

## CHAPTER I

### INTRODUCTION

#### 1.1 Background

Mangroves are evergreen forest situated between the land and the sea, found essentially in intertidal zones and occupying large tracts along sheltered coasts, estuaries and in deltas, where they are influenced by tides and widely differing conditions of salinity and rainfall regimes. They occur in certain locations where the soil conditions are favorable, such as mud flats and swamps. The mangrove ecosystem is very dynamic, with changes taking place regularly, and within the range of mangrove habitats, most major species grow within a given set of conditions. They are usually defined in terms of the distribution of characteristic tree species and found in brackish water on the margin between the land and the sea.

Mangrove forests generally embody two different concepts. The first refers to an ecological group of evergreen plant species belonging to several botanical families, but possessing marked similarities in their physiological characteristics and structural adaptation and having similar habitat preferences. The second concept implies a complex ecosystem of plant and animal communities (Kunstadter, *et al.* 1986; Sanit, *et al.* 1986).

They survive water logging due to periodic submergence by tides, high solar radiation and strong winds. Being ecologically complex, strictly habitat specific, highly resourceful, with vulnerable ecosystems exhibiting peculiar morphological and anatomical adaptations, mangroves have attracted much interest over the last few decades. The mangrove ecosystem is complex; composed of various species of plants, animals and micro-organisms, both marine and brackish water, and its structure and functioning is regulated by various environmental factors. Mangroves and mangrove dependent systems such as sea grass beds, coral reefs and coastal fisheries, are among the most productive systems in the world and are a natural, renewable resource. The people living in coastal areas are dependent on these forests as their primary source of income, fuel, food, medicine and other basic necessities, such as timber for housing

and roofing materials. Wise management of these resources is therefore essential for their sustainable use and for the cultural and socio-economic welfare of the coastal inhabitants (Sanit, *et al.*1984).

Mangrove swamps absorb rough waves from the sea and prevent destruction from typhoons and storms. They also prevent soil erosion and collect soil under their roots and branches. In short, mangrove swamps form a natural water break. Thus, a stand of mangrove swamp actually adds to the land it grows on. Mangrove swamps have long provided a living for the many people who fish in them and who cut down the trees to make charcoal. With the destruction of mangroves, ecosystem sustainability is endangered. Increased coastal storms, land erosion, higher salinity, and loss of biodiversity will occur, unless we approach the problem from different and new angles. The capacity of these forests to generate protein foods at a rate faster than rainforests or coral reefs, make them one of the richest and most important ecosystems known to mankind (Ohn, 2004).

Myanmar has more than 1,200 miles (2,000 km) of coastal fringe along the Bay of Bengal, with productive and wealthy marine resources of living and non-living things. Naturally formed sandy beaches, rocky shores, groups of islets and estuaries are decorated with diverse plants and animals. At present (2008), the total area of mangrove forests in Myanmar is 320,106 ha, distributed in Rakhine State, Tanintharyi Division and the Ayeyarwaddy Delta. Of these three areas, the largest mangrove forests exist in the Ayeyarwaddy Delta. Before 1970, there were 785,000 ha of mangrove forest along the Myanmar coastal line.

The Ayeyarwaddy River is the most important commercial waterway in Myanmar, traversing the country from north to south for about 1,350 miles. However, traveling north, the river is navigable by steamers for about 900 miles up to Bhamo and by launches up to Myitkyina. It has its source at the confluence of two rivers, the Maykha (N'mai Hka) and Malikha (Mali Hka), both of which have their beginnings on the Himalayan slopes. They join about thirty miles north of Myitkyina to become the Ayeyarwaddy. The Ayeyarwaddy River enters into the Andaman Sea by nine principal mouths, depositing enormous quantities of sediment. Ayeyarwaddy Division lies at the southern end of the central plains of Myanmar. To the north of it is Bago Division and to the east are Bago and Yangon Divisions. On the southern and western

