CONSERVATION POLITICS IN MANGROVE ECOSYSTEMS: A CASE STUDY OF RESOURCE DEGRADATION AND SUSTAINABLE LIVELIHOOD IN OAKPO-KWIN-CHAUNG VILLAGE, BOGALE TOWNSHIP, AYEYARWADDY DIVISION, MYANMAR

1. INTRODUCTION

1.1 Mangrove Background

Mangroves are evergreen forest between the land and sea, found essentially in intertidal zone 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 are usually defined in terms of the distribution of characteristic tree species and found in brackish water on the margin between land and sea but with other definitions of ecological zones. 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).

1.2 Mangrove Ecosystems

The mangrove ecosystem is very dynamic, where changes take place regularly, and within the range of mangrove habitats most major species grow within a given set of conditions. Mangroves are salt-tolerant forest ecosystems of tropical and subtropical inter-tidal regions. They occur in sheltered coastline areas such as small bays, estuaries, lagoons, creeks and sea channels separating islands and certain locations where the soil conditions are favorable such as mud flats and swamps. 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 during the last few decades. The mangrove ecosystem is complex which is composed of various species of plants, animals and microorganisms, 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 of the world. It has one of the most productive ecosystems and a natural, renewable resource. The people living in coastal areas are dependent on these forests as their primary source of income generation, fuel, food, medicines 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 (Aksornkoae, *et al.*1984).

With the destruction of mangroves, ecosystem sustainability is endangering. Increased coastal storms, land erosions, high salinity, and loss of biodiversity will occur unless we approach the problem from different new views. 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 ecosystem known to mankind (Ohn, 2004).

1.3 Myanmar Mangrove

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. Natural geographic formation of sandy beaches, rocky shores, groups of islets and estuaries are decorated with diversified plants and animals. At the present situation, a total area of mangrove forests in Myanmar is 320,106 ha distributed in Rakhine State, Tanintharyi Division and Ayeyarwaddy Delta. The largest mangroves exist in the Ayeyarwaddy Delta in these three areas. Before 1970, there were 785,000 ha of mangroves along the Myanmar coastal line.

The Myanmar coastal mangroves have also been overexploited from forestry, agriculture, aquaculture, and development projects. Mangrove forests are subject to severe degradation because there is no clear-cut land-use system. Forestlands have been converted to agriculture and other development activities.



Map of Mangrove Location Areas in Myanmar

1.4 Ayeyarwaddy Delta

The Ayeyarwaddy River, the longest river and main transportation route in Myanmar, has flowed into the country for several millenniums witnessing the physical and socio-economic changes along its banks and delta. The Ayeyarwaddy is the main river of Myanmar, traversing the country from north to south (from Himalayan slopes to the Bay of Bengal) for about 1,350 miles. However, 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 in the Himalayan slopes. They join about thirty miles north of Myitkyina to become the Ayeyarwady. The name is believed to come from the Sanskrit word *airavati*, meaning "Elephant River". In other words, it means "Big River".

Ayeyarwaddy Division lies at the southern end of the central plains of Myanmar. In the north of it is Bago Division and in the east are Bago and Yangon Divisions. On the southern and western sides of the Division are Andaman Sea and Bay of Bengal. It is contiguous with the Rakhine State in the north-west. The Ayeyarwaddy Delta lies between Mawdin point and the Gulf of Martaban. The Ayeyarwaddy River enters into the Andaman Sea by nine principal mouths in depositing enormous quantities of sediments.

The length of the coastline is about 469 km in the Ayeyarwaddy Delta. This area is 46.4% out of total mangrove area of Myanmar. The mangrove forests were rich in species composition three decades ago. In this Delta area, there were three types of mangroves which depend on topography and tide rising. These are the beach and dune type, tidal type and swamp mangrove. The Ayeyarwaddy Delta represents an important and extended mangrove forest that is included in the Delta Forest Division, which comprises 13 forests reserve, among which eleven contain mangroves and their associated flora and fauna. 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 seasons. The land is intersected by rivers and creeks dividing it up into numerous islands. All of the rivers, creeks and channels in this area branch from the Ayeyarwaddy River.

Mangrove forests in the Ayeyarwaddy Delta were cut for fuel wood and charcoal production in the beginning to cater to the need for Yangon City. With the energy crises in early 1970, this need rose in leaps and bounds causing the depletion of Ayeyarwaddy mangroves. With the growing population and land tenure, the cut over areas were cleared and transformed into paddy cultivation, fish and shrimp farming and salt production even in the mangrove forest reserved forest areas. Forest law could not prevail over the social and economic needs of the people and as such, during a period of 75 years (1924 to 1999), 82.76% of the mangroves were already depleted in the Ayeyarwaddy Delta. The depletion of mangroves had limited impact and by no mean adequate to handle the situation in the whole of this Ayeyarwaddy Delta.

