CHAPTER 3
ENVIRONMENTAL RISK AND ENTITLEMENT

Leach et al. (1999) state that an endowment is the rights and resources that social actors have and can call on; for example, land, labor, skills and so on. Gasper (cited in Leach et al., 1999) points out that entitlement is legitimate effective command over alternative commodity bundles, while more specifically, environment entitlements mean alternative sets of utilities derived from environmental goods and services over which social actors have legitimate effective command. The alternative set of utilities that compromise environmental entitlements may include any or all of the following: direct uses in the form of commodities such as food, water, or fuel; the market value of such resources, or the rights to them; and the utilities derived from environmental services, such as pollution sinks or properties of the hydrological cycle (Leach, et al., 1999).

By borrowing Leach's theory of environmental entitlement, in this chapter I would like to share how environmental entitlement plays a role in the well-being of the Intha people around Inle Lake, and how environmental deterioration has affected the environmental entitlements they have. The Intha people around Inle Lake depend on its ecosystem for their living, so the lake represents an endowment for them. The lake contributes environmental entitlements in the form of livelihood resources, and people obtain their entitlements through formal and informal rights. For fishing, they need to have formal rights, while in the case of floating gardens, their ownership rights exist according to local customary practices. Hence, for those engaged in the tourist industry, the lake is a tourist destination, while for the Intha people it supplies fish and floating gardens, as well as their transportation routes. The lake also acts as a pollution sink for the local people. For the pilgrims, Inle Lake is pilgrimage area. In this way, we can see that Inle Lake provides environmental entitlements according to the rights people have on different institutional levels.

3.1 Floating Gardens and Environmental Risk

In this section, I will explain how local people in different locations around Inle Lake region compete for its resources in different ways, and according to their livelihoods. By using environmental entitlements, people in different locations and with different livelihoods use the lake's resources in their given, local context.

Around Inle Lake, the major source of income for the Intha is the floating gardens they cultivate, and it would be hard for them to change their agriculture-based livelihoods to non-agriculture-based ones as their level of education is still relatively low. However, they are not ready to take account of environmental degradation within their ongoing processes; instead, they think it is an aberration when they are affected by dramatic changes to the lake's ecosystem.

Floating gardens form the main livelihood activity of the Intha, and the tomatoes they grow all–year-round on the floating islands are very famous. Floating gardens are locally called *ye-chan*, and are formed from grasses, reeds, sedges and other aquatic plants grown together. Some parts of these islands are submerged in the water and other part float on top. Originally these floating islands are cut from the natural floating plants found around the lake, then pulled into position and fixed with bamboo poles. The floating islands have been used as the principal media within the floating garden business for many years. After a number of years, the floating islands become thin and unable to support the gardens, so are removed and left at the edges of the gardens for one or two years. In this way, they can regain their thickness due to vegetation growth, and together these former-islands constitute a solid mass of islands after about one year. In this way, the floating islands can be used again and again. However, the floating islands in a given garden will not become thin at the same time, so the gardeners can grow seasonal cash crops in the garden without delay.

Floating gardens were introduced in the 1960s (Sidle et al., 2007), but at that time, it was not popular as a livelihood activity, though some people cultivated them for subsistence purposes. An elderly woman (aged 81 years-old) told me that floating gardening started about 65 years ago, when she was 25 years-old. People could clear the water grass and turn an area into a floating garden, and today the activity is open access. At that time, the population was very small and the main livelihood activity of the Intha was fishing.

Around the entire lake area, the livelihoods history of the Inthas can be described as follows, according to the local people. Before the 1970s, the major livelihood activity of the Inthas was fishing, and there was a famous monk in the area called Watthakin Sayadaw - the Abbot of Watthakin monastery. Local people respected him very much due to his religious devotion, and so were eager to obey him. Sayadaw did not want his people to fish, as this represents a misdeed for Buddhists, and as a result, almost all the people left fishing for a living and begun to cultivate floating gardens. Prior to this they had also cultivated floating gardens, but only on a household consumption basis. After the 1970s, floating gardening became the main livelihood of the Intha.

In Lwenyeint village, prior to 1988 the main livelihood activity of the villagers was acting as middlemen for the fish trade. Those who had enough money were middlemen, while others were wage laborers in the fish processing industry around the lake. Some were also motorboat drivers, collecting fish from other villages around Inle Lake and Sagar Lake. Very few people were floating gardeners at that time.

After 1988, due to the declining fish population and high cost of transportation, villagers transformed into floating gardeners, as this was able to bring a higher income. Very few people now work as middlemen, but those who do are within the better-off group in the villages, acting also as money lenders as they have sustained income. When the floating gardeners need to borrow some money, they have to go to people from this group.

