

## **CHAPTER IV**

### **THE STUDIED SITES**

#### **4.1 Location, climate and natural resources**

##### **Location**

The four communes selected for this study were Hongha, Hongtien, Binhthanh and Huongho. By administration, Hongha commune belongs to Aluoi district and the other communes to Huongtra district. The four communes are located to the West of the central market of Thuathien-Hue Province, Hue City, and dispersed at about 12 km between adjacent communes. Hongha is located at  $107^{\circ}20'E-16^{\circ}17'N$ , about 58 km from Hue city. Hongtien, Binhthanh and Huongho communes are located at  $107^{\circ}24'E-16^{\circ}19'N$ ,  $107^{\circ}29'E-16^{\circ}21'N$ ,  $107^{\circ}32'E-16^{\circ}26'N$ , respectively. Huongho is a suburb of Hue city, about 15 km from Hue (Figure 5)

##### **Topography**

In general, the slopes of the upland area of the North Central Coast are very steep. The altitude ranges from about 1000 m above mean sea level high West of Aluoi, on the Lao boundary, to 17 m high in the delta area, in a distance of less than 70 km. At the four studied communes, Hongha's altitude is 500 m high, 378 m at Hongtien, 225 m at Binhthanh and 180 m at Huongho.



Figure 5. Location of the studied sites

The gradient of the upland area of Thuathien-Hue province slopes from the West to the East creates a watershed of many short and steep rivers to the sea. The average slope of the inhabited areas ranges from 8 to 15 degrees. Forest or bare land is distributed at more than 15 degrees. Slash and burn fields are usually found in this area. The slope at Hongha commune ranges from 15 to 20 degrees for the inhabited areas, croplands and paddy fields are located in small valleys near the water resources among the hills and high mountains (see transect map in Figure 6)

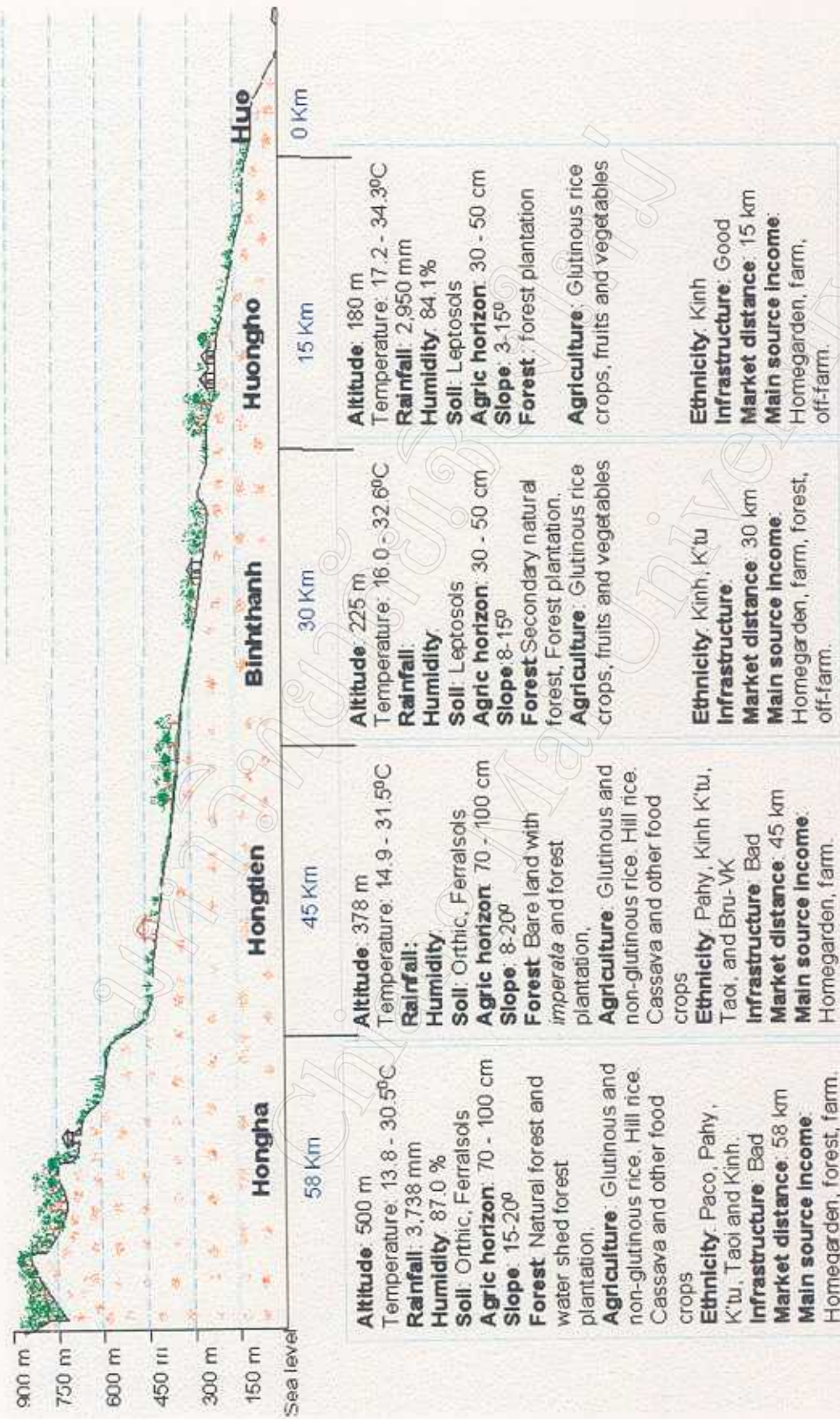


Figure 6: Transect map of the studied sites



### **Brief description of the studied communes**

#### *Hongha*

Hongha commune is an upland ethnic minorities commune. There are 5 villages, Kanton, Pahy, Konsam, Puring and Arom where 5 ethnic groups Paco, Pahy, K'tu, Taoi and Kinh are settled. Hongha was founded in 1963. Total land area is 30,000 ha in which rock mountain land occupies 25.019 ha, 873.6 ha watershed natural forest, and 742 ha watershed forest plantation. Main transportation system is national road No. 49 from Hue city to Aluoi (National road 14). (See Figures 5 and 6)

#### *Hongtien*

Hongtien is an ethnic minorities upland commune which was founded in 1975 under the National programme on New Economic Zone (NEZ). Five ethnic groups, Pahy, Taoi, K'tu, Bru-Vankieu and Kinh were settled on 4,431 ha. There are no natural forests in Hongtien commune. The main transportation system is national road No. 49 from Hue to Aluoi. Distance from Hongtien to Hue is 45 km. (See Figures 5 and 6)

#### *Binhthanh*

Binhthanh is a Kinh commune, which was founded in 1975 under NEZ programme and about 30 K'tu households resettled in Binhthanh in 1996 from Huongnguyen village. The mains off-farm activities are forest production collection such as timber exploitation, rattan, charcoal and aquilaria (*Aquilaria crassna*). Main

transportation system is national road No 49 and Huong river to Hue. (See Figures 5 and 6).