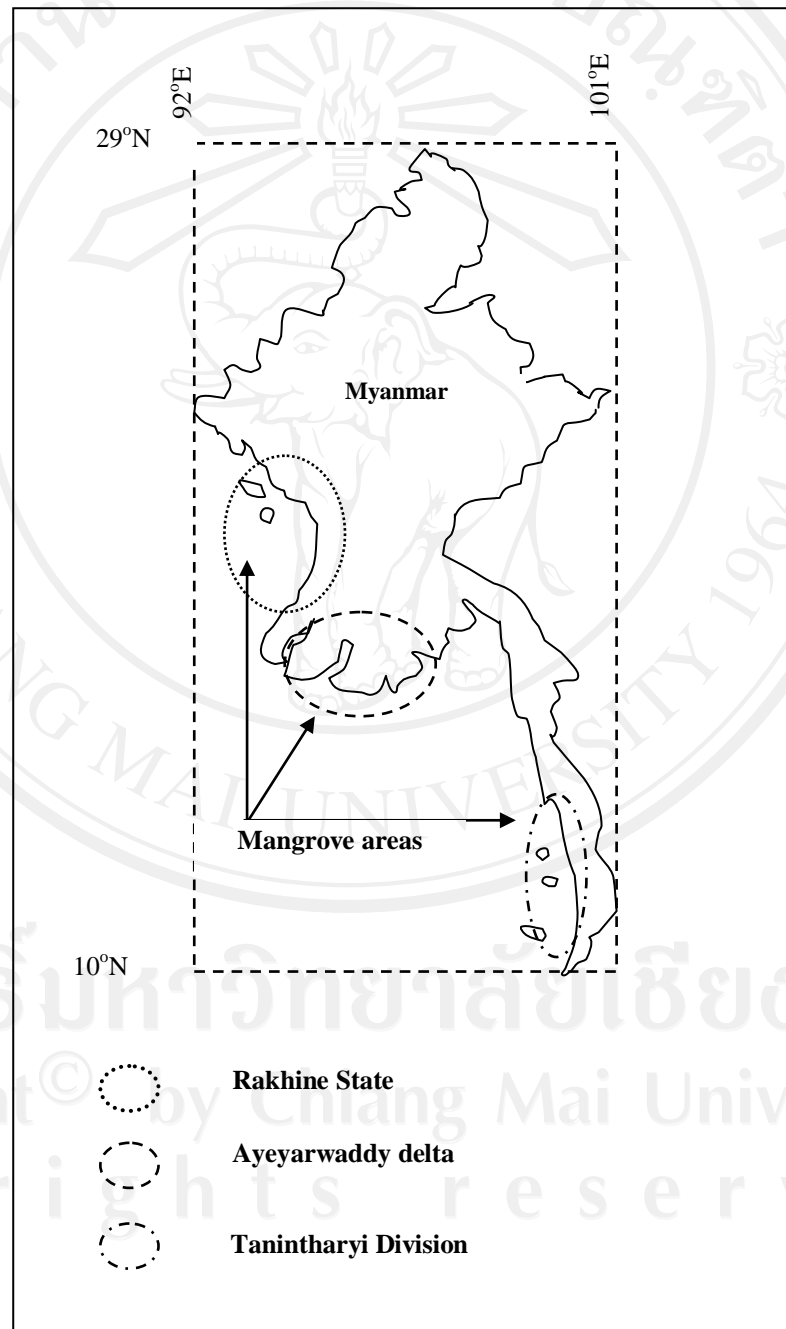
sides of the Division are the Andaman Sea and Bay of Bengal. It is contiguous with Rakhine State in the north-west. The Ayeyarwaddy Delta lies between Mawdin point and the Gulf of Martaban.

The length of the coastline in the Ayeyarwaddy Delta is about 469 km. This area constitutes 46.4% of the total mangrove area in Myanmar. The mangrove forests were rich in species composition three decades ago. The Ayeyarwaddy delta also consists of the interminable and fertile plain of the southern part of Myanmar, which is 180 miles (300 km) long and 150 miles (250 km) wide. The Ayeyarwaddy Delta represents an important and extended mangrove forest, one that includes beach and dune, tidal and swamp type mangroves in the Delta Forest Division, which comprises 13 forest reserves. The delta area has a large network of creeks, streams, and rivers, and is frequently flooded by tidal effects and/or rain during the rainy season. The land is intersected by rivers and creeks dividing it into numerous islands. All of the rivers, creeks and channels in this area branch out from the Ayeyarwaddy River.

In the past, Mangrove forests in the Ayeyarwaddy Delta were cut for fuel wood and charcoal production to cater to the needs of Yangon, the capital city of Myanmar. With the energy crisis in the early 1970s, this need rose in leaps and bounds causing even greater depletion of the Ayeyarwaddy mangroves. With a growing population, the already cut areas were cleared and transformed into paddy cultivation, fish and shrimp farms and salt production, even in the mangrove forest reserve areas. Forest law could not prevail over the socio-economic needs of the people and as such, over a period of 75 years (1924 to 1999), 82.76 percent of the mangroves were depleted in the Ayeyarwaddy Delta (Ohn, 2003).

The depletion of mangroves was so great and widespread that the Forest Department's efforts in restoring the mangroves has only had a limited impact and is by no means adequate to handle the situation in the whole of this Ayeyarwaddy Delta. The fate of the Ayeyarwaddy Delta mangroves in Myanmar, where mangrove forestlands have been reclaimed mainly for paddy (rice) over many decades, illustrates how mangroves are being degraded and destroyed, generally at a very much higher rate than that of tropical rainforests. The Delta was formerly covered with dense mangrove forests, most of which have been cleared during the last two decades to grow rice and to produce charcoal for domestic use. Though the production of

charcoal was banned in 1993, the average rate of deforestation in the delta mangroves has continued at 2.4 percent per annum, about three times higher than the national forest depletion rate of 0.74 percent.



**Figure 1.1: Map of Mangrove Location Areas in Myanmar**

## 1.2 Problem Statement

In 1856, the British colonial authority introduced policies and regulations to administer and manage the State Forests based on the scientific principles of forest management and the ideals of resource exploitation in Burma. Scientific forestry emphasized wood production and neglected public goods such as recreation, hunter-gatherer foods, scenic quality, soil conservation and nature conservation. After 1856, a new “scientific” approach based on state intervention was adopted. It was a system premised on long-term commercial timber production “designed to record both nature and customary use in its own image” (Bryant, 1997).