1.5 Problem Statement

Mostly forests has been drastically degraded and denuded by human activities because of socio-economic conditions such as energy crisis, promotion of paddy production, market oriented economic policy and lack of alternative income sources. Due to these reasons, nearly fifty thousand hectares of forest areas were changed into other land use between 1954 and 1989 in Ayeyarwaddy Delta.

With the dramatic increase in population of Myanmar, the Government's priority had to be food security. The consequence of this need gave impetus to the farmers to grow more paddies in Ayeyarwaddy Delta because this region has alluvial soil condition that is most suitable for paddy growing. But resulting in a virtual it is impossible to get rid of the encroached farmers in the reserved forest areas of the Ayeyarwaddy delta. Actually from the past time the delta area recognized as most productive area for paddy of Myanmar by the government. In such areas, as long as the encroached paddy land was productive, the farmers continued cultivating paddy until the authorities forced them to abandon the area for alternative land use in the period of 1970s. After mangrove forests degradation seriously later from 1985, most of the lower portion of Ayeyarwaddy delta that is near to the sea, measurements indicate salinity up to 2.5% or more in summer.

In the 1985, Agriculture Department extended commercial cultivation area for paddy in the 'reserved forest areas'. Without mentioning the difficulty in enforcing the rules of reserved areas, these conflicts between the government agencies such as Forest Department, Agriculture Department and Fisheries Department further complicate the issue. Land use policies for forestry, agriculture and fisheries has to be resolved once and for all since many of the forest reserves were either deforested or encroached for agriculture and fishery developments. There appears to be a lack of flexibility in using agriculture land for aquaculture.

Mangrove forest destruction in Ayeyarwaddy Delta is related to construction of shrimp ponds seriously started in 1988. After declared open economic policy by the government in 1990, many businessmen and traders constructed shrimp farms and fish ponds to produce marketable shrimps and fish for exporting to international markets. They are very closely to the local authorities and they got officially permission from them. They negotiate to the authorities to invest in aquaculture activities in the south portion of delta region. Businessmen marginalized to the local communities' daily livelihood. According to sources from the Forest Department more than 3,000 acres (1,200 ha) of mangrove forest area were already turned to shrimp ponds in this delta area in 2004. Most of the shrimp farms are established by clear felling the forests and dyke making as a result rise in salinity and pollution of water and the subsequent results. The construction of dikes, which obstruct tidal runoff, also causes an increase in salinity and consequently affects the growth of living organism.

In 1990s, Irrigation Department started dam construction for cultivated land when paddy growing in the upland area of delta region and to produce electricity power. Dam constructions, establishment of shrimp ponds, saltpans, and cultivation of nearby lands, erosion and sedimentation started in rivers and creeks. Series of forest areas have been turned into water area due to construction of dams and reservoirs to supply irrigated water for sustainable agriculture.

In the delta region, there were many migrants who are moved from Karen State during ethnic separatist insurgency since 1960's. The migrants in current parlance may well be called economic refugees for there is more opportunity in fishery. 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 have to face in getting the forest products. Before the government issued the mangrove forest concession in 1992, the villagers perceived that mangrove forest around the surroundings belonged to them. They could manage mangrove forests according to their experience and local knowledge for their survival. Karen peoples who came from upland or hill areas from Karen State have traditional knowledge for forest conservation and access for their livelihood.

The primary focus of this study is the dynamics of local forest management systems in the coastal areas of Ayeyarwaddy and the role of people at the local level which is crucial in forest management. The local communities live within the mangroves and are the primary users of mangrove forest products. They had customary rights that aim to be maintaining the ecosystems sustainability and secure of their livelihood. In currently situation, villagers from my research village, they became lack of opportunities to work for their daily life because they quite rely on land and forest. After mangrove ecosystem changed, there were started land degradation and depleted mangrove resources and marine resources.

1.6 Research Questions

1. What is the relationship between environment and the sociological, cultural and economic characteristics of mangrove dwellers?

2. How does forest management policy affect to the mangrove dwellers' cultural practice and their livelihood?

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

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

1.7 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 processes of cooperation, negotiation and conflict within the conservation discourse.

3. To examine the differences of social and economic status of the villager before and after mangrove forest degradation.

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

1.8 Research Methodology

1.8.1 Site Selection

My research study site was in one village that exists in Pyindaye mangrove reserved forest area. This is part of in southern portion of Ayeyarwaddy Delta.

Oakpo-Kwin-Chaung village is the research site for my study. 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 research site depending on low and high tide.