### *Huongho*

Huongho is the Kinh commune and was founded in 1856. Homegarden practice is one of the main agriculture in this commune. Huongho homegarden products supply fruits to Hue and other cities in the country and for export. (See Figures 5 and 6).

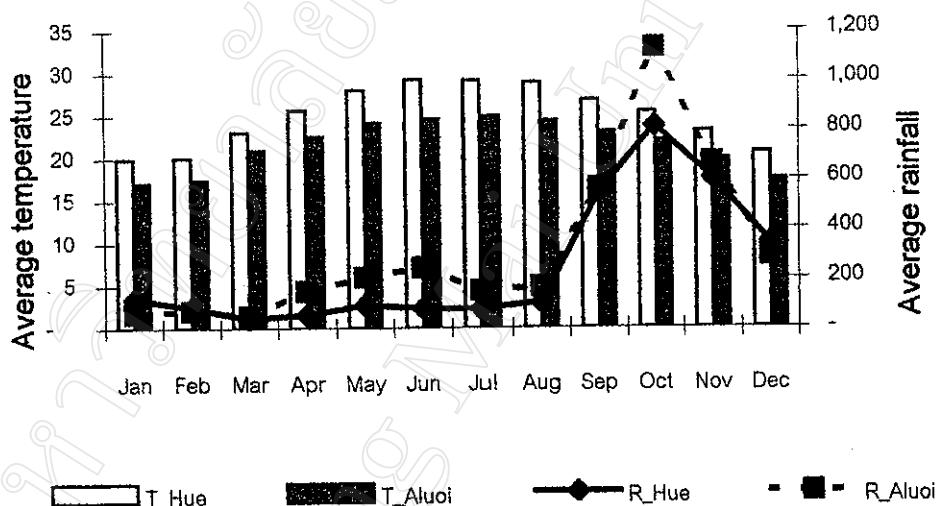
### **Forest area**

Twenty-five years ago, the studied areas were covered by dense tropical forest with woods of *Erythrophloeum fordii*, *Sindora cochinchinensis*, *Tarrietia javanica*, *Hopea pierrei*. Wild animals such as elephant, tiger, bear, deer ... were found. For the last fifteen years however national forest has been over-collected, and hence, has been significantly reduced. In order to reverse this trend, the government has undertaken many programs of forest plantation to recover bare land in the upland areas.

### **Temperature**

Meteorology and hydrography data were collected from the National Department of Meteorology and Hydrography (NDMH) from 1960 to 1989 and Thuathien-Hue Statistic Year-book (TTHSY) from 1990 to 1997. All the information on meteorology was collected from two weather watching stations at Hue (107,41E-16,24N-17.00m) and Aluoi (107,25E-16,12N-550.00m).

Annual average temperatures at the studied sites is not high; 25.0°C at Hue and 21.5°C at Aluoi. The hot season stretches from April to the end of September, with the highest temperature months in June and July with 29.2°C at Hue and 24.9°C at Aluoi. The cool and cold season runs from October to March. The coldest month is January; with 20.0°C at Hue and 17.2°C at Aluoi. The monthly temperature gradient is 7-10°C, with temperature thresholds from 34.3°C to 17.2°C at Hue and 30.5°C to 13.8°C at Aluoi (Figure 7).

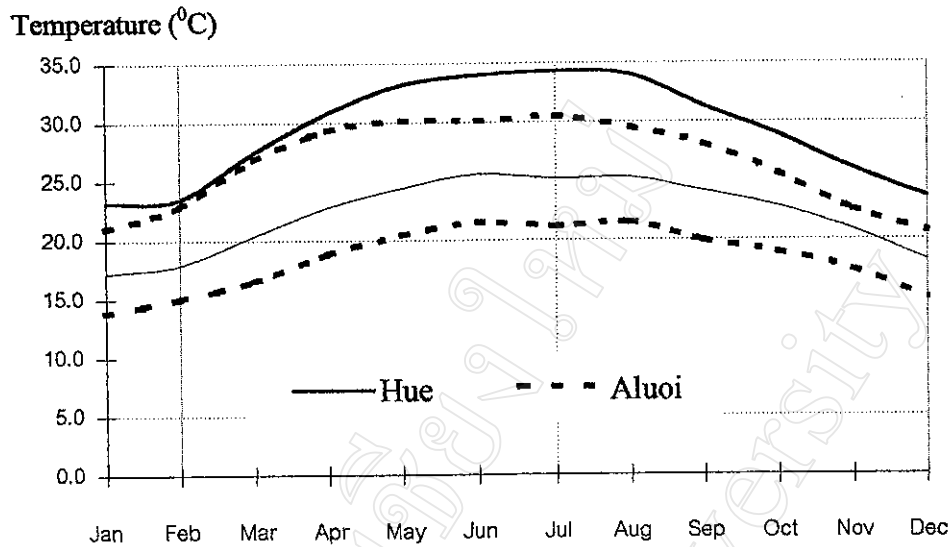


**Figure 7. Monthly average temperature and amount of rainfall from 1960 to 1997**

*Note: T\_ : Average temperature; R\_ : Average rainfall*

*Source: NDMH, 1989 and TTHSY, 1990-1997.*

These thresholds allow almost all the traditional species of trees and crops in homegarden, advantageous growth and development throughout the year (Figure 8).



**Figure 8. Monthly temperature threshold at Hue and Aluoi from 1960 to 1997**  
 Source: NDMH, 1989 and TTHSY, 1990-1997.