The Burma Forest Act of 1881, created special administrative requirements associated with the management of commercial forests. The need to modify legislation in order to maximize efficient resource extraction was the main policy for the management of natural forests in the colonial days. The original Burma Forest Act of 1881 was amended several times and finally enacted as the Forest Act 1902. It had worked well under conditions of abundant supply over demand. However, such a system came under growing stress as a result of increasing demand for forest products and the competing uses of forest land soon after independence, since the country had to be rehabilitated and rebuilt after World War II and its subsequent conflicts. Since then, mangrove forests have been regulated under the control of the Forest Law, a law that was modified in 1995. Myanmar forest resources were administrated for over a hundred years under the Forest Act of 1902. This Act was also amended several times to accommodate changing political and socio-economic conditions, with the current Forest Policy being developed in 1992, one which has a broader outlook, covering environmental and socio-economic issues, as well as conservation of bio-diversity and establishment of commercial forest plantations for sustainable production, by both the state and private sectors.

In the delta of Myanmar, traditional mangrove dwellers often combine the use of land, sea and inter-tidal resources. Even with limited economic development and modernization, the boundaries of the social and economic systems that influence the mangroves, spread well beyond the ecological limits of the zone itself. For example, charcoal from mangroves has long been an object of trade, as have fish and shellfish. The most important aspect of the mangrove forests, is that they provide excellent



breeding grounds for many species of fish, shrimp, crab and shellfish (Kunstadter, *et al.* 1986).

An increase in the human population as a rule causes over-cutting of mangrove forests and encroachment on to forest land for agriculture and fishery purposes. Moreover, fuel wood and charcoal produced from this area have been supplied to Yangon, where nearly five million people live. For these reasons, nearly fifty thousand hectares of forest area were changed to other land use between 1954 and 1989 in the Ayeyarwaddy delta. After 1989, the rate of forest degradation and denudation was higher than that for 1984. The rate of mangrove deforestation in the Ayeyarwaddy delta at present is 7775 ha per year.

Recently, the issue of encroachment by fish and prawn hatcheries into the mangrove areas has posed a much more serious problem than that of agriculture. With expectations of short-term income generation and some monetary incentives in certain locations, villagers have been persuaded by large business organizations to use forest land for aquaculture. Little did these villagers realize the protection that the mangroves provided, and the consequences they would face through the long term exposure to disasters from severe storms and tsunamis, such as those encountered later, if there were no mangrove forests.

Consequently, the continuing degradation and depletion of this vital resource has reduced not only terrestrial and aquatic production, but also removed wildlife habitats. The environmental stability of coastal forests, which afford protection to inland agricultural crops and villages, has become seriously impaired (FAO, 1994). In Myanmar, mangrove forests have been rapidly denuded and deforested. The main causes of this have been paddy encroachment, over exploitation and illegal felling. Over exploitation in the Ayeyarwaddy mangrove area started in 1942 during the Second World War, in order to satisfy military demands. The worst period of exploitation began in 1949, at the start of the insurgent period which lasted from 1949 to 1972. Mangrove forests were still abundant up to the end of the 1950s, and all species retained a presence in the form of tall, large-girth trees. However, after 30 to 40 years of over exploitation, the rich mangrove forests were transformed to low forest in the Ayeyarwaddy Delta, which once had the largest extent of mangrove forests. The total area of these mangrove forests in 1954 was 234,515 ha, but this had

decreased to 178,642 ha by 1984. Hence, 24 percent of the mangrove forest was destroyed within three decades; an annual area loss of about 579 ha. The present status of the Ayeyarwaddy mangrove is alarming. Not only has there been a continuous reduction in its extent through agricultural encroachment, but also the surviving mangrove has suffered greatly through the uncontrolled and repeated felling of trees.

With Myanmar's population increasing dramatically, the government priority had to be food production. This gave the impetus to farmers to create more paddies in the Ayeyarwaddy Delta, because this region has alluvial soil conditions that are highly suitable for rice production. However, the result is that it is now impossible to get rid of the encroaching farmers in the reserved forest areas of the Ayeyarwaddy Delta. In the past, the delta area was recognized by the government as the most productive area for rice for the whole of Myanmar. In such an area, as long as the encroaching paddy land was productive, the farmers continued cultivating rice until the authorities forced them to abandon the area for alternative land use, during the 1970s.

After mangrove forest degradation seriously increased from 1985 in most of the lower portion of the Ayeyarwaddy Delta near to the sea, measurements indicated that salinity was up to 2.5% or more in the summer. Moreover, the acid sulphate content of the soil was in the high range. Consequently, productivity of the rice paddies decreased per acre, making it uneconomical to grow rice. It has since been found that even after a fallow period of fifteen to twenty years, these abandoned paddy fields are unproductive and usually covered with salty grass (*Myet Khar*). Currently, in the southern portion of the delta region, there is a large expanse of abandoned land and the farmers in the region have come to realize that their only option in such areas is to grow mangrove tree species, as nothing else will survive. However, their abandoned paddy fields are in the state owned reserved forest and their anxiety is that once the mangroves are re-established they will simply revert back to the original forest estate.

In 1985, the Agriculture Department extended commercial cultivation areas for paddy production, even in the 'reserved forest areas'. Without mentioning the difficulty in enforcing the rules for reserved areas, conflicts between the government

agencies such as the Forest Department, Agriculture Department and Fisheries Department further complicated the issue. Land use policies for forestry, agriculture and fisheries had to be resolved once and for all, since many of the forest reserves were either deforested or encroached upon by agriculture and fishery developments.