Within floating gardening, people grow seasonal cash crops such as tomatoes, cabbages, cauliflowers, egg plants, chilies and flowers. Tomatoes are grown as the major cash crop, and almost all the gardeners grow tomatoes for cash income. In Myanmar, the floating agriculture sector around Inle Lake is the major tomato supplier nationwide, and every year, millions of kilos of tomato are distributed across the country.

The Inthas start their gardening by weeding-out some grass on the floating islands, before planting the crop. After weeding, the islands are covered with algae from the lake. The wild algae are essential in floating agriculture, and the Inthas use them in almost every stage of the plant growing process. The algae are used as mulching media and as natural fertilizer in the gardens. There are hard and soft algae

in the lake, but the gardeners prefer to use soft algae as they think soft algae is more nutritious for their plants. They collect the algae in the open-water area of the lake, and in the floating garden season, people collecting algae can be seen across the open water area. They use bamboo to collect the algae under water, and this is physical work. Women do not join in with this work, because it is felt they are not strong enough to collect the algae.

Figure 3.1: The Intha Collecting Algae for Floating Agriculture

The Inthas put algae on the floating islands and cover it with a thick layer of mud. In some cases, people put sheets between the floating island and the algae so as to easily transport the seedlings to the field. After about two or three hours, the seed bed is somewhat dry and they make small square plots of 2.5 square inches on the seed bed. On each plot, two tomato seeds are placed to ensure germination, then they put some fumigant powder on top. After this, the seeds are covered with algae again. After one month, the plants are about four inches tall and are ready to be transplanted to other floating islands. Before being transported, the islands in the fields are prepared like a seedbed. At that time, the plant sheets are carried by boat and

transplanted. The spacing between each plant is about one foot. Both men and women can transplant, but mostly the women do this because they are more patient than the men. When the women are transplanting, the men go and collect algae in the lake. After transplanting, the algae are required in order to cover the base of the newly transplanted plants, for mulching.

After about two weeks, more algae are used, as the mulched algae has become dry and already given sufficient nutrients to the plants. The gardeners then travel to the open water to collect more algae, which is then placed at the base of the plants, as a second layer, after which the gardeners start using fertilizers. After another week, one more algae layer is placed on the floating island, and this time hard algae can be used. The gardeners then start to set up the bamboo poles on the floating islands, and after about one month, the plants have grown to about 1.5 feet and it is time for the scaffolding to be added. At this time, the gardeners are busy with scaffolding and tying the plants to the scaffolding, plus weeding grass from around the plants. At the same time, they spray chemical fertilizers and pesticides on the plants, to help them grow. The plants start flowering after about one and half months after this, with small fruit developing later.

Gardeners can start their first harvest about 70 days after transplanting. During the early harvest, the tomatoes can be collected every ten days; however, after the fourth harvest, the gardeners can collect tomatoes every twelve days. When the plants are about five or six months old, they stop producing flowers and tomatoes. Generally, the gardeners can collect tomatoes about twelve times from a garden, but some people told me that they can extend the harvesting season somewhat using chemical fertilizers. If the price of tomatoes is high, they use this method to extract more profit.

Regarding the area units used for floating gardening, the Inthas locally use a *lan*, which is equivalent to two square yards, and they count the length of each floating island as a *lan*. In Myanmar, area is usually measured using acres, except around Inle Lake. The Inthas are not worried about the width of each floating island, just the length. According to the local authorities, 1200 *lan* is equivalent with one acre. The total area of a floating garden may be quite large, but the gardeners think only about the length. So, among the floating gardeners of Inle Lake, the *lan* is the

key unit used, and it is from this they calculate the inputs needed to grow their gardens.

When some gardeners want to put more floating islands in their garden, and if the garden still has space, they can buy islands from other gardeners who want to sell theirs. In some cases, they will buy them from those who cut floating islands from the natural floating beds. Cutting islands in this way is prohibited, as these natural floating beds are important residences for birds; hence, it is very rare to find people cutting floating islands in this way. The price for of these beds may be different according to the locality. For example, in the northern part of the lake, such as in Khaung Daing village, the price for one hundred *lans* of floating islands is about 80,000 Kyats, and the price depends on the thickness and maturity of the plants on the island. In the southern part of the lake, as in Kilar village, the price for one hundred *lans* is about 300,000 Kyats.

The Inthas calculate the required inputs according to the number of *lan* they have. Mostly, they base this calculation on 100 *lans* of floating islands, and the following table shows some of the material and labor inputs used for 100 *lans* of floating gardens.