The villagers' livelihoods depend mainly on the fishing; charcoal making, shrimp and salt farming by clearing mangrove trees, and a little rice cultivation and some use of minor forest products such as honey bee and nipa leave collection for roofing. The villagers are Buddhist and literacy rates are very low sitting around 20 percent. The construction of large shrimp farms in the mangrove forests areas has disastrous consequences to the environment and the life of village communities who are dependent upon the fish and crabs on the mudflats of the mangroves. Consequently, natural ecosystems are changing in the Delta area. Local communities have lost opportunities to access mangrove forests for their survival. They don't have jobs or own land and natural resources for their livelihood. Consequentially, local communities became poorer. The people in the study area and also in the entire Ayeyarwaddy Delta region depend on 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 Forest Department, I worked reforestation and forest conservation projects with local villagers around this area. So, I am very familiar with local villagers and have good communication. Secondly, this village is located in the reserved forest area and the poorest villages are the southern part of this area those that are close to the sea. I observed that most villagers are dependent on fisheries for their livelihood. Third, Oakpo-Kwin-Chaung village started is about 80 years old. This village stands as the main charcoal making center of the Ayeyarwaddy Delta.

1.8.2 Methods of Data Collection

1.8.2.1 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 informal interview with key informants, household interviews as well as constant participant observation during the process of my data collection.

When I started key informant interviews, I met village leaders, monks, school teachers, old persons and younger persons. First, when I met the village chairperson in his house, he explained about real situation of villagers in the context of socioeconomics and their daily livelihood activities. Included in this interview with this person, I investigated social networking for their trade, social relations and social structure of this village. In the next day, while I was in this village, I arrived to one monastery to meet monk. After I asked monk, I got many information and data such as villagers' traditional culture, religious affairs, believe on spirit such as "U Shin Gyi festival" who is the guard spirit of mangrove and sea. In interviews with two school teachers, in their houses during school holiday, they spoke about their schoolchildren' condition as well as village education matters. There is only one primary school in this village, so school teachers especially explained about the need for the schoolchildren to continue studied for a bright future. When I met with three old men about 70 to 75 years old and one old woman 72 years old, they spoke me the history of their village including their household situation, everyday practices, socio-economic status, the local peoples' belief in spirit and their religious ideals. With the younger generation of villagers, I met frequently in their house and in some places such as in teashops and on boats. I received data about the present state of villagers' livelihoods situation, village infrastructure and some social matters such as religious ceremonies, donation matters, and marriage affairs. In brief, I studied information related to local history, relationship in the community, villagers' kinship, cultural practices, traditions, customs and their perceptions and opinion over the mangrove forest as well as the associated discourse.

Interviewing different stratified households enabled me to get specific information and data on local villagers' livelihood, living condition, social relation and life history. Moreover, I got information about how villagers accessed mangrove forests in their past time and present, how they perceived their traditional culture and beliefs, and how they think about the past and present access to and from the forest. I selected 60 households from the whole village based on the economic stratification of the villagers for my household survey. This research include stratified random sampling method to gain information from wealthy, middle and no income families regarding charcoal production, rice cultivation, fishery, and others such as general store owners and casual laborers.

I used participant observation to collect data and information about local living conditions, social relations, economic activities, traditional practices and daily practices in livelihood. During my study period, I participated with fishermen, paddy cultivators and general store owners. I spent one week with fishermen participation to study their daily practices such as what kind of methods are used in fishing, what kind of materials they used and about their benefits. I was together with them in their boat and could observe in detail. For three days, I participated with paddy cultivators. In my participant observation with paddy growers, I went to paddy fields with them and observed their traditional practices. In the evening I walked in the village with one of my friends who worked in the Forest Department in the past time. I visited to general stores owner's house and I could talk with him about his business. He mentioned to me about his daily activities. I saw that he is very busy wit his work. He could not give me more time to talk with me. After half hour talking with me, he did continue his work. I also drank green tea with my friend and I used that time in the teashop for casual observation. In my study period of participant observation, I met three fishermen, five paddy grower and two general store owners.

1.8.2.2 Secondary Data Collection

Secondary data collection was performed in order to understand the importance of supporting evidences in terms of past conditions and trends as well as

constraints in the previous development efforts such as policy, rules, and regulations, how the government accessed resources and resource management. The data was collected in the respective agencies such as government offices, research centers, and academic institutions. I gathered data on prescribed forest rules and regulations, real data on forest conservation such as numbers on reforestation, Forest Inventory data and about forest reserved data from Forest Department Head Office and Township Forest Staff Officer. Fortunately, I got past and present data of Ayeyarwaddy Delta and Pyindaye reserved forest data from my friends who are working in Forest Department and also got specific data of Pyindaye reserved forest data from forest staff officer of Bogale Forest Department. He was my classmate when I was in Forestry University and through him I received. I got land use data of Oakpo-Kwin-Chaung village from Land use and Land Record Department in Township level.

1.8.3 Data Analysis

All collected data from field research both primary and secondary data were 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 to understand the relevance of differences between theories and field data. And also these theoretical issues were woven into the relevant arguments and critiques to the social theories of social dynamics for my study site. Both qualitative and quantitative methods also were applied in during analysis.