Mangrove forest destruction in the Ayeyarwaddy Delta was also related to the construction of shrimp ponds that started in earnest in 1990. After an open economic policy was declared by the Government, many businessmen constructed shrimp farms and fish ponds to produce marketable shrimp and fish for international export. These businessmen were very close to the local authorities and they got official permission from them. They negotiated with the authorities to invest in aquaculture activities in the southern portion of delta region. Businessmen then marginalized the local communities' daily livelihoods. According to sources from the Forest Department, more than 3,000 ha of mangrove forest area had already been turned to shrimp ponds in Bogale Township, by 2004. Most of the shrimp farms were established by clearing the forest and constructing dikes. As a result, there was a marked rise in salinity and also pollution of the water, with related and subsequent results. The construction of dikes, which obstruct tidal runoff, also causes an increase in salinity and consequently affects the growth of living organisms.

In the 1990s, the Irrigation Department also started dam construction for paddy growing in the upland area of the delta region, in order to produce electricity. Dam construction, the establishment of shrimp ponds and saltpans, as well as the cultivation of nearby land caused erosion and sedimentation which started in rivers and creeks. A series of forest areas were turned into water areas due to dam construction and created reservoirs to supply irrigated water for sustainable agriculture.

The Karen people live in several parts of southern and eastern Myanmar. The largest Karen population is in the Ayeyarwaddy Delta, area which has vast agricultural lowlands. Many migrants moved from Karen State during the ethnic separatist insurgency in the 1960s. The migrants, in current parlance, may well be termed economic refugees, for there is more economic opportunity in fisheries. Paddy growers, fishermen and forest dwellers are in direct contact with the mangrove ecosystems. Mangrove dwellers are quite aware of the dwindling production from the



mangroves and the hardships they face in getting the forest products. Before the government issued the mangrove forest concession in 1992, the villagers perceived that the mangrove forests belonged to them. They could manage mangrove forests according to their experience and local knowledge, and for their survival. The Karen people who came from the upland areas in Karen State, brought with them traditional knowledge with respect to forest conservation and access for their daily needs.

Nowadays, at my research site, there is a lack of work opportunities in the villagers' daily lives; they rely on the land and forest, and after the mangrove ecosystem changed, so land degradation and also the depletion of mangrove resources and marine resources began; moreover, their access to resources was restricted by the local government. Eighty years ago, this area had three houses to each village, and at that time, the village was called Kwin-Chaung. By the 1970s, there were 80 households in the village and the population had also increased, and 90% of the villagers made charcoal for their main income, sending it to the cities by boat everyday. There were fifty charcoal kilns in this village and this was the most popular job in the Delta region.

Oakpo means 'Charcoal Kiln' in Burmese and so later, this village changed its name to Oakpo-Kwin-Chaung. Dense mangrove forests existed around the village and wild animals were found in the forests. Near the village, it was easy to get hold of marine products such as shrimp, prawns and fish, and also fire wood and timber for making furniture and houses, so, villagers could stay without difficulty for their livelihood. Later, in 1980, they were prohibited from accessing the forest products by the Forest Department. By this time there were 87 households in the village due to the population increase. At the same time, the government extended the cultivation area around the village; local villagers lost the work opportunities to support their daily subsistence and became poorer and poorer. The State and powerful actors such as traders and local bureaucrats were able to legitimize the benefits received from the over exploitation of natural resources. In contrast the powerless, such as the local people, were marginalized from fair access to their communal resources (Bryant, 1997). Local communities living within the mangroves are the primary users of mangrove forest products, and as a result of this, they create customary rights that are aimed at maintaining the ecosystems sustainability and securing their livelihood.

Traditionally, rural people collected fire wood, mostly from the neighbouring natural forests and the trees growing on their farmlands and homestead. Forest law allows the villagers to fell any un-reserved trees growing in the unclassified public forest land, within a 40 kilometer radius of their village. A greater transparency and a clear-cut land-use policy would also help to boost the expansion of community forestry in the Ayeyarwaddy Delta. In reality, the paddy purchase policy inside Mangrove reserves acts against the protection of mangroves. Though paddy cultivation inside forest reserves is considered unlawful by forestry standards, the understanding is that paddy can be grown, as long as the grower meets the sales quota for rice. While paddy production is becoming such a high priority in the delta, community forestry can be established only on low fertile soils with salinity problems. From the view of a poor family it is much more suitable and reasonable to reclaim such land, than the fertile land. Nevertheless, there are some dedicated communities who really want mangroves back in the delta and it is an encouraging sign that promoting community forestry activities in Ayeyarwaddy delta might lead towards a restoration of mangrove ecosystems in Myanmar.

I would like to study the local villagers' daily livelihood, their social and economic status, customary rights, culture, religious and traditional beliefs and also their social networking since the mangrove forest degradation has taken place. In this study I will address the following questions and issues: (i) what is the conflict in land use patterns among local government agencies, such as the Forest Department, Agricultural Service and Fishery Department? And (ii) what are the impacts of the state's forest policies and mangrove management practices on the local communities? Moreover, I would like to investigate the local people's participation and negotiation with local NGO's and government agencies after the mangrove forest degradation and the future prospects for and perspectives on their livelihood.

