Chapter 11
Degeneration of Mangroves in a Changing Policy Environment: Case Study of Ayeyarwady Delta, Myanmar

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Abstract Some projection shows that mangrove in Ayeyarwady delta would disappear until 2020. Although Myanmar mangroves are among the largest mangrove habitats in Southeast Asia, continual deforestation, both historically and contemporarily, lead to significant concern for future mangrove sustainability in the region. Historically, Ayeyarwady delta had huge tracts of mangroves that underwent extensive farmland conversion. Consequently, the region played an important role in local economy and food security, accounting for 35 % or more national rice production. As a result, the mangrove cover has dramatically decreased in 1990 to 2000. Despite significant conservation policy reforms in the 1990s (e.g., Forest Law (1992), Forest Rules (1995)), agriculture, especially paddy fields, is simultaneously encouraged as a means to reduce poverty. Recently, the Government of Myanmar encouraged community participation for conservation of mangrove through various activities of the Forest Department and Ministry of Environmental Conservation and Forestry. In addition, International Non-Governmental Organizations (INGOs) and local NGOs promote plantation of mangrove leading to a gradual increase in level of awareness among local people. Legal systems and policy transition are key factors for conservation of mangrove in Myanmar. Under this backdrop, this chapter elaborates the correlation among deforestation of mangrove forest in Ayeyarwady Division and expansion of paddy fields through the lens of changing policy environment.

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11.1 Introduction

Myanmar, one of the forest-rich countries of the world, has been undergoing rapid economic and policy reforms since 2012. After a long period of highly centralized governance, the President of the Republic of the Union of Myanmar introduced new government systems through democratic approaches since 31 March 2011. The transition in governance led the United States and other Western countries to revoke their earlier economic sanctions, which essentially led to massive inflow of domestic and foreign investments (Wang et al. 2013). The country is, therefore, gradually opening up to the rest of the world and remains in a spectacular state of sociopolitical and economic transition. Nevertheless, irrespective of the recent economic growth, the United Nations Food and Agriculture Organization (FAO) expressed alarming concern over the large-scale annihilation of natural ecosystem and its services in Myanmar. Unfortunately, the trend of natural resource depletion and unscientific management of ecosystems continues, and the roots of the country's inability to conserve its vital natural resources can be traced to the historical lack of supporting policy environment, conflicting interests, and lack of priority settings of the government.

This chapter examines the causes of mangrove deforestation in Ayeyarwady delta through an in-depth review of the historical and existing conservation policies of the national government. In particular, this chapter aims to provide a comprehensive understanding of the causes of mangrove degradation in the Ayeyarwady delta in a historical perspective and an analysis of agricultural policies and the recent policy amendments toward conservation of its explicit mangrove resources. In addition, this chapter also attempts to analyze and identify the policy and implementation gap and proposes some essential intervention toward effective conservation of its rich natural resources.

11.2 Changes of Mangrove Cover in the Ayeyarwady Delta

Despite the fact that nearly 48 % of Myanmar is covered by forest, the country is ranked third in terms of rate of forest degradation. FAO (2010) mentioned that the annual change in forest cover in Myanmar during 1990 to 2000 is estimated as 435,000 ha per year (FAO 2010). Later, for the decade starting from 2000, deforestation continues at the rate of 311,000 ha per year (FAO 2010). A significant portion of this huge deforestation is contributed by the loss of mangroves from the Ayeyarwady delta, which, still, is the largest mangrove habitat in Myanmar. However, due to poor documentation and lack of scientific research, mangrove

Table 11.1 Land use change in 5 years (2003–2007)