Table 3.1: Material and Labor Inputs needed for 100 *lan* of Floating Agriculture

No.	**Materials and Inputs Needed**	**Amount**
1.	Medium-sized bamboo (to pull floating islands into position)	15 Bamboos
2.	Small bamboo poles (for plant growth)	1000
3.	Small bamboo (to tie scaffolding)	700 *[what???]*
4.	Thin bamboo strips (for tying)	
5.	Seeds	10 grams
6.	Chemical fertilizers	100 kg
7.	Natural fertilizers (cattle, pig and bat waste)	200 kg
8.	Pesticides and insecticides (liquid)	4 items *[liters??]*
9.	Pesticides and insecticides (powder)	4 items *[kg???]*
10.	Fungicides	

Table 3.1 (Continued)

No.	Materials and Inputs Needed	Amount
11.	Weeding (before growing)	3 people (men)
12.	Transplanting	2 people (women)
13.	Collecting algae and mud	18 people (men)
14.	Weeding (after growing)	5 people (women)
15.	Cutting leaves	5 people (women)
16.	Scaffolding	5 people (women)

Source: Field Interview, 2011

The above table shows how much money and labor is necessary for their gardens, as they need to buy everything except their own labor. There are no bamboo forests around Inle Lake anymore, so they have to buy this material from the nearby town, Nyaung Shwe. When they go to buy bamboo, they cannot get it all in one visit, so they need to go two or three times by motor boat to get enough of a good quality, and this costs money in transportation charges. This bamboo can be used for about two or three seasons before being replaced. In this way, they do not need to spend money on bamboo every year. After the growing season, they keep their bamboo in the house or in a shelter. The durability of the bamboo depends somewhat depend on the storage condition.

One harvest of 100 *lans* of floaing islands can yield about ten baskets of tomatoes, and one basket of tomatoes is equivalent to 45 to 50 kilograms. So, one yield from one hundred *lans* adds up to more than 300 vises. The gardeners roughly calculate their expected yields from the floating gardens in this way locally.

The floating gardeners use hybrid varieties of tomatoes which require the use of pesticides, insecticides and chemical fertilizers. Some researchers have pointed out that the Intha people use a lot of insecticides, more than the loading capacity of the 'land'. Butkus and Su (2001) point out in their research that fifteen times the recommended amount of Cypermethrin is applied and 59 times the recommended amount of Metalaxyl. The over application of these pesticides is not only costly to the farmers, but also causes unnecessary pollution that may be harming the health of

watershed residents. Min Aung and Maung Maung Yi (2005) state that nitrogen removal due to tomato cultivation in Inle Lake is about 30,545 tons per year, and the cost necessary to take out the water weeds and sediment is US$419,074 per year.

The Intha people told me that they know about the danger of using these agricultural products in terms of their health and the environment, but have to use them to generate a yield. Moreover, they said that if there was a good market for the organic crop, they would not use the chemicals. They said they do not want to use pesticides and chemical fertilizers, but have to in order to make a living.

As mentioned above, the lake is under the jurisdiction of Forest Department. In the case of floating garden, Myanmar Agriculture Enterprise supports some knowledge about agriculture and how to control pest and weed in biological measures. In some villages, they establish model organic agricultural practice and support vermin-compost technique.

In terms of land tenure, local people do not have ownership rights, as the lake is in the wildlife sanctuary area. In the village, they have separate areas set aside for floating gardens, and although these areas have been extended, some local people claim that before creating the wildlife sanctuary, the area was theirs to use. Floating gardening was introduced in the 1960s (Sidle et al., 2007), while the Inle Wetland Wildlife Sanctuary (IWWS) was established by the Forest Department in 1985. The Forest Department allows local people to practice floating gardening in certain areas, for the sake of local people's rights. Although they do not have ownership right for their area, they have use rights, so they practice local customary rights in terms of ownership. In their village, people sell, inherit or transfer according to their local customary rights. For inheritance, sons and daughters have equal rights in the Inle Lake area, as in other regions of Myanmar. In some cases, if parents need money for their gardens, they sell the gardens to their sons or daughters at a cheaper than normal price. Mostly, when a son or daughter gets married, the parents share a part their garden with him or her.

Each year, taxes are collected on the crops by the Settlements and Land Records Department (SLRD), but in the local context, local people recognize it as a tax for using the land. The staff from the SLRD explained that it is not a land tax, but a tax for growing crops on the land.

Until about five years ago, in the wet season tomatoes were grown only in the Inle Lake area, and the Intha got a certain level of profit. Tomatoes can grow on the floating islands of Inle Lake all year round, while in other parts of country they could not be grown in the wet season. However, since a few years ago, wet season tomato growing has become somewhat popular in other regions of the country, and due to new technologies, people from other areas have also been able to grow tomatoes all year round. In this way, the market conditions are not as stable as before and they are not certain of being able to make a profit. So, while the prices of inputs such as chemical fertilizers, pesticides, seeds and bamboo are rising each, the tomato market does not favor the Intha anymore.