### **1.3 Research Questions**

1. What is the relationship between the environment and the sociological, cultural and economic characteristics of the mangrove dwellers?
2. How does the forest management policy affect the mangrove dwellers' cultural practices and their livelihood?

3. In what ways do local communities adapt their livelihoods, in times of resource degradation?

4. How do local people negotiate with internal and external actors, in order to survive in the mangrove forests?

#### **1.4 Research Objectives**

1. To explore the impacts of mangrove degradation on the coastal ecosystem and the livelihood of local people.

2. To understand the social, political and economic dynamics of mangrove ecosystem management, by investigating the processes of cooperation, negotiation and conflict within the conservation discourse.

3. To examine the differences in the social and economic status of the villagers, before and after mangrove forest degradation has taken place.

4. To investigate the local peoples' livelihood strategies during the time of mangrove forest degradation.

#### **1.5 Research Methodology**

##### **1.5.1 Site Selection**

My research study site was one village in the Pyindaye mangrove reserved forest area, part of the southern portion of the Ayeyarwaddy Delta, namely Oakpo-Kwin-Chaung village. It is located near the Andaman Sea and about 70 kilometers to the south of Bogale Township. It takes around six hours to travel by boat from Bogale to the village depending on the state of the tide.

The villagers' livelihood depends mainly on fishing, charcoal making and a little rice cultivation, plus some use of minor forest products, such as making honey and nipa leaf collection for roofing. The villagers are Buddhist and literacy rates are very low, sitting at around 20 percent at the time of the study. The construction of large shrimp farms in the mangrove forests areas has had disastrous consequences on the environment and the life of the village communities, who are dependent upon the fish and crabs that live on the mudflats around the mangroves. Local communities have since lost the opportunity to access the mangrove forests for their survival and now do not have jobs or own land and natural resources. Most of the people in the

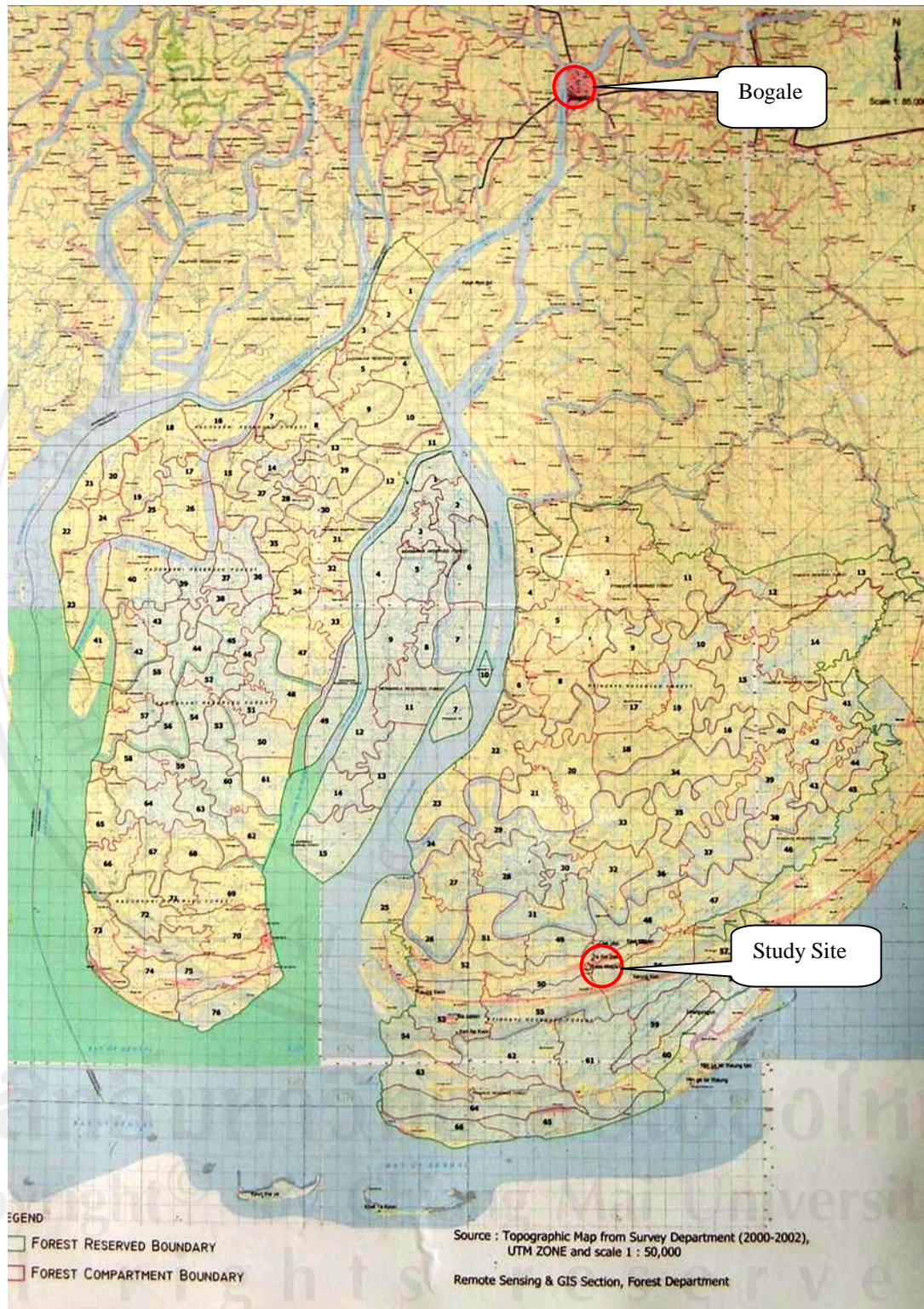
study area and also in the entire Ayeyarwaddy Delta region depend entirely upon this mangrove ecosystem.