Classification	2003		2005		2007		Gap within 5 years
Mangrove	73,076 ha	34 %	51,514 ha	24 %	44,900 ha	21 %	**−13 %**
Kaing grass	49,308 ha	23 %	20,342 ha	10 %	21,245 ha	10 %	**−13 %**
Agricultural land	49,987 ha	23 %	81,906 ha	38 %	83,977 ha	39 %	**16 %**
Wetland	8573 ha	4 %	10,986 ha	5 %	14,353 ha	7 %	**3 %**
Summer paddy	8425 ha	4 %	20,255 ha	9 %	20,474 ha	10 %	**6 %**
Water	23,426 ha	11 %	28,080 ha	13 %	28,081 ha	13 %	**2 %**
Others	454 ha	0 %	17 ha	0 %	223 ha	0 %	**0 %**
Total	213,249 ha	100 %	213,254 ha	100 %	213,253 ha	100 %	

JICA (2007)

cover prior to 1990 cannot be retrieved properly. It is believed that the massive deforestation of mangrove in Ayeyarwady delta started since the 1960s as the communities were allowed to settle in the delta. This was a result of government's aim to further reclaim the fertile delta for agriculture. In a satellite-based documentation, Leimgruber et al. (2005) examined that mangrove deforestation in Myanmar significantly increased during the period of 1990 to 2000. They mentioned that nearly 20 % of mangrove forest declined within these 10 years in the Ayeyarwady region (Leimgruber et al. 2005). In 2000, nearly 26 % of delta remain forested which continued to suffer from massive reclamation. Japan International Cooperation Agency (JICA) implemented a mangrove plantation project in Ayeyarwady region by utilizing the satellite-based monitoring data for the comparison of the degradation of mangrove in the project area. Table 11.1 provides the summary of changing land use pattern of the delta. It is clearly observed that there has been an increase in agricultural land area compared to gradual loss in mangrove and grassland cover area over the years in the study region.

In a more recent study by Webb et al. (2014), it has been stated that mangrove in Myanmar may well vanish by 2020 to 2045, if the current trend continues or increases. The study is primarily based on scenarios and presents an alarming situation of the delta demonstrating its enhanced vulnerability to natural disasters and climate change. However, as suggested by Webb et al. 2014, the deforestation scenario can be changed with appropriate management and policy interventions. Hence, it remains highly imperative to identify the current policy gaps and to improve the ground-level policy implementation strategies.

11.3 Role of Mangroves During the Cyclone Nargis

Cyclone Nargis, one of the worst natural disasters of recent times, hit Myanmar in 2008 and resulted in a causality of more than 140,000 people. The devastating impacts were further magnified by massive destruction of houses, farmlands, and infrastructures. One of the interesting findings following the impacts of Nargis was the distinct relationship between occurrence of mangroves and damage to lives and properties. Thant (2011) conducted a research in Bogale Township which suffered severe damage from the cyclone and reported that the number of casualty has strong negative correlation with the distance from cyclone path and density of mangrove forest. Based on a huge sample size of 2809 people, Thant (2011) concluded that 90 % of people also believed that mangrove forest helped in reducing the impacts of storm (Thant 2011). In other words, the findings closely indicate that high-density mangrove forest saved lives of villagers by reducing the cyclone's impact and played an important role as bio-shield against natural disaster during Cyclone Nargis. Hence, from Disaster Risk Reduction (DRR) perspectives also, conservation and restoration of the Ayeyarwady delta mangroves emerges seemingly important.

11.4 Transition of National Environmental Policy and Agricultural Expansion

As mentioned, deforestation of mangrove forest deeply relates with national legislative framework. In this section, we will explore how transition of national policy and priorities led to the deforestation of mangroves during the 1990s and what are the major policy amendments since then.

11.4.1 Evolution of Environmental Legislation and Lack of Implementation

In Myanmar, the idea of ecological conservation has been mainly implemented through protected area (PA) since the eleventh century (Aung 2007). Under colonial period of the nineteenth century, formal forest rules were issued in 1856 in the Province of Burma under the British Indian Regime. These rules, made for forest management, systematically adopted to introduce 30 years felling cycle for timbers (OIKOS and BANCA 2011). The rules were subsequently converted to Burma Forest Act in 1902 (OIKOS and BANCA 2011). Since World War II, twelve acts and rules were issued related to forest management. However, it focused more on the protection of wild animals such as elephant and wild birds, while the conservation of forests itself remains neglected (Aung 2007). Following the independence

of Burma in 1948, no particular laws were issued related to forest or environmental conservation due to immense political confusion. It is only during the1990s when the country revisited its interest in conservation of forest resources, mainly due to international and domestic pressure.