For this reason, floating gardening - the main source of income for the Intha - faces challenges due to unstable environmental and market conditions. The level of legal access to the market does not affect the gardeners so much, but the decline in the water level has not favored the gardeners over the last two years or so, something made worse by the less secure market conditions.

In the watershed area around Inle Lake, local people, most of them from the Danu and Pa-Oh ethnic groups, practice shifting cultivation for their livelihoods, a practice which was environmentally sustainable when the population was not so large. Under shifting cultivation, in winter people clear the land by cutting down a certain amount of forest in order to grow crops. After cutting down the trees, they leave the land to dry for about one month in the summer sun. When the trees are dry enough to be burned, they burn them and in this way, the land is fertilized with the resulting ash and is ready to grow seasonal crops. The above groups grow seasonal crops such as sesame and others. After one or two years, they leave the land fallow, as the land is not fertile enough to produce a good crop by this time. During the first year, the land can support a high production rate, then the soil cover degrades in the following years. At this point the farmers have to look for other areas and move there. After about five years, the fallow land regains some of its soil fertility, and a little forest cover has grown. According to the area of land available, the fallow period changes; the wider the area, the longer the fallow period is. When the population was small in the area, the fallow period and the fallow land was sustainable. However, with the recent

population dynamics, the groups cannot now leave the land fallow for long, so according to my study, there is no fallow system in place today in this region.

Although they once grew crops for their subsistence, now they grow for sale. According to the market demand, they will grow crops over a large area, in order to offset the soil fertility loss and the decline in production rates. They told me that the crop production rate has been declining in recent years, as they do not have any fallow land left; the land they grow crops on has become permanent land.

During the shifting cultivation period, the land they cleared was recognized as their land, and at this time, this land was not in the reserved forest, so it was treated as common land by the local people. At the village level, they have boundaries between the villages, and in their village, they have customary rules regarding land inheritance in accordance with their ancestors. According to the law, local people do not have ownership rights legally, but they have user rights for which they must pay tax. Every year, they have to pay a certain amount of tax to the Settlements and Land Records Department (SLRD). At the village level, they continue to sell or handover their land to each other in the customary way.

After their agricultural area was assigned as reserved forest, as an ecological conservation measure around Inle Lake, their land fell under the jurisdiction of the Forest Department; however, they still had right to access the land due to reserved forest procedures. These procedures say that the land and villages must be measured before being assigned. The Forest Department then records the area of land, and gives it a name and location. After this, local people still have the right to access their land, for the sake of their livelihoods.

In term of the environmental effects of the local people's practices in the upland areas around Inle Lake, as already mentioned, they liked to practice shifting cultivation in the past, for which they ploughed the land and eroded the soil cover. Now they are practicing permanent cultivation. As the soil became less fertile than before, the production rate fell, so they started to use chemical fertilizers, pesticides and insecticides in order to attain higher yield. When it was the wet season, the chemical residues and the soil eroded from the upland areas was carried along with the water downstream. In this way, Inle Lake has become a pollution sink for people's

agricultural practices, leaving their residues in the lake as a result of their right to use the land in the upland areas of the lake.

They practiced their agriculture cultivation at the top of hills without bothering to conserve the forest or soil cover, and as a result, this led to a decline in production rates. If they had not changed their cultivation style, they would have faced greater hardships. They told me that the production levels of their crops fell to one half of the previous levels. Ten years ago, they could get twenty rice baskets from one acre of land, but today they can get less than ten baskets. It is also more difficult to collect seasonal vegetables than it was before; ten years ago they could collect vegetables from around their village and sell them at the five-day markets. Now, they cannot find as many vegetables as before, and they have to put a lot more effort in to get a regular income.

For their daily water requirements, up to a decade ago they could fetch water from a local spring not far from the village; however, now the springs are dry and so they have to go a long way to get water for their household use. In some cases, when they go to the market, they also take their clothes for washing and on the way back bathe and wash their clothes at the spring on the way. After taking a bath and washing, they fetch water for their household use. Most of the households have small tanks in which they save water during the wet season. For the communal pool, they dig ponds in the village to collect rain water; however, a few months after the wet season has finished, these ponds are dry. In these villages, it is seen as a luxury to take a bath. So, it can be seen how they face hardships, even just finding enough water for their daily use - one of the impacts of environmental degradation on their daily lives.

Although Inle Lake is the main water supply for Lawpita hydroelectric power plant, most of the villages around Inle Lake do not have access to electricity. Among the 400 villages around Inle Lake, only about 150 have electricity; most are prevented from doing so by the Electricity Installing Committee of the Inle Lake region. The main reason they have not had electricity installed in the villages is due to the high cost of transformers. The villages could install electricity by themselves, but this would mean the inhabitants having to bear the costs of installation. As a result, local people continue to use firewood for their household heating cooking requirements.