I selected Oakpo-Kwin-Chaung village to study for my research for three main reasons. First, in 1985 when I was in the Forest Department, I worked on reforestation and forest conservation projects with local villagers around this area. As a result, I became very familiar with local villagers and developed good communications with them. Secondly, this village is located in a reserved forest area and the poorest villages are in the southern part of this area, close to the sea. I observed that most villagers are dependent on fisheries for their livelihood. Third, Oakpo-Kwin-Chaung village was founded 80 years ago in this area and has stood as the main charcoal making center in the Ayeyarwaddy Delta since the 1970s.



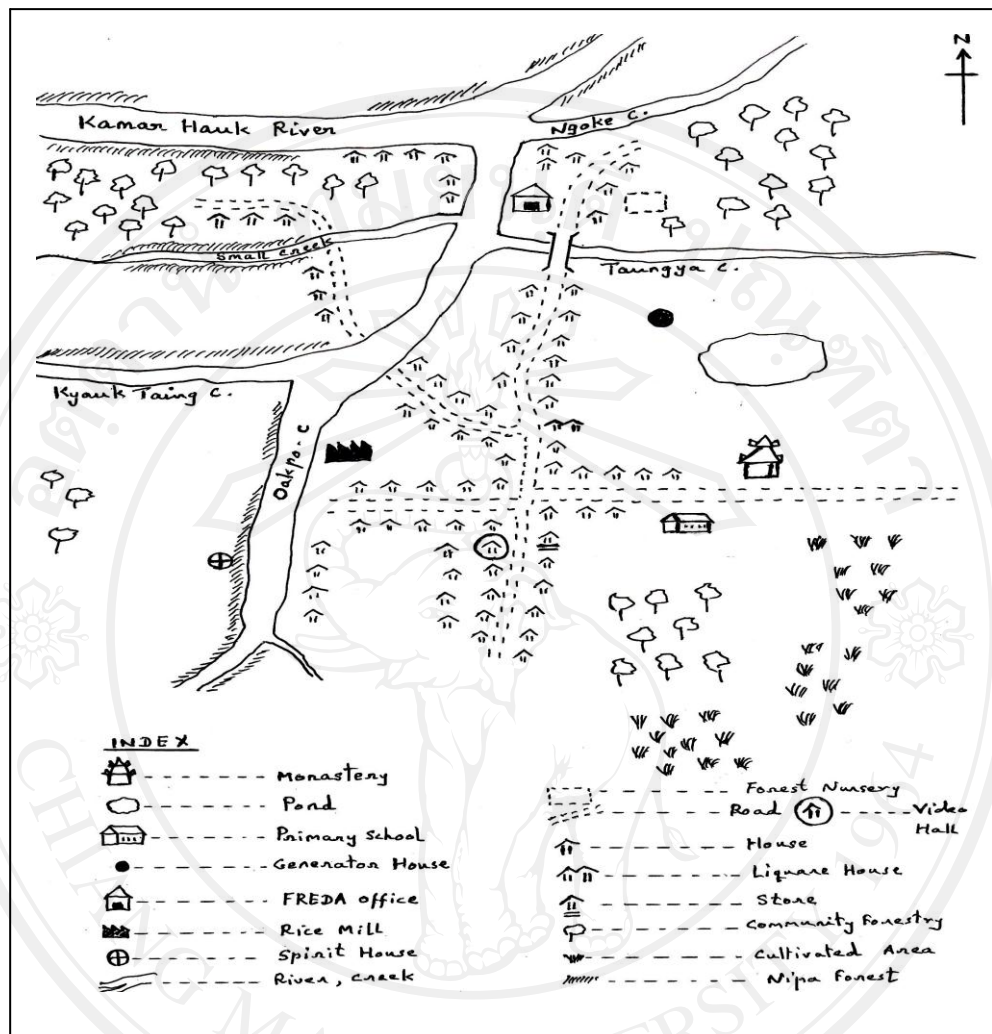
Figure 1.2: Map of Myanmar





**Figure 1.3: Location of Study Site**





**Figure 1.4: Map of the Infrastructure and Land Use Patterns in Oakpo-Kwin-Chaung Village**

## 1.5.2 Methods of Data Collection

### 1.5.2.1 Primary Data Collection

Primary data collection was conducted to provide basic up-to-date facts and figures for my field research. It contributed to a better understanding of the actual situation. The methodology used for primary data collection included key informant interviews, informal interviews and participant observation during the process of my data collection. When I started my key informant interviews, I met village leaders, monks, school teachers, old people and younger people. First, when I met the village

