zone is poor in fertility and lack of irrigation (Cong *et al.*, 1992). Cassava-sweet potato cropping systems are popular in the zone. Because of vulnerable market, low price and other causes, cassava and sweet potato production proved a poor economic efficiency. Besides, planting cassava and sweet potato often lead to soil degradation, and soil erosion, thus lead to decreasing its yield and low living standard for farmers in the zone (Vinh and Phien, 1997). Therefore, improvement of cassava-sweet potato cropping systems is necessary in order to enhance soil fertility as well as farm income.

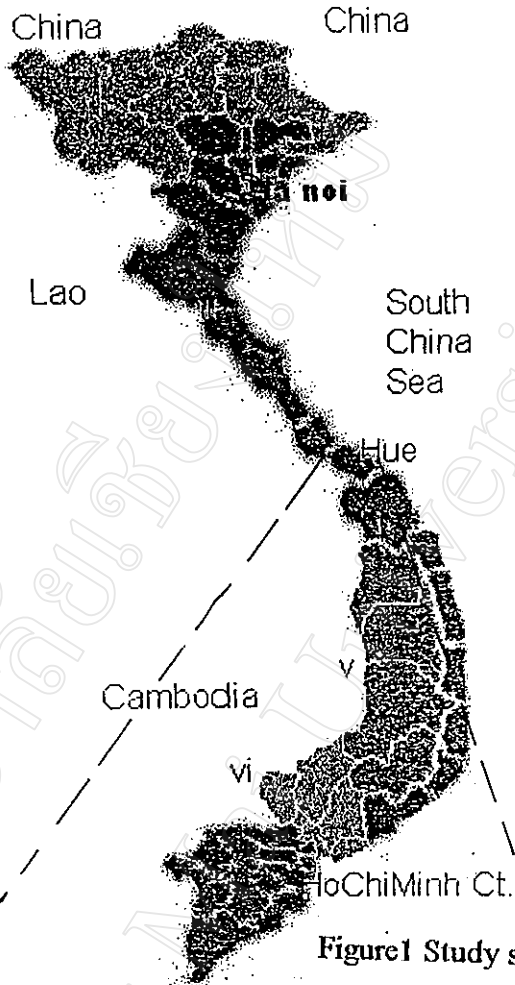
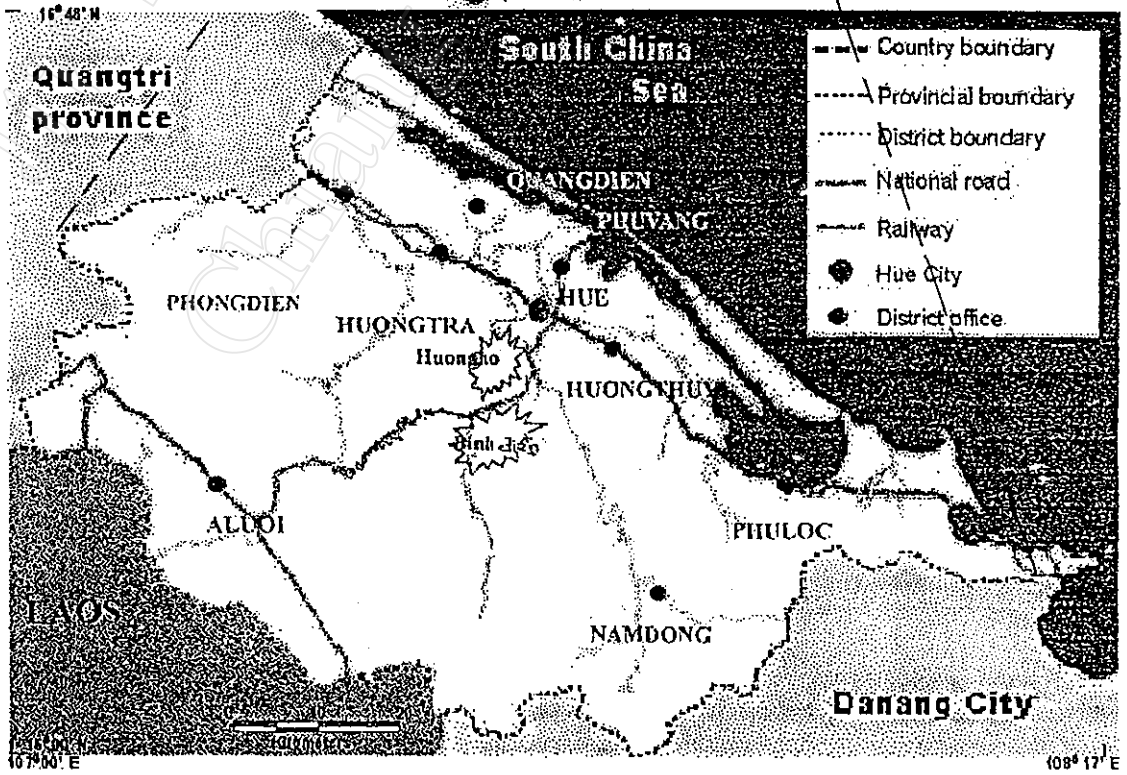