### Rainfall

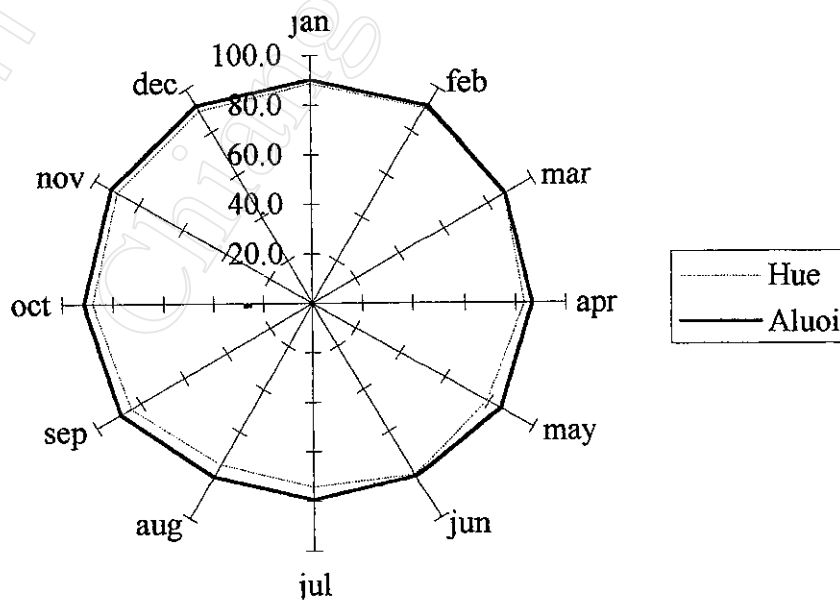
Figure 7 also illustrates the monthly amount of rainfall. In general, annual rainfall in the North Central Coast is higher than six other ecological regions of the country. This region has two main seasons in a year, rainy season and dry season. Annual rainfall at Hue is 2,950 mm and 3,738.4 mm at Aluoi. Rainy season runs from September to the middle of December. In this season, the amount of rainfall totals 71 – 78 % of the annual amount. The highest amount of rain occurs in October, 813.2 mm at Hue and 1,127.4 mm at Aluoi. The dry season runs from January to the end of July. However in early May there is an early rainfall (*tieuman*: small rainy). The dry month is March with only 39.1 mm at Hue and 50.2 mm at Aluoi.

## Humidity

Humidity in the North Central Coast is quite high. Annual average humidity is 84.1% at Hue and 87% at Aluoi. The highest humidity months occurs in February with about 90.7% and in November with about 92.5%. The lowest humidity month is July with 74.2% at Hue and 79.3 at Aluoi (Figure 9).

## Soils

The predominant soil sub-type in the four studied communes are Orthic Ferralsols (Cambisols) of the major soil grouping Ferralsols (Binh, 1996; Linh and Binh, 1995) (Soil classification FAO-UNESCO) or Oxisols (USA) (DST, 1993). The main problem of this sub-type is that it is an acidic soil, poor in nutrients. Orthic erralsols (Cambisols) are a yellow red soil on micaschist, metamorphous stone or acidic magma.



**Figure 9. Monthly average humidity data from 1960 to 1997**

*Source: NDMH, 1989 and TTHSY, 1990-1997*



This soil sub-type covers up to 30.3% of the natural area of the country, 10,130,000 ha (Linh and Binh, 1995) and is distributed largely on the upland areas of Vietnam. In the North Central Coast, Orthic Ferralsols cover 2,316,639 ha (Binh, 1996). Fluvisols (fluvents, USA) are distributed on the banks of streams, valleys and the foothills. Agricultural land takes advantage of these areas. Leptosols (lithic leptosols) appear more in the forest and bare land areas at Binhthanh and Huongho. Some leptosols areas are also recorded at Hongha and Hongtien. The agric horizon is quite thin at Huongho and Binhthanh, from 30 to 50 cm deep. However, 30% of the surveyed homegardens have soil horizons deeper than 100 cm. The agric horizon at Hongtien and Hongha is deeper, at 70-100 cm thick, and in some places, the epipedon is deeper than 150 cm. Stoniness is 30-50% at Hongtien and Binhthanh at 0-50 cm deep in the epipedon.

## 4.2 Demographic

### Population

The total population at Hongha is 1,085 people, 703 people at Hongtien, 2,600 people at Binhthanh and 8,668 people at Huongho. Population densities at the four communes are 0.036, 0.343, 0.371 and 2.821 persons/ha for Hongha, Hongtien, Binhthanh and Huongho respectively. Meanwhile, Thuathien-Hue's population density is 2.11 persons/ha (Thuathien Hue statistic office, 1998) and the country's population density is 2.23 persons/ha (General statistical office, 1996). As with other rural areas of at the North Central Coast region, the sizes of households are big. There are three generations in the house including grandparents, parents and children.

Family size at Binhthanh is the highest, at nearly 8 persons per household. However, labour power in each household is not high, with only 50% of the persons in the family between the ages of 16 to 65. The main problems of population and land resources at the studied sites can be seen by the population density. Population density at Huongho is very high, at 2.8 persons/ha while the population of whole country is about 2.6 persons/ha (General statistical office, 1996) (Table 1).

**Table 1. Population profile at the four studied communes**

	Hongha	Hongtien	Binhthanh	Huongho
Population (person)	1,085	703	1,852	8,495
Pop. growth rate (%)	1.80	1.78	1.78	1.75
Labour	560	400	921	4,810
Land area (ha)	30,000	4,431	7,000	3,073
Pop. Density (per./ha)	0.036	0.343	0.371	2.821
No. of household	183	134	250	1400
Household size	5.9	5.2	7.9	6.1

*Source: TTHSY, 1997 and field survey, 1998.*

### **Education Status**

The education system in Vietnam has three levels, primary school for grade 1 to 5, secondary school for grade 6 to grade 9 and high school for grade 10 to grade 12. Every commune in the upland area of the North Central Coast has primary school. Moreover, in crowded communes, there are 2 to 3 primary schools as in Binhthanh and Huongho. Secondary schools are established for 3 or 4 communes in the inhabited area. At the studied communes, Huongho has 2 secondary schools for children in the commune and other neighbouring communes. In the other three communes however, there are no secondary schools, so the children have to go to

study in other commune or in Hue City. All high school pupils have to study at Hue City. However, older people who are the decision-makers in the household, have limited education, although they do possess experience.

Education status depends on location, age, and ethnic group. According to the annual report of the local Community People's Committee, 25% of pupils continued to study at secondary school and 10% then followed to high school. Almost all the homegarden leaders in Hongha and Hongtien did not attend primary school. By comparison in the lower land, 80% of household leaders in Binhthanh finished secondary school. The other 20% were older than 60, but also finished primary school. Local farmers in Huongho had highest education level of the four studied communes. Fifty percent of samples finished high school, while all of them finished secondary school. In particular, Kinh people had greater opportunity to study than any other ethnics in the studied communes. Bru-Vankieu, the high mountain ethnic group, having moved to Hongtien commune in the year 1987 were far less educated. Most of the old generations did not attend any education grade but they can speak the popular language and some are fluent in the common Lao languages.

#### **4.3 Infrastructure**

In the upland area of the North Central Coast, the transportation and communication system is fairly well developed in the lowland areas but less so in the upland areas, where only a national road runs through the provinces from North to South. Provincial transportation and communication connect the district towns to the provincial cities. In Huongho, the suburb commune, the road to the commune is very

good but Binhthanh, Hongtien and Hongha communes face the big problem of a poor transport and communication system. Output from agricultural products meets the difficulty of transportation to the market place. Local markets were therefore founded at Huongho and Binhthanh. But at Hongtien and Hongha, no markets were founded. The main reasons were that ethnic people, especially, ethnic minorities of the North Central Coast, are not accustomed to markets. They still practiced the self-sufficient economy. Homegardens, forest and hill fields could provide for their daily needs. However, for some years now, homegarden and forest products have been sold to middlemen from the lowlands but for lower than the real price.