Map of Myanmar



Research Site

2. LITERATURE REVIEW

I used three relevant concepts in my research. These are (1) politics of forest conservation, (2) poverty in connection with mangrove degradation, (3) local knowledge as a livelihood strategy. These three concepts are useful as basic analysis and discussion of the literature.

2.1 Politics of Forest Conservation

Most of states have applied forestry management policies as a strategy to reach financial, social control and national security as well. Conservation initiatives may thus be a means for states to assert their authority over peoples and environmental resources control, thereby strengthening the state position in relation to other actors (Peluso, 1992).

Scott (1998) points out that nowadays, an old-growth forests were destroyed and replaced by rationally planted, scientifically chosen, commercially successful trees, would never be able to recapture the lost of local ecology as animals and activity of the forest floor steaming from diversity. Political and economic factors often play an important role in stimulating state to adopt forest protection policies.

Scientific forestry itself has three mainly problems. First, scientific forestry is harmful because its claim to privilege status for its mode of knowing legitimizes colonization and exploitation of the object of its knowledge. Second, Scientific is used to justify short-horizon commercial practices rather than to pursuit of genuinely long-run interest. Third, it has direct state control compound the problem even further because of corruption, inefficiency and waste. (Forsyth, 2003).

Community forestry means different things in different social, political, geographical and ecological contexts. Community forestry involves a number of users who live in the same area and primarily carried out by peasant farmers or smallholders (Adams, 1993).

2.2 Poverty in connection with Mangrove Degradation

Most state forest management systems in the Third World have failed to overcome either forest degradation or rural poverty. (Peluso, 1992). People who are living in the forests, the key to livelihood improvement are to leave the forest environment. (Sunderlin, *et al.* 2005).

Poverty and environmental degradation co-exist in the developing countries. Poverty cannot possibly be alleviated without ensuring environmental stability and vice versa. Social factor that is communities as a whole is becoming more and more important especially when it is directed towards environmental conservation (Ohn, 2004).

2.3 Local Knowledge as a Livelihood Strategy

Local knowledge is used when referring to recent knowledge, as in the nontraditional knowledge. The term indigenous knowledge is more broadly defined as the local knowledge held by indigenous peoples or local knowledge unique to a given culture or society (Ruddle, 1994a).

Lvelihood systems are defined as the mechanisms that people pursue to ensure household social reproduction, and meet the various obligations of self and society (Bryceson, 1997).

A livelihood is considered to be sustainable when it can cope with and recover from stresses and shocks and can maintain or enhance its capabilities and assets both at the present time and in the future, while not undermining the natural resource base (Carney, 1998).

Traditional knowledge is considered at four interrelated levels (Berkes, 1989a).

- First, there is the local knowledge of animals, plants, socials and landscape. This level includes knowledge of species identifications and taxonomy, life histories, distributions, and behavior.
- At the second level of analysis, there is a resource management system, one that uses local environmental knowledge and also includes an appropriate set of techniques tools and practices.
- Third, a traditional system of management requires appropriate social institutions, sets of rules-in-use, and codes of social relationships.
- Forth level of analysis is the worldview, which shaped environmental perception and gives meaning to observation of the environment. The

forth level of traditional knowledge and management systems include religions, ethnics, and more generally, believe systems, and rounds out the knowledge-practice-believe complex that describes traditional knowledge.

2.4 Conceptual Framework

In my conceptual framework, I aim to see mangrove forest degradation in a more holistic way or as an ecosystem to illustrate dynamics and complexities of ongoing processes and changes. The basic analysis on resource degradation is developed in relation to politics of forest conservation in Myanmar versus current local resource management situation. At the heart of the politics of forest conservation I place 'conservation discourse' which is the basic idea inherited from the British colonial times to the Myanmar Forestry Policy. The focus of inquiry here is related to the question of 'for whose benefits and whose rights?'

My main argument addresses the issue of the conflicting politics of forest conservation and consequent results in mangrove resource degradation and poverty. Government separate agencies such as Ministry of Forestry, Ministry of Agriculture and Ministry of Fishery and discoordination with each other results conflicting policies in the resource management. Also the critical gap between the law enforcement and reality situation exacerbates the resource degradation. Local people's livelihoods that depend on those resources are hindered by the result of the misleading policy. Therefore, poverty is closely related to natural resource degradation and the vice versa: poverty-stricken people also on their turn contribute to the resource degradation. So, I would like to focus two ways on mangrove ecosystem dynamics. First, how are the government forest conservation policy effected to ecosystem management and forest conservation, and secondly how are local people controlling natural resources for their sustainable livelihood with local knowledge. There are also included conservation discourse, centralization of power and de jure and de facto laws and regulations. In the local community's resource management, there are included indigenous knowledge, equally access resources and customary rights. Local communities use natural resources and depend on this demand for their survival. Government controls the natural resources and natural forests by the rules and

regulations, but they over used natural resources exploitation for the country's economic development. So, later communities became poor and found it very difficult to survive and continue their current livelihood.

