Toward Sound Forest Governance

Proceedings of the 5th Workshop on Sustainable Forest Resource Management

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content

Preface

As part of its capacity building program, the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) sponsored its fifth workshop under the theme "Forest Resources Management" which took place in Kunming, China in October 2011. Senior officials from 15 economies exchanged views about the challenges and opportunities associated with improving forest governance and law enforcement in the region.

In the past few decades, many economies in the Asia-Pacific region with supportive legislation in place, have been implementing certification schemes, strengthening institutional capacity and developing monitoring systems to track progress as they move toward sustainable forest management. However, weak capacity and insufficient resources still pose serious constraints to achieving goals.

Discussions during the workshop generated innovative ideas on how to address a number of forest management issues in the region, including better ways to balance development with protection - the theme of the first APEC ministerial meeting on forestry which took place in Beijing in September 2011.

APFNet is pleased to share this compilation of reports from participants. We hope that readers find the information helpful in terms of assisting with efforts to improve the situation in their respective economies. Last but not least, we would like to thank all attendees, including resource people, for their contributions. Their willingness to recount experiences and draw on lessons learned has made this publication possible.

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Sustainable Forest Management in Bangladesh

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1. Introduction

Bangladesh is a densely populated country of 147,570 square kilometers which lies between 20°34´ and 26°38´ North latitude and between 88°01´ and 92°41´ East longitude. Its territory consists of a short stretch between the Himalayan chain and the Bay of Bengal and is virtually the only drainage outlet for the Ganges, Brahmaputra and Meghna river basins (GOB 1992). Its area comprises around 66% agricultural land, almost 17.15% forest land, and 7% urban area. Water and other land uses account for the remaining 10%. Forest land is divided into 3 groups: classified forests, unclassified state forests and tea/rubber gardens (Rahaman, A.R. 2011).

Forest types, area and distribution

Forest type	Area (m ha)	% of total area of 14.75 m ha
Hill Forest	0.67	4.54
Natural Mangroves	0.60	4.07
Mangrove Plantations	0.14	0.95
Plain Land Sal Forests	0.12	0.81
Unclassified State Forests	0.73	4.95
Village Forests	0.27	1.83
Total	**2.53**	**17.15**

Source: FD, Ministry of Environment and Forest, 2011.

1. **Tropical wet evergreen:** Rich in floristic composition, they are usually found in hills and moist shady areas in Rangamati, Bandarban, Khagrachari, Chittagong, Cox's Bazar, Habiganj, Moulvibaza and Sylhet District.

2. **Tropical semi-evergreen:** Found in Cox's Bazar, Chittagong, Rangamati, Bandarban, Khagrachari, Moulvibazar, Hobiganj and Sylhet Districts.

3. **Tropical moist deciduous:** Found in Dhaka, Gazipur, Mymensingh, Tangail, Dinajpur, Rangpur, Naogaon and Comilla.

4. **Mangrove:** Found in Sundarban in Khulna, Bagerhat and Satkhira districts, this contiguous forest ecosystem constitutes the world's largest. Mangrove plantations cover a total of 140,000 ha in the district of Barguna, Patuakhali, Bhola, Laksmipur, Pirojpur, Barisal, Noakhali, Feni, Chittagong and Cox's Bazar.

2. History of Forest Management

Forests and their sustainable management are a major concern of the Bangladesh Government. For nearly one hundred years, the British colonial system shaped the country's forest management as it did in India and Pakistan (Rishi,2002). The primary objective was to meet demands for fuel, timber, and other products on the basis of sustained yield (Choudhury, 2005). During the Pakistan period (1947-1971), attempts were made to convert the tropical hardwood forest to meet industrial demand and the Bangladesh Forest Industries Development Corporation was established to exploit the forest mechanically. A number of sawmills also began operations. Forests were managed according to 10-year working plans which covered a given area.

After liberation in 1971, a ban was imposed on the felling of natural trees, management plans were suspended and, under different development projects, plantations were established on a limited scale on denuded forest land - Teak, Gamar, Mehogany and Xylia, for example. Innovative approaches to afforestation were also taken on the newly accreted mud flats along the coast and offshore islands.

Conventional forest management in Bangladesh is unsuitable under prevailing socio-economic conditions. Over-exploitation of resources has led to forest degradation in many areas due to increasing demand for forest products. To address this issue, government initiated a community forest program in 1981. The earlier concept of sustained yield was expanded to include management for multiple use (Das 1982, Choudhury, 2005) and is now being transformed into a sustainable integrated management approach (Choudhury 2005). In 1988, Canonizado and Hossain wrote an Integrated Forest Management Plan for forest reserves in Sundarban, Cox's Bazar, Sylhet and Chittagong. In the same year, Canonizado and Istiaque developed an Integrated Forest Management Plan which is still in place for the coastal areas of Naokhali, Bhola, Patuakhali and Chittagong (Choudhury, 2005). The other forest areas are being worked either on the basis of advanced prescriptions (e.g. Balmforth, 1985) or project oriented annual development programs (Ahmed, 2003).

3. Organizational Structure of Forest Agencies:

The Forest Department of the Ministry of Environment and Forest is entrusted with overall forest management and this responsibility falls under the Chief Conservator of Forests. Total area is divided into 9 Forest Circles and 41 Forest Divisions, each comprising of a number of Ranges under which Beats (the lowest administrative unit), check stations and patrol camps operate. The autonomous Forest Industries Development Corporation is responsible for designated rubber gardens on forest land.

4. Sustainable Forest Management

Sustainable forest management aims to ensure that forest goods and services meet present and future needs while, at the same time, contributing to long-term development. In its broadest sense, the concept encompasses the administrative, legal, technical, economic, social and environmental aspects of forest conservation and use. It also implies various degrees of human intervention, ranging from safe guarding forest ecosystems and their functions to favoring valuable species or groups of species for the improved production of goods and services.

Around the world, governments, forest industry, private forest owners and other stakeholders are expressing concern about the sustainability of some forest management practices and Bangladesh is no exception. Sound forest management based on the principles noted above should be rewarded at global, national and regional levels. In this regard, many regions and countries have developed criteria and indicators as effective tools to monitor progress toward sustainable forest management. For example, the Regional Initiative for the Development and Implementation of National Level Criteria and Indicators for the Sustainable Management of Dry Forests in Asia identified 8 national criteria and 49 indicators for dry forests in Asia. Member countries are Bangladesh, Bhutan, China, India, Mongolia, Myanmar, Nepal, Sri Lanka and Thailand.

5. Forest Policy Framework and Enforcement

The origin of forest policy in British India dates back to 1894. Public rights to forest use were regulated to some degree during the reign of Emperor Chandra Gupta Maurya (Dwivedi, 1980). During the Mughal period (1526-1700), hunting was given priority and forest area was gazetted for this purpose - an aspect which was incorporated into forest policy at that time. The British government issued the first formal forest policy of the Indo-Pak subcontinent in 1894 (Mustafa, 2002) but it did little to improve forest management. By prioritizing crop production, forest land was rapidly converted for agriculture use. Nevertheless, the first Forest Act (1927), and related provisions were based on this policy, including manuals, transit rules, and stumpage appraisals.

After the division of British India, when Bangladesh was still part of Pakistan, the Pakistan government formulated a forest policy in 1955 which was reminiscent of the direction under colonial rule. Government interest in Bangladesh forests was primarily monetary and its goal was to maximize revenue. Thus, clear felling was rampant, followed by artificial regeneration, using short rotation species. Such practices ultimately proved to be highly detrimental to forests (N. Mohammad et al).

The first forest policy of independent Bangladesh came into effect in 1979. Despite many contradictory sections, emphasis was given to increasing tree cover, conserving forest and wild life, providing recreational amenities and offering extension services.

The Asian Development Bank (ADB) assisted with the development of the 1994 forest policy which focused on the preservation and management of trees outside designated forest areas through local participation. Important aspects include state support of local forestry and forestry businesses as well as for tree planting by communities and local groups along roads, stream banks and marginal land. Subsequent to this policy, the Forestry Sector Master Plan (1995-2015), Forest Act of 2000 (amended), Institutional Restructuring (1998-2000) and Social Forestry Rules of 2004 were put in place. A more effective application of this policy would be for the FD to regain and rehabilitate encroached forested areas as well as to use participatory social forestry to restore forests and expand cover to non-traditional areas such as strip plantations, marginal and fallow land, and newly accreted coastal regions.

In response to continued forest degradation, Bangladesh has been emphasizing social forestry, over the past two decades - an approach which provides for participatory management on a small scale and the application of local understanding and knowledge of forest ecosystems for their utilization, protection and maintenance.

Village forests supply 82% of the country's demand for wood, firewood, bamboo and animal fodder. However, because they also meet needs of a growing population for housing and cultivable land, they are being degraded as well and the gap between supply and demand for wood and firewood is widening day by day. Therefore, the government's Social Forestry Program seeks the involvement of local people through benefit sharing to both increase production and reverse degradation.

6. Social Forestry

The ADB provided financial and technical assistance to the first social forestry project in Bangladesh. The Community Development Project was successfully implemented in 23 districts in the north from 1981-1982 to 1986-1987, followed by Thana Banayan and Nursery Development Project and Coastal Greenbelt Project which it also supported. Government then funded the Extended Social Forestry Project from 1995-1996 to 1996-1997 and approved a 20-year Forestry Sector Master Plan (FSMP). Again with assistance from ADB, the Forestry Sector Project was launched in 1997-98 to implement the plan. Specific objectives were to (a) prevent forest degradation, (b) increase forest productivity, (c) conserve forests in selected protected areas and involve landless people in local communities in sustainable forest management. Until the project ended in June 2006, the FD undertook massive reforestation with local participation, especially in the degraded

Sal forests of Dhaka, Tangail, Mymensingh, Dinajpur and Rangpur. About 177,100 people (39,579 women) helped restore 35,100 ha of degraded and encroached land under FD control; planted 23,200 seedlings on marginal land owned by other agencies; and increased forest cover on 1850 ha of Char land controlled by the District Administration. The coastal green belt project also undertook similar afforestation in coastal areas (Choudhury, J.K. 2011).

7. A Case Study

Tangail Forest Division oversees 49,752 ha of moist deciduous forest of historical significance in central Bangladesh which was threatened with destruction mainly due to conflict over land ownership, insufficient staff, heavy dependency on resources for fuel wood, brick production, saw mill operations, furniture making and other forest industries. When traditional management failed to address local beliefs and sentiments, forest cover decreased. The Tangail Forest Division then used the Social Forestry Program to reverse this trend (Paul, A.R.2011).

Of the 8 forest ranges, 32 beats and 4 camps within the Tangail Forest Division, Banstoil Forest Range (5767 ha) was selected as the case study area. Sal (Shoresa robusta) species once comprised more than 90% of the stands, along with Kumbi (Careya arborea), Bohera (Terminalia bellerica), Koroi (Albizia spp) and Kusum (Scheleichera oleosa), among others. Most of the forest was destroyed through illegal conversion to agriculture, unsustainable use by poor people residing in and around the area, and political interference. Since it was not practical to evict the poor and landless encroachers for socio-political reasons, FD involved them in the Thana Banayan and Nursery Development Project noted above. They afforested 94 ha of degraded and denuded Sal forest land (45 ha for a woodlot and 49 ha for agro-forestry). Of the 94 participants/beneficiaries, 70 were male and 24 were female.

Motivational Steps: Various means were taken to motivate participants and other stakeholders:

a. Direct contact

b. Group meetings

c. Meetings with local elite and leaders

d. Meetings with village and union leaders

e. Meetings with public representatives, government officials and NGO representatives

f. Seminars and workshops

Nursery and Plantation: A sufficient number of seedlings of different species (as per the choice of participants) were raised in the vicinity of the planting area, including Akasmoni (Hybrid acacia), Mangium (Acacia mangium), Bokain (Melia azadirachta) and Eucalyptus (Eucalyptus spp). Each participant was granted usufruct rights over 1.0 ha, conditional upon raising, nursing, maintaining and protecting both woodlot plantations and agro-forestry systems. They were each given 2500 seedlings for the woodlots and 750 seedlings for agro-forestry - a total of 112,500 and 36,750 respectively.

Maintenance: Participants/beneficiaries assisted with weeding, manuring and filling empty spots 3 times in the 1st year, twice in the 2nd year and once in the 3rd year.

Benefits from the 1st rotation: Of the 49 participants who engaged in agro-forestry, table 1 shows the number involved by crop cultivated between 1991 and 2001 and average income.

Table 1: Crops cultivated and average earnings - 1st rotation (1991-2001)

Year	A Paddy only	A Earnings (taka)	B Paddy and wheat	C Vegetables only	D Vegetables and other crops	B, C, D Earnings (taka)
1st	29	1500	0	20	0	1900
2nd	28	2000	2	14	5	2800
3rd	28	2500	2	14	5	2600
4th	29	3000	0	20	0	3200
5th	29	3500	0	20	0	3200
6th	29	3000	0	20	0	2800
7th	29	3500	0	20	0	3000
8th	29	3500	0	20	0	1800
9th	29	2500	0	20	0	2000
10th	29	2500	0	20	0	2000
	Total	**27500**				**25300**

Source: Agro-forestry Plantation Journal, TFD 1990-91

In the woodlot plantation, 45 participants cultivated agro-crops such as bringal, pineapple, ginger and turmeric in the 1st rotation (first four years). Table 2 shows the average annual income per participant during this time.

Table 2: Average annual income per participant

Year	Annual income/participant (taka)
1st	6500
2nd	6200
3rd	5700
4th	5900
Total	**24300**

Source: Woodlot Plantation Journal, TFD 1990-91

8. Other tangible benefits

a. Beneficiaries collected and sold leaves and twigs in the local market

b. According to the benefit sharing agreement, all material from the first thinning after 5 years (1995-96) was distributed among the beneficiaries. After the second thinning 2 years later, all products (fuel wood, poles and logs) were sold at auction and beneficiaries received 45% of the proceeds, as shown in table 3.

Table 3: Products and revenue from 1st and 2nd thinning (1st rotation)

Type of plantation (and	1st thinning		2nd thinning		Total Amount (taka)
	Fuel wood (cu ft)	Amount (taka)	Fuel wood (cu ft)	Amount (taka)	
Woodlot (45)	4523	54250	3780	45365	99615
Agro-forestry (49)	1356	16200	2835	34025	50225
Total	**5879**	**70450**	**6615**	**79390**	**149840**

Source: Woodlot and Agro-forestry Plantation Journal, TFD 1990-91

Tenders were issued to fell the trees in the 94 plots of 1 ha after 10 years (2000-01) and proceeds from the sales were distributed as follows: 45% to government, 45% to beneficiaries and10% to the Tree Farming Fund for plantation and maintenance (table 4).

Table 4: Products from and value of 1st rotation (1990-1991)

Type of plantation	Timber (cu.ft)	Pole (nos.)	Fuel wood (cu.ft)	Value (taka)
Woodlot	20972.60	8235	5000	4642732
Agro-forestry	11280.00	4850	30374	2845545
Total	**32252.60**	**13085**	**80374**	**7488277**

Source: Woodlot and Agro-forestry Plantation Journal, TFD 1990-91

Table 5: Distribution of revenue among the stakeholders from felling (1st rotation)

	Woodlot	Agro-forestry
Total sales (taka)	4642732.00	2845545.00
Share of participants	2089229.50	1280495.00
Government revenue	2089229.50	1280495.00
Tree Farming Fund	464273.20	284554.50

Source: Woodlot and Agro-forestry Plantation Journal, TFD 1990-91and sale register TFD 2000-2001

After felling the first rotation in 2000-01, both types of plantation were immediately reforested. Most expenditures were covered by the Tree Farming Fund, with the balance coming from government. The area, types of plantation and number of participants remained the same.

Benefits from the 2nd rotation: Of the 49 participants who engaged in agro-forestry, table 6 shows the number involved by crop cultivated between 1991 and 2001 and their average income. Overall average income per participant over this period was 79250 taka.

Table 6: Crops cultivated and average earnings - 2nd rotation (1991-2001)

Year	A Paddy only	A Earnings (taka)	B Paddy and wheat	C Vegetables only	D Vegetables and other crops	B, C, D Earnings (taka)
1st	29	4500	0	15	5	4500
2nd	25	4200	0	14	6	5000

3rd	29	4000	4	8	12	4700
4th	29	4000	0	10	10	5200
5th	29	3800	0	12	8	4600
6th	29	3200	0	12	8	4800
7th	24	3400	0	17	8	4000
8th	29	3650	0	13	7	3500
9th	29	3300	0	14	6	3000
10th	23	3400	0	15	11	2500
	Total	**37450**				**41800**

Source: Agro-forestry Plantation Journal, TFD 2000-2001

In the woodlot plantation, 45 participants cultivated agro-crops such as bringal, pineapple, ginger and turmeric in the 2nd rotation (first five years). Table 7 shows the average annual income per participant during this time.

Table 7: Average annual income per participant

Year	Annual income(taka)
1st	11500
2nd	9300
3rd	9800
4th	7600
5th	5800
Total	**44000**

Source: Woodlot Plantation Journal, TFD 2000-2001.

9. Other Tangible Benefits

Table 8 shows the products and average earnings of the 49 participants in the project.

Table 8: Products and revenue from 1st and 2nd thinning (2nd rotation)

Type of plantation (and beneficiaries)	1st thinning		2nd thinning		Total amount (taka)
	Fuel wood(cu ft)	Amount (taka)	Fuel wood(cu ft)	Amount (taka)	
Woodlot (45)	8886	177720	8590	189078	366798
Agro-forestry (49)	3234	64680	6363	146350	211030
Total	**12120**	**242400**	**14953**	**335428**	**577828**

Source: Agro-forestry and Woodlot Plantation Journal, TFD 2000-2001

At the 2nd rotation, tenders were issued to fell the trees after 10 years (2010-11) and proceeds from the sales were distributed as follows: 45% to government, 45% to beneficiaries and 10% to the Tree Farming Fund for plantation and maintenance (table 9).

Table 9: Products from and value of 2nd rotation (2010-11)

Type of plantation	Timber (cu.ft)	Pole (nos.)	Fuel wood (cu.ft)	Value (taka)
Woodlot	49022	6665	28500	22991690
Agro-forestry	25420	4295	15067	14558853
Total	**74442**	**10960**	**43567**	**37550543**

Source: Agro-forestry and Woodlot Plantation Journal, TFD 2000-2001and sale register of TFD 2010-2011

Table 10: Distribution of revenue among the stakeholders from felling (2nd rotation)

	Woodlot	Agro-forestry
Total sales (taka)	**22992437.90**	**14558853.00**
Share of participants	10346260.50	6551483.85
Government revenue	10346260.50	6551483.85
Tree Farming Fund	2299916.90	1455885.30

Source: Agro-forestry and Woodlot Plantation Journal, TFD 2000-2001and sale register of TFD 2010-2011

Table 11: Comparison of 1st and 2nd rotations (agro-forestry)

Description	Stakeholders	1st rotation (1990-91 to 2000-01)	2nd rotation (2000-01 to 2010-11)
Earning from 1st thinning (taka)	Participants	16200	64680
Earning from 2nd thinning (taka)	Participants+Govt.+TFF (45%+45%+10%)	34025	146350
Earning from other crops (taka)	Participants	2587200	3883250
Earning from felling (taka)	Participants	1280495	6551483.85
	Government	1280495	6551483.85
	Tree Farming Fund	284554	1455885.30
Total (taka)		**5482970**	**18653133**
Timber (cu.ft)	Participants+Govt. +TFF (45%+45%+10%)	11280	25420
Number of poles	Participants+Govt. +TFF (45%+45%+10%)	4850	4295
Fuel wood (cu.ft)	Participants+Govt.+TFF (45%+45%+10%)	34565	24664

Source: Agro-forestry Plantation Journal, TFD 1990-1991, 2000-2001 and TFD sale register 1990-91, 2010-11

Table 12: Comparison of 1st and 2nd rotations (woodlot)

Description	Stakeholders	1st rotation (1990-91 to 2000-01)	2nd rotation (2000-01 to 2010-11)
Earning from 1st thinning (taka)	Participants	54250	177720

Earning from 2nd thinning (taka)	Participants+Govt.+TFF (45%+45%+10%)	45365	189078
Earning from other crops (taka)	Participants	1093500	1980000
Earning from felling	Participants	2089229.50	10346260.50
	Government	2089229.50	10346260.50
	Tree Farming Fund	464273.20	2299169
Total (taka)		**5835847**	**25338488**
Timber (cu. ft)	Participants+Govt.+TFF (45%+45%+10%)	20972.60	49022
Number of poles	Participants+Govt.+TFF (45%+45%+10%)	8235	6665
Fuel wood (cu.ft)	Participants+Govt.+TFF (45%+45%+10%)	13303	45976

Source: Woodlot Plantation Journal, TFD 1990-1991, 2000-2001and TFD sale register 1990-91, 2010-11

Results

Tangible benefits from social forestry activities include:

- Recovery of encroached land
- Reforestation and afforestation of degraded forest land
- Increase in the quantity and quality of bio-diversity
- Employment in tree planting and maintenance
- Improved standard of living and reduced dependency
- Sufficient wood supply to meet demand
- Greater awareness about the environment and bio-diversity

Every year, a certain area of encroached forest land and marginal lands are brought under tree cover. After a 10-year rotation period, trees are extracted and the areas are reforested. This process has been repeated over the last two decades in different parts of Tangail Division, along with various silvicultural operations and maintenance. The Forest Department is implementing this approach across Bangladesh and, in this way, progress toward sustainability is being made.

10. Challenges

The biggest challenge for the forestry sector is to sustain the environmental services that forests provide while meeting current and future demand for timber, fuel wood, fiber and other forest products. Increasing the prosperity of the citizens of Bangladesh in the face of rapidly shrinking forest area is a major concern as well.

Capacity of the Forest Department in terms of human resources, logistics, knowledge and management must be improved significantly if it is to make the interventions needed to meet the growing demands of the nation. In this regard, forestry legislation, policies and other regulations must also be updated (Rahman-2011).

Factors associated with challenges in the sector include:

a. **Forest protection:** A rapidly growing population, illicit felling, encroachment, long delays in resolving disputes/complaints all contribute to making forest protection difficult in Bangladesh.

b. **Land tenure:** Individuals rather than communities are being granted settlement rights to acquired forest land, mainly in the central and north-western districts.

c. **Forest reservation:** Because the Forest Department has not completed the reservation of acquired and protected forests under its jurisdiction, illegal settlers are taking control of these areas and are felling the trees.

d. **Overlapping jurisdiction:** Unclassified state forests account for 0.73 million ha in the Chittagong Hill tracts where District Land Administrations are leasing this land for shifting cultivation and other purposes, all of which result in the destruction of top soil, erosion and degradation.

e. **Inadequate resources, including human, financial and material:** Considering the job entrusted to the Forest Department, more staff, education and training are urgently needed to function adequately, as are sufficient capital assets and budgets.