#### **4.4. Land use pattern**

##### **Land use type**

There are five types of land use in the studied areas. They are agricultural land, forestland and rural residential land, land for specialised use and unused land.

Agricultural land is the land designated primarily for use in agricultural production such as crop cultivation, animal husbandry, aquaculture, or experimental research on agriculture (NASRV, 1993).

Forestry land is the land designated primarily for use in silviculture production, including land with natural forest, land under afforestation, and land used for forestry purposes such as afforestation, forest nursery, protection for natural rehabilitation, forest enrichment and experimental research on silviculture (NASRV, 1993).

Rural residential land is the land designated primarily for housing construction and projects servicing rural activities. Residential land of each rural household includes land for housing construction (living land) and other works servicing the family life (NASRV, 1993). However, in this study, rural residential land includes homegarden land and living land. In fact, homegarden, as mentioned in the literature review, is garden land around the house. Difference to agricultural land and forest land which are allocated by government to people as rented land with specified time, residential land include homegarden land is allocated to household. Owners of the residential land shall be entitled to exchange, transfer, lease, inherit, mortgage the land use right. The State shall protect the legal rights and interest of the land uses (NASRV, 1993). On other hand, the land user would be responsible for the protection, improvement, and effective use of land; for fulfillment of all cadastral procedures, payment of tax on transference of land use right and other payments are in accordance with legislative regulations (NASRV, 1993).

Land for specialised use is land designated for purposes other than agriculture, forestry and residential purposes. It includes land used for the construction of projects in the realms of industry, science and technology, transports, irrigation, dykes, socio-culture, education, health, sports, public services; land for national defence and security; land for exploration and exploitation of mineral resources, rock, sand; land for salt production, land for the production of porcelain, bricks, tiles and other building materials; land of historical heritage, cultural relics and picturesque landscapes; land for cemeteries, and land with water surface used for purposes other than agriculture (NASRV, 1993).

Table 2 shows the land use distribution in the four studied communes. In particular, the table indicated that although the total land area at each commune in the upland area is high, the area under agriculture is very low: 0.55% at Hongha, 4.94% at Binhthanh, 9.07% at Hongtien, and 12.66 % at Huongho. Number of person per ha of agricultural land was 6.5 at Hongha, 1.8 at Hongtien, 4.6 at Binhthanh and 21.8 at Huongho. On average, agricultural land occupies 6.81% of the total area. Meanwhile, land under forestry is 50.50% and unused land is 27.71%, on average. In particular, forestland occupied 88.38% at Hongha and 75.26% at Binhthanh. Unused land also occupied large areas in upland areas, about 49% at Huongho.

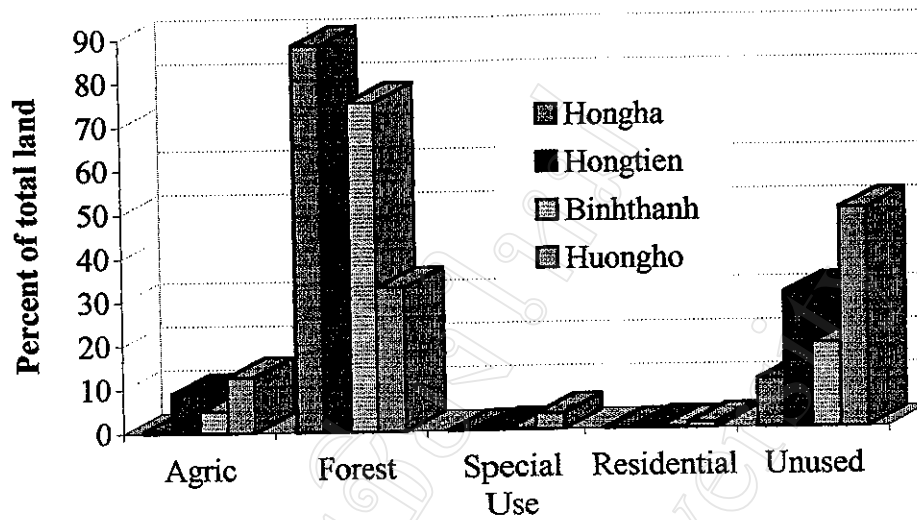
**Table 2. Distribution of land use types at studied areas (ha)**

	Hongha	Hongtien	Binhthanh	Huongho
Total land area	30,000	4,431	7,000	3,073
Agricultural land	166	402	346	389
Forestry land	26,515	2,623	5,268	1,011
Land for special use	10	20	16	109
Residential land and homegarden	8.8	22.0	25	34.6
Unused land	3,300	1,362	1,345	1,533
Population	1085	703	1852	8495
Person/ha agri. land	6.5	1.8	4.6	21.8

*Source: TTHSY, 1990-1997.*

In brief, there were not enough agricultural lands for agricultural production. As presented at the beginning of this chapter, most of the upland areas of the North Central Coast are watershed areas and complex landscapes, enlargement of agricultural land is an impossible strategy in this region. Local people could however, improve their living standards by increasing exploitation of forest products, intensifying farming, or improving productivity in their homegardens.





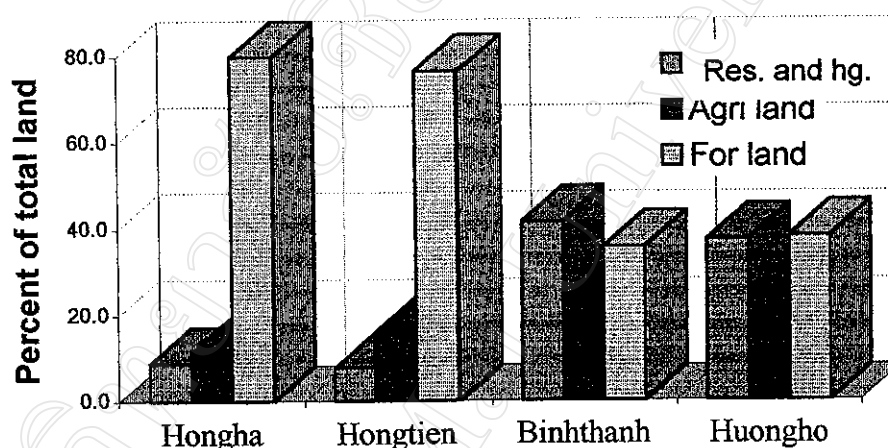
**Figure 10. Distribution of land use at the studied sites**

#### **Land ownership**

Usually, homegarden farmers own their garden land that was either inherited from their ancestors or allocated by the government as new economic zone (NEZ) communes. Residential land can be stable and long-term. While use of agricultural and forestry land has time frame, up to 20 years for agricultural land and 50 years for forest land (NDFA, 1994). There are two types of homegarden in the studied sites, those at the old communes of Hongha and Huongho and those at the new economic zone (NEZ) communes of Hongtien and Binhthanh. The land holding size of households in the studied communes are shown in Table 3.