Four important policy documents were issued during this time – Forest Law (1992), Myanmar Forest Policy (1994), Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law (1994), and Forest Rules (1995). The Government of Myanmar also accepted some of the international conventions such as Convention for the Protection of the World Cultural and Natural Heritage (issued in 1972, accepted by Myanmar in 1994) and Convention on Biological Diversity (issued in 1992, accepted by Myanmar in 1994). During this period, Myanmar also came under international pressure for proactive conservation of its resources. These external pressures led to internal transformations which resulted in the formulation of the National Forest Master Plan (2001) and National Sustainable Development Strategy (2009). Interestingly, the latter document called for participatory conservation of forests and natural resources. One of the main policy transitions observed in this period is the emergence of the conservation of biodiversity instead of exploitation. For example, the Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law emphasized the conservation of biodiversity, whereas previous legislation mainly focused consumption of natural resources (Aung 2007). In general, protected area (PA)-based conservation blossomed during this span. For example, compared to 14 PAs (4724 km^2) during the 1980s, 35 sites (approximately 42,000 km^2) have been selected as PAs and eight more sites are proposed (as of 2010) (Aung 2007; OIKOS and BANCA 2011). Within the scope of PA-based conservation, mangrove protected area covers roughly 3 % of the country's entire statutory conservation zones. For example, Mainmahla Kyun is a designated wildlife sanctuary and mangrove protected area in Ayeyarwady delta. Although, the utility of PAs in protection of mangroves is beyond doubt as highlighted by DasGupta and Shaw (2013), Aung (2007) criticized that most of PA is considered as "Paper Park" due to lack of management and essential budgetary provisions in Myanmar. Therefore, despite the protected area status, mangroves along with other forests suffer illegal logging and exploitation of forest resources, and there are not yet adequate provisions to step up the forest vigilance (Aung 2007).

11.4.2 Mangrove Deforestation at the Expense of Agriculture

Myanmar is one of the lower-middle income countries in the Indo-China region which exhibits significant lack of economic development. The rate of undernourished people in Myanmar was 62.6 % in 1990–1992 which decreased to 16.7 % in 2012–2014 (FAO, IFAD, and WFP 2014). This remarkable success is, however, achieved at the expense of mangroves. Since rice is the major staple food of the country, increasing the productivity and yield of rice has always been the highest

priority of the national Government of Myanmar (Matsuda 2009). The Ayeyarwady delta, also known as the rice bowl of Southeast Asia, made significant contribution toward achieving this target. According to Mury (2010), the Ayeyarwady delta is divided into three different salinity zones. Out of this, the freshwater zone is recognized as an attractive area because of the availability of fertile soil for rice cultivation. In addition, due to the development of extensive irrigation canals, two rice cycles can be maintained in this area. The brackish water zones, consisting of clay soil, are utilized for pulses and one cycle of paddy cultivation. In the third zone, the coastal saline areas, paddy cultivation is bit difficult. Yet, communities exploited these areas for paddy cultivation by deforesting huge tracts of mangroves. However, these areas can only be cultivated for the first 6–7 years before renormalized high salinity completely destroys its productivity (Thant 2011). Subsequently, the farmers abandon the previous land and prepare new farmlands by cutting down mangrove forest.

Control of agriculture has always been one of the priority agendas of the Myanmar Government. Similar to the Indian subcontinent, Myanmar used to follow landlord-based agriculture system for a long time. However, this system, under the Farmland Tenancy Law (1963), was disposed by the military government, and all the productive lands were brought under government control. In this period, known as "Burmese Socialism," there were restrictions to open markets. For example, agricultural land was taken if farmers did not follow the regulation set by the government (Kurosaki et al. 2004). In 1988, the Burmese Socialism was officially abandoned, and liberalization of market was partially started. Since then, as shown in Fig. 11.1, the area of farmland demonstrates an increasing trend in Myanmar.