11. Vision 2021 for The Forestry Sector

The Bangladesh Government is targeting to achieve 20 percent forest cover (2.84 million ha) by 2021 in order to sustain an ecological balance; create more employment for women; provide wildlife habitat; adapt to climate change; establish a coastal green belt; and increase accountability and transparency in forest management, among other reasons. Strategies to achieve the vision include increasing productivity through higher efficiency, focusing on agro-forestry and social forestry, and making Sundarban a strong barrier between the sea and landmass (Rahman, A.R.2011).

As a member of the global community and signatory to various international agreements and protocols such as Kyoto, Bangladesh is incorporating international guidelines on sustainable forestry into its national forestry directives, including forest certification and guidelines produced by the International Tropical Timber Organization.

12. Conclusion

Although traditional forest management in Bangladesh does not encompass the formal application of criteria and indicators, the social forestry movement is gaining momentum and rapidly moving the country toward sustainability. This program is playing a vital role in the recovery of encroached forest land, forest conservation, maintenance of biodiversity, production of biomass and alternative income generation. It also provides tangible and intangible benefits to the many people engaged in forestry and, above all, it helps to mitigate the negative effects of climate change.

The national development of natural resources through afforestation should be based on land-use plans that take into account not only the short-term economics of alternative land use but also the long-term capacity of the country to achieve the Millennium Development Goals. In this regard, strong political commitment to sustainable management is a prerequisite to success.

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Sustainable Forest Resource Management in Brunei Darussalam

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1. Abstract

Brunei Darussalam is situated on the north-west side of the island of Borneo on the coast of the South China Sea. It covers 5765 km², and shares a 381 km border with the Malaysian state of Sarawak. It is the smallest economy on the island of Borneo and the second smallest in the ASEAN region, after Singapore. Even though the size of the economy is small, it has the highest percentage of forest cover in the region - about 76% (438,000 ha).

Forests provide many social, economic and environmental goods and services that are essential to all life on the planet. Thus, the Forestry Department, as the agency responsible for the domestic forests, will continue to manage these invaluable resources in a sustainable manner for the benefit of current and future generations. To date, about 40% of land area (235,520 ha) is either gazetted or notified as forest reserve. In line with the National Forest Policy (1989), the Forestry Department aims to increase this proportion to 55%. However, stronger commitment of and coordination among relevant agencies are required to achieve this goal. In this regard, the Heart of Borneo Initiative is an important part of efforts to sustainably manage and develop the country's forest resources.

This paper highlights forestry development in the country; its forest resources; management strategies and practices; forest related policies and legislation; and activities at national, sub-regional, regional and international levels to achieve the sustainable management, conservation and protection of forests as well as the biodiversity they contain.

2. Overview of Forest Resources

Brunei Darussalam has one of the highest percentage of forest cover in the region - around 76% of land area - which consists of two types: swamp and hill forests. The former category occurs in low-lying areas which are subject to tidal, seasonal or continuous flooding: mangrove, beach forests, freshwater swamp forests, and peat swamp forests. The latter category generally is found on high and dry grounds and is composed of tropical heath (kerangas), mixed dipterocarp, and montane. Based on their floral composition, forest formations, soil conditions and micro-environment, these forests are further classified according to the dominant plant species. Table 1 describes the forest types and Figure 1 shows their percentage distribution throughout the country.

Table 1: Forest types

Forest Type	Description
Mangroves	Occur exclusively on coastal and riverine saline soils subject to the influence of sea tides and can be clearly differentiated from peat swamp which it typically borders. These forests are further classified into 7 sub-categories based on the dominant plant species: Bakau, Nyireh Bunga, Langgadai, Nipah, Nipah-Dungun, Pedada, and Nibong.
Beach	Generally found above the high-tide mark on sandy soil and has adapted to harsh growing conditions (strong winds, salinity, lack or excess of humidity). They are important in stabilizing land and thus prevent the silting of lagoons. They also protect human settlements from moving sand dunes.
Freshwater Swamps	Found in valleys and along water courses that are prone to flooding and are usually the next forest type to develop behind mangrove swamps. These forests are further classified into 3 sub-categories: Emparan on Levee Alluvian, Non-Arboreal Alluvium, and Sub-Arboreal Alluvian.
Peat Swamps	Are a natural progression of freshwater swamps where accumulated leaf-litter has raised the peaty soil into a dome or lens, the top of which is above the normal level. They are the second dominant forest type (next to mixed dipterocarp) and sub-categories consist of transitional mangrove-peat swamp , Ramin-Pulaie Association, Jongkong, Terentang, Alan, Alan Bunga, Padang Alan, Padang Mix, and Padang Keruntum.
Tropical Heath (kerangas)	Occurs on infertile, base-poor soils that are derived from siliceous parent rocks which are usually overlain by a thin peaty soil, except in eroded areas. Based on the dominant plants species, sub-categories are Belait Pleistocene, Tulong (Belait Quaternary), Kapur Paya, and Mountain Kerangas.
Mixed Dipterocarp	Is the dominant, most uniform and most complex forest type. Uniformity lies in the structure and physiognomy - a dense, multi-storied high forest with an uneven canopy. Its complexity is manifested by its floristic richness. The 3 sub-categories are Lowland Association, Hill, and Highland Mix.

Montane Forest	Found only at 760 m above sea level or more and confined to the Temburong district. Height can reach more than 15 meters and trees are small and slender with dense layers of undergrowth, including many palms. The branches are draped with mosses, liverworts and lichens. The two categories are lower montane (Mixed Lower Montane, Tulong Association, and Shorea coriacea Mix) and upper montane (Oak and Rhododendron Mix).

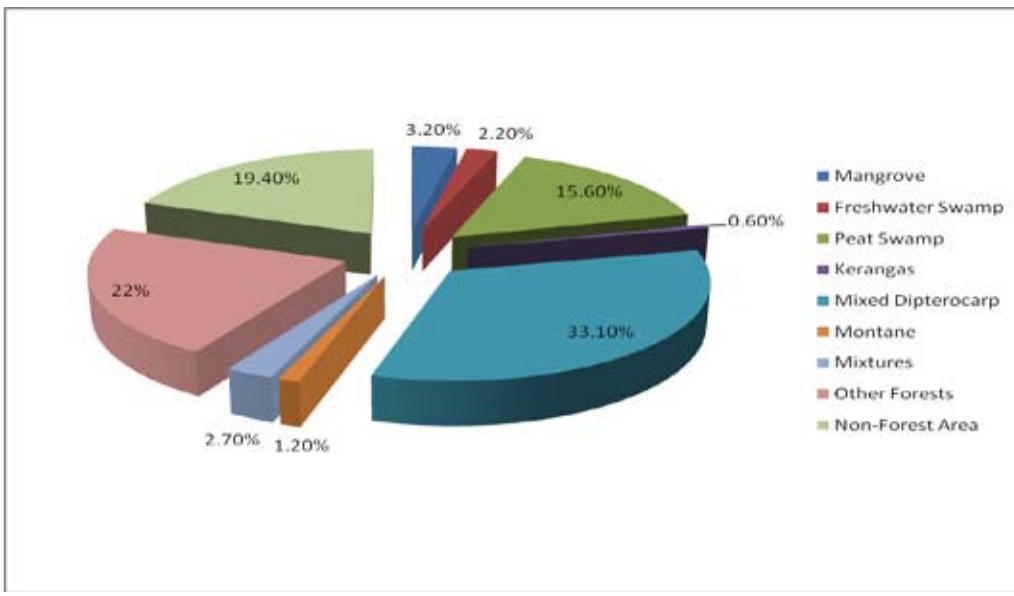

Figure 1: Percentage distribution of forest types

3. Forest Resources Management

Chapter 46 of the Forest Act assigns responsibility for the management and administration of forests to the Forestry Department. The Act also includes provisions on the reservation of forest lands, harvesting, customary rights, penalties for violations, and the prescription of forest royalties.

In the early days, officials were mainly concerned with collecting revenues from a small volume of timber and non-wood forest products such as latex of Jelutong (Dyera spp.). The discovery of oil in 1929, an industry which remains the basis of today's national economy, is largely the reason for the Department's limited profile in its initial years.

Systematic, semi-mechanized logging in the mixed dipterocarp and peat swamp forest which began in the mid 1950s required that proper procedures be in place for natural forest management

and silviculture so that harvesting and rehabilitation could be controlled and coordinated. Several approaches were tried with varying degrees of success. The Malayan Uniform System (MUS) to treat the logged area of mixed dipterocarp in the early 1970s resulted in high tree mortality and exposure of the fragile soil surface, likely because the system was applied without due regard for site variations. Therefore, the productivity of these stands is now below average and an intensive program of enrichment planting using suitable indigenous species is being planned. The Department has also replaced the MUS with a selection felling system which it has extensively modified to increase its flexibility. For example, the minimum diameter for felling increased to 60 cm DBH for dipterocarps and 55 cm for non-dipterocarp trees; the density of logging tracks per hectare was reduced; directional felling was introduced; and the cutting cycle increased to 60 years. Surveys and prescribed stand improvement of pre- and post-felling and regeneration are important components of the new system.

Consistent with the 6th National Development Plan, large-scale plantations have been established since 1992 to help meet demand for quality timber. Based on trial plantings since the 1960s, species include dipterocarps, tropical conifers and Acacia mangium. The Forestry Department aims to develop at least 30,000 hectares to supply the country's forest industry on a sustainable basis. A comprehensive study in 1984 recommended that plantations for sawn timber be developed within the Inter-Riverine Zone, between Tutong and the Belait River.

4. Management of The Forest Reserve

Forest area is divided into state land forests (under the Town and Country Planning Department) and permanent forest reserves (under the Forestry Department) for a total area of 438,000 ha. Of this amount, about 235,520 ha (40% of the land base) is gazetted forest reserve. In line with the National Forest Policy, the Department aims to gazette an additional 15%.

For management purposes, the forest reserve is classified according to functional categories which are described in table 2.

Table 2. Functional description of forest classification

CLASSIFICATION	FUNCTIONAL DESCRIPTION	GAZETTED AREA (Ha)	PROPOSED ADDITION (Ha)
Protection	Preserved forests to protect critical soil and water resources; keep the country green and the climate invigorating; prevent or minimize floods, droughts, erosion, pollution, and similar environmental problems; and contribute to the ecological stability of the country.	18,562	-

Production	Natural and planted forests, including non-timber plantations, for a sustained supply of products and services.	138,026	80,624
Recreational	Forested areas with natural features, developed to promote social, psychological, physical, and economic well-being.	4,595	234
Conservation	Undisturbed forests set aside to preserve and conserve biodiversity for scientific, educational and related purposes.	28,511	3,173
National Park	Areas with distinctive geological, topographic and other features of special interest, reserved to maintain diverse plant and animal communities for the benefit of present and future generations.	46,210	2,644-
TOTAL		**235,520**	**86,675**

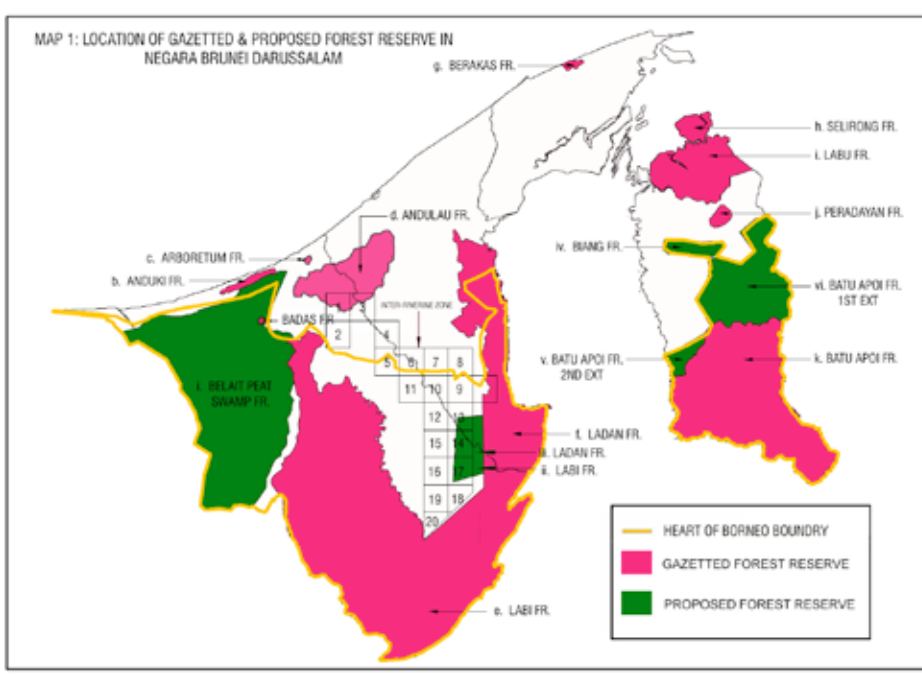

Figure 2: Current and proposed forest reserve and Heart of Borneo boundary

5. Organizational Structure of Forest Agencies

The Forestry Department is one of the earliest government agencies to be established, beginning with an office in March 1933 in Kuala Belait to manage forests and harvesting operations within the district. After independence in 1984, the Department was placed under the Ministry of Development until it moved to the Ministry of Industry and Primary Resources in 1989. To better pursue efforts to achieve sustainable forest utilization and improve environmental quality, the Department reorganized in 2005. As Figure 3 shows, it now consists of four divisions: Budget and Enforcement, Forest and Human Resources Development, Eco-Tourism and Amenity, Research and Development; and five line sections of 23 units: Enforcement, Policy and Planning, Resource Development, Economic Forestry, Amenity and Environment, Biodiversity Conservation, Research and Development.

6. Forest Policy Framework and Enforcement

6.1. Commitment

The National Forest Policy states that, in pursuit of national development objectives, the government of Brunei Darussalam (i.e., the Forest Department)commits to conserve, develop and manage the country's forest resources to improve the quality of life; promote social, political, and economic well-being; advance the use of technology; and balance environmental and ecological needs over time.

6.2. Policies, laws and regulations

Several amendments were made to the Forest Act (1934) to reflect the latest trends and developments in the sector, including Order (2007), Chapter 46, and Rules (2007). The National Forestry Policy (1989) and the Forestry Sector Strategic Plan (2004-2023) complement the Act, in addition to other supporting legislation such as the Land Code and Land Acquisition Act, the Wildlife Act, the Town and Country Planning Act, the Antiquities and Treasure Trove Act, and the Wild Flora and Fauna Order (2007).

The Forest Act assigns the Forestry Department full jurisdiction over all gazetted forest reserves, including planning, development and management. It also gives it the power to manage all other forests in the country. However, responsibility for the actual land classified as state land, reserved land and alienated land falls under the purview of other government agencies and individuals to whom the land has been gazetted or allocated. The role of the Forestry Department in these areas is limited to overseeing harvesting and the utilization of timber and other forest products.

In terms of logging operations, Brunei Darussalam has put guidelines in place to ensure

sustainability. Specific goals are to maintain or increase productivity in production forests and to balance harvesting with conservation measures. They also cover aspects related to the construction of forest roads, logging procedures and post-harvest reporting. Field officers use these guidelines to determine whether activities conform to the Brunei Selection Felling System (BSFS) - a system which involves an assessment of the timber stand before and after logging. Trees to be cut and those to be left for the next harvest are marked according to commercial species and stipulated diameter limits.

To safeguard against illegal activities, the Department conducts regular forest patrols via air, land and water, either as part of its routine operations or as part of joint efforts such as "Jawatankuasa Protap Salimbada" with the Royal Brunei Police Force, Royal Brunei Armed Forces, Survey Department and Land Department.

In terms of implementing forest laws, rules and regulations, effective coordination is carried out in partnership with district offices, the police, the military, customs and excise officials, and other agencies that manage gazetted lands which are forested. After Brunei Darussalam became party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1990, the Forestry Department was named the country's Scientific Authority and it serves as a member of the CITES Management Authority for which the Department of Agriculture and Agri-food has responsibility.

7. Lesson Learned, Challenges and Future Strategies

• Successful experience, tools and lessons learned

Tropical rainforests are home to 50% of all animal and plant species on Earth. They not only provide shelter and habitat for wild fauna and flora but they also are a source of food, raw materials and medicine for human beings. In addition, these forests absorb large amounts of carbon dioxide and produce oxygen in exchange.

Despite their importance, about 20 million hectares of rainforest worldwide are lost every year due to logging and conversion to agriculture land. Most remaining rainforests are in developing nations where people rely on income from farming and the sale of timber for their survival. Thus, these activities often take precedence over conservation so that the destruction of these resources continues at an alarming rate.

In Brunei Darussalam, pressure on the natural forest is not as great as elsewhere in the region because its national economy is based on the production of oil and gas. However, the pristine forests of the country still must be conserved and managed according to the principles of sustainable management for the social, economic, and environmental values they provide.

8. The Heart of Borneo Initiative

The Heart of Borneo (HoB) is one of the largest initiatives in the region, the aim of which is to conserve a large tract of mainly upland rainforest that spans the central highlands of Borneo and extends through the foothills into adjacent lowlands. The Forestry Department is implementing it in partnership with Indonesia and Malaysia. The initiative complements and strengthens efforts to ensure that the forest resources in Brunei Darussalam are managed and developed in a holistic and sustainable manner, one which balances forest conservation with development. In this regard, the country has committed to place 58% of its land area under HoB management. Although the thrust of this endeavor is not new, the international attention and accolades it is receiving attest to the value of the work being carried out.

Prior to the HoB, the Forestry Department assumed responsibility for planting trees, with only the passive involvement of the private sector and other stakeholders. However, under this initiative, they have become proactive champions of forest rehabilitation and replanting projects.

The HoB National Council, established in April 2008, is comprised of ministries which have jurisdiction over land use management. It provides an important venue for policy and decision makers to exchange information, share ideas, and address land use management conflicts. In this way, it helps to guide the country's approach to sustainable development.

In addition to the HoB, the Department is implementing other policies, strategies, programs and initiatives, as described below.

8.1. Reduced logging

A policy which reduced logging by 50% (from 200,000 m3 to 100,000 m3) has been in place since 1990 as part of conservation efforts under the National Forest Policy. The shortfall in domestic supply of sawn timber is offset by imports.

8.2. Logging permits/licenses and ban on log exports

The Forestry Department has not issued new logging permits or licenses since the 1980s as part of a conservation strategy which limits the area of production forests. Only 24 sawmills cum loggers are still operating in the country. In addition, a ban on the export of logs has been imposed.

8.3. Public awareness

The Forestry Department continues to raise public awareness of the importance of

conserving and protecting forests as well as to instill in citizens a sense of love and appreciation for nature. Annual programs include celebrations to commemorate World Forestry Day, mass tree planting for all walks of life, nature camps and nature excursions for students, and the prestigious Princess Rashidah Young Nature Scientist Award for secondary school students.

8.4. Forest productivity

As part of the 5-year National Development Program, the Forestry Department will continue to intensify silvicultural treatments in logged-over forests to increase productivity. Forest harvesting will also continue under a well planned system so that silvicultural objectives of natural production forest reserves are met. In addition, 30,000 ha of fast-growing species (15–40 year rotation) will be planted.

8.5. Conservation areas

The Forestry Department has established ex-situ and in-situ conservation areas and has delineated areas of genetic resources. In addition, the Agriculture Department is collecting germplasm. The Brunei Forestry Centre in Sungai Liang contains excellent examples of ex-situ conservation: selected tree species, palms, bamboo and rattans, and the Forestry Branch in Sungai Lumut houses several plant collections.

Ulu Temburong National Park is one of the country's largest in-situ conservation sites. Situated mainly in the Batu Apoi Forest Reserve in Temburong District, it is mostly a virgin jungle of forest types, classified according to altitude and soil. In addition to conservation, research, and education activities, the park also caters to ecotourism.

8.6. Development of brunei tropical biodiversity centre

The National Development Program calls for the construction of the Brunei Tropical Biodiversity Centre, the objective of which is to ensure the conservation and sustainable utilization of biodiversity resources. Once built, the center will focus on research, education, and eco-tourism. The master plan for its development has been completed and construction of the main building, which started in May 2010, is expected to be finished in 2012.

- **International & Regional Cooperation**

  The Forestry Department participates actively in regional and international meetings, conferences, symposiums and workshops. It is also strengthening cooperation with other research institutions and organizations as part of its commitment to enhance capacity building, facilitate technology transfer, and exchange information on forestry issues, including forest conservation.

- **Challenges**

Although 40% of the country's land resources are protected under legislation and gazetted as forest reserves, huge tracts of forested areas (35% of land area) remain outside these reserves and can be developed. Land is a scarce resource in Brunei Darussalam and, like some other countries, the modernization/development of other sectors such as agriculture, fisheries, industry, and housing threaten these forested areas through their conversion to other land uses.

8.7. National strategies for the next five to ten years

- **Forest plantations**

The National Forest Policy (1989) formalized the strategy to establish forest plantations for the sustainable production of timber to meet domestic demand. In this regard, His Majesty issued His Titah on 24 July 1991 to plant 30,000 hectares for sawn timber, a goal which is expected to be achieved by 2035, as part of the forestry component in Brunei Darussalam's Long-Term Development Plan (Wawasan).

Recent government policy to increase forest conservation efforts further justifies the establishment of timber plantations, given that significant areas of production forests will be unavailable for harvesting in the future.

Specifically, it is hoped that plantations will provide about 200 cubic meters per hectare at rotation age. If 1,000 hectares are cut per year, the yield should be 200,000 cubic meters, enough to cover the country's requirements. Thus preservation of the country's natural forest will be possible.

- **Modernization of industry**

In view of limited timber resources, the Forestry Department is urging industry to diversify and invest in downstream processing as a means to add value to wood products. Such activities call for improving efficiency, including the utilization of a greater proportion of raw materials, and for developing new and innovative products. In addition, operators of small saw mills are being encouraged to combine resources, develop common business strategies and procure state-of-the-art technology to modernize facilities.

- **Tropical Biodiversity Centre (TBC) – Biodiversity conservation**

As noted above, the Tropical Biodiversity Centre should be completed in 2012 and a comprehensive plan put in place for the conservation and sustainable utilization of biodiversity resources. The centre will not only house the genetic inventory of Brunei's forests but it will also be the primary research and development institute of

the country, focusing for example on the development of non-timber forest products and aspects of forest biodiversity such as forest microbes. The 2nd phase (2012-2017) entails the construction of facilities for the general public and tourists: botanical gardens, an aviary park and a butterfly house.