Most of the land-based villages have forest areas within their traditional boundaries, and in some villages there are many people whose livelihoods depend on the making of traditional snacks, which are then sold at the five-day market. When making snacks, it is necessary for them to use a lot of wood for fuel, and according to my interviews, these households use at least 100 tons of fuel wood per annum. With many villages making snacks in the area, one can see that firewood consumption is very high in the Inle Lake area.

Up to the last decade, local people around Inle Lake collected firewood from nearby forests for their household use, for at that time forest cover was still good. In the 1990s, forest areas around Inle Lake were assigned as reserved forests, the objective being to conserve the Inle Lake environment as well as retain its ecological value. After they had been assigned as reserved forest, it became hard to collect firewood, as this led to degradation over time. In some villages, the heads of the villages prohibited anyone from collecting firewood from the nearby forests, meaning that now most local people have to buy firewood or charcoal at the five-day market.

There are some small villages at the base of the mountain for whom their main source of income is collecting fuel wood and selling it at the five-day market, as they have limited space for cultivation. In the cultivation season, they grow sesame, pigeon, groundnut and some other crops, but the amount of land owned by each household is small in size, so cannot rely on cultivation alone. As a result, almost every day they go to the forest and collect firewood for sale - even the children and women join in. However, they now need to spend more time in the forest to collect the fuel wood, because the forest has degraded over time. They told me they need to walk further into the forest and expend a lot more effort than they did a decade ago. There is no water in the villages, so they have to fetch water from elsewhere, about two kilometers away. The people in this area are poor when in compared to the other villages, due to their lack of cultivatable area and lack of alternative options.

As firewood consumption around Inle Lake is so high, many firewood collecting villages are needed to supply the demand, so some people buy charcoal from neighboring townships and sell it to the villagers. For local people, fuel wood is a commodity upon which they have to spend a certain amount of their income. For the Intha people, rice, cooking oil and fuel wood are the key commodities needed, so

people from the local villages pay as much attention to getting fuel wood as they do to their land.

Local people from some villages claim that they are now conserving the natural forest because they do not collect fuel wood from nearby forests anymore; instead they buy charcoal and firewood from the market, which comes from neighboring townships. However, the Intha people still blame the upland dwellers, pointing at the cleared land on top of the mountains. They also complain that with no forest cover the hills cannot hold water. They add that the lake is facing environmental deterioration due to sedimentation and that this is due to the activities of the people who live in the upland area.

However, the paradox here is that from the point of view of the highlanders, they have no alternative ways to make a living except through cultivation activities. One of the lowland residents told me that the upland people should change their cultivation system from seasonal cropping to agro-forestry, suggesting that they should grow seasonal crops and perennial crops together on the same land. In this way, the soil could regain its fertility and at the same time, they could reduce sedimentation rates. He said that to achieve this, the government should also provide some sort of technical assistance, as well as loans for agro-forestry activities.

Under Article 17 of the Forest Law (1992), it states that forest produce may only be extracted after a permit is obtained; however, if it is for domestic, agricultural or piscatorial use, and not on a commercial scale, forest produce may be extracted to an amount not exceeding the stipulated quantity - without a permit. Under this law; therefore, local people can collect firewood for their household use.

To sum up, when people are entitled to use natural resources for their livelihoods in the study area, the environment does not allow them to do so, not because of a lack of entitlement, but because of environmental deterioration. They use improper agricultural methods on the lake and in the watershed area, and at the same time, their daily fuel requirements have led to forest degradation. Many people not only extract resources, but also deposit unwanted materials into the lake, and these practices in turn cause a loss of entitlement to the natural resources. At the same time, unstable market conditions create added livelihood risks.

3.2 Conflicting Environmental Services around the Lake

With diesel residues being left in the lake from the tourism activities and contamination due to floating gardening activities, the fish population has declined in recent years, meaning fishers can no longer catch as many fish as they did two decades ago. One person may be a gardener and fisher at the same time, and though their resource uses does not cause conflict among people, it does lead to conflict within their own work.

The main means of transportation for the Intha are rowing boats and motor boats, as there are fifteen village tracts across the lake. The water body of the lake also serves as a transportation route for the Intha, but it is not only local people, but also visitors who enjoy passing through the lake using motor boats.

The owners must have a license for each motor boat, and the fee for one year is about 3000 Kyats. Each motor boat must have a license number, like a car. Almost every motor boat has a license and each motor boat cannot carry more than fourteen people. The license can be obtained at the general administrative office in Nyaung Shwe, which told me that in 2010 there were 1861 licensed boats in the area. However, some local people told me that the actual number of boats may be much more.