Takahashi (2015) monitored the development of mill industry in the Ayeyarwady region. Mill industry polishes rice for the market and is essentially an indicator of the yield of paddy. As shown in Table 11.2, there has been a rapid increase in number of mill industries in Myanmar since 2000 which shows the increase in demand of marketable rice.

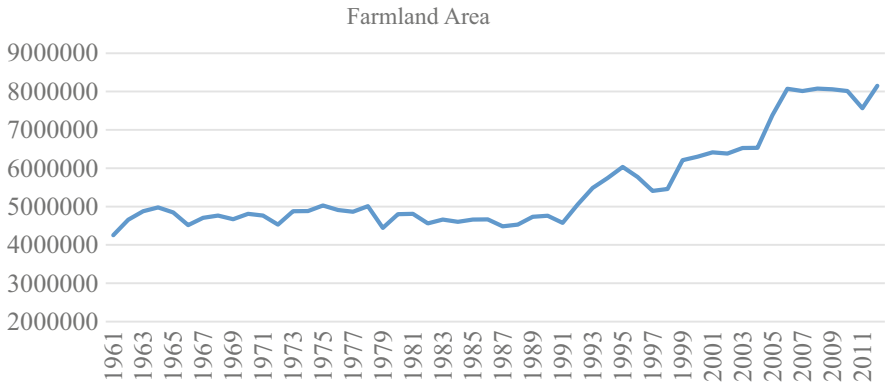

Fig. 11.1 Changing trend of farmland area in Myanmar (Data source: FAO statistic)

Table 11.2 Mill factories established in Myanmar

Established year	Number of mills	Delivery paddy		Delivery polished rice	
		Waterway	By land	Waterway	By land
1919	1	1			1
1948–1956	9	7	2	2	7
1962–1989	0				
1994–1999	7	5	2	1	6
2000–	18	13	5	3	15
Total	35	26	9	6	29

Based on Takahashi (2015)

Due to the opening of market for rice, based on Foreign Investment Law on 1988, and introduction of irrigation in the middle of the 1990s, the mill factories started to flourish in Myanmar. In addition, 505 of newly established mill factory owners are found to belong to Myanmar-Chinese origin which can be considered as a foreign investment in Myanmar (Takahashi 2015).

Thus, in an attempt toward reducing the number of undernourished people in the country, economic development was prioritized which was mainly conducted by expansion of agriculture. However, the absence of proper policy and lack of planning acted like a boomerang leading to generation of large areas of abandoned agricultural lands and loss of vast expanse of mangrove ecosystems. Thus, it is imperative for the present national government to strike a balance between economic development of the country and conservation of its natural resources, especially mangroves.

11.5 Present Policy and Conservation Approach

Table 11.3 shows the various legislation and policies formulated in Myanmar for development of agriculture as well as conservation of the environment. The transitions in environmental and agricultural policies deeply affected the mangrove forests in terms of both quantity and quality in Myanmar, especially in the Ayeyarwady region. National government reformation in 2011 has influenced the legislation and policy making. This section focuses on present situation of policy for agricultural development and National Land Use Policy and will try to establish the link between degradation of mangroves and agricultural development in Myanmar.