Furthermore, as part of the Heart of Borneo Initiative, the Forestry Department intends to significantly increase forest conservation areas and focus on the sustainable use of forest biodiversity. In this regard, it is undertaking a botanical survey, in collaboration with local and foreign research institutes.

- **Conversion of production to conservation forests**

The Forestry Department is exploring the possibility of closing off an undisclosed portion of reserved forests from logging in order to increase conservation areas. Currently, harvesting is allowed in the Batu Apoi (46,210 ha), Ladan Hills (28,480 ha) and Labi Hills (119,880 ha). With the conversion, logging will move to the secondary forest on state land, i.e., the 30,000-hectare plantation being established in the Inter-Riverine Zone. As previously stated, this new thrust will relieve pressure on the natural forest and show that Brunei Darussalam is committed to reducing greenhouse gas emissions associated with forest loss.

- **Forest Certification**

The development of Brunei's criteria and indicators for sustainable forest management at both national and forest management unit levels is based on those that ASEAN produced for tropical forests, as follow:

a. Extent of forest resources

b. Forest health and vitality

c. Biological diversity

d. Production function of forest resources

e. Productive function of forest resources

f. Socio-economic function

g. Legal, policy and institutional framework.

As far as certifying timber concessions, efforts will be made to align the national scheme with the Pan-ASEAN Timber Certification Initiative. Even though Brunei's timber production and domestic market are small by comparison and despite the fact that timber imports are not significant, the country intends nonetheless to pursue

certification.

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The Drawa Block

Sustainable community Forest Management in Fiji

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THE DRAWA BLOCK:

the model area for sustainable community-based forest management

Supported by the SPC/GTZ Pacific-German Regional Forestry Project

1. Background

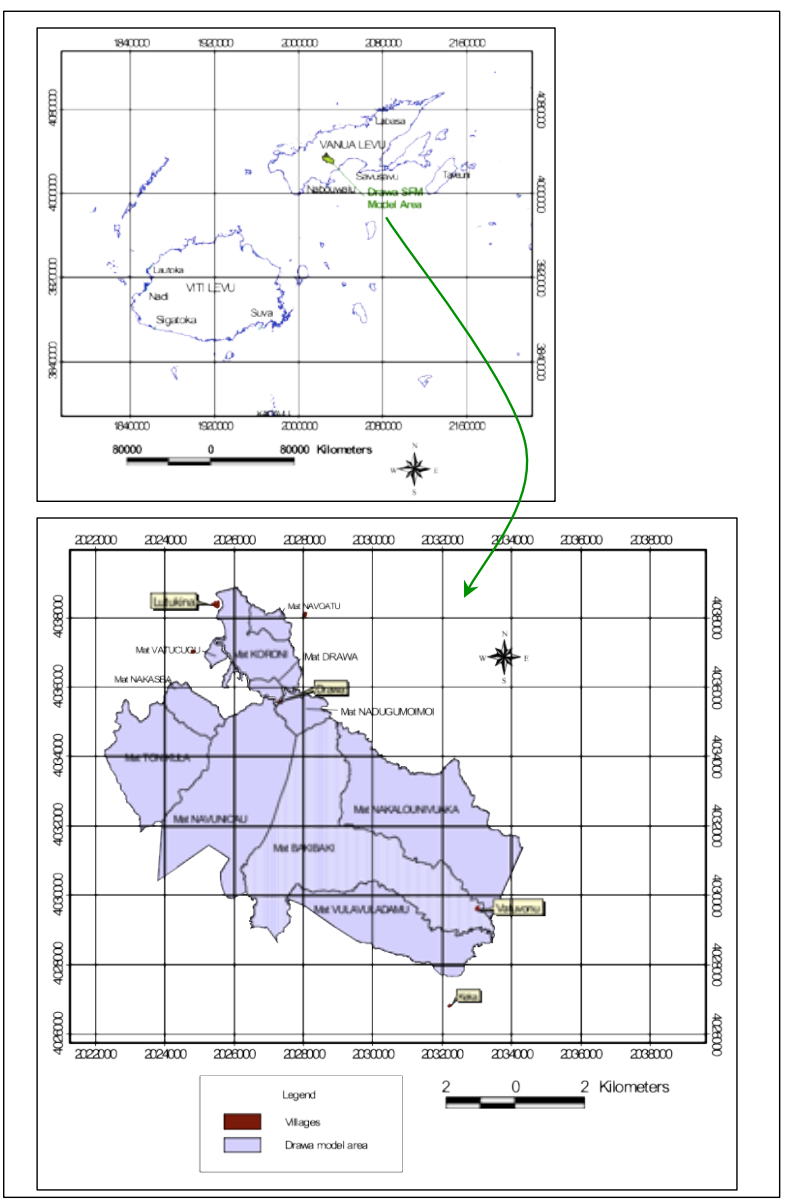
The Drawa model area for community-based sustainable forest management is located in the centre of Vanua Levu, the second largest island of Fiji. It spans 6,345 hectares of mountainous terrain, covered with indigenous and restored secondary forest. Most of the area is in the province of Cakaudrove, with a small portion situated in the province of Macuata at the northwest end. All land is under customary ownership and is divided into eleven mataqali (landowning units) spread over six main villages where members of the mataqali and their households reside: Drawa and Vatuvonu in the model area; Keka and Lutukina on the periphery; and Batiri and Nayarailagi to the north.

In 1994, the Forestry Department selected the Drawa Block to pilot the sustainable management of native forests in Fiji and, with the support of the Secretariat of the Pacific Community (SPC) and the German Technical Cooperation (GTZ) Pacific-German Regional Forestry, it has been working with landowners to develop a community approach. A National Sustainable Forest Management Working Committee, led by the Forestry Department, was formed in 1995 to provide institutional support and make binding decisions on the development of the sustainable forest management model. Other members of the committee are the Native Land Trust Board, a landowner representative, the Fijian Affairs Board, the Department of Land Resources and Planning, the Department of Environment, the Department of Regional Development, the Fiji Forest Industries and the SPC/GTZ Pacific-German Regional Forestry Project. Training and field activities commenced in 1999.

When the project started, the Fiji Forest Industries held the land concession and, under its old 1964 agreement, the company had the right to extend the contract when it expired in 1999. However, after negotiations, it surrendered the Drawa Block in 2003 and the Drawa Landowners Forest Management Co-operative Ltd. now holds the concession - a change which gives them legal long-term security and control of their forest resources.

So far, a forest management plan and a land use plan for non-timber activities were developed through extensive consultations with the Drawa mataqali and all relevant government and non-government agencies. The plans provide the regulatory framework for community-based natural resource management and guidelines for an approach that takes into account the use of forests for multi purposes. The lead agencies for implementation of the plans are the Forestry Department of the Ministry for Fisheries and Forests and the Department of Land Resources, Planning and Development of the Ministry of Agriculture, Sugar and Land Resettlement.

Experiences gained from the Drawa model are expected to help both institutionalize viable community-based sustainable forest management regimes for native forests in Fiji and mainstream participatory rural land use planning.



2. The Forest Managent Plan

The Forest Management Plan prescribes operational procedures for the sustainable management and use of native forests in Drawa, including for multi purposes. It was developed in a participatory manner to reflect the needs and wants of the 11 mataqali units and to minimize conflicts during implementation. In addition, the National Sustainable Forest Management Working Committee contributed significantly to its development. As noted earlier, the Drawa Landowners Forest Management Co-operative Ltd. owns the concession over timber production areas and manages them according to established guidelines.

As the first long-term (10 years) management plan for a forest area in Fiji, this document serves as a model for the rest of the country and for the Pacific region. Based on an analysis of a wide range of environmental and socio-economic data, it contains strategies, goals, activities and procedures to put the plan into operation. It also defines indicators and methods to continuously improve forest management practices and provides the means to achieve international recognition and certification of the sustainable management of the forests of Drawa.

Although the forest management plan will form part of a proposed 60-year lease agreement, it will be revised every 10 years and evaluated every 5 years. It provides the basis for annual working plans and will be amended whenever conditions significantly change or the majority of resource owners give their consent.

2.1. Mission and vision

The mission is the sustainable management and development of forest resources in the Drawa area by enhancing the health and productivity of these ecosystems while providing ecological, economic, social and cultural benefits for present and future generations. It requires:

- Environmental sustainability – a healthy and productive ecosystem
- Social sustainability – active participation of landowners, from planning to implementation, to maximize forest benefits without diminishing the services and products these resources provide
- Economic sustainability – benefits that exceed costs and economic viability of forest-based ventures today and in the future.

The vision of resource owners and managers is to obtain the maximum value and economic return from forests through community-based processing and facilities that add value to products. The goal is to alleviate poverty and improve livelihoods. In the future, forest management and a range of forest products may be certified by an internationally recognized scheme such as the Forest Stewardship Council.

2.2. Sustainable forest management principles in the drawa model area

The Forestry Department undertook a pre-harvest inventory of the model area in 1999 - 2000, with technical assistance from the SPC/GTZ Pacific-German Regional Forestry Project. In addition, landowners were trained to carry out field operations. Data was compiled on all stands and trees of ecological and social value. From this information, the total volume of timber and logging intensity were determined. The annual allowable cut was calculated as well, based on the principle of sustained yield which calls for areas to be harvested at specific intervals, then left to recover. The cycle is repeated in adjacent areas so that a continuous supply is available.

A selective logging system is used to harvest the merchantable timber species, based on diameter felling limits which are computed from several data sets of the pre-harvest inventory. These limits are applicable to the conditions in the Drawa Block and take into consideration the stocking and regeneration rate of individual tree species as well as their timber utilization potential. Given that this system only allows for a few big trees of marketable value to be cut, the structure of the forest and its biological diversity are maintained. As the standing stock in the production areas in Drawa consist of more than 80% commercial and potentially marketable species of good regeneration capacity, it is not necessary to replace the natural forest with plantations or to carry out enrichment planting to achieve economic viability. Logging operations are conducted according to the National Code of Logging Practice to minimize the negative impacts on the remaining stand and the environment. Other silviculture treatments are identified on site during the planning of the coupe.

The Forestry Department established several permanent sample plots to monitor forest growth and findings will be regularly incorporated into the further development of the management regime.

Environmentally sensitive areas are designated as protection forest and excluded from timber production: for example, steep slopes at risk of eroding, watercourses prone to pollution and sedimentation, habitats of rare or endangered plant and animal species, and cultural sites. When trees were selected and plans for the coupe were developed, ethno-botanists identified rare, threatened and endangered species and buffer zones were then established to protect fragile habitats. Other environmental safeguards include a system to monitor and evaluate ecosystem conditions prior to and after interventions to allow a comparison to be made, detect impacts and determine if forest operations need to be improved. Protection forests are left untouched to conserve fragile ecosystems, protect biological diversity and maintain a healthy environment. Since these sites are susceptible to soil erosion, their management is extensive, especially to

stabilize soils and store water. Harvesting and other forest uses are restricted to non-timber forest products and to manual or non-mechanised timber extraction because such operations have negligible effect on forest cover, stand composition or hydrological conditions.

2.3. Participatory land use planning

Participatory rural appraisals and surveys of the Drawa model area revealed that the conversion of forests to yaqona (traditional drink root crop) and dalo (taro, a root crop) gardens was adversely affecting timber resources - a situation which highlighted the need for a holistic land use plan to ensure a continuous wood supply.

Resource owners of the Drawa model area actively participated in the formulation of an integrated (inter-sectoral) land use plan, in collaboration with the Department of Land Resources Planning and Development, the Agriculture Extension Unit, the Forestry Department, provincial administrators, and the Native Lands Trust Board which facilitated discussions. Neighbouring communities were also consulted.

The goal of this 10-year plan (2005-2015) is to establish and manage timber estates, agriculture areas, ecologically and culturally sensitive sites, and natural reserves in an integrated and sustainable manner, while examining the potential to develop an ecotourism industry.

The following specific objectives reflect the concerns and needs raised during the participatory appraisals and surveys carried out in and outside the model area.

- Ensure a continuous timber supply from production forests for the benefit of present and future generations
- Select agriculture sites and systems based on environmental, social and economical requirements
- Delineate agriculture sites so that land use needs can be better addressed and activities more effectively monitored
- Determine income generating activities which will have minimum detrimental impact on forest resources
- Strengthen the role of women as primary household providers through crop diversification (at subsistence level)
- Invest in cash crops that are economically viable, environmentally suited, and contribute to general well-being
- Identify market opportunities
- Evaluate customary agriculture systems and current husbandry and management practices

with a view to better conserving soil and use land sustainably

- Protect threatened and vulnerable plants, historical sites, and cultural artifacts
- Establish a land use monitoring system which actively involves landowners

2.4. Protection of timber production areas

During the planning process, the mataqali of the Drawa Block agreed to clear forests only in defined areas so that productivity could be maintained. Based on technical information such as the carrying capacity of the land, data from the forest inventory, soils, assessment of socio-economic conditions and botanical surveys, landowners identified suitable and sufficient land to be reserved for future agricultural and non-forestry activities. By endorsing and signing the plan, they agreed to curb the encroachment of yaqona and dalo plantations into forest areas and confirmed their commitment to apply sustainable land use technologies and methods on marginal and vulnerable lands. Furthermore, the forest lease agreement they signed stipulates fines for encroaching into production and reserved forest areas - provisions which community bodies were formally appointed to monitor.

Plans are being discussed to jointly develop strategies for the production and marketing of non-timber forest products and agriculture produce. In addition, the Drawa Landowners Association, with assistance from relevant agencies, are exploring the potential of developing eco-tourism in the area, given the many attractive natural and historical sites. This industry could provide a source of extra income for the landowners without adversely affecting the forest.

3. Community Organizations

3.1. The drawa landowners forest management co-operative limited

In 2003, the Drawa mataqali agreed to form a cooperative to manage the forest resources in the model area. In May of that year, the Drawa Landowners Forest Management Co-operative Limited was registered and its regulations documented in by-laws. The Board of Directors, elected by landowners, is the governing body and consists of nine representatives. An external Supervisory Committee of three (also elected) assesses the Co-operative's performance, including in terms of its development, accountability and reliability. It reports severe breaches in logging practices to the Board and to the Forest Beat Officer, and may recommend cessation of operations. As part of monitoring, the committee examines monthly reports submitted by the Board and compares them with annual work plans, budgets, as well as with coupe and management plans.

For the first three years (2003-2006), the SPC/GTZ Pacific-German Regional Forestry Project helped to coordinate and supervise activities, after which time the Board and Supervisory Committee assumed responsibility. Beat Officers monitor and endorse all forestry operations.

The Co-operative encourages community participation, strengthens collaboration among the mataqali and supports local economic development. Membership is also open to the mataqali living adjacent to the Drawa Block, subject to their agreeing to the regulations and required contributions.

3.2. Development of a community-based enterprise

The need to balance the income objectives of land users with society's objective to preserve natural resources is widely recognised. The challenge is to turn communities into stakeholders, not simply users of forest products. Experiences around the world reveal that owners can be convinced to sustainably manage their forests if efforts result in financial gain. In fact, the establishment of the Drawa Landowners Forest Management Co-operative Ltd. strengthened both community participation in resource management and economic development of the area.

The project's mantra for the establishment of community-based ventures is to start small. In this regard, it explored options which entailed varying levels of community involvement and skills in order to identify a point where landowners could become engaged within their current capabilities. The project also considered the need for the business to be socially acceptable to the larger community whilst, at the same time, economically beneficial. Training was then conducted to build capacity, including on technical aspects, business administration and micro-finance. With additional support from agencies such as the Forestry Department, the Native Lands Trust Board, and industry, forest owners are now effectively participating in the management of their forests. A chronology of events is described in the table below.

3.3. Portable saw mills – a community-based business venture

A market survey and analysis showed that a community-based portable saw milling operation was economically viable because local demand for sawn native timber is high, technology is simple and many opportunities are available for down-stream and value-added processing (mouldings, weatherboards and furniture, for example). Small-scale production on site also saves on the cost of transporting logs - a benefit that allows pricing to be competitive.

The SPC/GTZ Pacific-German Regional Forestry Project gave the Co-operative an interest-free loan to purchase a portable sawmill and landowners were trained at the Fiji Forestry Training Centre on how to operate it.

Table 1. Chronology of Drawa Business Operations

HIGHEST LEVEL of PARTICIPATION		
Stage IV	Value Addition	
	Furniture Hardware shops Other	
Stage III	Sawmilling and Marketing	2006
	Markets secured	Portable sawmill set up on site Landowners trained to grade timber Local markets established
Stage II	Logging	2004 - 2005
	Landowners become contractors and engage in felling, extraction, loading and hauling	Landowner involvement in logging operations assessed; Drawa Landowners Forest Management Co-operative granted concession and signs lease; Fiji Forestry Training Centre trains landowners in logging operations and the use of portable saw mills; local market assessed
Stage I	Conventional arrangement	2003
	Landowners receive royalty and premiums only	Fiji Forest Industries surrenders concession of the Drawa Block; the Drawa Landowners Forest Management Co-operative Ltd is registered and landowners undertake business training
LOWEST LEVEL of PARTICIPATION		

3.4. Landowners association of drawa

The Landowners Association of Drawa was formed to oversee the Drawa Landowners Forest Management Co-operative; control the distribution of logging revenue for community development; create employment opportunities for the mataqali; and monitor/evaluate activities related to both the forest management plan and the land use plan for the model area. Its by-laws document the rights and obligations of members and the linkages with the Co-operative. Together with the forest management plan, the by-laws are incorporated into the Forest Lease Agreement, thereby setting the stage for legal recognition.

3.5. Stakeholders

The success of the Drawa project is owed to the 11 mataqali units who have remained united and resolute in their commitment to sustainably manage their forest resources, despite enticing offers from outside commercial loggers. Also to be commended is the fact that stakeholders are making decisions and implementing activities on a collaborative basis: the Forestry Department, the Native Land Trust Board, the Ministry of Agriculture, the Sugar and Land Resettlement and Extension Divisions of the Department of Land Resources, Planning, and Development, the Fijian Affairs Board, the Co-operatives Department, the Department of Environment, the Department of Regional Development, Fiji Forests Industries, and non-government agencies who helped to survey the flora and fauna of the area.

3.6. Capacity development

Since 2008, resource owners of the Drawa model area have confidently taken over more activities with a heightened sense of ownership and responsibility. They are implementing the forest management plan, practicing sustainable agriculture and land management as well as running successful small-scale business enterprises in Drawa village.

a. Sustainable resource utilisation and development

Field monitoring and assessment were undertaken in October 2008 to gauge land use activities and practices in the area. Findings revealed that Drawa resource owners diligently followed land use plans and engaged in sustainable land management. The team included forestry officers, land use officers, the landowners, and SPC/GTZ staff. Landowners trained in GPS capably marked the sites as part of the exercise.

The assessment also found that agriculture did not expand into production and protection forests but that clearing was largely contained in the sites indicated in the land use plan - a significant change from the steady encroachment into these areas which was detected in an assessment in 2001. All the more remarkable is the fact that taro production increased since that time. Clearing practices are also moving away from the total removal of vegetation cover for dalo and yaqona planting to less detrimental forms. A few farms returned to traditional agroforestry systems where the cash crops are planted beneath standing trees and alongside tree crops. Improved cultivation and crop management skills have also increased productivity and reduced cropping area.

With regard to forestry activities, the Drawa Landowners Forest Management Cooperative is competently running its operations and its mataqali labour force, skilled in management and technical know-how, are brokering deals with timber

buyers and logging contractors for the best prices and most favourable terms. In 2008, the Co-operative signed an agreement with Fiji Forests Industries to not only harvest trees and process timber but also to construct a logging road through the model area - an important social development in itself.

In 2008, the production and sale of dalo jumped from 6,000 to 20,000 plants over the previous year and resulted in a corresponding increase in income from $1,700 (at $1.20/kg) to $4,000 (at $1.00/kg). The quality of the second harvest also saw a reduction in the rejection rate of produce bound for the export market. Furthermore, a pineapple farm established in a demonstration site added to the income of village youths and government assistance to help Drawa women set up a poultry farm now allows them to sell fresh eggs at a premium price due to high demand in this rural area.

b. Changing mind-sets – "saving for a rainy day"

The year also saw an increase in household and individual bank accounts - a notable change in mind-sets since 2001 when villagers drew on the natural resources and plantations they owned when cash was needed. Community organizations and households now receive training in money management at the same time as technical training. Most residents in the model area, including youths, have now opened accounts to bank their income.

c. Capacity Building

The commitment of the Drawa resource owners to follow forest management and land use plans stems largely from the project's emphasis on building capacity at individual, organizational, and institutional levels - in recognition of the fact that an integrated and participatory approach is required to achieve sustainable development. Landowners actually learn by doing, i.e., carrying out tasks and learning from their mistakes. Some of them were trained as field assistants when the forest inventory was conducted and they are now able to draw up harvesting plans and perform field operations in accordance with the Fiji Harvesting Code of Logging Practice.

A field school approach was used to train farmers on site to apply better cropping techniques and thus increase taro production. Lessons covered all phases of the process, including marketing, where farmers travelled with buyers to their processing sheds to witness the produce being prepared for export.

Without any surveillance or external incentives, most farmers willingly practiced sustainable management - a change in attitude that attests to their capacity to make informed decisions. In addition, the landowners came to recognize that all natural resources can potentially generate income, especially if processing facilities are

available to add value. This realization reinforces the benefits associated with the adoption of an integrated management approach.

The development of organizational capacity targets all levels, from village to government structures and is an important component of projects to ensure operations continue when funding ceases. Aside from technical training and resource support, government agencies were encouraged to establish cross-sectoral links and develop participatory processes. This collaborative approach was a strong feature of the Drawa project which enabled teams in the field to manage resources in an integrated manner. A workshop to formulate land use planning guidelines was also convened, the outcomes of which were fed into the government process. In addition, the Drawa model provided practical direction, especially in terms of community participation and the Fiji Forestry Training Centre continues to use it in its syllabus on sustainable forest management.

Experiences from the Drawa model have been incorporated into national policies, including the National Forest Policy with regard to community-based forest management and the National Harvesting Code of Logging with regard to silvicultural prescriptions. Forest legislation which has been amended will strengthen Fiji's efforts to achieve sustainable forest management as well. The Drawa model has also informed the revision of policies and organisational procedures of other agencies and has fostered the participation of communities in the management of their forest resources, including for the benefits this approach brings to them.

GTZ and others also assisted the Ministry of Agriculture to review the Land Conservation and Improvement Act in order to strengthen sustainable land management, including through the establishment of mechanisms to support land users and owners and closer collaboration among government agencies.