chairperson in his house, he explained the situation of the villagers in the context of their socio- economic status and daily livelihood activities. Also in this interview, I investigated the social networking used for trade, social relations and the social structure of the village. The next day, while I was in the village, I visited one monastery to meet the monk. From interviewing the monk, I obtained much information and data regarding the villagers' traditional culture, religious affairs and their belief in spirits, such as *U Shin Gyi*, the guardian spirit of the mangroves and the sea. In interviews with two school teachers in their homes during the school holiday, I was told about the condition of the school children, as well as village education matters. There is only one primary school in the village, but the school teachers explained about the need for the school-children to continue their studies for a brighter future. When I met with three old men about 70 to 75 years old and one old woman aged 72, they told me the history of their village, including their household situation, their everyday practices, socio-economic status, local peoples' belief in spirits and their religious ideals. I obtained data about the present state of the villagers' livelihoods, the village infrastructure and some social matters such as religious ceremonies, donations and marriage affairs. In brief, I studied information related to local history, relationships in the community, the villagers' kinship, cultural practices, traditional beliefs, customs and their general perceptions.

Using the purposive sampling method, I selected 60 households out of the 121 total households in the village for an informal interview. This sample was based on the economic stratification of the villagers. I also used the purposive sampling method to interview low income, medium and better-off families; covering farmers, charcoal makers, fishermen, general store owners and casual laborers. As a result, I was able to gather specific information and data on local villagers' livelihood, living conditions, social relations and life history. I obtained information about how villagers accessed mangrove forests in the past and in the present, how they perceived their traditional culture and beliefs and what they thought about past and present access to and from the forest. I studied villagers' income and their expenditure for the whole year, using my purposive sampling method. I interviewed eighteen households of fishermen, five households of charcoal makers, twenty households of farmers and seventeen

households covering others such as casual laborers. In total, I spent one and a half months undertaking the household survey in the village.

I used participant observation to collect data and information about local living conditions, social relations, economic activities, traditional practices and daily livelihood practices. Participant observation involved participation in the lives of the people under study, but with the maintenance of a professional distance that allowed adequate observation and recording of data. During my study period, I accompanied fishermen and paddy cultivators. I spent time with fishermen in order to study their daily practices, such as what kind of fishing methods they used, what kind of materials they used and to learn about their income. I went together with them in their boats when they caught fish, in order that I could observe in detail, the process of fishing.

**Table 1.1: Interviews with the Different Households**

Occupation Stratification	Fishery (Households)	Charcoal Making (Households)	Farming (Households)	Small Orchard Owners/Others (Households)
Better-off	3		5	2
Medium	6	2	5	5
Poor	9	3	10	10
<b>Total</b>	<b>18</b>	<b>5</b>	<b>20</b>	<b>17</b>

In my participant observation with the paddy farmers, I went to the paddy fields with them and observed their traditional practices as part of the paddy growing process, throughout the whole day. In the evening, I walked into the village with one of my friends who had worked in the Forest Department in the past. I visited the general store owner's house and talked with him about his business. After that, he

continued his work. I also drank green tea with my friends and used that time in the tea shop to observe the casual laborers. I met many casual laborers and I got much information about their everyday practices from them.

#### 1.5.2.2 Secondary Data Collection

Secondary data collection was performed in order to understand the importance of supporting evidence in terms of past conditions and trends, as well as the constraints in the previous development efforts such as policies, rules and regulations; and also how the government accessed resources and undertook resource management. The data was collected in the respective agencies located in government offices, research centers and academic institutions in Bogale Township and Yangon. I gathered data on prescribed forest rules and regulations, including real data on forest conservation such as numbers with respect to reforestation, forest inventory data and forest reserve data from the Forest Department Head Office and Township Forest Staff Officer. Fortunately, I obtained past and present data for the Ayeyarwaddy Delta and Pyindaye reserved forest from my friends working in the Forest Department and also obtained specific data regarding the Pyindaye reserved forest from the Forest Staff Officer of Bogale Forest Department (who was with me at university]. I obtained land use data about Oakpo-Kwin-Chaung village, from the Land Use and Land Record Department at the township level.

#### 1.5.3 Data Analysis

All collected data from the field research, both primary and secondary data, was useful in terms of research questions and research objectives for my study. During this process, theoretical issues were used in the analysis of social phenomenon, in order to understand the relevance of differences between theories and field data. Also, these theoretical issues were woven into the relevant arguments and critiques on the theories of social dynamics, for my study site.

## 1.6 Thesis Organization

This thesis contains six chapters which can be briefly described as follows:

This Chapter I is a brief introduction, and includes an overview of the mangrove's characteristics, its ecosystem, and also the definition of 'mangrove'. The current situation of the mangroves in the Ayeyarwaddy delta in Myanmar is also stated. This chapter includes a description of the research questions, research objectives and research methodology. Moreover it describes the primary and secondary data collection methods. The thesis organization is briefly described at the end of this chapter.

Chapter II presents the theoretical relevance and literature review on the concepts of the politics of forest conservation, the poverty connected with mangrove degradation and local knowledge as a livelihood strategy. Moreover, a conceptual framework of the theoretical review with a diagram is presented.