Fishing is the traditional livelihood activity of the Intha and the source of their daily food supply, with Inle Lake a huge endowment for local people in the region; the lake contributing environmental entitlements for their livelihoods. For the fishers, the water body is an entitlement, and traditionally they have used conical nets to fish. A fisher using a conical net while rowing with his leg is a trademark view of the Intha people. According to the elders I spoke to, using this method they used to be able to get at least fifteen kilograms of fish per day, but now they cannot get as much due to the low fish population. As a result, they need to use more fishing gear in order to get a suitable daily return.

Nowadays, they use several kinds of net to catch enough fish. Some fishers use hooks and line traps because fishing nets are expensive for them, while others use a gill net and trap. The amount of fish caught depends on the availability of these fishing tools. The longer the fishing nets possessed, the greater the fish catch. Some fishers go fishing in the day and some at night – when they drop the nets into the

water and sleep on their small boats in case the nets are stolen. To buy a new net is expensive, so they sleep on their boats, close to the net. At night it is windy on the lake, and so sleeping on their boats, for those who are not in good health, is risky. Some fishers have died after dropping into the water when suffering a stroke.

In recent years, the fishers have been told not to use electrical or disturbance fishing practices. Those who are greedy use batteries to stun the fish, for using normal fishing methods a fisher can get three or four kilograms a day, while using a battery, a fisher can get about fifteen kilograms within just one or two hours. If they are caught using a battery, they are fined and their battery and other tools are confiscated by the authorities. Most people do not want to use a battery, because they understand that it will lead to severe fish scarcity over a very short period if they do.

For the rice farmers, water from the lake provides irrigation as an environmental entitlement. Unlike in other areas of the country, rice farmers in the Inle region grow rice when the water level becomes low – as the land appears in the early winter, then harvest when the monsoon rains arrive. The availability of the lake's water and the level of the lake play a fundamental role in the lives of the local rice farmers. If the water level is too low, it affects rice growth, and if the water level is too high, or there is a flood, the rice plants are submerged under water and their efforts will be in vain.

In the 2011 wet season, there was a severe flood and all the rice fields were submerged under water, just as the rice plants were about to be harvested. In a normal year, farmers can sell any surplus rice (having saved some for household consumption), but in 2011 the flood forced them to buy rice, even for their household consumption. Some people told me that the water level of the lake was very low that summer, but that there was then a flood in the wet season, which caused them many difficulties.

In summary, the livelihoods of people around Inle Lake look like they are destroying the environment around them unintentionally, due to a lack of options, and as a result, their livelihoods are now at risk. These risks are not related to any legal access to the resources, but due to the environmental conditions in the area. When resource use has an adverse impact on the environment, the response of that environment becomes the root cause of conflicts within the environmental services

provided. For example, even within one household, they may practice floating gardening and fishing at the same time, leading to an internal conflict over resource use.

3.3 Failure of State Regulations and Marginalization of the Local Community

With the objective of protecting the environment and preventing further deterioration, in 1985 248 square miles of the Inle Lake area was declared a wildlife sanctuary, under Notification Number 15/1985. However, in reality, it has been difficult to regulate this area according to the standing forest laws and regulations. The reason why the enforcement of these laws has been so poor, is that local communities have been residing in the Inle Lake area for many centuries, and to enforce the laws strictly is impracticable, due to the local community rights developed over this period.