On the other hand, extension of paddy field, charcoal making, shrimp farming, saltpan, and timber extraction are the main causes of degradation of mangroves emerged due to government policy flaws, create new livelihood opportunities for the local people. Despite the structural bottlenecks, local actors find a way to access natural resources through their negotiation with local authorities.



Conceptual Framework

3. FOREST CONSERVATION POLICY

3.1 History of Forest Conservation

The Burmese kings basically designed forest administration system to text and control forest use. Teak was made royal property by king in 1775 and its extraction control by girdling. Seasoned natural teak lost almost all moisture and the trees and logs of such trees or logs float in the streams during the rainy season they are brought in rafts down to the timber deports and saw mills along the river. Revenue and customs posts set up along Principle Rivers and roads regulated and controlled movement of all forest products.

British annexed Burma in three phases: the territories of Tenasserim and Arakan after the first Anglo-Burmese War in 1824-26, the province of Pegu after the second Anglo-Burmese War in 1852 and the rest of the country after the third Anglo-Burmese War in 1882. Towards the end of 1859-60 there was a clam our to allow private enterprises to exploit the teak forests, and he was forced to agree to the introduction of the permit system, whereby 12-years leases were granted to private agencies to harvest teak timber from tree selected and girdled by the government (Blanford, 1925). Around 1870, the Forest Department was divided over how to guarantee future teak supplies.

By the end of the nineteenth century, the need for working plans become more urgent as the government allocated teak leases to the European firms. Beginning in 1902, the government of Burma ordered the accelerated creation of working plans according to the principle that the effort be expended to increase the commercial value of its forests. In 1920, a special branch within the Forest Department in the name of "Working Plans Circle Division" was formed to direct formulation of the district level working plans. The working plans manual, was published by this working plans circle in 1938 and the third edition was printed in 1948 and it was revised and published again in 1990 (Forest Department, 2002).

3.2 Forest Policy and Management

The original Burmese Forest Act of 1881 was amended several times and finally printed as the Forest Act 1902. The Rules under this Forest Act was published as the Forest Rules in 1911. The Forest Act of 1902 and Forest Rules 1911 had worked well under the conditions of abundance of supplies over demand. However, such system had come under steadily growing stress as a result of increasing demand for forest products and competing uses of forest land soon after the independence since the country had to be rehabilitated or rebuilt after the World War II and subsequent unrest. Myanmar Forest Resources were administrated over a hundred years under the Forest Act of 1902. It was amended several times to accommodate the changing political and socio-economic conditions of the time. The Forest Policy objectives were relevant directly to the tangible benefits only. Four main classes defined in the policy were (1) protection forests essential on climate or physical ground, (2) commercial forests for supply of valuable timber for domestic use and export, (3) local supply forests to provide for the local community the essential needs of timber, fuel wood and others and (4) pasture lands. Since attaining independence from British Colony in 1948 till a new Forest Policy 1894, with a few amendments, had serve as the guidelines for forest management and administration in Myanmar. Certain amendments were made during the period 1962-88 to bring the Policy to be in line with the socialist economy during that era.

Independence in 1948, the Burmese State sought to restore order in the forest as part of a general attempt to re-introduce a system of rationalized forest use in the country. In the process, however, it sought to modify that system in light of the political and economic goals of the post-colonial leadership- notably, the promotion of national security in the face of widespread insurgency as well as the nationalization of key sectors of the economy in keeping with socialist ideas. The advent of rule by the State Law and Order Restoration Council in 1988 may mark a new phase in this process of adapting the colonial model of forest management. Yet the underlying dynamic of attempted state control and popular resistance has endured, and continues to condition Burmese forest policies in the late twentieth century (Bryant, 1996).

Burmese Forest Act 1902 was replaced in 1992 and the State Law and Order Restoration Council enacted the new Forest Law No 8/98 on 3 November 1992. The new Forest Law 1992 has a broader outlook, covering environment, economic and social aspects such as conservation of biodiversity, establishment of commercial forest plantations for sustainable production by both the State and private sectors, and formation of community forests for the local peoples. Myanmar Forest Policy (1995)

focuses on the balanced approach toward conservation and development issues implicit in the concept of sustainable forestry and highlights environmental and biodiversity conservation. The biodiversity and ecosystem services, being natural heritage of the country, it deserves to be safeguarded for the benefits of both present and future generations. Today's primary focus of monitoring forest resources has been shifted beyond forests and trees. As development activities have intensified and increasing population has spread onto marginal lands, problems of deforestation, soil degradation, wetlands drainage and diminished biological diversity have paramount environmental concerns. Therefore, there is an urgent need for adequate information bases from which appropriate resource monitoring and management strategies and interventions can be derived. The forestry sector, today, is linked with, not only the economic aspects, but also the environmental stability, biodiversity and ecological balance. Consequently, sustainable management of forest has emerged as the most important concept in the development of the country's forest resources. As such, it is inevitable that policy intervention is called for as an instrument for maintaining a balanced utilization and conservation to benefit both man and nature and that this equilibrium is sustainable. The new Forest Policy was promulgated by the State in 1995, taking into consideration the multiple functions and uses of the forest, as well as its potential for sustainable development. Six Policies imperatives have been derived from the forest principles. Thus, Myanmar forest policy explicitly indicates the political communities, goal and objectives for the national development.