4. Conclusion

The main lessons learnt from the Drawa model area are twofold: sustainable management of resources requires an integrated and holistic approach and the path to sustainable development requires that capacity be built systematically and consistently at all levels, using integrated and participatory processes.

After more than 15 years of development assistance, the SPC/GTZ Pacific-German Regional Forestry Project looks back with great satisfaction and pride on the Fiji Drawa model area which closed its doors in December 2008. It was exemplary in terms of integrated natural resource management involving thematic groups, the Secretariat of the Pacific Community and national counterparts. Such collaboration facilitated the smooth transition of responsibility to the Secretariat and national agencies upon termination of project funding.

Sustainable Forest Management in Indonesia

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1. Overview of National Forest Resources

Indonesia's economy is primary based on agriculture. However, the domestic vast forest resources cover about 130.68 million hectares (68.4% of land area) and the Ministry of Forestry is responsible for their management. Forest formations number about 15, of which the tropical rain forest is the dominant type. They are classified according to five functions:

a. Fixed production forest (32.60 million ha) is exploited for timber and non-timber forest products using selective or clear cutting methods.

b. Restricted fixed production forest for timber (24.46 million ha), because of fragile growing conditions such as topography, soil type and amount of rain fall, minimum diameter requirements are imposed, depending on the species.

c. Converted production forest (17.94 million ha) can be changed for other land uses through releases or exchanges approved by the Ministry of Forestry.

d. Conservation forest (26.82 million ha) has specific ecosystem features which should be preserved, including biodiversity, flora and fauna.

e. Protection forest is designated to protect against floods and drought, control erosion and sedimentation, maintain soil fertility, and safeguard against sea abrasion.

Although forests are found throughout Indonesia's islands, they are concentrated in Sumatra, Kalimantan, Sulawesi, Papua and Java as follows:

a. Primary or virgin (about 41.26 million ha)

b. Secondary or logged over (about 45.55 million ha)

c. Plantations (about 2.82 million ha)

d. Degraded (about 41.05 million ha)

Private forests cover about 8.07 million ha and these resources are also important for the wood industry and rural livelihoods.

2. National Forest Management

2.1. History

The history of the forestry sector dates back to 350 years of Dutch rule which ended in 1942. At that time, the industry was founded on teak plantations (Tectona grandis) on Java island. After Indonesia gained independence in 1945, government established a state forest enterprise (Perum Perhutanai) which still manages this area today.

During the 3 years of Japanese occupation, no records on forest management were kept, likely because of the short duration and focus on the world war. In fact, except for data gathered on harvesting operations (mostly by selective logging) in Java, government only began to document forest management in other areas in the mid 1970s, including Sumatra and Kalimantan. Until the late 1990s, forest exploitation by private concessions brought remarkable foreign exchange earnings and created many jobs. Operations then spread to other islands.

After three decades, inappropriate implementation of selective logging and weak government supervision led to deforestation and forest degradation - a situation which resulted in erosion, sedimentation, floods during rainy season and drought during dry season. In response, government called for a reduction in forest exploitation and an increase in rehabilitation programs. Also in the late 1990s, it initiated programs to manage watersheds, control erosion and sedimentation, conserve soil, empower communities and promote stakeholders participation. Rehabilitation efforts are continuing to this day, including in critical areas outside forests. The establishment of private forest plantations is also being promoted.

2.2. Organizational structure of forest agencies

Forestry Law no. 41 (1999), calls for the Ministry of Forestry to coordinate the management of forest resources. In the mid 1990s, central government began decentralizing authority to provincial, and local/district offices - a system which is now regulated under Law no. 32 (2004).

Both laws stipulate three levels of forestry administration: central, provincial and district. The federal Ministry of Forestry is based in Jakarta and four levels of staff fall under its Minister:

a. Echelon I : Director General

b. Echelon II : Director

c. Echelon III : Head of Sub-directorate

d. Echelon IV : Head of Section

Echelon I consists of 8 sections :

a. General Secretary, responsible for coordination, guidance and administrative support for the entire Ministry

b. Directorate General of Forest Planning, responsible for corporate planning and forest land use planning

c. Directorate General of Watershed Management and Social Forestry Development, responsible for watershed management planning, forest and land rehabilitation, social forestry and tree seed development

d. Directorate General of Forest Protection and Nature Conservation, responsible for forest protection, fire prevention, nature conservation and ecotourism development.

e. Directorate General of Forest Harvesting, responsible for utilization of forest products, natural and planted forest, forest product processing and marketing.

f. General Inspectorate, responsible for internal supervision and auditing of all agencies under the Ministry

g. Agency for Empowerment and Human Resource Development, responsible for community empowerment and training

h. Agency for Forest Research and Development, responsible for forestry research and development.

The Ministry of Forestry also has technical agencies at the provincial level in echelons II and III, based on job descriptions:

a. National park grand agencies (echelon II)

b. National park agencies (echelon III)

c. Natural resource conservation grand agencies (echelon II)

d. Natural resource conservation agencies (echelon III)

e. Forest boundary and land use agencies (echelon III)

f. Production forest monitoring agencies (echelon III)

g. Mangrove forest management agencies (echelon III)

h. Watershed management agencies (echelon III)

A Governor heads the Provincial Forestry Agency (echelon II) which is responsible for forest management at that level. It consists of two structures:

a. Head of division (echelon III)

b. Head of section (echelon IV)

Similarly, a Head of District or Mayor is in charge of the District Forestry Agency (echelon II) which has two structures as well:

a. Head of division (echelon III)

b. Head of section (echelon IV)

All levels of the organization work as a team to coordinate the management of forest resources, from central government to district/local levels. Central authorities are responsible for corporate planning and budgeting while provincial and district governments are in charge of program monitoring/supervision and implementation respectively.

3. Forest Policy Framework and Enforcement

3.1. Commitment

As stated in Article 33 of the Constitution of 1945, the Government of Indonesia has the mandate to manage all natural resources for the welfare of its citizens. This provision forms the basis of Law no. 41 (1999) and all other regulations concerning the management of natural resources. It also attests to the government's commitment to develop the forest sector in a sustainable manner. Law no. 41 also stipulates the need to increase the quality of watersheds. Thus, this aspect is a major component of forest management plans. Another important aspect is the shift in focus in early 2000, from forest management for timber only to forest management for a range of non-timber products and environmental services.

3.2. Forest policies, laws and regulations

To implement development programs in all sectors, including forestry, the National Planning Bureau formulated the Mid-Term National Development Plan (2010-2014) which includes targets for all government departments and which forms the basis for their individual mid-term planning. **In the case of the Ministry of Forestry, plans consist of six key elements:**

a. Better demarcation of forest boundaries and inventory data

b. Rehabilitation of degraded forest and improvement of watershed capacity

c. Forest fire prevention

d. Protection of biodiversity

e. Revitalization of forest harvesting and industry

f. Empowerment of communities in and around forest areas

Under Regulation no. 76 (2008), the government set up a program to rehabilitate degraded forest and land called Strengthening Watershed Function and Capacity Based on Community Empowerment. **It consists of the following activities:**

a. Rehabilitation of degraded forest and land, including mangrove, coastal forest and peat swamp forest

b. Establishment of community forestry

c. Development of private forests

d. Development of seed source stands

e. Establishment of village forests

f. Establishment of integrated watershed management plans.

To implement this program, Minister of Forestry Decrees have been issued as follows:

a. Decree no. 4 (2011) entitled Forest Reclamation (replaces Decree no. 146 of 1999)

b. Decree no. 60 (2009) entitled Evaluation of Forest Reclamation

c. Decree no. 39 (2010) entitled General Plan, Criterial and Standard of Forest Rehabilitation and Reclamation

d. Decree no. 70 (2018) entitled Technical Guidance for Forest and Land Reclamation

e. Decree no. 39 (2009) entitled Guidance for Establishment of Integrated Watershed Management Plans

f. Decree no. 32 (2010) entitled Guidance for Establishment of Technical Plans for Forest and Land Rehabilitation Within Watersheds

g. Decree no. 38 (2010) entitled Guidance for Establishment of Management Plans for Forest and Land Rehabilitation

h. Decree no. 24 (2010) entitled Guidance for Establishment of Community Nurseries

3.3. Law enforcement and implementation of regulations and policies

Regulation no. 76 (2008) stipulates that three types of plans must be developed before initiating forest and land rehabilitation as a condition for central government to release funds to carry out activities. **The plans and authorities involved are as follows:**

a. The Directorate General of Watershed Management and Social Forestry, Ministry of Forestry issues 15-year technical plans for watershed areas

b. The district forestry agency establishes 5-year management plans and annual work plans

In addition, Law no 41 and Regulation no. 76 require that mining companies operating

in forest areas first obtain a permit from the Minister of Forestry. In order to be granted authorization, they must submit plans which include commitments related to rehabilitation and reclamation, community empowerment, and environmental protection. If these compulsory activities are not properly executed, the Minister of Forestry will cancel the permit and fine the company.

4. Lessons Learned, Challenges and Future Strategies

4.1. Successful experience, tools and lessons learned

More than 1 million ha of forest in Indonesia become degraded every year. The total area now stands at 41 million ha and represents a serious problem. Although government programs rehabilitate approximately 500,000 ha annually, the shortfall is made worse as a result of the conversion of forest land to other purposes such as mining. However, as noted earlier, Regulation no. 76 requires mining companies to reforest their concessions and they must also plant trees to rehabilitate watersheds outside these areas. Both activities benefit communities in economic as well as ecological terms.

PT Newmont Minahasa Raya, a gold mine company which operated in North Sulawesi from 1998 to 2006, is a good example of responsible stewardship by private enterprise. In collaboration with provincial and district forestry agencies and under the close supervision of the Ministry of Forestry, it completed its obligation to restore the concession area in 2009. Success was due in large measure to the commitment on everyone's part to fulfill the terms outlined in Minister of Forestry Decrees nos. 146 (1999) and 60 (2009) through a partnership approach. This valuable experience demonstrated the importance of working together as a team. Government will draw on lessons learned when it deals with other companies which have concessions on forest land and the same obligations as PT Newmont Minahasa Raya - those involved in estates, fisheries and power, for example.

In 2010, the Ministry of Forestry formed 8,000 units of community nurseries, each managed by a group of 10-20 trained farmers. Each unit produced 50,000 seedlings for a total of 400 million. All seedlings were used to establish 400,000 ha of private forest plantations (1,000 trees per ha) in 2011. In that same year, the Ministry expanded this successful program by adding another 2,000 units. It expects that 100 million more seedlings will be produced to plant an additional 100,000 ha in 2012. Under this program, government not only provides farmers the seedlings but, as an extra incentive, also covers the costs of planting them. In 2012, it intends to increase the number of community nurseries to 15,000 to bring a total of 750,000 ha under forest cover by 2013.

After training, farmer groups undertake the following steps to establish community nurseries:

a. Develop a proposal under the guidance of a field adviser

b. Prepare the land

c. Prepare the materials (seeds or vegetative)

d. Establish facilities - information board, shed, net for shading, inspection road, watering system

e. Produce and care for the seedlings

f. Transport seedlings to the planting site.

Forestry Law no. 41 (1999) and Regulation no. 76 (2008) which govern forest rehabilitation in Indonesia form the basis for the Minister of Forestry Decree no. 24 (2010) to guide the establishment of community nurseries. Thus, two types of rehabilitation programs are implemented successfully - one focusing on the private sector and the other on rural communities. In the former case, the private sector covers all costs as a consequence of mining operations. In the latter instance, government assumes all costs.

To speed up the rehabilitation of degraded forest and critical land, government initiated another massive program in 2010 to produce seedlings. By the following year, a permanent nursery program had established 28 units in 22 provinces. It flows from the Regulation of the Director General of Watershed Management and Social Forestry Development no. P.5 (2011) which is based on Minister of Forestry Decree no. P.12 (2011) entitled Guidance for Implementation of Forest and Land Rehabilitation.

The establishment of permanent nurseries differs from that of community nurseries. Instead of farmer groups, private companies secure the rights through a bidding process and must conduct a feasibility study as well as develop an engineering design. Seedling production is also significantly higher per unit: 1 or 2 million seedlings as opposed to only 50,000 in community nurseries.

4.2. Current challenges

Forest rehabilitation is complex, consists of many activities and involves a number of central, provincial and district government institutions. Challenges include:

a. The vast area of degraded forest

b. Remote areas

c. Expensive transportation

d. Lack of human and financial resources

e. Weak coordination among levels of government, in many instances

f. The cost of implementation

g. Encroachment

To a large extent, the success of rehabilitation programs depends on the capacity of staff to implement them, especially after central government transfers budgets and administrative responsibilities to district forestry offices. To overcome this problem, government is now training district forestry officers and farmers to take on new duties.

The size of Indonesia is another issue. Although forests cover close to 70% of the land surface, many are located in remote areas where transportation is difficult and expensive. In fact, this is one of the main reasons for establishing community nurseries. The program has proven its worth by producing and distributing seedlings much cheaper than other methods. Moreover, it provides incentives for farmers to participate.

4.3. National strategies for the next five to ten years

For the next five to ten years, the management of forest resources in Indonesia will focus on rehabilitating 41 million ha of degraded forest under the supervision of the Directorate General of Watershed Management and Social Forestry Development. In this regard, the Directorate's medium term plan (2010-2014) identifies the following targets:

a. Rehabilitation of degraded forest and land including mangrove, coastal forest and peat swamp forest - about 2.5 million hectares

b. Establishment of community forestry - about 2 million hectares

c. Development of private forests - about 250,000 hectares

d. Development of seed source stands - about 10,000 hectares

e. Establishment of village forests - 500,000 hectares

f. Establishment of integrated watershed management plans in 108 critical watersheds.

Five directorates are involved in different aspects of the program as follows:

a. Directorate General Secretariat sets up activities and is responsible for budgeting.

b. Directorate of Watershed Planning and Evaluation provides guidance and supervision for the preparation of integrated watershed management plans for 108 critical

watersheds.

c. Directorate of Forest Seed Development is mandated to develop community and permanent nurseries.

d. Directorate of Forest and Land Rehabilitation provides guidance and supervision for the rehabilitation of degraded forest and land, including mangrove, coastal forest and peat swamp forest.

e. Directorate of Social Forestry Development is tasked with establishing community forestry, village forests and private forests.

The success of forest rehabilitation also depends on the selection of suitable species and joint planning with farmers to take into account their preferences. Normally, two types of tree species are chosen:

a. For wood production: Albizzia falcataria, Swietenia macrophila, Tectona grandis, Acacia mangium, Acacia auriculiformis, for example

b. For fruit production: Durio zibethinus, Mangifera indica, Nephelium lappaecium, for example

c. For fire wood: Leucaena glauca, Leucaena lecocephala, Gliricidea sp, Calliandra sp, for example.

Sustainable Forest Management in Malaysia

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1. Introduction

1.1. Malaysia is committed to the implementation of sustainable forest management, as enshrined in the resolutions of the United Nations Conference on Environment and Development (UNCED) and the World Summit on Sustainable Development (WSSD). While focusing on economic growth and development, it also emphasizes the conservation of natural resources and the social aspects of forestry.

1.2. As of 2009, about 59.5% or 19.52 million ha of Malaysia's land area remained under forest cover, despite robust development in the last few decades. Of that total, 74% or 14.39 million ha are gazetted as Permanent Reserved Forest (PRFs) under the National Forestry Act (1984) and relevant state enactment and ordinances. Another 1.83 million ha outside the PRFs are gazetted as national parks and wildlife sanctuaries.

1.3. Within the PRF, 3.21 million ha (22%) are designated as protection forest while the other 11.18 million ha (78%) constitute production forest where commercial harvesting on a predetermined rotational cycle is permitted. Production forest represents about 57% of the country's forested area.

2. Policy and Legislation

2.1. Under the Constitution, forestry comes under the jurisdiction of state governments which are empowered to enact laws and formulate policy independently. The authority of the federal government extends to advice and technical assistance, training, and research.

2.2. Again under the Constitution, the National Land Council (NLC) is responsible for formulating national policies to promote and control the utilization of land for mining, agriculture and forestry. In December 1971, it established the National Forestry Council (NFC) to implement a coordinated approach to forestry, including by taking into account the relevant policies of other sectors. The Deputy Prime Minister chairs the NFC which is composed of the Chief Ministers of the thirteen states, the Minister of Natural Resources and Environment Malaysia and other federal ministers whose portfolios have an impact on the sector such as finance, trade, agriculture, science, technology and the environment. Heads of the forestry services of Peninsular Malaysia, Sabah and Sarawak are also members. In addition to providing a forum to discuss issues of common concern, the NFC enhances collaboration between federal and state governments on the implementation of policies and programs. The NLC must endorse all decisions which state governments then action unless responsibility lies at the federal level.

2.3. In 1992, the National Forestry Policy (1978) was revised to include the conservation of biological diversity, the sustainable utilization of forest genetic resources and the role of local communities in forest development.

2.4. Since the early 1900s, state authorities formulated and enforced various forestry enactments and ordinances to ensure effective forest management and implementation of the National Forestry Policy. Inconsistencies among these documents were removed and forest management planning and operations were strengthened through the adoption of the National Forestry Act and the Wood-based Industries.

2.5. In 1993, the National Forestry Act (1984) was amended to incorporate more stringent penalties for forest offences, including illegal felling of trees, among others, and to provide for mandatory imprisonment of convicted offenders. The police and armed forces were given new powers in order to curb illegal logging, encroachment into forest areas and timber theft.

2.6. In December 2007, Parliament passed the Malaysian International Trade in Endangered Species Act (2008) as the basis for implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The act contains provisions for the administration and management of international trade in wild fauna and flora to ensure that such trade does not threaten their survival in the country. The Ministry of Natural Resources and Environment is currently drafting CITES Regulations.

3. Protection and Conservation

3.1. Malaysia has 2.15 million ha of conservation areas outside the PRFs which are protected under legislation: national parks, wildlife reserves, nature parks, bird sanctuaries and marine parks. In addition, 139 Virgin Jungle Reserves covering 114,237 ha have been established since the 1950s as permanent nature reserves and natural arboreta; control sites to compare harvested and silviculturally treated forests; and undisturbed natural forests for ecological and botanical studies. Together with the protection forests of the PRFs, an estimated 5.04 million ha of protected areas are designated for the conservation of biological diversity - an amount which represents 25.9% of forested land or 15.3% of total land area.

3.2. Malaysia has also drawn up a comprehensive list of plants and animals to be protected, many of which are covered under legislation, such as the tiger, rhinoceros, slow loris and bird-wing butterfly. In 1998, Malaysia adopted a National Policy on Biological Diversity to further identify and protect hotspots of high conservation value. It also established the National Bio-Diversity and Bio-Technology

Council in 2001 to elaborate a strategy and set direction for the conservation of biological diversity and the development of bio-technology in the country. The Ninth Malaysia Plan (2006-2010) includes actions to conserve biological diversity through rigorous in situ and ex situ programs.

4. Forest Management

4.1. To ensure a continuous supply of timber and to regulate forest activities, Malaysia uses area control and/or volume methods, as prescribed in the forest management plan. The annual allocation of the felling coupe is based on forest inventory data, the net area of production forest and prescribed silvicultural management practices. Each state reports on compliance in terms of the allocation to the National Forestry Council which, as noted earlier, is chaired by the Deputy Prime Minister.

4.2. Selective harvesting of the natural inland forests is carried out to ensure that the trees left standing reach commercial size in 25 to 55 years, when the process is repeated. Several studies have shown that this method is in fact a form of silvicultural treatment because the gaps created during harvesting promote natural regeneration of the desirable species. Logged-over forests are silviculturally treated only when necessary.

4.3. Licenses to log in the PRFs are issued for designated areas in the production forest. Thus, the forest classified as protection is managed for conservation and for the purposes listed below so that the multi-functionality of the natural forest is maintained. Under section 10(1) of the National Forestry Act (1984), it is possible to classify an area of the PRF to perform more than one of the following functions:

- Soil protection
- Soil reclamation
- Flood control
- Water catchment
- Sanctuary for wildlife
- Virgin jungle
- Amenity
- Education
- Research

- State park

4.4. These and other practices, policies and institutions are revised from time to time to meet prevailing challenges and requirements as well as to achieve the sustainable management, conservation and development of Malaysia's natural forest.

5. Tree Planting Along The Coastlines

5.1. It is a well known fact that mangroves protect coasts against the action of strong waves, wind and currents. They can also reduce the loss of life and destruction caused by tsunamis, as was the case on the northwest coast of Peninsular Malaysia where damages were not as severe as in areas exposed to the open sea. The Honourable Prime Minister, understanding the urgent need to take preventive measures, called for trees to be planted along several coastlines of the country.

5.2. In order to implement this program, the Ministry of Natural Resources and Environment (NRE) formed a national task force which met for the first time in February 2005. It is headed by NRE's Secretary General and members are from relevant state and federal governments as well as non-governmental organizations. Since coastal areas fall within the purview of several agencies, both at state and federal levels, this committee is responsible for coordinating activities, providing advice and assessing progress in implementation. Two technical committees were established to assist in this regard: the Planning and Implementation Technical Committee, chaired by the Director General of the Forestry Department of Peninsular Malaysia; and the Research and Development Technical Committee, chaired by the Director General of the Forest Research Institute of Malaysia.

5.3. The task force identified 2,010 ha in Peninsular Malaysia that need to be planted during the Ninth Malaysia Plan (2006-2010). Of this total, 1,617 ha are in the Permanent Reserve Forests and another 393 ha are outside on state land. In Sarawak, 230 ha of poorly stocked mangrove forests will be enriched and, in Sabah, about 596 ha of coastline have been earmarked for planting.

5.4. As of 2008, Malaysia planted 3,573,735 trees which cover 1,301.94 ha of coastline: Rhizophora apiculata, Rhizophora mucronata, Avicennia spp., Bruguiera parviflora, Bruguiera cylindrical, Sonneratia caseolaris, Ceriops tagal, and Casuarina equisetifolia.

6. Forest and Timber Certification

6.1. To ensure sustainable forest management and to meet the demand for certified products, the Malaysia Timber Certification Council (MTCC) was established in

October 1998 as an independent organization. Its mandate is to develop and operate a voluntary national timber certification scheme, the first phase of which was introduced in October 2001. The standard used is the Malaysian Criteria, Indicators, Activities and Standards of Performance for Forest Management Certification, based on the ITTO Criteria and Indicators for Sustainable Management of Natural Tropical Forests.

6.2. The next phase of the scheme began in December 2005 with a new standard (MC&I 2002) that was developed through multi-stakeholder consultations and incorporated the principles and criteria of the Forest Stewardship Council. For chain-of-custody certification, MTCC assesses compliance of timber manufacturers and exporters based on a document entitled Requirements for Chain-of-Custody Certification.