Table 11.3 Acts and rules to protect and conserve environment and development of agriculture in Myanmar

Legislation (environment)	Year	Legislation (agriculture)	Year
Forest Rules	1856		
Elephant Preservation Act	1879		
Burma Forest Act	1881		
Indian Forest Policy	1894		
Burma Forest Act and Rules	1902		
Wild Birds and Animals Protection Act	1912		
Burma Village Act	1921		
Burma Game Rules	1927		
Wild Birds and Animals Protection Act Amendment	1929		
Wild Birds and Animals Protection Act Amendment	1934		
The Wildlife Protection Act	1936		
The Wildlife Protection Act Amendment	1956	Land Nationalization Act	1953
Burma Forest Act Amendment	1956		
		Disposal of Tenancies Law	1963
		Law Safeguarding Peasant Rights	1963
		Foreign Investment Law	1988
Forest Law	1992		
National Environmental Policy	1994		
Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law	1994		
Myanmar Forest Policy	1995		
Forest Rules and Community Forestry Institutions	1995		
Myanmar Agenda 21	1997		
National Forest Master Plan	2001		
Rules on Protection of Wildlife and Protected Area Conservation Law	2003		
National Sustainable Development Strategy	2009		
		Farmland Law	2012
		Vacant, Fallow and Virgin Lands Management Law	2012
		The Law of Protection of the Farmer Rights and Enhancement of their Benefits	2013
National Land Use Policy	On draft		

(*Data source*: Kurosaki et al. 2004, Aung 2007, OIKOS and BANCA 2011, and Food Security Working Group's Land Core Group 2012)

11.5.1 Development of National Land Use Policy

Farmland Law and Vacant, Fallow and Virgin Lands Management Law (VFV Lands Management Law) were issued in 2012. The main purpose of Farmland Law is to implement certification and registration system for farmland. As discussed above, small farmers cannot afford to own farmlands and have generated large wastelands resulting from exploitation of mangroves and subsequent intrusion of saline water. Farmland Law attempts to issue Land Use Certification (LUC) to secure the farmland for small farmers who had limited farmland. On the other hand, VFV Lands Management Law aims at granting permission for agricultural development, mining, or other purpose by private sectors, NGOs, and even public. These lands, however, are not provided with permanent ownership but as a lease for a maximum period of 30 years.

Based on these laws, National Land Use Policy is drafted by Land Use Allocation and Scrutinizing Committee. One of the objectives of this policy is "....to benefit and harmonize the land use, development and environmental conservation of the land resources of the State, to protect the land use right of the citizens and to improve land administration system (Government of the republic of the union of Myanmar land use allocation, scrutinizing committee 2014)." The draft designates ten types of lands – forest land; agricultural land, livestock land, and fishery land; vacant, fallow, and virgin land; urban and rural residential land and the public lands; water area; swamp land; pasture land; protected areas; mines and, oil field, mineral lands; and national defense and security areas. Demarcation of available land as per their use is a significant contribution of this policy. This clear classification is necessary to develop further rules and regulations, e.g., to protect forest lands or revival of vacant and fallow lands to develop agriculture. Moreover, the draft of the National Land Use Policy was released to public openly to be consulted among citizen since October 2014. The Government of Myanmar launched the draft of National Land Use Policy online to collect ideas and input in order to make better policy through the consultation meeting with experts and NGOs.

Though the National Land Use Policy is intended to provide new classification of the existing forest land, Forest Law (1992) classified forests into three categories – reserved forest land, protected public forest land, and public forest land. Reserved forest lands are designated to protect forest products by the local villagers residing in those lands. However, similar to other cases, smallholder farmers are found to actually transform the reserved forest land into agricultural land without any permission from any concerned authorities. Hence, reserved forest can be considered as gray zone especially in rural areas and is the root cause behind overlapping territory under both Ministry of Forest and Ministry of Agriculture and Irrigation. These reserved forests can, in turn, be converted into community forest that may play a significant role in enhancing both economic development of local communities and conservation of mangroves.

11.5.2 Community Forest and Mangroves

Community forest was first proposed by Forest Law in 1992. Next, Forest Policy (1995) and Community Forest Instruction (CFI) promoted villagers' participation in conservation of forest lands (Lin 2004). These legislations protected Forest User Group (FUG) rights for a lease period of 30 years. As of 2011, 572 FUGs are organized, and it covered 104,146 acres as community forest (CF) which is only 0.13 % of total forest coverage area (Woods and Candy 2011). Increase in community forest area is recently prioritized under the national government's master plan, and the target is to include 2.27 million acres of forest lands under the category of community forest by 2030. However, as reported by few international NGOs, farmers are converting the community forest land, received by them, into farmlands to seek short-term monetary benefits in the study region (Schimidt 2012).