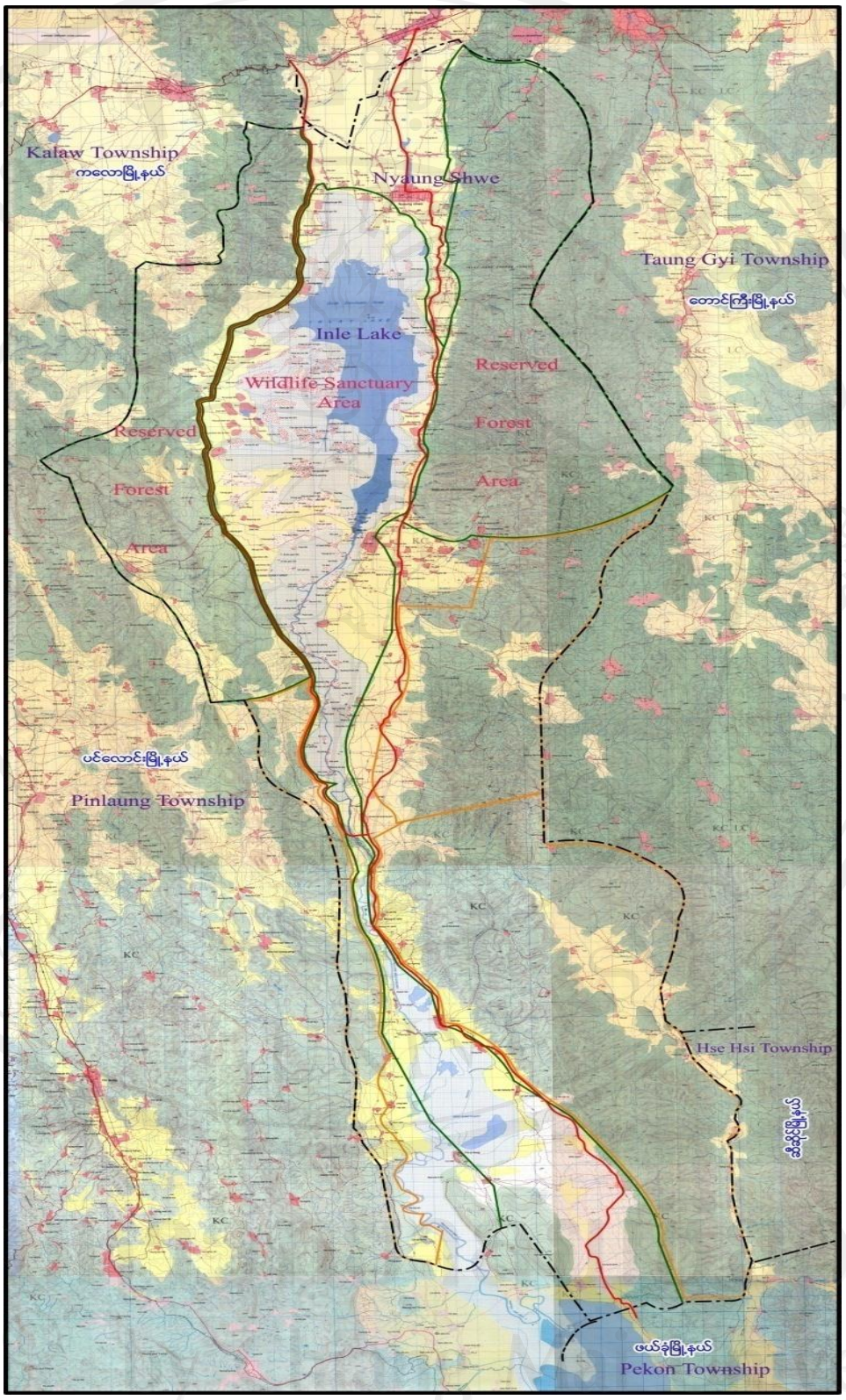

Figure 3.2: Map of the Study Area's Wildlife Sanctuary and Reserved Forests

From the above map one can see that almost all of Nyaung Shwe Township is covered by a wildlife sanctuary and a reserved forest area. According to the law, the whole of Inle Lake region falls under the jurisdiction of the Forest Department. There is a Nature and Wildlife Conservation Division under the Forest Department, and this has a park warden's office in Nyaung Shwe. In the northernmost part of the lake, there is a special wildlife management zone, which is square-shaped and is sixteen square miles in area. Within this zone there is a bird watching house, and the Wildlife Conservation Division does not allow fishing, though sometimes villagers near the area sneak-in and catch fish, because the area has a large fish population. If they go fishing in other areas, they can get only about two or three vises; however, if they catch fish within the excluded zone, they can catch ten vises within one or two hours. As a result, conflicts sometimes erupt between local people who enter the area to catch fish and staff from the wildlife sanctuary. Mostly, these fishers are released, but some people enter the area again and again to catch fish, so are arrested and prosecuted.

According to the law, Inle Lake comes under the jurisdiction of the Forest Department, which is part of the Ministry of Environmental Conservation and Forestry, as it is a wildlife sanctuary. However, in reality, various government organizations take an interest in the area, for different reasons. For fishing, it is the Fisheries Department that gives permission, and those who get permission to fish then release their fishing rights to individual fishers on a transfer-quota basis and collect fees in return. Every year, local fishers have to pay a charge to get a fishing ticket, with the tickets stating what activities are allowed. Fishers are not allowed to catch fish near pagodas, monasteries and other religious locations, and fish smaller than one inch cannot be caught. Without a ticket, no one is allowed to fish, and any instructions duly issued by the local authorities must be obeyed. For example, fishing during the fish breeding season is not allowed.

When they go fishing, the fishers must take their ticket with them, and if they meet anyone who wants to check the ticket, they must show it, or they will be fined. These cases are rare; however, for according to my survey, every fisher buys a fishing ticket. As each ticket costs about five US dollars for one year, it is affordable for everyone.

In the case of the motor boat licenses, the General Administration Department collects the fees, and in this way various state organizations marginalize the local communities from natural resource and environmental services. However, though their main goal is to conserve the ecosystem around Inle Lake, this aim is rarely achieved.