**Table 3. Average area (m<sup>2</sup>) of land tenure at household level**

Community	Residential and homegarden land	Agricultural land	Forestry land	Total
Hongha	1,805	2,306	16,375	20,486
Hongtien	3,778	7,856	37,875	49,509
Binhthanh	4,064	2,250	3,500	9,814
Huongho	2,503	1,656	2,563	6,722



Source: Field survey, 1998

**Figure 11. Average farm size for different types of land use**

On average, the land area per household at Hongha is highest, at more than 2 ha and lowest at Huongho, at 0.67 ha. However, the main type of land tenure is forestry. Local forest administrative offices allocate forestland to farmers for plantations. According to land law and degree 02/1994, local farmers will own their forests in 50 years. Agricultural land and residential land including homegardens at those communes are very low. The minimum size of land ownership is about 0.20 ha at Hongha and Binhthanh, 1.23 ha at Hongtien and 0.13 ha at Huongho. The maximum land ownership is 12.60 ha at Hongtien and lowest also at Huongho at 1.91

ha (Table 4). Area gradient of used land per household in the upland areas is large from 5 to 10 times from the minimum data to maximum data.

**Table 4. Size (m<sup>2</sup>) of the total land holding at the studied sites**

Community	Min	Max	Mean
Hongha	1,990	54,010	20,486
Hongtien	12,350	126,050	49,509
Binhthanh	2,060	26,120	9,814
Huongho	1,330	19,160	6,722

*Source: Field survey, 1998.*

According to the General Statistical Office (1996) (See Table 5), the average used land of households in the whole country is 5,381m<sup>2</sup>, but specially, 4,707m<sup>2</sup> per Kinh ethnic household and 10,115m<sup>2</sup> per other ethnic group household. Living land for households is 378m<sup>2</sup> for the whole country, 369m<sup>2</sup> for Kinh people and 441m<sup>2</sup> for other ethnic groups of which, homegardens occupy 205m<sup>2</sup> for the whole country, 195m<sup>2</sup> for the Kinh and 278m<sup>2</sup> for the others. Agricultural land per household is 4,143 m<sup>2</sup> for the whole country, 3,818 m<sup>2</sup> for the Kinh, and 6428 m<sup>2</sup> for the other ethnic groups. As for the characteristics of the landscape, the upland ethnic groups have more forestland than the Kinh people, at 2,317 m<sup>2</sup> compared with 239 m<sup>2</sup>, whereas for the whole country there is 489 m<sup>2</sup> per household.

**Table 5. Average land use in whole country and ethnic distribution**

Land use	Square (m <sup>2</sup> )
Average used land per household in the whole country	5,381
Kinh people	4,707
Other ethnic people	10,115
Average living land per household in the whole country	378
Kinh people	369
Other ethnic people	441
Average agricultural land per household in the whole country	4,143
Kinh people	3,818
Other ethnic people	6,428
Average forest land per household in the whole country	489
Kinh people	239
Other ethnic people	2,317

*Source: General Statistical Office, 1996.*

Comparing the whole country data on used land per household, with used land per household in the studied sites, both ethnic minorities and Kinh, is higher from 103 to 389 % at Hongha and Hongtien communes and 43 to 108 % at Huongho and Binhthanh communes.

## 4.5 Major cropping pattern

### Food crops

The main food crops of the studied areas are rice, cassava, sweet potato, arrowroot and so on. In upland areas, there are two main kinds of rice production, paddy rice and upland rice.

Hongha and Hongtien are two ethnic minority communities. Paddy rice is not their traditional crop. However, since 1975, step by step, the ethnic minorities had developed permanent agriculture. With no more opportunity to move their settlements, paddy rice had been adopted, as opposed to slash and burn. Paddy fields were located in small valleys or near streams, 14 ha at Hongha and 6.1 ha (two crops) at Hongtien. Most of these fields can cultivate one season per year. The other season can not be cultivated because of flood or drought. Nevertheless, because of the shortage of experience and knowledge, paddy rice yield was low (from 1.5 tons to 2.6 tons per ha per year) and there were many problems of diseases and pests. At Hongha, 95% of the paddy fields received no fertilisers nor pesticides but 50% of farmers at Hongtien used chemicals to their fields. Expanding the area of paddy rice cultivation in these sub-zones was not possible because of the complex landscape. Rice varieties planted at these communes were local varieties brought from Kinh neighbouring villages or from agricultural extension offices. The preferable rice varieties at these communes were IR38, IR36, and two other Vietnamese varieties, NN<sup>\*</sup> and NN8 because of high yield and resistant to diseases and pests. Upland rice is the main food

---

<sup>\*</sup> NN is a acronym of *Nongnghiep* In Vietnamese, means agriculture

source of upland ethnic minorities. All of upland ethnic minorities cultivate upland rice. The two main kinds of planted upland rice are glutinous rice and non-glutinous rice. However, the upland field area was reduced because of the forest plantation covering their old hill fields and natural forest protection. Hill fields far from the inhabited settlements were also omitted because of wild animals. The average yield of hill rice was from 0.7 to 1.0 ton per ha per year. According to the community reports for the years 1996 and 1997, 88% of local farmers at Hongha and 63% at Hongtien still had hill fields for hill rice and other crops.

Most inhabitants at Binhthanh and Huongho are Kinh ethnic majority. Non-glutinous rice is planted with high intensity. There are two crops per year. The mean yield of paddy rice was from 4.21 tons per ha per crop at Huongho and 3.50 tons at Binhthanh. Paddy field area at Huongho was 182 ha and 14 ha at Binhthanh.

As compared to the country, and regional data, the yield of paddy rice at Huongho was highest and higher than the average yield of Thuathien-Hue province, 3.96 tons/ha (Thuathien Hue statistic office, 1998) and the average yield of the nation, 3.56 tons/ha (General statistical office, 1995). However, at the furthest distance from the centre, paddy yield was very much lower as compared to the general yield of the region and nation (from 42.13% to 73.03%).