In an important pilot project in Pyindaye village, initiatives were taken to restore the mangrove forest for 10 years, i.e., from 1999 to 2008, by an international NGO. Local NGO, international NGO, Forest Department, and local community were included as project members. Mangroves were planted over an area of 3323 acres (1289.2 ha) of abandoned paddy field. Monitoring and survival counting of planted mangrove trees were conducted every year, and the average of survival rate was found to be 81.2 %. The pilot project demonstrates three significant findings that provide important insight on mangrove conservation in Ayeyarwady region. First, it has been found that villagers wanted to grow fast-growing species like *Sonneratia apetala* without considering factors like site selection, species survivability, and stem borer attack. As a result, the plants were being destroyed by stem borers after several years. At that time, villagers noticed that it is important to integrate local indigenous knowledge and science (FREDA and ACTMANG 2012). Secondly, it was found that community alone was not able to conduct community forest successfully as the process of Community Forestry Certificate (CFC) is too complicated to villagers. Villagers do not have enough time and knowledge for documentation process and procedure. Therefore, other stakeholders such as local NGO can support to enhance community forest and play a pivotal role between villagers and Forest Department (FREDA and ACTMANG 2012). Lastly, forest plantation does not provide short-term and immediate profit at initial stage. Hence, the villagers need to wait for a certain period before they start earning from community forest. In spite of waiting several years, they can receive small profit from pruning and thinning operations. Therefore, implementation of the concept of community forest not only requires mangrove plantation but also plans for providing alternative livelihood to local communities to retain their interest on mangrove conservation and refrain them from converting community forest land into farmlands. As an alternative, this project introduced Konjak plantation which can be both consumed as food and can be sold in markets for income (FREDA and ACTMANG 2012).

11.6 Identification of Stakeholders in Mangrove Conservation

Various stakeholders related to mangrove deforestation, plantation activities, and economic growth especially through agricultural expansion have negative impacts on mangrove forest. Policy transition for conservation of natural forest and protection of farmers are one of the milestones for revival of mangrove forest. However, the efficiency of this transition is still not clear until it is applied on a practical scale. To analyze the sustainable implementation for mangrove forest management, identification of potential stakeholders helps in understanding their capacity, different expected roles, and responsibility. Community forest is one of the possibilities that involves local people in plantation of mangrove making local villagers, local NGOs, and Forest Department as the key stakeholders in this analysis. In addition, National Land Use Policy Working Group plays a crucial role in the implementation of accurate land use policy management. Hence, the pillars of SWOT analysis are local community, NGOs, Forest Department, and National Government Working Group.

Although local community, especially in rural area, is getting the benefits from plantation of mangrove and community forest, the waiting time to derive income from them is long. They have to depend on alternative sources of income to sustain their lives. Hence, an established source of alternative income can help the local communities wait longer. For example, growing marketable vegetables along with plantation of mangroves under community forestry can provide alternative income opportunity for local villagers. In addition, the role of mangroves as bio-shield in case of natural disaster such as cyclone and tsunami is an indirect benefit derived by the communities from plantation of mangroves.

Local and international NGOs can contribute in empowering local community with knowledge and skills. Intervention of NGOs in plantation of mangroves is one of the entry points that plays a significant role in the process of transition. Local villagers cannot derive the benefits from policies even though policy and legislation are well prepared due to their complicated implementation methods. NGOs play a major role in translating the national-level policies to local-level implementation and can also help in raising awareness about national policies and laws among local communities. However, NGOs cannot actively work in villages as there is lack of political stability. Also, corruption at national level imparts a huge negative impact on, especially, international NGOs. Therefore, stability and transparency at national level is the backbone for implementation of concepts like community forestry and proper functioning of NGOs.