Under the Protection of Wildlife and Conservation of Natural Areas Law (1994), Article 35 states that if a person (a) hunts without a license, (d) causes water and air pollution, or damage to a water-course or puts poison in the water in a natural area, or (e) possesses or disposes of pollutants or mineral pollutants in a natural area, they will be punished with imprisonment for up to three years, or with a fine up to 10,000 Kyats 10,000, or with both. Article 36 states that if a person (c), destroys the ecosystem or any natural state in the natural area, they will be punished with imprisonment for up to five years, or with a fine of up to 30,000 Kyats, or with both.

According to these articles, almost all floating gardeners should be punished because they used chemicals in their floating gardening areas, inside the wildlife sanctuary. However, the Wildlife Division understands the local people's situation; that they have been living around Inle Lake since before the wildlife sanctuary was established, and that their main livelihood activitiy is floating gardening.

Legally, the Intha do not have ownership rights, but manage the resources according to their local customary rights. They transfer, sell and inherit their land or their floating gardens according to their customary rights, and in their local context, such activities are recognized. Even at the legal level, the management of the lake is somewhat complicated. For example, the floating garden area is inside the wildlife sanctuary; however, in reality, the fee for using the area is collected by the Settlements and Land Records Department (SLRD).

When a company wants to build a hotel inside Inle Lake wildlife sanctuary, cabinet agreement is required, because no one can get land ownership or land concessions inside the sanctuary. The first step required is to exclude the area from the forested zone. According to the Protection of Wildlife and Conservation of Natural Areas Law (1994), in Section (a) of Article 9 it states that the Minister may, with the approval of the government, revise, alter or cancel the whole or a part of a natural area. Under this law, the wildlife sanctuary is one category of "natural area",

so the first step towards getting land ownership is to cancel the area. To do this, a company needs to apply for agreement from the Ministry of Environmental Conservation and Forestry, after which the next step is government approval. If the government agrees to cancel the area and allow the hotel construction, the company can start building. However, to protect the environment, the government plans to allocate a hotel zone in the future, in an area where the hotel industry will not have as much of an adverse impact on the lake's environment.

Different government agencies implement different measures with the aim of conserving the sustainability of Inle Lake, but in reality, the room for negotiation among government agencies is small and environmental degradation is already underway. The environmental degradation of Inle Lake is not just a technical and scientific issue, but also a socio-economic one. On the ground, government agencies focus on technical measures and underestimate the socio-economic issues, which is why their ultimate goal - to conserve and rehabilitate the lake's ecosystem – remains out of reach.

3.4 Summary

In the study area, even when people are entitled to use the natural resources in support of their livelihoods, local environmental conditions do not allow them to do so. So, the key issue is not their level of entitlement, but the environmental deterioration taking place. The Intha use improper methods in their agricultural activities on the lake, as do others in the mountainous areas surrounding it. Their daily demand for fuel wood has put pressure on the watershed forest around the lake, and many different groups of local people not only extract resources, but also leave waste items in the lake, which has a devastating impact on the local environment. This environmental decline has caused a loss of their entitlements to access the natural resource; moreover, insecure market conditions have added to the livelihood risk experienced.

People around the lake are competing for resource and environmental services through their agriculture-based and other livelihood activities. As these competing resource uses have had a negative impact on the environment, so the response of the environment has created further conflict in terms of these same services. Added to

this, many people around the lake may be floating gardeners and fishers at the same time – meaning they are competing with themselves.

Although Inle Lake is under the jurisdiction of the Forest Department at the Ministry of Environmental Conservation and Forestry, various government organizations have jurisdiction in the area, covering different issues. The Fisheries Department grants fishing licenses to one person, who then has the right to release his rights to local, individual fishers. In the case of the motor boat license, the General Administration Department collects the fees, meaning that various state organizations end up marginalizing local communities from natural resource and environmental services.

The right to access the resources of Inle Lake is also contingent upon other factors. The first is the environmental condition of the resource itself. In the case of water for household use, water contamination prevents the Intha from accessing clean and safe water, while for the floating gardeners, the water level in the lake plays a fundamental role as to whether they can grow their crops on the floating islands. Also paddy fields need regular watering when they are growing rice, and floods can destroy their harvests. So, the environmental condition of the lake is a basic factor influencing and constraining environmental entitlements which is of major importance for the livelihoods of the Intha.

As environmental conditions have deteriorated, so the Intha have lost their access rights to natural resource. When managing their floating gardens, the decline in water level of the lake obstructs the Intha and causes difficulties in terms of transportation. On the other hand, floods before and during the harvest cause a loss of capital for the paddy farmers, regardless of the legal or customary rights they have. In such situations, environmental conditions are more important than other factors in terms of deciding their levels of environmental entitlement.