The second most popular food after rice in the upland area of the North Central Coast of Vietnam is cassava. Cassava was planted throughout the year in these areas. There are many varieties, associated with each ethnic group who have protected and improved them over many generations. The popular varieties in the



studied sites are \* *Badang* (three months), *canh nông*, \* *đàđep*, \* *Ble*, \* *Bluc*, \* *Xen*, \* *Klo*, etc. The preferable varieties are *Badang*, *đàđep*, and *canh nông* because of high yield, easy planting and short maturity. Cassava is planted at every household farm, crop field, hilly farm and homegarden. Farmers at Hongha, Hongtien and Binhthanh had been planting cassava on large areas for food and feed for domestic animals, 60% for food and animal feed (Field survey, 1998). Cassava is also a cash crop of these communes, about 40% (Field survey, 1998). The other crops such as corn, arrowroot and sweet potato were planted on cropland and on paddy fields during the dry season.

### Other crops

Croplands play an important role in generating income as well as providing food for the household. Depending on the local custom, croplands of upland ethnic minorities are hilly fields and a little bit of paddy fields in the dry season. With Kinh people, croplands are dry fields that can not be irrigated for wet rice cultivation. Sometimes, paddy fields are planted to other crops because of the benefit and the needs of the market. At Huongho and Binhthanh, croplands were also used to plant other cash crops such as onion, tuberose (*Polianthes tuberosa* L.), cornflag gladiolus (*Gladiolus hybridus* Hort.), mungbean and peas. Sweet potato was also cultivated as a tuber and leaf vegetable. At Hongtien and Hongha, 80% of sweet potato is used for food and the other for animal feed (Field survey, 1998). Corn was planted for long time at Huongho and Binhthanh but not at Hongtien and Hongha. Today, corn is planted throughout the upland area of the country. At the studied sites, depending on the soil condition and local needs, farmers would plant corn from two to three crops

---

\* Upland Ethnic language (Pahy, Taoi, Ktu, Bru-Vankieu...)

per year. Twenty percent of corn production was used as food, 60% for animal feed and 20% for cash.

### **Vegetables**

Vegetables were grown in the gardens at Hongha, Hongtien and some Binhthanh families. At Huongho, vegetables were planted in cropland by season. Vegetables provide foodstuff for household daily meals at Hongha and Hongtien but were cash crops at Binhthanh and especially, Huongho commune. Vegetables were planted at the end of winter and spring seasons, where as in the autumn and especially the summer, none were grown in the field or garden land. Ethnic upland groups collected wild vegetables from the forest during these seasons. Figure 12 illustrates the vegetable crops by seasonal calendar.

### **Other trees**

Coffee and tea were planted at Hongha, Hongtien and Binhthanh by the promotion of agricultural extension. These species were planted in the homegarden only.

### **Forest tree**

Forest trees were planted every year in two types concentrated afforestation and dispersal planting of trees. The first type followed the annual plan of the Provincial Department of Forestry with subsidised seedlings and forestry land allocation. The afforestation season started in October and finished in February the following year. Dispersal planting of trees involved the planting of trees throughout

the year, especially during the rainy season on unused land in the village, along the road and around the living areas. With forest plantation, dispersed trees were really the source of fuel wood to supply local people, reduced the pressure of upland people on the natural forest as well watershed forest plantations. Forest tree species planted at the studied sites were *Acacia auriculiformis*, *A. mangium*, *A. crassicaspa*, *Eucalyptus camaldulensis*, *E. tereticornis*, and other indigenous tree species such as *Cassia siamea*, *Cinnamomum cassia*, *Dipterocapus* spp, *Lissea* spp, *Shorea* spp. Dispersed trees were *Melia azedarach*, *Eucalyptus* spp, *Acacia* spp, and bamboo's species.

#### **Animal husbandry**

Fifty percent of upland farmers at the studied sites had been raising cows and water buffalo. They were raised in the forests of the communes for power and meat. Pigs were also raised in most local households. Cattle played an important role for income and power on the fields of the upland people.

Poultry such as duck and chicken were raised in all the households at the studied sites. Poultry were one component of VAC. By-products from the field and homegarden were used to feed poultry and small domestic animals.

#### **Seasonal calendar**

Figure 12 presents the seasonal calendar in general at the four communes. Paddy rice had two crops per year. The spring crop started in the middle of November and was harvested in the middle to end of April. The main varieties of this crop were

IR38 and IR36. The summer crop was from the mid-April to early July. The crop period was around 100 days. The popular variety was CN02 (*Cuc ngan*: Super short). The harvest period was short because this time was the typhoon and flood season of this region. Cassava could be planted in early to mid March. Depending on the variety, farmers usually harvested tuber after three months and six months. However, ethnic minority groups kept fresh tuber in the field and harvest throughout the year.

Homegarden activities were carried out all year. The results of the survey showed that, the time for taking care of homegardens was every month when farmers had finished field works. Sometimes, taking care of their homegardens was during their relaxation time. The real time for homegardens was in spring and autumn, to replant trees in the garden and for harvest. Most homegarden products were able to meet daily household needs. Eighty percent of gardeners sold their products to middlemen from the garden, the other twenty percent sold their products at the market by themselves.

The seasonal calendar presented in Figure 12 shows the cropping patterns throughout the year. From November to April the following year, almost all crops were planted at the same time as paddy rice. In the dry season, farm works were less than the others, so greater attention was focused on the homegarden during this time.