Forest Department plays a bridging role between NGOs and local community. Participation of Forest Department helps the villagers in understanding the details of the whole process of plantation and conservation. For instance, Forest Department helps in translating the legal mechanism of 30 years lease to the farmers as they often do not know the legislation and its details like tenure rights. Furthermore, knowledge about selection of mangrove species is an important factor to maintain

high survivability rate after plantation. Therefore, creating awareness and empowerment of local people with knowledge and understanding are the main roles of Forest Department. On the other hand, functional overlapping with Ministry of Agriculture and Irrigation is a big challenge for Forest Department. In addition, it is difficult to clearly designate and classify abandoned paddy fields and reserved forest without the enactment of National Land Use Policy. Unless there is a clear segregation of land use, land use conflicts are a significant threat to Forest Department.

Working Group for National Land Use Policy is a crucial key stakeholder in community forestry. Abandoned paddy fields and reserved forest are unclear broader terms of law that are root cause of the conflict among the ministries. There is a need for clear definition of these terms which will, in turn, be the entry points of managing them. The policy should be implemented well according to the rules and regulation after it has been approved. The implementation process will take time; hence stability in governance is a prerequisite for sustainability of implementation. Successful implementation of the policy will help in clear segregation of all national land into different categories like farmland, forest, and protected area, thus assigning different responsibilities on different ministries. Therefore, the Working Group has a huge responsibility of developing and implementing the policy at a national scale and then translating it at a local scale.

11.7 Conclusion

Mangrove in Myanmar has been declining along with increasing economic development. According to satellite-based monitoring, mangroves in Ayeyarwady region are dramatically decreasing and are expected to get degraded to an alarming scale in near future. Historically, human settlements considered mangrove forest as a natural consumable resource and transformed them into agricultural land. However, saltwater intrusion through small channels and creeks affected the soil, thus making them unsuitable for any agricultural activity. This, in turn, has generated large areas of abandoned agricultural lands which cannot be used for any productive activity. Hence, it is quite evident that exploitation of mangroves to create agricultural lands, though provides short-term benefits, results to both agricultural failure and degradation of mangrove ecosystem. The National Land Use Policy is a significant step toward overcoming the land use conflict and promoting economic development and natural conservation simultaneously. The government intended to open discussion through the online accountability of draft, but the conclusion was being postponed. The study identified several stakeholders who can play important roles for local implementation of programs like community forest. Enhancing community participation and balanced legislation progress will strengthen mangrove protection in Ayeyarwady region in Myanmar.

11.8 Recommendation and Way Forward

11.8.1 Package of Alternative Livelihood with Mangrove Plantation in Community Forestry

Alternative livelihood for local villagers can enhance their participation in mangrove forest plantation. As discussed above, mangrove plantation provides less direct benefit for villagers so creating awareness and providing training for alternative livelihood like Konjak cultivation, harvesting crabs in a sustainable manner, and selling seeds are recommended. Forest Department can develop the capacity of knowledge and skills for training mechanism.

11.8.2 Segregation of Responsibility Among Ministries Through the Implementation of National Land Use Policy

As long-term recommendation, implementation of National Land Use Policy can provide zonal maps demonstrating the present status of land use. However, the implementation phase requires a lot of time for carrying out surveys and assessments. The Working Group might get dismantled after the policy is approved and issued. Hence, specific agency or department should be set up to complete this task. However, preparing zonal maps requires survey all over the country and needs clear demarcation of various types of land borders. This may take several years or a decade, but this implementation process ensures application of Land Use Policy at a localized scale.

The most probable challenge in the survey may arise due to conflicts regarding land border and land rights. Community forestry and mangrove plantation can be conducted after the clear segregation between farmland and forest. A third party should be involved in the Working Group to look after the local authorization process and maintain transparency because the conflict of land rights is a complicated issue in the region.

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