3.3 Traditional Knowledge of Shifting Cultivation (Taungya) in Karen Community

The taungya system of agro-forestry originated from Myanmar. Taungya, stemming from the Burmese terms taung (*hill*) and ya (*cultivation*), means temporary cultivation of hilly land and is practiced in the Bago Mountains, the homeland of the Karen people. During the 19th century, teak plantations based on the taungya system were established in reserved forests in the Bago Mountains by the colonial government, and Karen areas were demarcated where the Karen people could freely practice shifting cultivation. Traditionally, the poor rural people have much attachment to the native place and unwilling to shift themselves to the new surroundings for land. But in order to reduce the degradation of forest and to raise the

living standard of rural farmers near the forest, the controlled agro-forestry typed shifting cultivation (or) Taungya method is used by the forest department. Rural communities are still heavily dependent on forests for food, fuel, fodder and timber for their livelihood. Several deforestations occurred primarily as a result of land clearing for agriculture. Myanmar forest resources were administered by the Forest Department in 1978 by using the "Taungya" method. "Taungya" is a typical type of agro-forestry that is combined plantation of agricultural crops with forest trees. In this method, local people and shifting cultivators from other community could grow their agricultural crops in allotted lands; simultaneously they will take part in forest plantations programme with low cost but also the cultivators can get the agricultural land and norm provided by forest department.

4. COASTAL ECOSYSTEM MANAGEMENT IN AYEYARWADDY DIVISION

4.1 Management of Forest Policy in Delta

The Ayeyarwaddy Delta is in the southern part of Myanmar. It is located between latitudes 15° and 18° north, and between longitudes 94° and 96° east. The total area of Ayeyarwaddy Division is approximately 155,795 km2. The mangrove of Ayeyarwaddy Delta is the largest in the country, with 180,826 ha, compared to other areas of Rakhine and Taninthayi. Mangrove forests are mainly found in Bogalay Township, which is situated in the south of the Ayeyarwaddy Delta (Forest Department, Myanmar, 2002).

Ayeyarwaddy division is where the Ayeyarwaddy River splits into many streams and drains into the Andaman Sea. Many river streams rich in minerals collected along hundreds of kilometers run through the middle of the country, islands, swamp land, wetland, sands, mud and mangrove forests, bush forests and large rice fields are fully occupied in the division. The delta area has a large network of creeks, streams, and rivers, and is frequently flooded by tidal effects during the rainy season. The land is intersected by rivers and creeks that divide it up into numerous islands. Basically, all of the rivers, creeks and channels are branches of the Ayeyarwaddy River. Myanmar government's mainly objectives are towards the development and increasing the productivity of coastal and marine living resources up to the maximum sustainable yield to meet human nutritional needs as well as social, economic and development goals. The forestry sector, today, is linked with, not only the economic aspects, but also the environmental stability, biodiversity and ecological balance. Consequently, sustainable management of forest has emerged as the most important concept in the development of the country's resources. Local communities mainly livelihood strategies are fishery production and forest resources access. Fishing in any types of marine animals which are caught from the rivers and canals located in mangrove forests. The availability of the marine resources in the rivers and canals is directly related to the presents of mangrove forests and fishing is one type of mangrove forest using indirectly. Villagers have knowledge of tending for mangrove forest. Based on their experiences, it is believed that young seedlings need shade at the beginning of their growth in natural regeneration.

4.2 Description of Oakpo-Kwin-Chaung Village

The village is located in Bogale Township. It is about 60 km away from Bogale and towards south-east direction. There are 120 household in the village. The total population is 531 which included 271 male and 260 female. 95% of the villagers are Buddhist and others are Christian. All villagers belief in forest spirits and practices such as tree ordination that are popular among the Karen people as well as native. The occupation in the village can be categorized: (a) agricultural people, (b) fishery people and (c) casual labour people. The large farmers sell their surplus paddy to local collectors/millers and earn cash income required for household necessities.

Villagers exploited forest products by customary rights within their community. But outsiders or anybody from other ethnicities and other areas, especially those from urban areas such as timber merchants or the person who has to over exploits were not allowed or not encouraged to cut trees in the communal forests. In order to control extensive cutting of trees, local people has created strong discourse of *nat* (spirit) to spread fear about punishment that will be given by the forest spirit in case of cutting trees beyond their traditional norm. There are popular gossips among the local people about someone punished by the forest spirit such as eaten by a

crocodile or spiritual tiger, stricken by a thunder, or dying in the storm when traveling by boat.