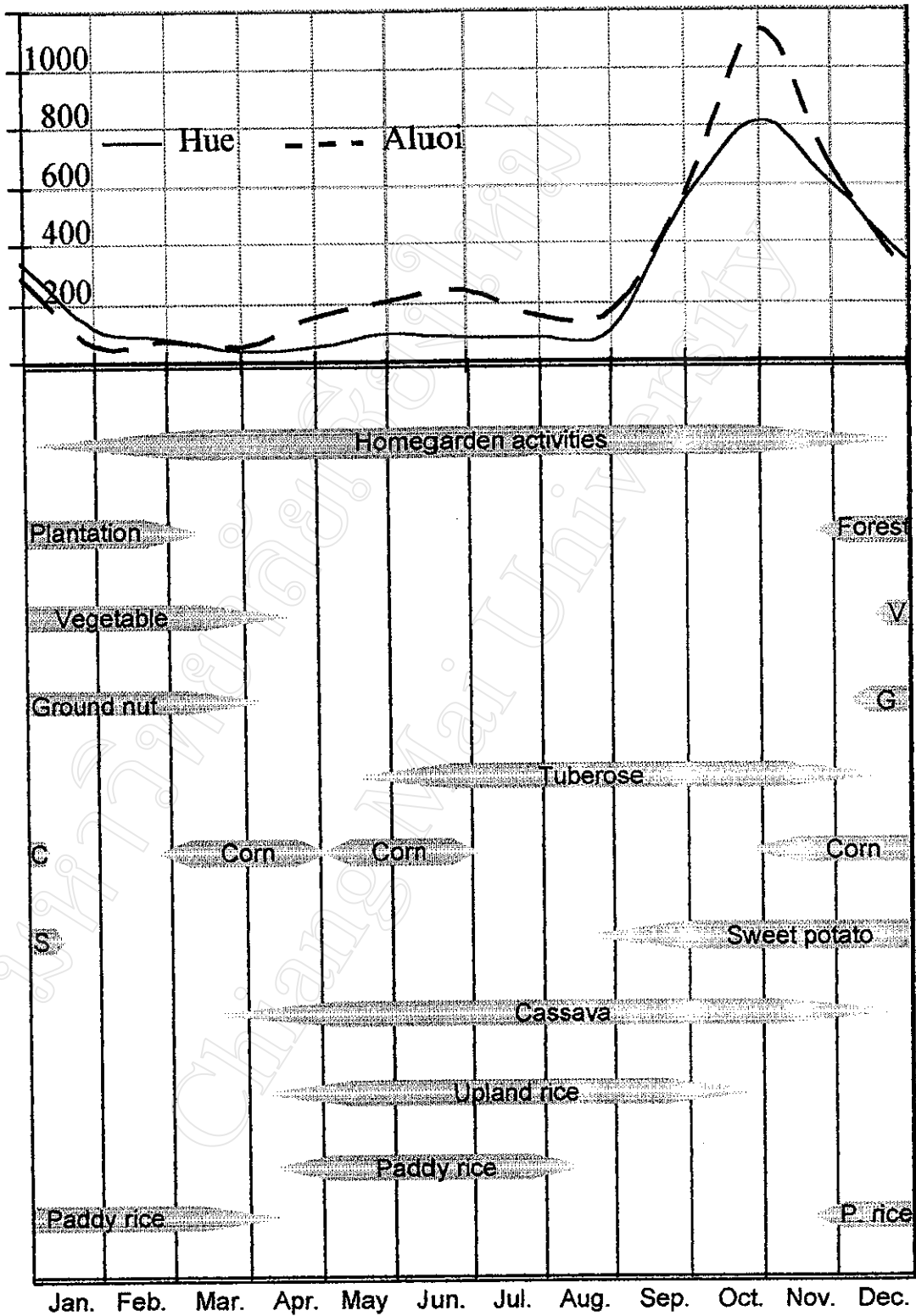


Figure 12. Seasonal calendar of main crops at studied sites (Western calendar)

and distribution of annual rainfall

Time for gardening came after rice transplantation from the end of February to mid April. Weed control, new planting and applying fertilisers in preparation for the harvest in the summer. The autumn crop season, from early August to September was also another gardening time. Fruit harvesting, pruning branches, and garden dressing were carried out after the typhoon and before the coming of flood season. The gardening idiom, “January\* for bamboo and June for pepper” (*Giêng trúc, Lục tiêu*) could be used to explain the two main seasons for gardening during the year as the spring and the fall seasons.

#### 4.6 Culture and society

##### 4.6.1 Ethnic status

Vietnam has 54 ethnic groups, of which Kinh is the ethnic majority accounting for more than 75% of the total population of the country and 97% of the population of the North Central Coast region (Loc et al., 1984). Kinh people settled in the lowlands and their culture as well as socio-economy status is based on wet rice culture. Village and inhabited areas are built among the paddy fields. Inhabited areas are selected near the river, or near the main road. Huongho and Binhthanh communes are two Kinh communes in this study. Most ethnic minorities settled in the upland areas (except for *Hoa and Khmer*). Their cultures are associated with hill fields, hunting, wild plant collecting, and self-sufficiency. Social economics of hill tribes of the Northern Central Coast of Vietnam are based on their hill fields. Hill fields are selected in the old and dense forest on slopes ranging from 25 to 30 degrees (Loc et al., 1994). Forest

---

\* January and June in Lunar calendar are about February and July of Western calendar



clearance by burning for milpa starts in March and finishing at the end of April. Early May to June is the time for hill rice planting and harvesting in October and November. Milpas are not only cultivated rice cultivars but also other vegetables. For some ethnic groups, hunting and collecting still plays an important role in their life, such as *Chít* ethnic, but for others, they now cultivate paddy rice, and their society have been developing. In general, socio-economic development status of ethnic minorities in the North Central Coast is similar, although each group has its own characteristics.

The studied site covers a large area from the mountain in the West to the lowlands in the East, in which many ethnic groups have settled. Ethnic minority groups are mainly settled at Hongha and Hongtien, and 30 other Pahy new-settlement people at Binhthanh. As previously stated, Huongho is a Kinh commune (Table 6).

**Table 6: Proportions (%) of ethnic groups in the studied areas**

Ethnic group	Hongha	Hongtien	Binhthanh	Huongho
Kinh	5	30	95	100
Paco	45	4	-	-
Pahy	20	50	-	-
K'tu	20	12	5	-
Taoi	10	-	-	-
Bru-Vankieu	-	4	-	-

There are five ethnic groups settled at Hongha commune, Paco, Pahy, K'tu, Taoi and Kinh. Here, the Kinh group occupied 5% of the population. They are new comers of this commune to carry out business. The other four ethnic groups have their own language, culture and customs in agriculture and life style. More or less, they can understand the language of the other ethnic groups. The commune officers can speak

and understand all five languages. Each ethnic group now settles together as sub-administrative unit or *bản* but there is close relationship among ethnic groups. Hongtien commune has five ethnic groups. The Kinh occupied 30.1% of the commune population but the Pahy group which is the main ethnic group, accounting for 50.2% of the total population. K'tu occupied 12.5%, whilst Paco and Bru-Vankieu totaled just 3.6% of the commune population. As with other upland regions of the country, the Kinh language is the most common language, with ethnic groups using Kinh language in public and their own language in private. Most people can speak and understand this common language apart from old people and some women.

#### **4.6.2 Lunar calendar and Western calendar**

Today, Vietnamese uses two calendars, the Western calendar (office calendar) and the Lunar calendar (traditional calendar). The Western calendar is the same common calendar across the World, but the Lunar calendar is based on the cycle of the Moon, so that, there are 30 days per month except for February, which has 28 days. Every four years, there is one leap year with thirteen months. A year is divided into 24 climatic periods, of about 15 days each (Table 7). Farmers follow these climate periods for farming and gardening. As usual, the Western calendar comes about one month earlier than the Lunar calendar.

