

# Chapter 1

## Introduction

### 1.1 Background

Nowadays, land use change is most important for every country including Thailand. Land use in Thailand has changed rapidly as modernizations have grown and the population increased. It has been changed to generate infrastructures, housing and food production for more and more people. Agricultural areas have become industrial factories, natural forests and wetlands were used for agriculture or residential buildings.

The Office of Agricultural Economics (2007) data indicated that, the area of natural vegetation called 'forest' (but also including such areas as wetlands and beaches) decreased continuously between 1986 and 1999 but increased by approximately 25% in 2000 and approximately remained at this level until at least 2002. This forest area increase appeared to have been almost simultaneous with a decrease in 'Other' land use (for example, decreased area of land used for hospitals, schools etc), and the agricultural land use area was quite stable from 1986 to 2002.

Recent land use estimating for Thailand, showed overall land use to be agricultural 41.2 %, forest or natural vegetation 27.6 %, and 'other' (non-agricultural) 34.1 %.

The main types of agricultural land use in Thailand were paddy fields (51.9 %), farms (23.8 %) and fruit production (16.6 %) (The Office of Agricultural Economics, 2007).

Songkhla is a province in the south of Thailand which has been developed rapidly. It is a centre of commerce and tourism. Therefore, urbanization affects land use change.

In Songkhla province less of 9.6 % of land area is forest (or natural vegetation), 44.0 % is agricultural area and 46.4 % is 'other' (non-agricultural) area and the major activities in agricultural land use in Songkhla are 69.4 % as rubber plantation and fruit gardens, 22.7 % as paddy fields and 7.9 % as residential, commercials and 'other' (The Office of Agricultural Economics, 2007).

Na Thap is a sub-district in Chana district of Songkhla province. It is an old village. This area used to be an army camp, called Thai Na Thap (Info Systech Co., Ltd., 2008). Tambon Na Thap consists of 14 villages and has a major river called Na Thap River, which originates from the high mountains in western part of Songkhla and then flows into gulf of Thailand that about 26.5 kilometers long. The land along the river is mostly natural and undeveloped areas. The main occupation of people in this area is agriculture (Sapaeing, 2007). In 2008, Electricity Generating Authority of Thailand's Chana power plant was built by using water from Na Thap River for cooling mechanic system.

Pattern of land use change around Na Thap River is interested; therefore, comparing of the land use change in 1982 and 2000 was conducted. It is expected that the results from this study will be useful to be a tool for land development in the future and hopefully will provide the optimal land use planning according its potentiality.

## **1.2 Objectives**

1. To investigate land use patterns and its change around Na Thap River where located at Na Thap Sub-district of Chana district of Songkhla Province in 1982 and 2000.
2. To use a statistical model for showing location and change in types of land use.

## **1.3 Literature review**

Bunyachatphisuth (1999) investigated the association between land use around coastal areas and coastline change in Thailand. This study used remote sensing technique and logistic regression to evaluate the relationship between coastline change and 10 categories of land use (1. high density built - up area, 2. built - up area, 3. beach area, 4. bare soil, 5. mangrove area, 6. vegetation: well develop, 7. vegetation: sparseness, 8. paddy field, 9. flood plain, and 10. inland water). The results shown that high density built-up area always has high probability of erosion, while bare soil always has low probability of erosion. The logistic model did not exhibit any statistical relationship between land use/land cover with coastline changes could not be concluded. When the model contains more variables the significance increased.

Durongdej (2000) conducted a studied of land use around the coast of Thailand during 1961-1998 using Landsat-5 TM image. The changes in land use along shoreline depended upon spatial and economic development. Four main types of land use were found. There are forest and mangrove, residential, agriculture and abandoned.

Mangrove forest had the most impact from human activities. A large number of mangrove forests had been changed to shrimp farms and built-up areas. Decreasing

mangrove forests had resulted in floods, beach erosion, water pollution and other environmental problems.

Tongrak (2003) investigated on evolution of land uses and forest land uses in Songkhla Lake Basin. Data were obtained from various sources such as secondary documents, focus group discussion, interviewing key informants and conducting seminars in local communities. Qualitative analyses were used to explain on this. The results showed that the major land uses of the Basin in 2000 were agricultural and forest. Important agricultural land uses were for rubber, rice, fruit trees, and shrimp production. Forest land, rubber and fruit tree production were predominant on the west of the Basin. Rice growing was dominant on the rolling plains and the plain on the east and the west of the Basin. Shrimp production was widespread on the coastal plain. Major land uses changes during the past century (1899-2001) were from forest to rubber plantations, forest on the plain to rice fields, rubber to fruit tree plantations, and from rice fields to shrimp ponds.

Prabnarong and Thongkao (2006) studied land use change in Pak Panang Bay using aerial photographs and geographic information system. The aerial maps were on 1:15,000 scales for 1974, 1995 and 2003. The result revealed that shrimp farm area around the bay increased from zero hectares in 1974 to 1,954 hectares in 1995 and expanded to 2,592 hectares in 2003. Most shrimp farm areas were found to have been changed from mangrove and paddy field.

Wongsaichue (2006) studied on the role of population dynamics in rural households, such as fertility, mortality, and out-migration in agricultural land use and land cover change. The results show that population events which occur in households have an

effect on decision making to use the land for agriculture. For example, death and out migration events in households reduce the probability of agricultural land use.

Moreover, out-migration and the proportion of the household engaged in agriculture are important factors to determine land use and land cover change.

Janjang and Kaewnern (2007) studied on changed in land use and aquaculture farming areas after Bangpakong Diversion Dam Construction in Chachoengsao province was conducted by analysis Landsat-5 TM recording in 1996 and 2004. The result of comparison on land use in two districts (Bang Khla and Banpho district) between 1996 and 2004 indicated that aquaculture farm, mangrove and urban areas were increased. Agriculture and forest areas were decreased. Comparing to 1996, in Bang Kla district aquaculture farm area was increased 83.30 percent. In Banpho district aquaculture farm area was increased 39.57 percent which all increased areas were changed from agriculture area and other.

Venkatachalam et al. (1991) investigated on integration of remote sensing and geographic information systems is essential for effective resources management. By combining Remote Sensing and GIS study on changes in land use pattern for a part of Goa, India. The land use maps of 1969, 1987. He focused on the areas where forests (27% of all) have been depleted over 2 decades and changed into agriculture and plantations (21.59%), to open scrub (3.42%), to built-up land (1.15%) and to mining (0.84). The study shows the fast environmental changes occurring in the hilly train of Goa and the depletion of forestry.

Sodeinde (2000) developed software for land use management with visual basic (VB) and ArcView Avenue.VB used to generate coordinates and create a user-friendly interface for the users and utilities for linking other functions. The management aspect was done in ArcView GIS. This program operated like union, intersection, merging combination and finds the percentage of overlap.

#### **1.4 Outline of This Thesis**

This thesis contain five chapter, including this introductory chapter. It proceeds with the background, objectives, and literature review.

Chapter 2 describe the methodology, study area, data sources, work flow diagram, data management and data analysis. Describe types of land use location and Constructed a map and described sub-groups of land use.

Chapter 3 comprises the preliminary analysis about our variables. In this study is not follow in assumption, so type of land use change which is similar were combined from nine groups into four groups.

Chapter 4 presents the results after fitting a multinomial logistic regression model. From this study the proportion and their 95% confidence intervals was shown in percent of land use change in each group and in each location.

Chapter 5 summarized the statistical methods and the findings and discussed of our study.