Nat shrines to protect the forests



Crocodile near Oakpo-Kwin-Chaung Village

4.3 Current Status of Local Villagers' Daily Practices

There are many economic differences among villagers. On the average village households are poorer than other villages. In the past time, small dried shrimp making and dried fish making is the popular for this village economy. Although, charcoal making was the most popular market economy. Most of the villagers got income from charcoal selling. In the past time, about last 30 years ago, the average annual income earned by the village household was 360,000 kyats (4,500 US \$). At that time, Myanmar kyats are high value. And every thing was low prize. Therefore, villagers' livelihood was not difficult in their life. In the present situation, every thing such as transportation fees, rice, food and others are become high prize. For example, in the past time about 30 years, there was 350 to 400 kyats for one rice bag (50 kgm). In the currently time one bag of rice is 25,000 to 30,000 kyats in the village. Villagers' daily income and prize is not equity. So, in this village, moat of the people are become poor. They are now fully depending on thatch making and small scale fishing. Most of the marine animals catch by the fishermen since there are no processing techniques other than drying. Fish paste and shrimp paste was make in small scale by the villagers who use old methods; the quality is low and the process is time consuming. When they sell, they receive a low price for it and thus earn a low income.

Larger farmers earn more income from raising livestock and poultry than small farmers, while farmers specializing in aquaculture earn more than those engaged only in paddy cultivation irrespective of land holding size. There are two types of fishery people in the area: (a) full-time fishery households and (b) part-time fishery people. Full-time fishery people earned much more than the high income farm groups, while part-time fishery households (landless households) engaged in crab catching live on a subsistence basis. Since the majority of small farmers and landless households suffer difficulties in maintaining their livelihood, they must work as agricultural laborers during the peak agricultural season at the average daily wage rate of 600 Kyats for woman and 1,000 Kyats for man.

In the current situation, most of the villagers that 95% of local communities are working on crab collection and nipa thatch making for house roof. These are the main jobs in their livelihood strategies in many villages in Ayeyarwaddy Delta. With the destruction of mangrove forests, loss of employment income and declining paddy yields, the Delta's population, wealthy and poor alike, has increasingly turned to fisheries as the second most available natural resource in the region. Most landless people depend on fishing, and the poorest rely on catching mud crabs. Many people are spending their lives moving from village to village fishing and crabbing, some even living on boats throughout the year. Consequently many cultivated land were out of use, as they became high salinity area. With the creation of big boats, trading of river sand or sea sand through inland watercourses of river and bringing back fresh water became a popular business in the delta.

4.4 Villagers' Participation in Community Woodlot

According to the local peoples' needs, community forestry activity started in 1999 with supported by local and international organizations. One NGO named FREDA with the financial assistance of Japan has launched a programme to reafforest 600 ha of mangrove plantation within 5 years around the village.



Community Involvement in Community Forestry

In the project activities, there are included three main components. These are community participation, mangrove forest nursery establishment and plantation establishment. For the woodlot establishment, when they choose tree species for planting local community select themselves suitable tree species according to their local knowledge and reality their needs.



Community Forestry Plantation

5. CONCLUSION

5.1 Main Finding of the Study

Villagers have scientific knowledge and power to use in reforestation. Local authorities ignore local knowledge. Local villagers are pushed into the process of marginalization. Local villagers were included as a labour with very low labour charge in the process of reforestation but they don't have chance to give some suggestions to local authorities. Villagers have local knowledge and ability to use in reforestation. Local authorities ignore local knowledge. Local villagers are pushed into the process of marginalization. Local villagers were included as a labour with very low labour charge in the process of reforestation but they don't have chance to give some suggestions to local authorities. In the community forestry operation also, local villagers were not provided with some facilities. So, they don't want to participate with local authorities and forest department's reforestation project activities. In the community forestry operation also, local villagers were not provided

with some facilities. So, they don't want to participate with local authorities and forest department's reforestation project activities.

5.2 Theoretical Discussion on Research Finding

Land is main resource for local villagers' livelihood. In the conflict of land use pattern, they were lost their survival opportunities in their local area. Mather (1986) explained patterns of land use on the basis of two approaches. One emphasizes the role of the physical environment. This approach assumes that land use is determined by the nature of the physical of the environment in the same way that natural vegetation is related to climate. Another approach is base on the assumption that land use if an economic activity and that is determined by economic forces. Most of states have applied forestry management policies as a strategy to reach financial, social control and national security as well. (Peluso, 1992).