6.3. As of 2008, 8 forest management units (FMU) covering 4.43 million ha of PRFs have been certified using the MC&I 2002, while 1 FMU covering 0.056 million ha of PRFs is certified under MC&I 2001. To date, 146 timber companies have been certified for chain-of-custody.

6.4. MTCC has been a member of the Programme for the Endorsement of Forest Certification (PEFC) since November 2002 and, in March 2008, requested that the Malaysia Timber Certification Scheme (MTCS) be recognized within the PEFC's framework.

6.5. By March 2009, 302,403m3 of MTCS-certified sawn timber, moldings, laminated finger-jointed timber, plywood and furniture were exported to 21 countries: Albania, Australia, Belgium, Denmark, France, Germany, Greece, Indonesia, Ireland, Italy, Japan, Mauritius, the Netherlands, New Zealand, Norway, Poland, Singapore, South Africa, South Korea, the United Kingdom and USA. Specifically, the countries below recognize the MTCS in the following ways:

Denmark: the Ministry of the Environment lists it in its Purchasing Tropical Timber-Environmental Guidelines and describes it as a good guarantee of legal forest management, on its way towards becoming sustainable.

France: The Ministry of Environment and Sustainable Development and the Ministry of Agriculture, Food and Rural Affairs list the MTCS as an acceptable certification scheme in its National Timber Procurement Policy.

Germany: The city of Hamburg initially recognized the MTCS for a 2-year period under a joint project and has since included it in its procurement guideline for public construction projects.

Japan: The Forestry Agency in the Ministry of Agriculture, Forestry and Fisheries lists the MTCS in its Guideline for Verification on Legality and Sustainability of Wood and Wood Products.

The Netherlands: The Keurhout Protocol for Sustainable Forest Management accepts 6 certified FMUs and 10 chain-of-custody (CoC) companies while the Keurhout Protocol for Legal Origin accepts 3 FMUs and 123 holders of CoC certificates.

New Zealand: The Ministry of Agriculture and Forestry lists the MTCS as one of seven certification schemes in its Timber and Timber Products Procurement Policy Guidelines.

The United Kingdom: The report commissioned by the Central Point of Expertise on Timber (CPET), an expert group appointed by the Department for Environment Food and Rural Affairs, concluded that the MTCC certificate provides the assurance of legally harvested timber. The Royal Horticultural Society of the UK also lists it as one of seven recognized certification schemes in its Conservation and Environment Guidelines.

6.6. With effect from 1 July 2008, a new institutional arrangement has been in place for the MTCS: MTCC continues to be the National Governing Body but Certification Bodies which are accredited under the Department of Standards Malaysia are responsible for receiving applications, conducting assessments and issuing certificates. These changes will strengthen the MTCS and its acceptance in the international market.

7. Malaysian Timber Industry

7.1. The Malaysian timber industry sells products to more than 150 countries and is a major contributor to export earnings. The sector provides 337,000 direct jobs (3.5% of the workforce), including in some 4,000 wood-processing mills.

7.2. In 2008, timber exports amounted to RM 22.8 billion (US$6.9 billion). Furniture topped the chart at RM 6.9 billion (US$ 2.1 billion), followed by plywood and sawn timber at RM 6.3 billion (US$ 1.9 billion) and RM 3.1 billion (US$ 0.9 billion) respectively. Logs brought in RM 2.1 billion (US$ 0.6 billion) while medium density fibreboard and builder's carpentry and joinery contributed RM 1.2 billion (US$ 0.4 billion) and RM 1.0 billion (US$ 0.3 billion) respectively.

7.3. In recent years, the harvesting of logs from Malaysia's natural forests has decreased steadily, mainly due to effective forest management practices and the imposition of tighter laws, policies and regulations.

8. Forest Plantations

8.1. Recognizing the importance of the timber industry for the country's socio-economic development, Malaysia is implementing an aggressive programme to establish forest plantations because they can yield a higher volume of timber per ha, reach maturity in a shorter time, relieve pressure on the natural forest, and increase the supply of wood.

8.2. By the end of 2007, forest plantations covered 0.38 million ha. Under the Forest Plantation Development Programme, plans are to add another 25,000 ha annually over the next 15 years, for a total of 375,000 hectares.

9. Research and Development

9.1. Given the many pressing forestry issues worldwide such as deforestation, illegal trade in products, unsustainable practices and lack of integrated approaches to ecosystem management, forestry research and development (R&D) are more crucial and relevant than ever before. To strengthen Malaysia's R&D capabilities as well as forestry education and training, relevant institutions are aligning themselves with international organizations such the Global Environment Facility, the International Tropical Timber Organization, the Japanese International Cooperation Agency, the Danish International Development Authority, the International Plant Genetic Resources Institute, the Food and Agricultural Organization of the United Nations, and the private sector.

9.2. Salient R&D programmes include the following topics: sustainable management of natural forest, silviculture in forest plantations, production of planting stock, biotechnology, landscape and recreation, conservation of forest biodiversity, discovery of natural products, wood processing technology, wood protection and construction application, and utilization of wood residues for composite products, pulp and paper and energy.

10. Forest Law, Enforcement and Governance

10.1. Malaysia, like other developing countries, places importance on the economic and social needs of the nation. In this regard, conversion of land to other uses is done within a long-term development plan which takes into account the need to achieve ecological balance. For this purpose, various pieces of legislation and guidelines have been developed to protect the environment.

10.2. Amendments to the National Forestry Act in 1993, in addition to more stringent enforcement and closer monitoring of forestry activities through aerial surveys,

geographical information systems and remote sensing technology, have significantly reduced the number of offences related to timber theft and encroachment of the PRFs over the past ten years. This fact is confirmed in the 2001 report of the World Wildlife Fund and the World Bank on forest law enforcement in Peninsular Malaysia and East Malaysia. Findings also show that illegal logging in Sabah and Sarawak constitutes only 1% or less, compared to the trade in legally harvested products.

10.3. Recently, 62 posts were created to hire enforcement officers and legal officers in Forestry Department Headquarters and State Forestry Departments. These additional positions are expected to significantly strengthen capacity in this area.

10.4. Apart from being a member of the ITTO, Malaysia is participating in the following initiatives and dialogues. It is an active partner in the EU FLEGT which aims to combat illegal logging and reduce the trade in illegally-harvested timber through a proposed Voluntary Partnership Agreement (VPA). Malaysia is also involved in various bilateral meetings and regional cooperation to foster legal and responsible trade in timber products through the Pan-ASEAN Timber Certification Initiative as well as East Asian FLEG Process. In addition, Malaysia is signatory to various international fora, conventions and other non-legally binding commitments.

Matang Mangroves

The primary management objective of Matang mangroves is to provide fuel wood, initially for firewood and eventuallyS as raw material to manufacture charcoal. The secondary objective is to produce poles. Both goals are socio-economic in nature, basically to provide employment in local communities and produce a continuous supply of wood. The third objective is to conserve and protect resources and the environment for wildlife habitat, fisheries, recreation, education, research and biodiversity.

These mangroves are divided into four management zones: (i) protective zone (protection forest), (ii) restricted productive zone (restricted production forest), (iii) productive zone (production forest) and (iv) unproductive zone (unproductive area).

Zoning of the forest and mapping of the forest types helped to devise silvicultural systems based on ecological considerations - a management approach which allows the development of options to tap the full potential of the forest resources available.

Visitors can visit charcoal kilns, a bird sanctuary, a prehistoric area, a fishing village and fish farming carried out by local residents.

Sustainable Forest Resources Management in Mongolia

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1. Overview of Forest Resources

Since Mongolia moved from a communist system to a market economy in the 1990s, it has suffered great economic hardship and has not been able to adequately address land degradation in many parts of the country. At only slightly more than 8% of its forests under closed canopy, Mongolia is considered a low forest cover country by FAO definition. These resources are mainly located in the north-central part, forming a transition zone between the Great Siberian boreal forest and the Central Asian steppe desert. In Khentii and Khovsgol, the mountain slopes are covered with boreal taiga forest and, due to the short growing season, plant species are few. The area forms the most southern extension of the east Siberian taiga and consists mainly of Siberian Larch (Larix sibirica) and Siberian Pine (Pinus sibirica). It is also rich in mosses and lichens. A number of ungulates typical of Eurasian forests are also found: Musk Deer (Moschus moschiferus), Elk (Alces alces), Roe Deer (Capreolus pugargus), and Reindeer (Rangifer tarandus), among others. In northern Mongolia, a few families still herd reindeer in the traditional manner, reminiscent of the Lapps in northern Europe. Forest predators include the grey wolf (Canis lupus), brown bear (Ursus arctos), wolverine (Gulo gulo), and Eurasiona lynx (Felis lynx). Typical birds of these forests include the great grey owl (Strix nebulosa), boreal owl (Aegolius funereus), black-billed capercaillie (Tetrao parvirostris) and pine grosbeak (Pinicola enucleator). At lower altitudes, a high degree of biodiversity if found where the taiga forest meets the steppes. In this zone, mixed conifer and broadleaf forests intermingle with lush grasslands and it is here where most population resides. The fauna includes species characteristic of both taiga and steppe.

Due to the harsh climate (predominantly dry and windy) and short growing season, trees mature slowly. However, Mongolia's forests still provide a multitude of environmental functions in terms, for example, of climate change mitigation, carbon sequestration, watershed protection, preservation of permafrost in ecologically important areas and reduction of harmful emissions.

Significant areas of arid forest and shrub land are located in deserts to the south and southwest where saxaul (Haloxylon ammodendron), an almost leafless woody shrub, grows up to 4m and protects fragile soils from wind erosion.

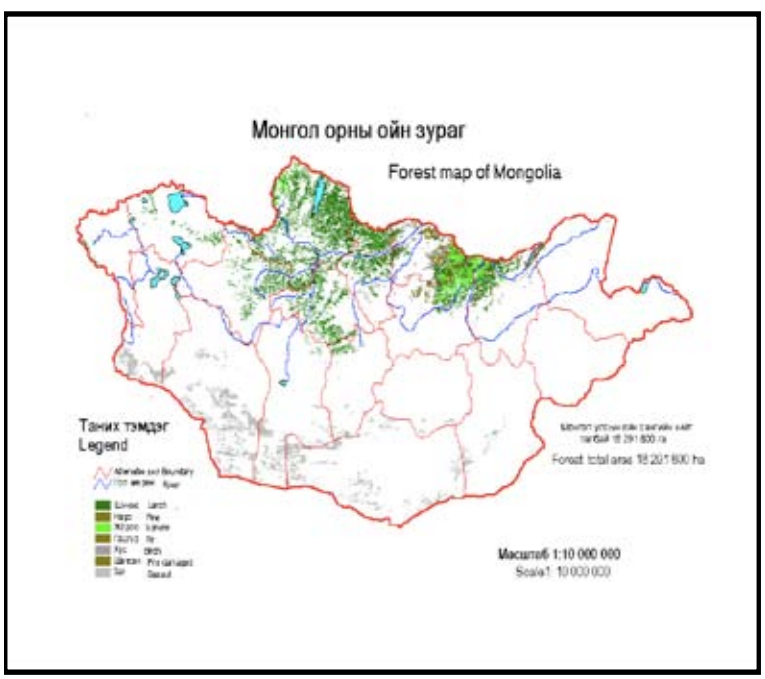
2. Forest Management

2.1. History

All forests and land in Mongolia are state-owned. Since 1990, the institutional and legal framework for the sector has changed several times but forest protection and wise use are founded on the "Law on Forest", the "Law on Protection from Forest and Steppe Fires", the

"National Forestry Policy" and the National Forest Master Program".

Forests are grouped into 3 types: strictly protected (8.4 million ha), protected (7.9 million ha), and utilization (1.2 million ha). The area of this third category has been reducing steadily since 1992, with some forests being reclassified into strictly protected and protected. Management of forest resources in Mongolia suffers from several weaknesses such as unregulated use, overuse and inadequate protection. According to a survey of the impacts of human interference on ecosystems during the past 100 years, some 40% of forests have been affected to some degree: 684,000 ha have not regenerated after fire and 250,000 ha after clear-cutting; birch and poplar replaced 1,737,000 ha of coniferous forests; steppe and sand/stones replaced 159,000 ha; and low-quality coniferous forests replaced 1,230,000 ha. In addition, cold-resistant taiga forest has been shrinking and non-forest ecosystems replaced 16% of forest ecosystems. Reports also indicate that about 1.6 million ha of forest would be lost between 1974 and 2000 (Krasnoshekov et al., 1992).



The main causes of deforestation and forest degradation are fire, overgrazing, mining, improper commercial logging, illegal collection of wood for construction and fuel, hay making in forest steppes, weak enforcement, pests and disease. Fire, mostly set by herders and collectors of antlers, has caused the greatest damage by far. Between 1990-2000 about 7.52 million ha were burned. Reforestation efforts began in 1971 and, so far, about 84,000 ha have been planted. However, the quality of these plantations is generally poor, mainly due to lack of maintenance and care, and partly due to harsh climate.

2.2. Organizational structure of forest agencies

Before the transition to a market economy, forestry and wood industry had full ministry status. Now, the Ministry of Industry and Trade is responsible for wood industry, the Mongolian Academy of Sciences undertakes forestry research, and various departments and agencies in the Ministry of Nature and Environment (MNE) oversee planning and implementation of programs, forest management, afforestation, and inspection. However, no single entity has primary responsibility for forestry and less than 5% of the ministry's staff is trained in this discipline. Local governments have been delegated field activities but they lack funds, facilities, skilled human resources and institutional mechanisms as well.

3. Forest Policy Framework and Enforcement

3.1. Policies, laws and regulations

Rules governing forestry in Mongolia were adopted in 1925 which formed the basis of the first Forest Law in the 1930s. This legislation was revised in 1974 and again in 1995 but several of the old provisions were retained. Since the change from a centrally planned to a market economy, Parliament passed new laws, rules and regulations on every aspect of Mongolian life and governance. Legislation falls into four categories: land and environment; natural resources, including forestry; fees for the use of natural resources (consistent with the market economy); and natural disasters. More specifically, Parliament enacted about 25 environmental laws on land use, environmental protection, air quality, plants, animals, forests, toxic substances, impact assessments and protected areas. It also passed the Law on Forests, the Law on Fees for Timber and Fuel Wood Harvesting, the Law on Forest Fire Prevention, and the Law on Quotas of Export Custom Tax on certain goods. However, the urgent need to restructure institutions and to privatize forestry operations after Mongolia's transition has prevented the development of relevant forestry regulations.

In the face of so many changes over a short time, conflicts and contradictions in legislation have arisen. In such cases, the following order is used to determine which law prevails: the constitution, parliamentary laws, parliamentary resolutions, cabinet resolutions, and ministerial resolutions. Some 27 laws and more than 200 rules and regulations fall under the purview of the MNE. At the central level, the Environmental Protection Agency provides guidance on the interpretation of laws. Actual enforcement is the responsibility of the environmental units at the aimag level, the environmental inspectors at the soum level, and the rangers at the bag level.

3.2. Law enforcement and implementation of regulation and policies

The Law on Forests which became effective in June 1995 emphasizes forest protection

and the environment. It consists of seven chapters: (i) general provisions, (ii) forests within special zones and protective regimes, (iii) forests within protected zones and rules for their protection and usage, (iv) industrial zone forests and their usage, (v) forest protection and regeneration, (vi) forest utilization, and (vii) miscellaneous provisions.

As noted earlier, Mongolia's constitution stipulates that forest resources belong to the state which has the power to give possession to local governments. Local governments may then issue contracts or licenses to citizens, economic entities and organizations for the use the forests and forest resources. However, the Law on Forests does not indicate how this ownership affects the rights inherent in contracts governing the lease of land, their extension, or other laws and regulations pertaining to land use.

With regard to the annual logging quota, the central government establishes it and assigns limits to the aimags which then select the cutting areas. For each tree felled, logging companies must plant three to five seedlings. The new forest law also includes provisions for increasing royalties from current levels and for private entities to manage resources. In fact, closer collaboration between government (as owner) and forest users is an important element in the transition to a market economy. Leasing forest resources is another key aspect but, so far, terms to determine the period, rent, payment schedule, rights and obligations of the lessor and the lessee have not been defined.

4. Lessons Learned, Challenges and Reforestation Strategy

4.1. Successful experiences, tools and lessons learned

Several educational institutions are involved in activities related to remote sensing and geographical information systems (GIS) - for example, the laboratory at the National University of Mongolia which was established in 2003 in the School of Physics and Electronics, Department of Geophysics. This facility provides an opportunity for both national and international students as well as scientists and researchers to learn remote sensing and GIS technology.

Forestry research: The saxaul forest is dominated by an endemic brush type plant and spans an area in the Gobi desert of about 1650 km wide and 360 km long across 7 of Mongolia's provinces. Many hectares are thought to be disappearing every year due to logging and the collection of firewood. The first scientific studies were completed in the 1940s and inventories were compiled in 1960 and 1997. From 1961 to 1968, J. Gal conducted several studies on the saxaul forest and described its natural history, including area, growth patterns and local use.

These resources are important to Mongolia because the size and depth of their roots stabilize moving sand dunes, reduce the severity of sand storms, and retain precious

moisture in the soil. The sparsely structured spatial pattern of individual shrubs makes them a natural defense against sand storms and a loss of the saxaul forest could be one reason why storms are becoming more severe. It is therefore necessary to closely monitor the status of these resources over large areas.

4.2. Challenges

Unsustainable use and illegal logging: The sustainable annual harvest volume for Mongolia's forest has not yet been determined, although recent calculations estimate between 0.9 and 1.4 million cubic meters. Rates of consumption are also difficult to calculate due to lack of reliable data and different views on the amount of fuelwood that households use outside the capital. The lower end of estimates, 1.74 million m3 annually, is far above the sustainable harvest level while the upper end, 5.5 million m3, exceeds it by a factor of five. However, the large-scale, often illegal and uncoordinated logging practices in Mongolia today have depleted forest resources in certain areas, particularly those within easy reach of urban centers. In the short to medium term, thinning activities to make the forest structure fire resilient can produce large amounts of timber while, at the same time, provide employment and biomass for construction and energy needs. In the long term, Mongolia's slow-growing forests are unlikely to meet the demand for timber so that efforts are required to find alternatives.

Over grazing: Agriculture contributes 35% to Mongolia's GNP and accounts for 25% of exports. Other important sectors include pastoral farming, mining and processing of agriculture products. Animal grazing in the edges of forest areas often exceeds carrying capacity and, hence, hinders forest regeneration. Given the need to improve the integrated management of forest resources and pasture land, a community based approach should be implemented.

Forest grazing area

Fire: The country's total land area is 1.5 hundred thousand km2, most of which is steppe and desert. Nomadic life and farming are the traditional and popular ways of the Mongolian people and both entail a significant fire risk to pastures, livestock and the livelihood of herder families. According to recent statistics, about 2400 hazardous events annually cause the death of more than 160 people and the loss of 65 billion Mongolian Tugriks, or about

3 percent of GDP. An estimated 60% of these losses are caused by forest and steppe fire - human induced disasters.

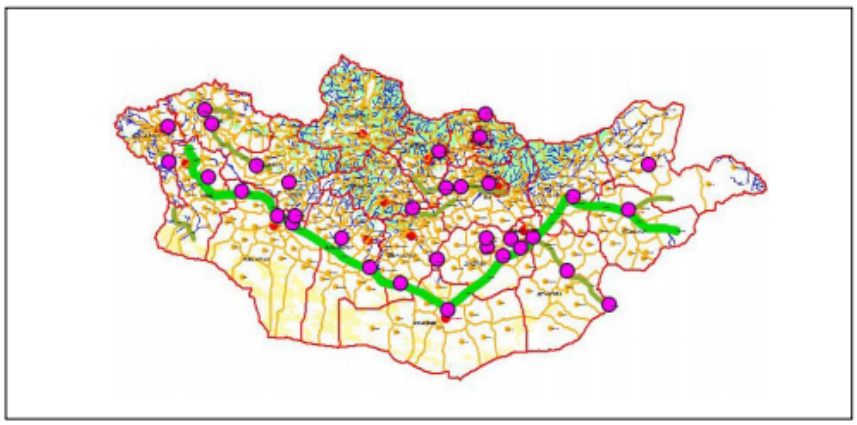
Forest fire

4.3. Reforestation strategy (5 to 10 years)

The MNE prepared a medium-term forecast (2000-2005) which estimated tree planting on between 6,000 and 8,000 hectares. From 2005 to 2010, it expected to reforest a maximum of 24,000 hectares per year. A program to build a green wall is being implemented in three phases over a 30-year period. A strip of up to 2 500 kilometers long and at least 600 meters wide will stretch across the Gobi Desert and steppe regions, for a total of 150,000 hectares. At the same time, a strip covering 50,000 hectares will be planted adjacent to these areas to prevent the movement of sand and desertification. The three phases of the Green Wall Program are as follows:

- 2005-2015:At least 20% of the planned program shall be completed and efforts to coordinate activities, build capacity and identify appropriate methodologies will be made.
- 2015-2025: At least 30% of planned activities shall be completed, progress will be assessed, and national capacity will be strengthened.
- 2025-2035: At least 50% of the program shall be completed, ecological and socio-economic outcomes will be enhanced, and methodologies/technologies for reducing the adverse impacts of desertification and sand movement will be mastered.

In the future, improvements in planting methodologies will be required to ensure the main belt and supportive strips are established in accordance with the plan.



Location of the Green Wall in 2005-2006

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Sustainable Forest Management and Rehabilitation in Myanmar

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1. Background

The Union of Myanmar is located in Southeast Asia between latitudes 9°32' N and 28°31' N and longitudes 92°10' E and 101° 11' E. It is bordered on the north and northeast by the People's Republic of China, on the east and southeast by Lao PDR and Thailand, and on the west and northwest by Bangladesh and India. The southern parts of the country lie along the coast of the Bay of Bengal and the Andaman Sea.

With an area of 676,577 km2, the country stretches 936 km from east to west and 2,051 km from north to south. The topography of Myanmar is divided into three regions – Western Hills, Central Valley and Eastern Hills. Sittaung Valley and Chindwin Valley comprise the Central Valley Region which is the broadest valley of the River Ayeyawady. The Shan Plateau in the Eastern Hills Region contains the River Thanlwin which flows north to the Tanintharyi Coastal Strip.

As a result of the great variation in rainfall, temperature, soil and topography, many different forest types are found: tropical evergreen forests in the south where rainfall is highest; hill and temperate evergreen forest in the eastern, northern and western regions where elevation exceeds 900m; and deciduous and dry forests in the centre where rainfall is less. For management purposes, forests are classified into 8 types as noted in the table below.