Chapter III goes on to discuss the history of forest management, such as the management of forests during the pre-colonial days and then the management of forests during the early colonial period. Moreover, the development of forest law and forest policy will be explained. This chapter also mentions the situation with regard to the forest management system after independence, from 1988 to the present, as well as the use of shifting cultivation (*taungya*) as a method of resource management and as a kind of method for reforestation.

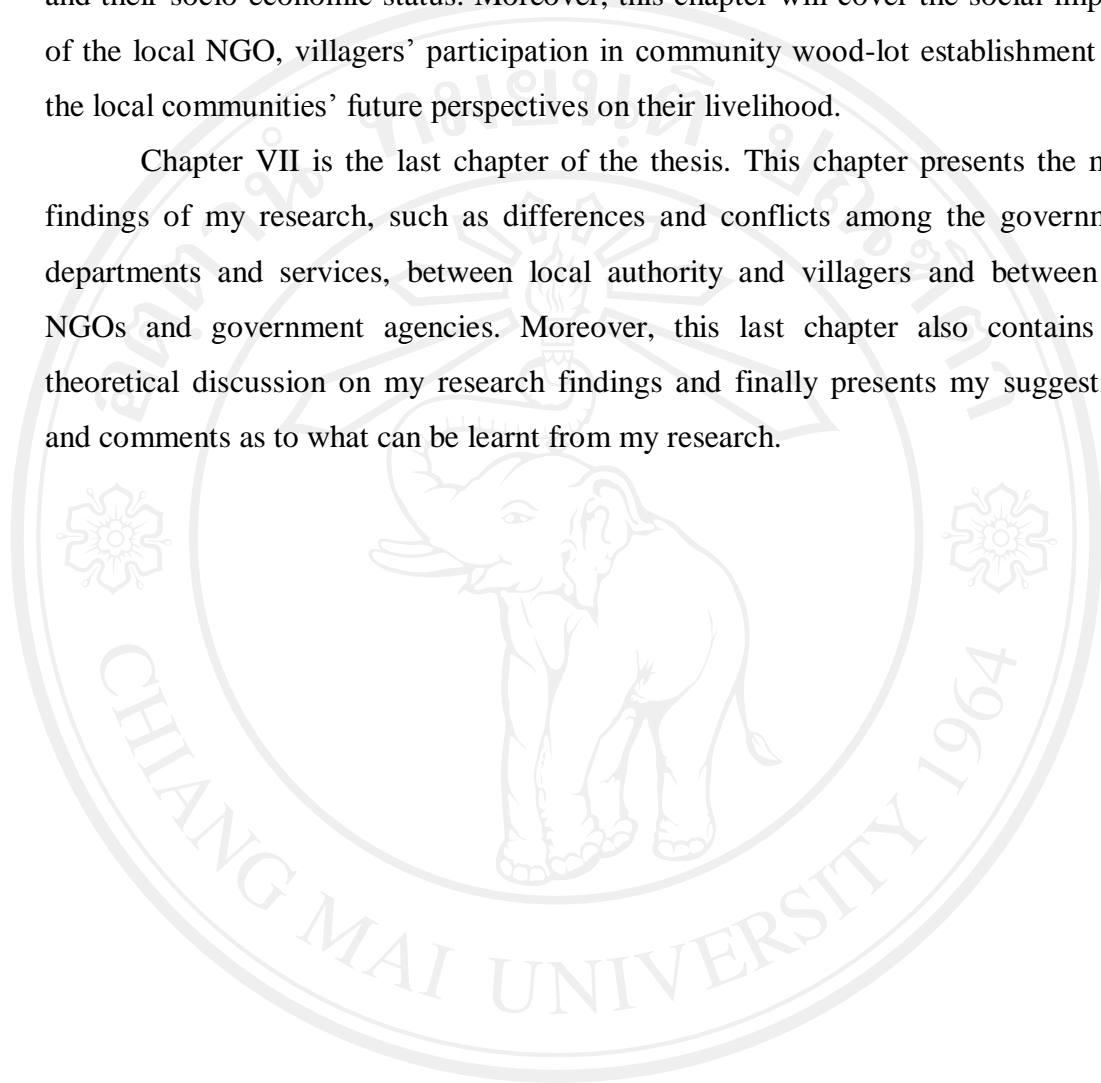
Chapter IV focuses on government policies with respect to mangrove ecosystem management, such as the forest management policy in the Delta and coastal zone development and management. Moreover, changing management policies and land use patterns in the Ayeyarwaddy Delta, mangrove dwellers' forest conservation in the delta and the relationship between humans and the mangroves, as well as the impacts on the environmental and social aspects of the mangrove, will be explored.

Chapter V focuses on the local villagers' daily practices, the current status of the household economy and common problems facing the village, such as intensive shrimp farming and the changing livelihoods of the local people.



Chapter VI describes the villagers' livelihood adaptation after mangrove degradation and how local people responded to the changes both in the environment and their socio-economic status. Moreover, this chapter will cover the social impacts of the local NGO, villagers' participation in community wood-lot establishment and the local communities' future perspectives on their livelihood.

Chapter VII is the last chapter of the thesis. This chapter presents the main findings of my research, such as differences and conflicts among the government departments and services, between local authority and villagers and between the NGOs and government agencies. Moreover, this last chapter also contains the theoretical discussion on my research findings and finally presents my suggestions and comments as to what can be learnt from my research.



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