Most of the rural poor worldwide are found in those least favored areas where natural and human factors combine to constrain agricultural production and market access. (Peluso, 1992). Poverty and environmental degradation co-exist in the developing countries. Social factor that is communities as a whole is becoming more and more important especially when it is directed towards environmental conservation. The poverty lines identify poverty with shortfalls in household purchasing power. Households are classified as poor or non-poor depending on whether their income is below or above the poverty line. (Kabeer, 1994).

People who are living in the forests, the key to livelihood improvement are to leave the forest environment. (Sunderlin, *et al.* 2005). Most of the coastal peoples rely heavily upon local fisheries for staple food and livelihood. Local knowledge is based on experience, adapted to the local culture and environment, and is continuously developing. Local knowledge is used to sustain the community, its culture and to maintain the genetic resources necessary for the continued survival of the community. Local people believe that every creature has a soul, which is seen as a resource controller and deciding all actions over resources. They have set up customs and habits in resource use and management that keep harmonious relation among human, nature and spiritual (Minh and Van, 1998).

5.3 Comments and Suggestions

I would like to suggest protecting the remaining forest and reforestation for local villagers to alleviate poverty and to solve the problems such as land use pattern in three kinds as under.

First, by giving advises to highest authority of this local area such as local Commander for land use pattern among Forest Department, Fishery Department and Agriculture Services. At the present situation, the same place which is in the reserved forest area, there are extended paddy fields, salt pans and shrimp farms as complexity in land use pattern. For the Delta Region, local commander of Southwest Command can decide as separately for the places for land use system in any Department and Agencies to protect forest in his responsible area. Local Commander is the most powerful person for decision in everything in his administrative area. In my country, government officials, INGOs, LNGOs and local community collaborate for sustainable development programme in many places to alleviate poverty in rural areas. In the government official institution, there is still practicing top-down system. But in the NGO role, there is a bottom-up system which means participatory approach to local communities to implement for development programme. Community participation is a real success in the rural areas. Thus, we need local NGOs to consult with local commander for the local communities especially in rural areas to alleviate poverty.

Second, we need to establish Biosphere Reserve areas as much as possible in the remaining forest. There are two parts of component in biosphere reserve. They are core area which is protecting flora and fauna and buffer zone which surrounded the core area. In the buffer zone there are two kinds; these are to supply forest produce to local communities under the control of the Forest Department and local authorities and another is seriously prevent in the core zone. In this case, if we can establish biosphere reserve, we need to submit to superior level up to the cabinet through local Commander and Minister for Forestry. There are more than 400 Biosphere reserved areas in the World. But, in my country, there is no such biosphere reserve, still. Biosphere reserves support for sustainable development for the local communities for their future and also protect the protected area system. Each Biosphere Reserve should contain three elements: one or more core areas which are securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems and undertaking non-destructive research and other two impact uses such as education; a clearly identified buffer-zone, which usually surrounds or adjoins the core areas, and is used for co-operative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism and applied and basic research; and a flexible transition area or area of cooperation, which may contain a variety of agriculture activities, settlements and other uses and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources.

Third, I would like to suggest to establish Community Forestry Plantations more and more in rural areas in the buffer zones and the nearby. I found in my study village, there had been a success in the establishment of community forestry through local community's participation. User groups have the right to use the plantation land to establish community forestry for 30 years. Community forestry is the one kind of forest establishment and conservation by the local community. This method is very effective to the local community for poverty alleviation. I found that local community is interested in community forest plantation very much because they know they can get benefit from the forest for their consumption such as post, pole, timber for house building and boat making, and charcoal making for fuel. If we establish community forest plantation more and more in the destroyed forest area and fallow land area, there will be much effects for forest conservation and provide local communities for their needs on forest produce and food from marine products. Local communities' participation, local capacity building, and dissemination of information on community forestry instructions are the prerequisites for promoting community forestry establishment. Consultation with local people, collaborate efforts, incentive mechanism and land titling are basic for motivating people to participate. Financial and technical assistances are essential in community forestry initiatives. In this context financial and technical support of international organizations and NGOs, and utmost efforts of local people will substantially contribute to promotion of community forestry.

By submitting about the land use conflict problem to local commander who is the highest authority for this area, can solve the land use pattern around the village forest area. If local commander discuss with local authorities and local government officials and local villagers there will be a solution for these complexity problems and alleviate poverty for local communities. Finally, the success in solving this complex problem depends on three stages. First stage is the awareness of the Governmental, regional and local authorities on how serious or critical the mangrove resource situation in the Delta is facing and the willingness to pull their resources to make concerted effort to solve the problem. Second stage is to enlist rural community support and participation throughout the different stage of developments in the form of utilization of forest produce, substitution of alternative energy base and the bioenergy plantation programmes. The last stage is the technique efficiency of all the departments and institutions handling the problem and an effective extension service which could reach to the grass roots levels to disseminate the message of research findings, transfer of technology and their capability for the successful on operation of development programmes.

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