Type of forest	Area (ha)	% of total forest area
Tidal, beach and dune, swamp	467,330	1.47
Tropical evergreen	5,470,600	17.22
Mixed deciduous	12,157,300	38.26
Dry	3,114,710	9.80
Deciduous dipterocarps	1,321,870	4.16
Hill and temperate evergreen	8,541,190	26.88
Scrub land	700,000	2.21
Total	**31,773,000**	**100.00**

Source: FAO, 2010

About 50% of the country's land area is covered with natural forests, resources that are socially and economically significant. In fact, more than 70% of Myanmar's population is

rural and depends on forests for basic needs such as food, fodder, fuel and shelter. As a result, forest degradation and deforestation are problematic.

The global Forest Resources Assessment 2010, compiled by the Food and Agriculture Organization, estimates that forests cover 46.96% of the country's land area, one of the highest percentages in the Asia-Pacific region. Closed forests account for 19.87%, while open forests constitute 27.09%.

Forest cover in Myanmar

FRA 2010 Classes	Extent in "000" ha			
Forest Category	1990	2000	2005	2010
Closed Forest	30883	23505	18475	13445
Closed Forest Percent	45.65%	34.74%	27.31%	19.87%
Open Forest	8335	11364	14846	18329
Open Forest Percent	12.32%	16.80%	21.94%	27.09%
Total Forests	39218	34868	33321	31773
Total Forest Percent	57.97%	51.54%	49.25%	46.96%
Other Wooded land	19498	19703	19908	20113
Other land	7039	11184	12526	13869
Inland Water bodies	1 903	1 903	1 903	1 903
Total Area of Country	67658	67658	67658	67658

Source: Forestry in Myanmar, 2011 and FAO, 2010.

• Forest policies, management and rehabilitation

In 1995, Myanmar adopted a forest policy to address issues and respond to society's changing needs in a sustainable manner. It also developed its own set of criteria and indicators (C&I) for sustainable forest management, in line with international initiatives to monitor, assess and report on the social, technical, ecological and economic aspects of forest management. Policies, legislation and institutions have also been revised in accordance with Agenda 21, especially Chapter 11, and the UNCED forest principles. In fact, many of the reforms undertaken in the sector reflect concerns expressed at national, regional and international levels.

• Forest Policy 1995

Myanmar's Forest Policy 1995 takes into account the parameters associated with environment and sustainable development, the UNCED principles, and the outcomes of other international forestry discussions. The primary objective of the policy is to conserve and manage the forest in a sustainable manner in order to make important contributions to the national economy and maintain a healthy environment. Six priorities are identified: protection, sustainability, basic needs, efficiency, participation and public awareness.

• Forest Legislation

a. **Forest Law 1992:** This law supersedes the Burma Forest Act 1902 and contains provisions to increase the involvement of communities and the private sector, conserve biodiversity, and improve the security of forest resources.

b. **Forest Rules 1995:** These Rules, issued by the Ministry of Forestry, replace those prescribed in 1902 and are meant to facilitate implementation of Forest Law 1992. They call for increasing the area and protection of reserved forests and public forests; sharing forest management responsibility with local communities; establishing fast growing plantations on degraded forest lands to conserve soil, water and biodiversity; and sustainably harvesting timber and other forest products.

c. **Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law 1994:** This law replaces the Wildlife Protection Act 1936. It introduces the concept of biodiversity conservation and highlights the need to expand the system of protected areas.

• Community Forestry Instructions 1995

When the Forest Department issued Community Forestry Instructions (CFI) in 1995, it marked a significant shift in forest management to approaches based on partnership, participation and decentralization. The instructions grant local communities tenure rights over trees and forest land for 30 years, a period which can be extended. The Forest Department provides technical assistance and plays a lead role in the implementation of the program.

• Myanmar Forestry Action Programme

The Myanmar Forestry Action Programme (MFAP), as a follow up to the Tropical Forest Action Plan, was also developed and adopted in 1995. Consistent with the forest policy, it comprises 8 elements: sustainability, basic needs, protection, efficiency, institutions, policy and legislation, forestry extension and research.

• The National Forestry Master Plan

In 1998, the Forest Department developed a 30-year forestry master plan (2001-02 to 2030-31) as a framework to implement the MFAP. In addition to national economic development, the plan focuses on rural development. Its major components are the establishment of forest plantations, community forestry, bio-energy, non-wood forest products, human resource development and forestry extension.

• Forest management planning

The Forest Policy 1995 stipulates the need to develop both short and long term forest management plans as a means to achieve sustainable development in terms of production, processing and marketing, biodiversity conservation and restoration of ecological balance.

The first manual to guide the formulation of working plans was published in 1938 and revised in 1957. In 1996, the Forest Department launched a special operation to amend these plans to include modern forestry concepts. At the civil district level, in addition to timber production, emphasis was placed on non-wood forest products, biodiversity conservation and socio-economic well-being. New management plans for the 62 districts in the country were adopted and further revisions were made in 2006-07 to cover the next ten-year period.

• Resource assessments for management planning

Myanmar has completed four forest inventories. The first one, in 1962, used aerial photographs taken in the 1950s. Two others were conducted in the 1980s based on satellite images of the 1970s and 1980s. The fourth was compiled from an analysis of 1989 Landsat TM imageries.

• Natural Forest Management

Natural forests are harvested according to the Myanmar Selection System (MSS) which spans a 30-year period. Trees of similar size are grouped and marked for felling in each of the 30 years, based on the projected annual growth rate and girth limits prescribed for each species. The annual allowable cut of teak and other hardwoods is revised periodically to ensure timber is harvested on the basis of sustained yield.

• Plantation Forestry

The Forest Policy 1995 stipulates that forest plantations will not replace natural forest. At present, both government and the private sector are involved in their establishment, the purposes of which are to rehabilitate degraded forest lands, replant deforested areas and

supplement timber yields from the natural forests.

Government: The development of small-scale teak plantations began as early as 1856 using the taungya method. In the 1980s, an average of more than 30,000 ha were planted annually. Between 2000 and 2005, this number grew to more than 40,000 ha per year - 30,000 ha by the Forest Department and 10,000 ha by the Dry Zone Greening Department. Government establishes different types of plantations: for commercial and industrial purposes, to supply the needs of villages and to protect watersheds. By the end of 2010, the Forest Department established 967,477 ha of forest plantations throughout the country.

Private sector: With Myanmar's transition to a market economy, the government is encouraging the private sector to become involved in plantation forestry through profit-sharing as a means to increase timber production, contribute to economic development and conserve the environment. Private entrepreneurs and companies began to participate in these initiatives in 2006-2007. By the end of 2010, they had planted about 13,127 hectares of teak and more than 16,220 hectares of other hardwoods.

• Community Forestry

The Forest Department has been promoting community forestry since 1995 when the instructions were issued. Extension staff, forest officers and village residents have been trained in this approach, including under a project funded by the Japanese International Cooperation Agency. Community involvement in forest conservation and utilization has gradually increased and, by the end of 2008, close to 46,200 community forests had been established.

• International cooperation projects

a. Integrated Mangrove Rehabilitation and Management through Community Participation in the Ayeyarwady Delta (JICA)

b. Community-based Mangrove Management in Wunbaik Forest Reserve (FAO)

c. National Biodiversity Strategy and Action Plan (GEF)

d. Tanintheryi Nature Reserve (MGTC & TPC)

e. Lampi Marine National Park Conservation and Management (Instituto OIKOS)

2. Main Forest Issues and Challenges

a. Lack of understanding of forest ecosystems

b. Inadequate human resources and logistic support

c. Illegal logging

d. Weak law enforcement

e. Insufficient cooperation among stakeholders

f. Inadequate financial support for rehabilitation

g. Unclear land-use policies

h. Weak trans-boundary forest ecosystem management in the region

3. Conclusion

Myanmar has a long tradition of forest management and is striving to sustain these valuable resources, including through the Forest Policy 1995, revised forestry legislation, the National Forestry Master Plan and updated working plans for application at the FMU level. In order to monitor, assess and report on sustainable forest management, Myanmar has developed its own C&I and is actively participating in regional initiatives, including on timber certification.

Sustainable Forest Management in Nepal

Nandlal Ray Yadav

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Nepal

1. Introduction

Nepal is situated between China and India and occupies 147,181 square kilometers. Altitude ranges from 70 m above sea level in the south to 8848 m at the summit of Mount Everest, the highest point on earth. Climate ranges from subtropical in the lowlands to arctic in the high mountains. Population totals 26.6 million, 85.38% of which lives in rural areas. Annual growth rate of the population is 1.4%.

Sustainable forest management is not a new practice in Nepal. Before unification, autonomous states in the eastern and western parts of the country managed all forests in this manner, including communities which practiced traditional methods. Most families depend on agriculture and animal husbandry for their livelihood and rely on forests to meet their needs for fuel, fodder, litter, timber, thatch and medicine. Local communities developed sustainable systems not only for forest conservation, but also for the management of other natural resources such as water holes, ponds, grasslands, roadside greenery, and river banks. As in many other countries, forests and trees provide a vast array of goods and services, including important ecological functions such as erosion control and sequestration of carbon dioxide. Agriculture is the mainstay of the national economy and, together with forestry, contribute 32% to gross domestic product (GDP).

This report describes the current status of forests in Nepal, major policies, instruments and institutions, drivers of change and deforestation, priority programs and future scenarios.

2. Forest Cover

The last National Forest Inventory (NFI), which was carried out in the early nineties, estimate that forest and shrub cover about 5.83 million ha, or 39.6% of total land area. Forest area decreased by 1.7% per annum from 1978/79 to 1994 whereas annual loss of forest and shrub was 0.5% during the same period. Recent studies from 20 Terai districts reveal that forest cover changed 0.06% per year from 1990/91 to 2000/2001. Other sources show that Nepal's forest cover and condition are significantly improving due to the implementation of community forestry.

3. Growing Stock

Nepal has 35 forest types and 118 ecosystems. Major species are Shorea robusta, Quercus spp, Terminalia alata, Pinus roxburghii, Abies spectabilis, Rhododendron spp, Alnus nepalensis, Schima wallichii, and Tsuga dumosa. Based on the last NFI, total stem volume (over bark) of reachable forests is 388 million cubic meters and the total biomass of stems, branches and leaves is 429 million tonnes (air dry). Volume and biomass for the entire country are estimated at 759 million cubic meters and 873 million tonnes respectively. The mean stem volume (over bark) is 178 cubic meters/ha, the mean stem volume up to 10 cm

top is 131 cubic meters/ha and stems per ha average 408.

4. Forest Management

Forests in Nepal are either government owned or privately owned. In the latter case, no data are available. The six categories of national forests are government managed, community managed, managed under leasehold agreements, religious forest, protected forest, and a system of protected areas. Next to the government managed forest, community forestry is the second largest regime, with more than 19000 community forest user groups managing about 25% of the national forest area. This approach has become a successful model for generating natural, human, financial and physical capital as well as for reforming forest governance.

5. Forestry Contributions

Forestry forms an integral part of agriculture and rural livelihoods. Fuelwood is the principal source of rural energy and non-timber forest products are an important source of income for rural poor people; medicine for primary health care; and revenue for government.
In addition, about 45% of all tourists to Nepal visit protected areas. Although, the sector contributes significantly to economic development, its share of GDP is unknown. As a result, its importance is underestimated and its profile is lower than it should be. FAO estimates that forestry contributed 3.5% to GDP in 2000 and 4.4% from 1990 to 2000. However, other sources calculate contributions to GDP at about 15%.

6. Wood Products

The Department of Forests (DoF), the Timber Corporation of Nepal (TCN), the Forest Product Development Board (FPDB) and Community Forest User Groups (CFUGs) are involved in the trade of wood products, mainly logs, sawn timber, poles, posts and fuelwood. Statistics on the removal of round wood ranges from 24.36 thousand cubic meters in 1992/93 to 80.54 thousand m3 in 2002/03. The figure for fuelwood is 178.13 m3 in 1992/93 and 20.79 thousand m3 in 2005/06. Annual consumption of wood and fuelwood is estimated at 2.2 million m3 and 11,623 million kg. In 2001, the production of industrial round wood and fuelwood was 0.15 million m3 and 0.95 million m3 respectively. The consumption of industrial round wood and fuelwood are 0.1 million m3 and 0.92 million m3 respectively.

7. Energy

Wood fuel from biomass alone makes up about 85% of all residential energy. Annual consumption of biomass has increased about 2.4% during the past decade while energy for commercial purposes is rising about 10% annually. An estimated 0.48% of total energy

production comes from renewable sources, with petroleum products comprising less than 10%. Though the country is rich in water resources, only about 1% of the economic potential of hydro power is harnessed. Electricity from a central grid system is around 2% and less than 1% of industry's energy consumption derives from wood fuel.

8. Biodiversity

Despite its small size, Nepal is rich in biodiversity - 26th in the world and 11th on the continent in terms of wildlife species. It possesses more than 2.7% of the world's flowering plants, 5% of bryophytes, 3% of pteridophytes, 9.3% of the bird species and 4.5% of the mammal species. About 19.7% (28,999 km2) of the country is under a system of protected areas to conserve a representative sample of biodiversity and outstanding landscapes.

9. Impact of Climate Change

The country has limited information on the impacts of climate change on economic development, conservation and livelihoods. On average, annual temperatures rose 0.060C during 1977-1994, a situation which can lead to glacial melt and retreat in high altitudes and can alter the rainfall pattern, hydrological cycle, and quantity of water. Due to extreme weather events such as excessive rainfall, a longer drought period, landslides and floods, Nepal has experienced problems with irrigation systems and water supply. It is thought that climate change will negatively affects agriculture, forestry and biodiversity.

10. Forest Policies, Legislation and Institutions

The framework which facilitates sustainable forest management in Nepal includes the Master Plan for the Forestry Sector, 1989 (MPFS), periodic plans, fiscal policies, and forest and forestry laws and regulations. The Ministry of Forests and Soil Conservation is responsible for national forests and 5 departments help it to exercise this mandate. The 19000 Community Forest User Groups (as of May 2008) are effective and powerful partners in the conservation and management of national forests while the role of the private sector is confined to advocacy and the marketing of forest products.

11. Drivers of Change

Some of the key drivers of planned and unplanned changes in the forestry sector up until 2020 are described below.

12. Political and Institutional Environment

How the current governing structure evolves will determine the future of forestry in the

country. This aspect is probably the most important in terms of influencing social and economic development. Political instability and conflicts accelerate deforestation and forest encroachment while democratic and participatory approaches foster the involvement of stakeholders in the formulation of national policies in all sectors.

13. Demographic Patterns

By 2020, population is expected to increase by more than 11 million, to about 34 million people and the percentage of children and the elderly will grow. Although the correlation between demography and forestry is complex, population growth, urbanization, migration and dependent segments of society will greatly affect land and resource use. In Nepal, one youth out of 4 households lives abroad (mostly in the Gulf countries) - a migration which causes a decline in the availability of labor at home for agriculture and forestry.

14. Economic and Social Changes

With 31% of its population living below the poverty line, Nepal is among the poorest and least developed countries in the world. Natural resources – arable land, water, forests, and protected areas – are the basis of the national economy and of efforts to alleviate poverty. Although Nepal is still predominantly an agrarian society in which forests and forestry form an integral part, industrial development is becoming increasingly important. Moreover, economic growth is opening up opportunities to invest in forestry but is also increasing pressure to develop infrastructure and to produce more forest products and services, including recreational and environmental, to meet society's additional demands as per capita incomes increase. In turn, these changes are giving rise to more conflicts with poor people over the use of natural resources.

15. Globalization

Globalization has facilitated the free movement of capital, labor, information and technologies beyond national borders. As a result, countries are becoming more closely linked in terms of political, economical and ecological aspects. Tax revenue has turn into a key source of national income and, in 2007, it constituted 16.7% of GDP. Its impact on forests has been significant as well in that global value chains are replacing local ones. To date, Nepal exports only non-timber forest products but the potential is growing to also sell surplus wood from community and other forests.

16. Environmental Concerns

Nepal's network of protected areas is providing a wide range of environmental services, in particular the conservation of biological diversity, soil, and watersheds, and the provision

of clean air. Thus, deforestation, forest degradation, desertification, climate change, natural disasters, invasive species and loss of biodiversity are of serious concern.

17. Technological Change

New technology can not only improve forest management and productivity but can also increase income. However, its adoption requires adequate financial and material resources, an appropriate institutional framework and trained human resources. Forestry research and extension are important elements as well but government investment in these areas are low compared to the support it provides to other sectors.

18. Drivers of Deforestation

Deforestation in Nepal is a serious concern, especially in the Terai and Siwalik. Between 1964 and 1991, an estimated 0.57 million ha forest were lost, 0.38 million of which were converted to agriculture, mainly because households rely on this sector for their livelihoods and because the return on investment in forestry is low in the short term, by comparison. Infrastructure development accounts for the loss of the other 0.19 million ha - roads, urban centers, irrigation canals, and educational institutions. Additional causes of deforestation include past resettlement programs, encroachment, illegal and unsustainable harvesting of forest products (timber, firewood and NTFPs), forage for livestock, unemployment, inappropriate policies, limited technical capacity, weak governance and inadequate law enforcement. Political instability, lack of commitment, and shifting cultivation are also factors. Furthermore, recurrent fire and unregulated grazing retard regeneration and growth. Burned areas also are more prone to invasive species.

Land degradation in the Terai requires urgent action, including on about 1.3 million ha of degraded forests. Desertification in geologically and ecologically vulnerable ecosystems on about 3.2 million ha or 28.24% of land area is problematic as well.

19. Underlying Causes

Among the indirect causes of deforestation and forest degradation, many are not within the control or jurisdiction of the Department of Forests - population increase and distribution, poverty, land scarcity, economic growth and commercial development, for example. Cross-cutting issues such as governance and cultural factors are also among the underlying reasons, as are insecure land tenure, unclear use rights, uncontrolled access, misguided policies and inadequate planning. Therefore, the development and implementation of programs to combat deforestation and forest degradation require strong coordination and collaboration across sectors and with multiple stakeholders.

With regard to the sale of forest products, the royalties that government charges do not reflect

market prices. Moreover, government and quasi-government organizations such as the Timber Corporation of Nepal, the Forest Products Supply Committee, and the Forest Product Development Board dominate timber production, the harvesting of forest products and their associated trade. Involvement of the private sector is not encouraged. As a result, the trade of timber and the transportation of forest products are subject to a number of formal and informal taxes which create huge differences between stumpage fees and end user prices for timber: US$ 4 and US$ 30 respectively per cubic foot in 2009.

Insufficient technical inputs to achieve sustainable forest management and weak government capacity have contributed to widening the gap between supply and demand for forest products. Forests which the Ministry handed over to communities are primarily managed for subsistence, although the potential to provide surplus products for the market is high if they are managed scientifically and if markets are deregulated.

20. Current Political Situation

Nepal's governance structure has been built on a type of feudal system where exclusion from mainstream society is based on social status, gender and ethnic origin. As a result, conflicts have emerged across the country and national development lags far behind. Thus, demands to transform the political, social and economic environment through state restructuring are being made and, in this regard, the interim constitution of 2007 proposes a new vision for Nepal - one that characterizes it as republican, federal, prosperous and inclusive. The Constitutional Assembly (CA) which was elected in April 2008 will draft a new constitution and, in doing so, will shape the country's future direction. Members consist of representatives from diverse castes and ethnic backgrounds, both genders and minority groups. The Nepal Communist Party (Maoist) is the largest party in the CA and won about 33% of the seats. As noted earlier, forestry is a sub-set of the political and socio-economic systems and the future of the sector depends on how these systems evolve. Political and institutional changes are the most uncertain yet the most important drivers of change. Based on the above considerations, the following scenarios and their likely impacts on forest and forestry have been developed.

• A new Nepal

Political stability and peace will replace the old regime. Governance will be inclusive and the national economy will grow. The importance of forests will be better understood, more resources will be available to invest in forest management, capacity to bring about technological development will increase, and a greater appreciation of the environmental values that forests provide will promote the protection of biodiversity and watershed areas. Over the long term, forest loss and degradation will be reversed. Pressure on forests will decrease and sustainable forest management will be achieved by

2020.

• The status quo

Uncertainty will continue and the country will remain at cross roads. Forest and forestry development will slow and sustainable forest management will not be achieved. Eventually, livelihoods of forest dependent communities will be negatively impacted.

• Failed peace processes and intensified conflict

Key players will fail to reach agreement so that current arrangements remain in place and conflicts resurface. Poverty and hunger will increase, agriculture production will decrease and added pressure will be placed on forests. Deforestation and encroachment will continue and environmental problems such as drought, flash flooding, desertification, water scarcity, and soil erosion in fragile mountain landscapes will worsen.

21. Reform Agenda

The forest sector is expanding its focus from wood production only to broader social, environmental, economic and cultural goals. Also, a greater mix of stakeholders with different interests have become involved in forestry - for example, forest dependent communities, forest industry, and investors in global carbon markets.

Fundamental changes are being introduced, such as the Constitutional Assembly's declaration that a republican system has replaced more than 240 years of kingship. Government restructuring will have huge implications for forests and forestry, starting with community forestry which is restoring denuded landscape and creating opportunities to offer diverse forest products and services to wider markets, from local to international. However, the sector must first implement many reforms, as listed below, to complete the road map which the people of Nepal have drafted.

a. Restructuring the forestry sector to fit with federalism

b. Reinventing and transforming forestry institutions

c. Reforming forest policy and law

d. Calculating forestry's contribution to GDP

e. Formulating and adopting standards for sustainable forest management

f. Linking community forestry and protected areas with a carbon credits mechanism

g. Making forestry governance inclusive, transparent and responsive

h. Enhancing the forestry sector to compete in global markets

i. Linking forestry with poverty alleviation

j. Balancing economic development and environmental conservation

k. Increasing forestry research and development

l. Conserving watersheds and promoting integrated development

m. Conserving, domesticating, sustainably harvesting, processing and marketing NTFPs

n. Managing ecosystems at the landscape level

o. Developing alternative sources of energy

p. Evaluating and marketing the ecological services that forests provide

22. Future Hopes and Expectations

The Government of Nepal targets to maintain 40% forest cover and the introduction of community forestry is helping to achieve this goal. Denuded landscapes are being restored and, as a result, forest area has increased and forest condition has improved in the middle mountain region. The country is moving from an agrarian to a mixed society and is becoming more politically stable. With the implementation of set strategies and priorities, the sector will achieve its objectives and targets. Pressure on forests will decrease due to urbanization, economic growth and stronger forestry institutions. The expansion of community forestry will contribute to poverty alleviation and improve forest management. Watershed management will shift from the micro level to a basin approach and conservation will be move from site-based to landscape. The sector will generate more employment and help to reduce poverty. Forestry institutions and policies will become more inclusive, democratic and transparent. Wood production from government managed forests is expected to decrease due to a reduction in area by the end of 2020. Although demand will be higher, it will be met through the sustainable management of community, collaborative and private forestry. Wood as a source of energy will decrease per capita, while the demand for timber and logs is expected to rise. Processing of wood into plywood, board, composite beams, and charcoal will replace the sale of only raw materials. Most trade of wood products will come under the commercial market system. NTFPs will have a greater role in reducing rural poverty and will earn more foreign income through the export of Himalayan herbs.