Figure 1 Study site, Thua Thien Hue Province



In fact, many farmers have started to incorporate various crops in their farming systems, of which mungbean is one of the common crops chosen. It was reported that mungbean growing area in the zone has been increasing yearly. It was estimated that mungbean growing area was 1,414 ha in 1990 and was double to 2,141 ha in 1996 (Hue Statistical Office, 1997).

In Vietnam, mungbean is one of the common sources of protein for the people and is traditionally planted by small farmers. Most of mungbean produced in Vietnam is consumed domestically. The most common usage of mungbean is cooked bean, sprouts which are consumed daily. It is also used as noodles, baby powder food, sweets, candy and also used as animal feed (Quyen, 1988). In addition to nutritional value, diversified role of mungbean in cropping systems is also recognized. Actually, mungbean is grown as a sole crop in marginal land. It is also grown as rotation crop, inter-crop, relay crop. Thereby, mungbean is presented in farming systems to increase productivity per area unit, to improve soil fertility, and to reduce the incidences of soil born diseases as well as to use their residues after harvest as a valuable source of animal feed (Quyen, 1988). However, mungbean average yield in the hilly zone is very low in which its yield was 0.36 ton per hectare in 1990 and 0.5 ton per hectare in 1996 (Hue Statistical Office, 1997). Its average yield was quite low in relation to national average yield which was 0.6-0.8 ton per hectare (Quyen, 1988). Therefore, efforts in research to enhance mungbean yield are essential in the region.

In the hilly zone, mungbean have to survive on rather poor arable land, in which majority is Yellow-Red-Ferralitic soils (Acrisols), with exception of those grown in cropping systems with major crops. According to Cong *et al.*, (1992) soil

fertility in hilly zone is very poor, especially available phosphorous is 2-4 ppm. While the critical value of soil for mungbean is approximately 8 ppm (Claimon, 1988). This means that soil in the hilly zone has available phosphorous deficit from 4-6 ppm for mungbean production. Therefore, phosphorous fertilizer application might be probably key solution for mungbean yield improvement.

Actually, phosphorous is essential for plants because of its role in vital life processes. It also has a significant role in sustaining and building up soil fertility. Unlike nitrogen, which can be recycled to the soil by fixation from air, phosphorous once removed from the soil by crops or by erosion, runoff, or leaching cannot be replenished except from external sources (Sanyal and de Datta, 1991).

However, the magnitude of response of crop to phosphorous application is different and is determined largely by soil conditions (Rochaiyati *et al.*, 1987). Claimon (1988) also revealed that response of mungbean to rock phosphate change with soil texture and degree of soil acidity.

In Vietnam, there was no study on phosphorous application on growth and yield response of mungbean particularly in the hilly zone. Thus, this study was conducted in order to determine suitable phosphorous fertilizer application for mungbean in the hilly zone which objectives are:

- (1) To investigate current farmers' practices on mungbean production in the hilly zone.
- (2) To characterize soil properties in the farmers' mungbean fields.
- (3) To determine proper phosphorous fertilizer level for mungbean production in Yellow-Red- Ferralitic soils (Acrisols).
- (4) To evaluate costs and benefits of phosphorous fertilization.