**Table 7. Climate periods of year in Vietnam**

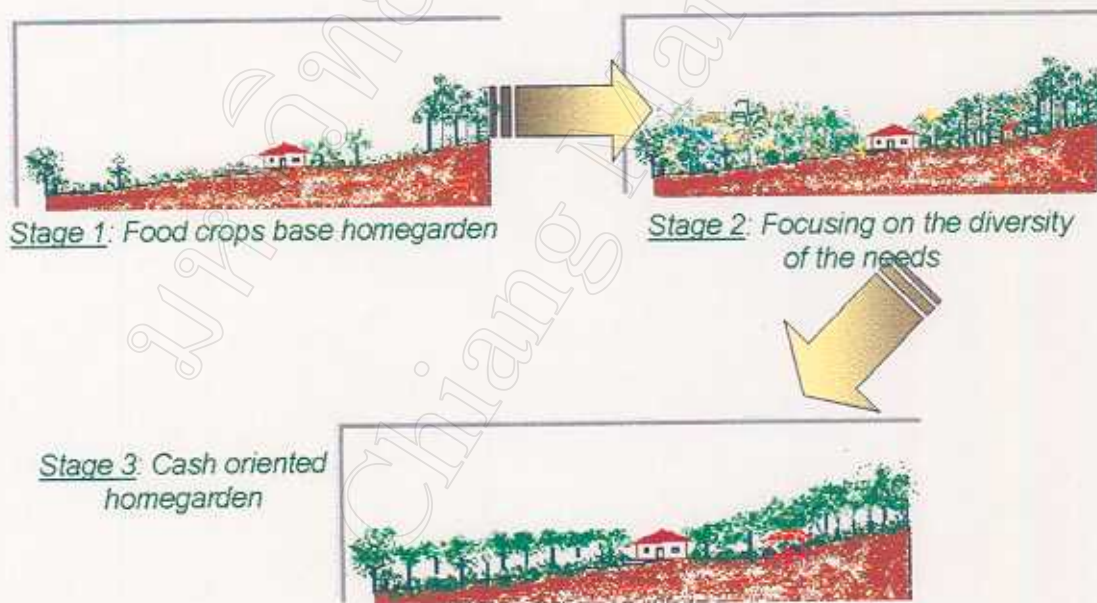
Vietnamese name	Meaning	Estimated time in Western calendar
Tiểu hàn		Jan. 6
Đại hàn		Jan. 20
Lập xuân	Beginning of Spring	Feb. 4
Vũ thủy		Feb. 19
Kinh trập		Mar. 6
Xuân phân	Vernal equinox	Mar. 21
Thanh minh		Apr. 5
Cốc vũ		Apr. 20
Lập hạ	Beginning of summer	May 6
Tiểu mãn		May 21
Mang chủng		Jun. 6
Hạ chí	Summer solstice	Jun. 22
Tiểu thử		Jul. 7
Đại thử		Jul. 23
Lập thu	Beginning of Autumn	Aug. 8
Xử thử		Aug. 23
Bạch lộ		Sep. 8
Thu phân	Autumnal equinox	Sep. 23
Hàn lộ		Oct. 9
Sương giáng		Oct. 24
Lập đông	Beginning of winter	Nov. 8
Tiểu tuyết		Nov. 23
Đại tuyết		Dec. 7
Đông chí	Winter solstice	Dec. 22

#### 4.6.3 Community settlement and homegarden foundation

As a custom, "*Nhất cận giang nhì cận thị*". Kinh people firstly prefers to settle near rivers or roads (transport communication) and secondly near a market. In contrast to the Kinh people, the upland ethnic people is used to stay in the forest, moving their settlements to follow their milpas that used to be moved every four years. However, because of convenience and natural resources management, government has encouraged upland people into settled agriculture and fixed residence. The unit of local administration is the commune and the distance between two neighboring communes is about 12 km. The oldest commune of the studied area is Huongho (1856), then Hongha (1963). The two other NEZ communes, Binhthanh and Hongtien (1975) are the youngest.

Homegarden structure is dependent on the management of the owner, the changing needs of the local people and the strong effect of the market. Originally homegarden structure was dependent on the household. However, a trend has been developed over time to meet the needs of local people as well as the market. The results of this trend for homegardens at Huongho commune is shown in Figure 13. At first, homegardens were used to grow food crops for both human and domestic animals such as cassava, sweet potato and sometimes non-glutinous and glutinous rice. Spices and vegetables are also planted then as well as other forest trees for fuelwood and medicinal herbs. Multipurpose trees were planted to provide the daily needs of the owner. However, the main products from homegarden were food crops and vegetables. The next development saw a change in the component pattern from

food base to other functions as local cultivation techniques increased. Based on the needs of the market, fruit trees, flowers and other economic cash crops were planted instead of food crops and vegetables. The role of homegardens had therefore changed from providing the owner's daily needs to meeting market demands. The developing trend of homegardens was dependent on time and on land-use management. Whilst most homegardens at Huongho commune changed to cash cultivation, homegardens at Hongha and Hongtien communes still satisfied the needs of local people. Thus, the developing trend for homegardens in the upland area depends on time and land-use management knowledge.



**Figure 13. Homegarden development trend in the uplands**

#### **4.7 Off-farm activities**

In the upland area, most households are agricultural farmers. However, some households get income from the forest, business, government, and other common jobs such as bricklayers, tailors and carpenters. Most upland people get income from the forest from selling fuel wood, timber, medicine, wild animal and food. Except for people at Huongho, those at Hongha, Hongtien and Binhthanh still received benefits from the forest at disengaged farm periods. Business was carried out by Kinh people in the ethnic minority communes. They were middlemen, buying garden products to sell at the market. Because gross incomes of upland people were low, any off farm incomes would provide an importance source of household income as well as benefiting the community. In brief, the main activities in the rural upland area of the studied site were agricultural activities including farm, field, and homegarden activities.

#### **4.8 Income sources and income**

The main sources of income for upland people are farm activities. According to the commune annual report, off farm income provided 20% of the total income of the whole commune at Huongho but lower at the three other communes. At household level, the main incomes came from the field and homegarden. Total income on average of people in the North Central Coast was 147.24 USD/ person/ year whilst for the whole country, it was 192.44 USD/ person/ year (Thuathien Hue Statistic Office, 1995). The income of rural people in Thuathien Hue province was 135.33 USD/ person/ year (Thuathien Hue Statistic Office, 1995). At household level,



65% of household expenditure was for foods and 35% for other needs (Thuathien Hue Statistic Office, 1995).

In brief, at the four studied sub-zones, there were differences in location, ethnic status, education, social relationship, time of settlement and opportunity for development. These differences affected homegarden structure, its function as well as household income at each sub-zone. The next chapters will analyse homegarden structure, function, and income of homegardens at each sub-zone. Homegarden evaluation and development recommendations for the four sub-zones in the upland area of the North Central Coast of Vietnam will also be discussed.