23. Sustainable Forest Management

• Community forestry

Community forestry is the most popular and participatory forest management practice in Nepal. Local forest user groups are established as non-government organizations, are legally bonded and are registered at the District Forest Office. The District Forest Officer approves each group's constitution and provides technical support to develop and implement forest management plans.

• Leasehold forestry

The Forest Act 1993 provides for any part of national forests to be leased to any organization, industry, or community. Licenses are granted for up to 40 years and can be renewed for another 40 if performance is satisfactory. The program was established to improve living conditions, raise the income of poor families, rehabilitate degraded land and plant trees in barren areas. It targets poor farmers who have less than 0.5 ha of private arable land and annual per capita income below the poverty line of 2500 Nepalese rupees. Priority is given to deprived ethnic or tribal groups and female-headed households who depend on livestock and forest resources.

• Protection forestry

Protection forestry is a new practice for environmentally sensitive forests.

• Religious forestry

Religious forestry involves maintaining healthy forest cover around religious places and serves as one of the indicators of sustainable forest management.

• Collaborative forestry

Collaborative forest management in Nepal is at an early stage and is being piloted in 11 districts in the Terai. A partnership of local users, other stakeholders and government officials steers the process and a committee oversees implementation. As with community forestry, this approach has improved social justice and inclusion, in addition to focusing on sustainable forest management and livelihood improvement.

Sustainable Forest Management in Peru

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1. Overview of National Forest Resources

Peru ranks among the top five mega-diverse countries in the world due to its many ecosystems, climate types (28 of the planet's 32) and life zones (84 of 117, as classified by L. Holdridge in the late 1960s). Reports estimate more than 25,000 species of plants and animals, of which approximately 5,500 are endemic.

At 68.7 million hectares or 60% of its territory, Peru has the 2nd biggest forest area in South America and 9th in the world. These forests are some of the richest in terms of biological diversity and natural resources such as timber, energy and minerals. More than 2,500 timber species grow in the Amazonian forest - up to 250 trees per hectare or an average of 200 m3. Despite this natural richness and potential, the national average harvested is less than 4 m3 per hectare due to limited access of forest companies to technology, markets and financing.

The coastal forest (dry and semi deciduous) in the northwest represents 4.6% of the 3 forest types; the Andean forest, on both sides of the mountain range represents 1.3%; and the Amazon forest represents 94.1%. These resources have enormous potential for national economic development in general and for forest inhabitants in particular. However, as in many tropical countries, income distribution is uneven in forested regions and high poverty rates lead to resource depletion and deforestation.

The current rate of deforestation is estimated at less than 0.2% per year - slightly below 150,000 hectares - and relatively low compared with neighboring countries. Most loss is the result of subsistence agriculture practiced by migrating farmers from the Andean highlands and neighboring areas who take advantage of weak law enforcement; unclear tenure and property rights; low education levels; extension and research that favor agricultural production on existing lands rather than on newly deforested areas; and perverse incentives to expand agriculture at the cost of forests.

Development activities are increasingly the reason for deforestation and forest degradation: the commercial cultivation of oil palm, sugar cane and Jatropha which the government declared of national interest to promote bio fuel production; gas and oil concessions granted by the Ministry of Energy and Mining; and road construction (often illegally conducted by local authorities, illegal loggers and local residents, even in protected areas - a situation which gives rise to unplanned and unauthorized settlements).

Another major cause of deforestation and environmental degradation in the last 20 years is gold mining. Riparian forests grow on important alluvial gold deposits that are mined by large and informal small-scale operators who blast away river banks, clear floodplain forests, and use heavy machinery to expose potential gold-yielding gravel deposits. These illegal techniques, now popular in the southeast part of the Peruvian Amazon, are tied to

mercury smuggling, drug trafficking and prostitution rings. Besides the negative impact on the health of miners and the loss of forest cover, biodiversity and ecosystem services, other major concerns are mercury contamination in fish which are the main source of protein for people living in the Amazon; greater river sedimentation and turbidity downstream which affect fish populations that are not only important for human consumption but are at the base of the food chain for predatory birds, mammals, and other wildlife. Further, new settlements in areas believed to hold gold deposits increase pressure on forests for bushmeat, fuelwood and agricultural land.

According to the second national report to the United Nations Framework Convention on Climate Change (UNFCCC), 47.5% of Peru's greenhouse gas emissions are due to the conversion of forests to other land uses. According to a study by Sassan Saatchi of Caltech's Jet Propulsion Lab, Peru is among the 5 top tropical countries in terms of forest area and carbon stocks. The study further reports that Peru has 5% of the tropical forest biomass in the world. Therefore, efforts are currently underway to develop and implement a REDD+ strategy to safeguard forest assets for current and future generations.

Most logging in Peru has been and is still based on a selective system which harvests less than 30 timber species. Historically, extractors focused only on three to five species because of high demand and the high price they commanded in international markets.

Logged forests can, for the most part, recover much of their lost biodiversity through natural regeneration, although this process is slow and the reduced standing value makes them more likely to be cleared for agriculture. Their capacity to recover depends on the natural resilience of the system, extraction techniques, intensity of the harvest, the minimum allowable cut diameter, and rotation cycles. As will be explained later, major efforts are being deployed to combat illegal activities and to foster legality and competitiveness. In this regard, a new management model has been implemented over the past decade which calls for sound territorial planning and forest governance as well as a combination of social inclusion and technical safeguards to achieve sustainability.

In addition, with its biodiversity and remarkable cultural and archeological features, Peru is a top tourist destination. Eco-tourism in the Peruvian Amazon is growing in popularity and the rainforest offers an important opportunity for such activities, based on the non-consumptive utilization of forest goods and services.

To provide an idea of the social and cultural issues related to Peru's forests, it should be noted 21% of total forest is assigned to indigenous and peasant communities. Currently concessions represent 12%, productive forest available for concessions represent 17% and 23% is part of national protected areas. The remaining 48% is unclassified and presents a major challenge to national and regional forest administrations in terms of categorizing this area under some form of land use - an issue that will be tackled under the new Forestry and

Wildlife Law (section 3.2).

2. National Forest Resources Management

With 13% of the Amazon tropical forest and a forest cover of more than 68.7 million hectares, Peru's forest sector contributes only 1% to gross domestic product and continues to experience a negative trade balance. The permanent production forest covers more than 17 million hectares where intensive management is possible. Some 7.1 million hectares have been allocated for concessions, 5 million of which have forest management units in operation. In addition to these areas, about 13. 6 million ha are on land belonging to indigenous communities and are suitable for management under partnership arrangements with private companies. Some 1448 indigenous communities, with an estimated population of more than 300,000, are officially recognized in the Peruvian Amazon.

Given the wide range of forest resources and the different interests of the many stakeholders involved, title and access rights also vary as follows:

- Timber concessions: This type of concession grants timber harvesting rights for 40 years (renewable for an additional 40) in permanent production public forests. Operators must comply with environmental, management and policy requirements as well as show evidence they are investing in sustainable forest management over the long term. They must follow an approved forest management plan that includes the need to conduct an environmental impact assessment and implement appropriate measures based on findings. Each year before harvesting, they are also required to prepare and obtain approval of an operating plan that incorporates environmental management considerations, harvesting techniques and environmental safeguards that ensure sustainable use over the full period of the concession. They must survey 100% of the commercial species over the minimum set diameter and produce detailed maps and GPS positioning of trees to be harvested as well as those which will remain as seed producers or remnants.

- Concessions for non-timber forest products: This type of concession is allocated in public areas, including permanent production forests, for ecotourism, conservation, wildlife management and the production of brazil nuts, medicinal and ornamental plants, bamboo and natural rubber, for example. Licensees must comply with both general and specific environmental management and sustainable use requirements.

- Forest management permits: Authorization rights are granted in private or community forest areas for the extraction of ornamental and medicinal plants, as well as plants along river banks, and for the use of wildlife and for hunting in specified areas.

- Concessions for agro-forestry: Rights are granted in public areas for agro-forestry

systems - shade crops such as coffee and cocoa.

The Forestry and Wildlife Law calls for forest management committees in districts or basins where concessions have been granted, the aim of which is to represent the interests of local stakeholders, including neighboring settlements and towns, indigenous people and logger associations. Their purpose is to mainstream participation in forest management planning and implementation while, at the same time, ensure compliance with applicable laws in order to prevent social conflicts and damage to the environment.

2.1. Historical review of national forest resources management

At the beginning of the Republican period in the mid XIX century, the Peruvian Amazon became an importance source of natural rubber which was harvested from two species (Hevea brasiliensis and Castilla elastica), using indigenous people as slave labour. The following are key pieces of legislation enacted since that time:

- Ley Orgánica de las Tierras de Montaña (1898) (Organic Law of the Mountain Lands) was promulgated to regulate the exploitation of forest resources. (The term "Montaña" refers to forests rather than mountains.)
- Ley de Primas de Gomales (1906) (Rubber Tax Law) created a tax on rubber exports and a fund for reforestation.
- Ley General de Tierras de Montaña (1909) (General Law of Mountain Lands) established the modalities for land acquisition in the Amazon such as purchase, concession, colonization, and free adjudication.
- Laws No 7643 (1932) and No 8928 (1939) established taxation regimes for imported timber and timber from the Amazon.
- Law No 10315 (1945) established that Peruvian colonists who settled in the Amazon region had the right to exploit and sell timber from the land they occupied.
- Decree No14552 (1963) created the Forestry and Wildlife Service to administer the nation's forests after domestic timber products replaced imports, following World War II and the industrialization of the country in the early 1950s.
- Decree N°21147 (1975) (Ley Forestal y de Fauna Silvestre) replaced N°14552 to regulate forestry activities. This new law declared forest resources as state heritage and stipulated that harvesting would be carried out through permits, authorizations, and contracts. The first national protected areas system was established at that time, following the new trend to categorize protection under different regimes and purposes. Under this law, two types of contracts for timber harvesting were possible:

- Up to 100,000 hectares: non transferable, renewable periods of 10 years, requirement to submit a feasibility study, and payment of a stumpage and reforestation fee
- Less than 1,000 hectares: duration between 2 and 10 years, no requirement for a feasibility study.

This law resulted in the proliferation of small contracts to loggers who actually represented large-scale operators so that they could avoid having to implement its costly provisions.

- Decree N°613 (1990) introduced the notion of sustainable use and public participation, in addition to highlighting the need to update Decree N°21147.
- Decree N°27308 (2000) (Forestry and Wildlife Law) introduced a series of new concepts such as mandatory forest management plans and annual operational plans, as described in section 2 of this report. This law and ancillary rules also established the possibility to grant concessions for the harvesting and use of forest goods and services such as non-timber forest products, ecotourism and conservation.
- Law 29763 (2011) (the new Forestry and Wildlife Law) was promulgated after extensive public consultations - including with indigenous peoples, in accordance with ILO Convention 160 regarding Free Prior and Informed Consent - and multi-stakeholder participation, including logging companies, NGOs, ministries and Congress. Although the new law has yet to be implemented, the country has improved forest zoning by delineating areas along biological characteristics. This approach identified four categories and offers the possibility to carry out different types of forest interventions in each one:

  a. Permanent Production Zones: Three categories of primary and secondary forests, divided by intensity of timber extraction; planted forests, where management of timber and non-timber products is possible.

  b. Protection and Conservation Zones: Fragile ecosystems, with limited timber extraction; contains natural protected areas which currently number 73 and span 15.21% of the territory.

  c. Recovery Zones: Areas which require a special strategy to restore their ecosystem processes and services; rights can be granted for timber management, restoration and conservation.

  d. Special Treatment Zones: Reserved territories where indigenous people choose to be isolated; no forest management is allowed.

• Timber and Non-timber forest concessions

The bidding on 40-year renewable concessions in areas up to 50,000 hectares took place

from 2002 to 2005. The process offered the possibility to manage forest units under a single consolidated management plan as a way to encourage national development of the forestry industry, while ensuring continued productive capacity to meet domestic and international demand. The current scheme promotes value addition. As noted earlier, concessionaires are obliged to prepare a forest management plan and an annual operational plan. These plans must be developed by professionals registered with and approved by regional forest authorities. Management plans cover a 40-year period, must be approved by OSINFOR (Bureau of Supervision of Forest and Wildlife) and must be updated every five years. The operational plan lists the activities to be completed during a given year, including a forest inventory, and it outlines proposed infrastructure development such as main and secondary forest roads.

• Ecotourism concessions

Ecotourism concessions are granted on lands with forest cover and the potential to exploit natural features and beautiful landscapes. Government grants use rights for a fee which is calculated based on area. These concessions are preferably located outside the permanent production forest but, when a request is approved within such boundaries, the amount paid per hectare corresponds to what is paid for logging.

• Conservation concessions

Conservation concessions aim to involve the private sector in the conservation of the forest heritage, biodiversity and environmental services for scientific research, environmental education, and local participation. They are granted for up to 40 years, free of charge, as their management is considered a contribution to the country's sustainable development objectives.

• Wildlife management concessions

Located in Tarapoto, the only wildlife management concession was granted to a company that trades sustainably bred poison-dart frogs in the international pet market.

2.2. Organizational structure of forest management agencies

Forest administration is being decentralized to regional governments but the central General Directorate of Forests and Wildlife (DGFFS) in the Ministry of Agriculture retains its mandate to promote forest management through its 24 regional offices, only 5 of which have been trained so far. Thus, the need to build capacity at this level is urgent in order to achieve transparent and efficient management. Each regional office can define its own organizational structure although position descriptions are based on DGFFS's central office structure. Some regional governments formed the Amazon Interregional Council (CIAM) in an attempt to make operations and development policies consistent.

Regional boundaries (geographic and political) divide the country's forests, including the Amazon region, non-Amazon areas, timber and non-timber concessions, ecotourism and conservation concessions, private lands, protected areas and buffer zones, and territorial reserves for indigenous peoples.

3. Forest Policy Frameworks and Enforcement

3.1. Developing commitment

Peru is committed to achieving sustainable forest management through implementation and enforcement of a national legal framework and as signatory to several international conventions for the sustainable use of natural resources - obligations it fulfills with due respect to the legal and traditional rights of forest inhabitants and other holders. It is a member of the ITTO and the United Nations Forum on Forests as well as party to the UNFCCC, the Kyoto Protocol, ILO Convention 169, CITES and Ramsar, among others.

More specifically, the new Forestry and Wildlife Law aims to achieve sustainable forest management through the following measures:

- Reduced annual fees for forests which are certified under recognized schemes (13 forest operations are FSC-certified and 28 chain-of-custody certificates have been issued)
- Access rights to forest resources include the right to benefit economically from environmental services
- Recognition of the need to manage forests sustainably to mitigate climate change
- Integrated management and conservation of environmental services
- Inclusion of environmental services as part of the national forest heritage
- Zoning all forests (no more uncategorized areas)
- Regulated access to goods and services in natural ecosystems, including environmental services, through concessions, permits, and licenses
- Forest plantations as means to restore degraded and deforested lands
- A national system that integrates regional control under regional governments, centralizes information and makes it accessible to users in a transparent manner.

3.2. Forest policies, laws and regulations

The National Forest and Wildlife Policy, formulated after more than a year of public

consultations, aims to promote sustainable development, conservation and sustainable use of forest goods and services. More specifically, it calls for improved forest governance, in addition to the adoption of an ecosystem approach, a preventative and precautionary approach, and a cross-sectoral approach. It also seeks to enhance the competitiveness and commercialization of forest and wildlife products, value-added processing, cultural diversity, as well as equity and social inclusion through community forest management. As such, it reflects the principles and objectives of APEC's Green Growth Policy.

Peru's new Forestry and Wildlife Law was formulated after more than 2 years of public consultation, including with indigenous people, consistent with Convention 169 of the International Labor Organization. This law established the Forest and Wildlife Service as a way to strengthen governance. It provides for greater public participation, specifies functions of regional governments, promotes certification schemes, and recognizes and protects the rights of indigenous people. It also promotes multiple use of forest goods and services through an ecosystem approach, provides for tighter controls to ensure legal use and calls for the forest inventory to be updated.

As a pluralistic country, social inclusion of indigenous people is an obligation. In this regard and, as stipulated in ILO Convention 169 and other international treaties, their vision of the cosmos and traditional knowledge are respected, valued and seen as key components in the development of this important sector of the population. As a framework for community forest management, the new Forestry and Wildlife Law includes the need for the Forest and Wildlife Service to provide technical assistance, including for value-added production and it sets the parameters for entering into equitable benefit-sharing agreements with private companies.

3.3. Law enforcement and implementation of regulations and policies

The new Forestry and Wildlife Law, enacted in July 2011, requires the development of ancillary regulations to be fully operational and a long-term strategy is being drafted to build the capacity of both government and non-government stakeholders: staff in the Ministry of Agriculture and the Ministry of Environment, law enforcement agencies, regional governments, indigenous communities, private companies and consultants. A massive reorganization is also required to decentralize decision-making, address personnel issues such as high staff turnover, and establish financial mechanisms for enterprise and new product development. A new agency under the Ministry of Agriculture, the Peruvian Forest Service, has been given administrative and operative autonomy - a freedom that allows independent decision making, reduces duplication with newly established regional offices, and provides the mandate to tackle institutional barriers to capacity development.

3.4. A case study in the reforestation of pastures

This initiative is the first project to be certified as a voluntary credit scheme under afforestation and reforestation (VCS A/R) in the Peruvian Andes, the main objective of which is to reforest communal pasture land belonging to the Sociedad Agrícola de Interés Social (SAIS) "José Carlos Mariategui" (JCM). Trees will be planted on 1,450 ha to earn carbon credits, enhance soil and water conservation, improve the environment and protect biodiversity.

The 4,000 ha of land for the project (called business areas) is allocated for a period in excess of 30 years and is to be managed solely by the corporate entity. Partners or private individuals are not allowed to carry out activities on their own such as cattle grazing and agriculture. As legal owner of the territory, the SAIS JCM determines the location of forest plantations and the nature of economic activities to be developed. However, a participatory rural appraisal conducted in 2003 and public consultations held in 2008 confirmed that the company lacked the financial resources to implement decisions - some believed, due to bad organization and mismanagement.

The project seeks to help rural communities of the SAIS JCM to achieve sustainable development and to provide them direct benefits from the sale of carbon credits and from forest exploitation. Administration has improved and residents are supportive because it promises to better their living conditions by increasing company revenue. The Asociación Civil para la Investigacion y el Desarrollo Forestal, a non-governmental organization, is charged with producing 1,850,000 seedlings and establishing plantations, using Pinus patula, P. radiata and P. pseudotrobus.

The credit period for this VCS project is 30 years and, according to the methodology used, the project area is sufficient in terms of stratifying major vegetation types because baseline removals in degraded or degrading land are expected to be small compared with removals during the project's duration. Following this methodology, the baseline condition identifies one stratum - degraded grasslands.

The original vegetation cover was changed centuries ago. Grassland remains the current land use as a result of extensive grazing and continuous fires (the management technique used) which eliminated seed sources for tree and woody vegetation. According to the ecological and economic zoning for land management, the project site contains two living areas: tropical montane moist forest and tropical montane wet forest. Therefore, if human interventions had not changed the natural conditions over time, the land would still be under tree cover.

As stipulated in the management plan, at the end of each 30-year rotation, trees will be replanted after harvesting. Some 952,118.91 tons of CO2 equivalents will be offset, for

an annual average of 31,737.30 tons. Private retirement plans have purchased part of the verified emission reductions and the income from this and future transactions will be deposited in a trust fund to finance the management of the planted forests. Any surplus will be allocated to the SAIS management.

With poverty as a major cause of deforestation in the Amazon, experiences from this unique and only VCS project in the Peruvian Andes is a good example of successful implementation of the reforestation policy in the country.

4. Lessons learned, challenges and future strategies

4.1. Successful experience, tools and lessons learned

The problems encountered with granting timber concessions, including incomplete planning, provide many lessons for regional governments to consider when designing their own processes:

- Overlapping designation: The 21 million ha of permanent production forest which government initially designated overlapped with areas which had already been assigned use or tenure rights - a situation which led to the exclusion of about 4 million ha of production forest.
- Lack of capacity: A full assessment of the financial and operational capacity of successful bidders was not undertaken so that only 5.5 million of the more than 7 million ha placed under concessions are functional today.
- Costly certification: NGOs are key stakeholders in promoting responsible forest management but their focus is often only on technical compliance with FSC standards of certification at the forest management unit level, not on market access. As a result, much of the certified timber was mixed with timber from questionable sources and forests lost their status because legal chain-of-custody could not be confirmed. Many operators were not convinced of the benefits of certification because the market for certified timber and premium pricing for such products was almost non-existent. Due to the high cost of monitoring, proving chain-of-custody, building capacity and meeting social aspects, they abandoned certification, opting to return to business as usual. Moreover, they did not appreciate the benefits they could reap in the long term: lower accident rate, reduced damage to machinery, and fewer social costs because of less labour disputes. The certified forest area in the country was once close to a million hectares but this figure now stands at under 500,000 hectares. However, large-scale companies are reversing this trend by independently seeking certification because they see the real economic and social benefits it brings.

4.2. Challenges

• International competitiveness: Although the export of forest products is increasing (US$395 million in 2010), with China, the United States and Mexico as main destinations, it represents a small percentage of total exports and a marginal percentage of the gross domestic product - clear proof that the forest sector is not as competitive as Peru's other sectors.

• Access to financing: In addition to lack of access to technology and weak infrastructure that makes the transportation of logs expensive, small forest companies have difficulty obtaining financing. Under current conditions, only operators large enough to self-finance have the potential to thrive. Therefore, securing private investment is one of the biggest challenges to achieving sustainable forest management and conserving the national forest heritage.

• High costs: Profitability is reduced due to the high cost of extracting hardwoods (the species most in demand) and transporting logs to the few primary and secondary processing plants which are located far from forest areas.

• Frequent staff turnover: Due to weather conditions, harvesting can only be done for 5 or 6 months a year. Therefore, laid-off workers often find other employment in the interim and do not return to the sector. Training new staff not only requires additional expenditures and time, but also increases waste in production, wear on machinery and unnecessary damage to the forest.

• Uneven playing field: Operators who follow the rules, including approved annual harvesting plans, and only trade in legal products must compete with extractors who buy their way through the regulatory framework with bribes and other tactics.

• Weak enforcement: Both the public and private sectors recognize illegal logging as a problem in Peru. Limited government capacity to enforce laws, insufficient information on forest resources and high demand for cheap timber are among the chief causes. Targeted species are those with a high economic value: mahogany (Swietenia macrophylla and listed in Appendix II of CITES) cedar (Cedrela odorata and listed in Appendix III), and cumala (Virola sebifera). However, tornillo (Cedrelinga catenae), shihuahuaco (Dipterix micrantha), ishpingo (Amburana cearensis), and lupuna (Chorisia insignis) are also extracted illegally.

• Patronage: Besides illegal logging, the stumpage fee to log in community forests is based on the volume harvested and this approach undermines the concession system. As a result, companies enter into commercial agreements with indigenous communities that are built on patronage. They harvest commercially valuable timber and leave a damaged environment behind.

• Deforestation: Significant efforts, especially in the Amazon region, are required to curb the average annual loss of 150,000 ha and average annual loss of 0.136% forest cover recorded between 2000 and 2005. Although Peru's deforestation rate is lower than the rest of the pan-Amazon region, around 9 million hectares of primary forest have been lost to date.

• Unclear title/property rights: Public and private entities are undertaking reforestation in the country but lack of clear property rights in the Amazon and Andean regions are slowing progress. Unclear title to land in the Amazon region is also problematic, especially in terms of sharing benefits associated with forest conservation and minimizing social conflicts.

• Legislation for environmental services: Peru needs specific legislation on the provision of environmental services and needs to clarify the normative and institutional framework for the implementation of REDD+.

Opportunities

As the table below indicates, an estimated 9.5 million hectares in the Andean highlands (71%) and the Amazon region (24%) are available for forestation and reforestation.

REGION	SUITABLE LAND FOR REFORESTATION	REFORESTED AREA (ha) AS OF 2010	AREA TO BE FORESTED/ REFORESTED
Cusco	1,414,582	122,832	1,291,750
Puno	1,120,400	44,218	1,076,182
Junín	1,010,291	71,255	939,036
Cajamarca	790,000	110,526	679,474
Huánuco	660,000	45,861	614,139
Loreto	659,900	23,480	636,420
Ancash	554,016	87,867	466,149
Ayacucho	539,400	68,808	470,592
Pasco	522,511	19,622	502,889
Madre de Dios	512,100	8,467	503,633
Otros	2,716,800	366,980	2,349,820
TOTAL	**10,500,000**	**969,917**	**9,530,083**

4.3. National sustainable forest management strategies in the next 5-10 years

a. Research and information: A new management information system (Sistema Nacional de Informacion Forestal y de Fauna Silvestre) is being developed to store and analyze data on trade volumes, authorized operations and implementation of management plans. The system will also include the processes to grant and administer access rights to forest resources. With regard to research, a sound and scientifically based method to establish minimum diameters, rotation cycles and harvesting intensities must be adopted.

b. Zoning information: A permanent system is needed to document, assess and track changes in land-use patterns, overlapping use rights, indigenous communities, and forest concessions (timber, non-timber, ecotourism, and conservation). Production forest must exclude protection areas, fragile ecosystems and high value conservation forests.

c. Institutional framework: The institutional framework is being reformed as part of the decentralization process. In terms of implementing the national forest policy, national and regional agencies must share a common vision and objectives regarding the forest concessions system and community forest management schemes.

d. Capacity building: As noted earlier, a long-term strategy to build capacity is being developed to provide central and regional agencies with the legal, technical, operational and organizational skills they require to efficiently manage the forest sector. The establishment of demonstration areas and interactive on-line training modules where students set their own pace are part of the planned strategy.

e. Legal framework: Regulations for the new Forestry and Wildlife Law, which take into account the provisions of ILO Convention 169, are being developed in a participatory manner. In addition, ancillary regulations to manage forest ecosystem goods and services are being reviewed in order to eliminate gaps and flaws. Besides incentives to attract foreign capital which have been signed into law, the judiciary must guarantee the rights granted to investors.

f. Decentralization: The decentralization process continues as more regional governments acquire capacity to manage the forest and wildlife resources within their jurisdiction. Special care is being given to provide funding to those which have been trained in law enforcement. The national forest service (SERFOR) will need to help these regional authorities to correct deviations and provide feedback to improve the system. Building on lessons learned, clear guidelines must be developed for granting concessions and the competencies of applicants to respect obligations must be closely

scrutinized before awarding contracts. The review of criteria and methodologies to evaluate the latter aspect is a key component of this action.

g. Simplification: Processes to apply for permits, obtain concessions, report violations are being simplified and clarified to make them more efficient. As a result, transaction costs for operators will be reduced and better use will be made of scarce capital assets.

h. Funding: The concept of a revolving fund which was tested under the national forest promotion fund, with the support of ITTO, will be replicated more broadly.

i. Infrastructure development: Given that transportation of logs is a major expense to concessionaires and community forests, government must improve road and energy infrastructures so that processing facilities can relocate near the forest. Closer proximity would mean greater efficiency and higher returns.

g. Stakeholder involvement: Under the new Forestry and Wildlife Law, the role of local forest management committees will be strengthened to monitor and report on logging activities. A national program for community forest management is being designed and will be linked to the process of granting land title to indigenous communities in the Amazon region, led by the Ministry of Agriculture in collaboration with the Ministry of Housing and Construction.

k. Communications: A communication strategy is being developed to make information available to stakeholders. All governmental agencies, at different levels, are required to operate in a transparent manner and be accountable for their decisions/actions.

l. Support to forest industries: Forest enterprises initially need assistance in terms of organizational and operational capacity in order to be able to comply with laws and meet other obligations.

m. Market development: Domestic markets must be developed for lesser-known species and for legally sourced timber, in conjunction with law enforcement and the new National Forestry and Wildlife Control System. A government procurement policy which sets conditions for the purchase of wood products from sustainable sources needs to be developed to set an example. In addition, the search for new markets and the promotion of Peruvian forest products in international markets must be done in close collaboration with the Ministry of Production.

n. Strategies to improve compliance in the forest sector need to include policy, legal, institutional and technical aspects. They should be based on an assessment of the root causes of illegal logging and on entry points to combat corruption. Although several initiatives have emerged in the last few years to tackle corruption and illegal forest activities, these issue do not appear to be a political priority.

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Sustainable Forest Management in the Philippines

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1. Extent of Forest Resources

The Republic of the Philippines lies to the east of continental Asia between the South China Sea and the Philippine Sea. It extends from 5° to 20° north of the equator and comprises more than 7,100 islands. Population numbers more than 90 million and the country's 30 million hectares is divided into 2 legally defined categories: 1) alienable and disposable land and 2) forestland. Classified forestland covers 15.05 million ha or 50% of land area; unclassified forestland covers 0.755 million ha or 3% of land area; and alienable and disposable land spans 14.19 million ha or 47% of land area.

Classified forestland is sub-divided into timberland (10.056 million ha or 69% of forest area); forest reserves (3.270 million ha or 22 % of forest area); national parks, game refuge, bird sanctuaries and wilderness areas (1.34 million ha); military and naval reservations (0.126 million ha); civil reservation (0.166 million ha); and fishponds (0.091 million ha). About 755,000 ha are still unclassified forestland, the use of which has not been determined.

The latest data which is based on 2001-2003 satellite images estimate forest cover to be 7.168 million ha or 24.27% of total land area. Distribution is as follows: open forest in more than 50% (4.031 million ha), closed forest in 35.71%, plantation forest in 4.60% and natural mangrove forest in 3.45%.

Forestlands are designated for forestry purposes, usually in areas with slopes of more than 18%. This category is defined in law and may or may not have forest cover. By the same token, alienable and disposable land may have forest cover.

As of 2009, 134 watershed forest reserves totaled 1.56 million ha, 5 of which were newly proclaimed in Surigao del Sur (43,601 ha). Lake Lanao Watershed Reservation is the largest in the country at 0.180 million ha. Region 3 has the most watershed forest reserves at 25, with a combined area of 0.281 million ha, mostly in the province of Aurora. The second largest is Kabulnan River Watershed Forest Reserve in Region 12 which spans about 116,452 ha in the provinces of Sultan Kudarat, Maguindanao and South Cotabato. La Mesa Watershed Forest Reserve in the National Capital Region (NCR) stretches across 2,659 ha and is the primary source of drinking water in metro Manila.

2. Legal and Institutional Framework

The forestry sector plays a vital role in the government's quest to improve the quality of life of the Filipino people. Since forests have multiple functions that positively contribute to the economy and the health of the environment, their management must be guided by policies that reflect society's goals and aspirations, consistent with the following vision:

"A forest that creates wealth for our nation as the cradle of life, nurtured by our people's aspiration for a just, humane and progressive society guided by the ideals of our ancestors

and the blessings of God Almighty."

To realize this vision, use of the best available technology will be encouraged, where appropriate and economically viable, to increase production, improve forest management and further contribute to national economic development. Social equity and empowerment will be served by promoting opportunities to equitably share in the benefits that forests provide. Due emphasis will also be given to revitalizing the functions of forests as a life support system. All activities will be carried out in the context of sustainable development through partnerships with local stakeholders as well as international development agencies and institutions.

2.1. Basic policy

The Constitution of 1987 provides the framework for the management and development of forest resources in the country. It identifies the environment and natural resources as major concerns of government and specifies the principles governing the use of natural resources to achieve national goals, as contained in the following provisions:

a. The state shall protect and advance the right of the people to a balanced and healthful ecology in accordance with the rhythm and harmony of nature. (Article II, Section 16);

b. All lands of public domain, water, minerals, coals, petroleum and other mineral oils, all forms of potential energy, fisheries, forests and other natural resources are owned by the State. The exploration, development and utilization of natural resources shall be under the full control and supervision of the State. (Article XII, Section 2); and

c. The congress shall, as soon as possible, determine by law the specific limits of forest lands and national parks, marking clearly their boundaries on the ground. Thereafter, such forest lands and national parks shall be conserved and may not be increased or diminished; except by law, the congress shall provide for such period as it may determine measures to prohibit logging in endangered forests and watershed areas. (Article XII, Section 4).

All forest policies are consistent with these constitutional provisions. However, current laws and regulations governing the utilization and management of forest resources are still based on approaches and strategies formulated decades ago when timber was abundant. For example, Presidential Decree No. 705, known as the Revised Forestry Code of the Philippines, was issued in May 1975. Section 2 outlines management policies as follows:

a. Orient the multiple-use of forestlands to the development and progress of the country, the advancement of science and technology, and public welfare

b. Systematize and accelerate land classification and surveys

c. Encourage and rationalize the establishment of wood processing plants

d. Emphasize the protection, development, and rehabilitation of forestland so as to ensure it remains productive.

Executive Order 318 (Promoting Sustainable Forest Management in the Philippines) was issued in 2004 and constitutes the government's main policy thrust to guide the sector.

Currently, authority to manage forest resources rests with the Department of Environment and Natural Resources (DENR). Executive Order 192 (the Re-Organisation Act of the DENR), issued in June 1987, assigned the management of both natural resources and the environment to the DENR by reorganizing the departments of environment, energy and natural resources. The Department of Agriculture (DA) and the Department of Agrarian Reform (DAR) still share some responsibility for natural resources and the environment regarding the management of upland and coastal areas but the establishment of the DENR represents a major effort to create a lead agency for these aspects. EO 192 also created the Forest Management Bureau (FMB) which has formulated several policies, particularly for stakeholder participation in the management and development of forest resources and the promotion of social justice for indigenous peoples and other forest dwellers. In addition, the Bureau is pushing for the final delineation of the forest line so that better strategies for land uses can be developed.

2.2. Strategies

Forest development programs, strategies and approaches are anchored in the Philippine Strategy for Sustainable Development (PSSD), the Master Plan for Forestry Development (MPFD) and Community-based Forest Management (CBFM).

• Philippine Strategy for Sustainable Development

Consistent with the Constitution, the Philippine Strategy for Sustainable Development is the framework that guides the country's economic growth. It contains the following core elements/activities:

a. Practice sustainable forest management as the most appropriate and viable approach

b. Ensure the integrity of the forestland by finalizing the delineation of boundaries

c. Conduct environmental impact assessments before implementing forestry projects to determine their potential effects

d. Establish permanent forest estates after completing a thorough inventory and delineation of all remaining natural dipterocarp, pine and mangrove forest, including

grazing lands, as envisioned in the Master Plan for Forestry Development

e. Strengthen the implementation of current forest protection programs and strengthen the administrative capacity of the DENR: delineate the forest zone and place it under the management of Provincial Environment and Natural Resources Offices and Community Environment and Natural Resources Offices.

f. Adopt community-based forest management as a national strategy for the sustainable development of forestland and provide a mechanism for its implementation

g. Ensure protection of forest biological diversity, vital ecosystems functions and environmental quality.

• Master Plan for Forestry Development

The Master Plan is a 25-year national blueprint for the development of the sector. It advocates a holistic approach to the multi-dimensional aspects of forestry; spells out goals and objectives as well as programs designed to meet them; identifies the resources required; and describes various scenarios and potential impacts resulting from implementation.

The plan consists of 3 clusters of programs which focus on primary development and institutional support as a means to address the following key concerns:

a. Man and the Environment: includes people-oriented forestry programs; soil conservation and watersheds management; an integrated system of protected areas and biodiversity conservation; urban forestry; and forest protection.

b. Forest Management and Development: includes the management of natural dipterocarp, mangrove, pines and other natural forests; forest plantations and tree farms; and wood and non-wood based industries.

c. Institutional Development: includes policy and legislation; organization; human resources; infrastructures and facilities; research and development; education, training and extension; and monitoring and evaluation.

• Community-based Forest Management

Community-based forest management (CBFM) is the government's approach to achieve sustainable forest development of the country's forestland resources, pursuant to Executive Order No. 263 of July 19, 1995. This strategy provides the framework for the responsible development, protection, conservation and utilization of forest resources, including in coastal areas, by organized and empowered communities, in collaboration with government agencies and private institutions. CBFM is also an effective means to alleviate poverty among forest dwellers and residents of adjacent communities.

• DENR Criteria and Indicators for Sustainable Forest Management

A DENR Memorandum Order in July 2007 adopted the Philippine criteria and indicators for sustainable forest management as tools for the ongoing monitoring and evaluation of practices in projects and at the forest management unit level, including where communities have been granted tenure. Management plans must be revised to reflect these criteria and indicators which provide a common yardstick for stakeholders to assess forest conditions and changes at any given time and location, for example in timber concessions and industrial forest management areas. In this regard, a full understanding of the components of SFM and their impacts on forests resources and ecosystems is required.

3. Forestry Programs, Projects and Activities

• Clean air

The role that trees and forests play in enhancing air quality and sequestering greenhouse gases is increasingly being recognized. Thus, two programs to expand forest cover - the National Greening Program and the Upland Development Program - are focusing on reforestation, enrichment planting, assisted natural generation, stabilization of stream banks, agroforestry and the rehabilitation of mangroves and coastal areas.

• Clean Water

Watersheds are the primary source of water for domestic use as well as for industrial and agricultural purposes. Their rehabilitation is based on the Watershed Ecosystem Management approach which is undertaken by DENR field offices not only for the tangible benefits it provides but also for the improvement it brings to water quality and quantity. The Forest Management Bureau provides technical support in the areas of watershed characterization, vulnerability assessment and management planning.

• Benefit Sharing

The State and other entities participate in forestry activities through joint ventures, co-production and production sharing. With regard to the utilization of forest resources, the following licenses, leases and agreements are issued:

Integrated Forest Management Agreement: The DENR enters into a production-sharing contract with a qualified applicant who is given the exclusive right to develop, manage, protect and utilize a specified area of forestland and forest resources therein, consistent with the principle of sustainable development and in accordance with an approved Comprehensive Development and Management Plan.

Socialized Industrial Forest Management Agreement: The DENR enters into an agreement with a legal entity who grants it the right to develop, utilize and manage a small tract of forestland, consistent with the principles of sustainable development.

Forest Land Grazing Lease Agreement: The government enters into a production-sharing agreement with a qualified person, association and/or corporation to develop, manage and utilize grazing lands.

Special Use of Forest Lands: Government as the first party, represented by the Secretary of DENR or the Regional Executive Director concerned, enters into a contract with a second party which authorizes the latter to temporarily occupy, manage, and develop public forest land for a specified use, as defined under section 3 of DAO 2004-59, on a benefit-sharing basis.

Forest LandUse Agreement for Tourism: The DENR enters into a contract with a natural or juridical person which authorizes the latter to temporarily occupy, manage, and develop public forest land for tourism purposes, on a benefit-sharing basis. Activities include special use of forest land for bathing establishments, camp sites, ecotourism destinations, hotels and resort facilities, among others.

Community-based Forest Management Agreement: Government enters into an agreement with a community to develop, utilize, manage and conserve a portion of the forestlands, consistent with the principles of sustainable development and pursuant to a Community Resource Management Framework.

• Climate Change Mitigation and Adaptation

In 2007, the President issued Administrative Order 171 which established the Presidential Task Force on Climate Change for the purpose of developing measures to reduce the impacts of climate change from various sectors, including forestry. The Forest Management Bureau is leading efforts to formulate policies geared towards climate change mitigation and adaptation through, for example, the National Greening Program which aims to maintain forest cover and establish forest and agro-forestry plantations. In addition, as a member of the Inter-Agency Committee on Climate Change and its Technical Evaluation Committee, the FMB evaluates all proposed afforestation and reforestation projects under the Clean Development Mechanism which include internal and external sources of financing for forest development.

FMB is also heading efforts to formulate the National REDD+ Strategy to reduce GHG emissions. In this regard, the Philippines offers not only valuable carbon stocks, but also a strong research community and capacity to engage in forestry projects.

• Lessons Learned, Challenges and Future Strategies

a. Formulate a comprehensive forestry policy

A comprehensive and holistic national forest policy is urgently required to guide the development of legislation, initiatives, plans and programs as well as to inform decisions on sustainable forest management which must be made on a daily basis. Many provisions of the Forestry Code (PD 705) are no longer relevant, as manifested by recent DENR policy shifts with respect to the allocation, disposition and management of forest resources. Congress is still reviewing a new bill to support DENR's strategy to achieve sustainable forest management and delays with its approval are slowing down needed reforms. Timely passage of the bill needs to be advocated to curb illegal logging and safeguard the production of a substantial part of domestic requirements for wood.

b. Strengthen community-based forest management

A community-based approach to forest management not only promotes partnerships and shared responsibility in conserving and managing resources but it has also proven to reduce open access areas that were over exploited. DENR needs to expand this program and institute a monitoring system to ensure that signatories to agreements comply with the terms. However, additional funding is required to implement alternative livelihood projects for People Organizations in CBFM areas.

c. Encourage private sector participation in reforestation

Government reforestation and plantation development programs are beset with policy issues and incentives are lacking to encourage private sector investment, including in value-added wood processing. (However, such incentives are included in the above-noted bill currently under review.) Moreover, policy guidelines for DENR's small-scale reforestation and plantation development program tend to be unstable and therefore hinder private sector involvement.

d. Revise regulations for the management of watersheds

Present regulations inhibit the proper management of critical and proclaimed watersheds, most of which are degraded due to occupation by the upland population. Since these watersheds are under strict protection and harvesting is not allowed, they are legally excluded from the community-based reforestation program. Therefore, villages in these watersheds have little reason to plant trees and are prevented from practicing agroforestry. Since these areas are densely populated, current restrictions need to be revised. Land use plans which identify buffer zones suitable for agroforestry should also be prepared so that areas can be allocated to occupants who are resettled.

To make the resettlement program attractive and successful, incentives such as inputs, technical support, and access to credit and markets should be provided.

e. Improve local enforcement of laws and regulations

Aware of the weak enforcement of laws, rules and regulations related to governance and the environment, DENR needs to develop measures to strengthen compliance at the local level. Empowerment of stakeholders and partnerships among government, communities, civil society and labor will enhance the monitoring and enforcement of laws, particularly those pertaining to illegal logging.

o improve the conservation, protection and rehabilitation of natural resources, the President issued Executive Order No 23 (Declaring a Moratorium on the Cutting and Harvesting of Timber in the Natural and Residual Forests and Creating the Anti-Illegal Logging Task Force). Under the supervision of DENR, the Task Force is mandated to lead the anti-illegal logging campaign and ensure the implementation and enforcement of environmental laws.

f. Conduct a national resource inventory

The absence of updated inventories deprives DENR of the empirical data base it needs for policy formulation, planning, and resource allocation. At present, statistics on human and natural resources are incomplete or unavailable - for example, the size and distribution of the population occupying forest lands, especially in upland areas; their growth rate; and the number of people who depend on forest resources for livelihoods. Estimates of forest cover in critical and proclaimed watersheds and in forest lands also are needed.

g. Enhance tenure arrangements in forest land and protected areas

Executive Order 263 identifies community-based forest management as the national strategy for sustainable forest management and is a milestone in the development of a system to secure property rights. The Order ended corporate dominance in the sector and ushered in a new era that promises a more equitable way of using the country's forest resources. Provisions also include government support services to build community capacity to fulfill forest management responsibilities.

In summary, the minimum guidelines required to save and rehabilitate Philippine forests are encapsulated in the acronym FOREST:

- Formulate laws and policies for the sustainable development of forests
- Observe sustainable forest ecosystem management in management units and agreements

- Reduce carbon emissions from deforestation and degradation
- Establish protected areas for biodiversity conservation
- Support the rehabilitation and greening of all denuded / degraded forest lands
- Teach people the importance of forests and how they can benefit from / get involved in sustainable use

With greater political push and commitment by all agencies and sectors concerned, the implementation of these guidelines will achieve sustainable forest management and move forestry forward. This simple acronym is better understood than complex goals, objectives, rules and regulations. Moreover, FOREST fits well on advocacy banners, flyers and other media material because it is brief, direct and convincing.

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Executive Order 192. Re-Organisation Act of the DENR

Executive Order No. 263. Adopting Community-Based Forest Management as the National Strategy to Ensure the Sustainable Development of the Country's Forestlands Resources and Providing Mechanism for its Implementation

Executive Order No. 318. Promoting Sustainable Forest Management in the Philippines

Presidential Decree 705. Revised Forestry Code of the Philippines

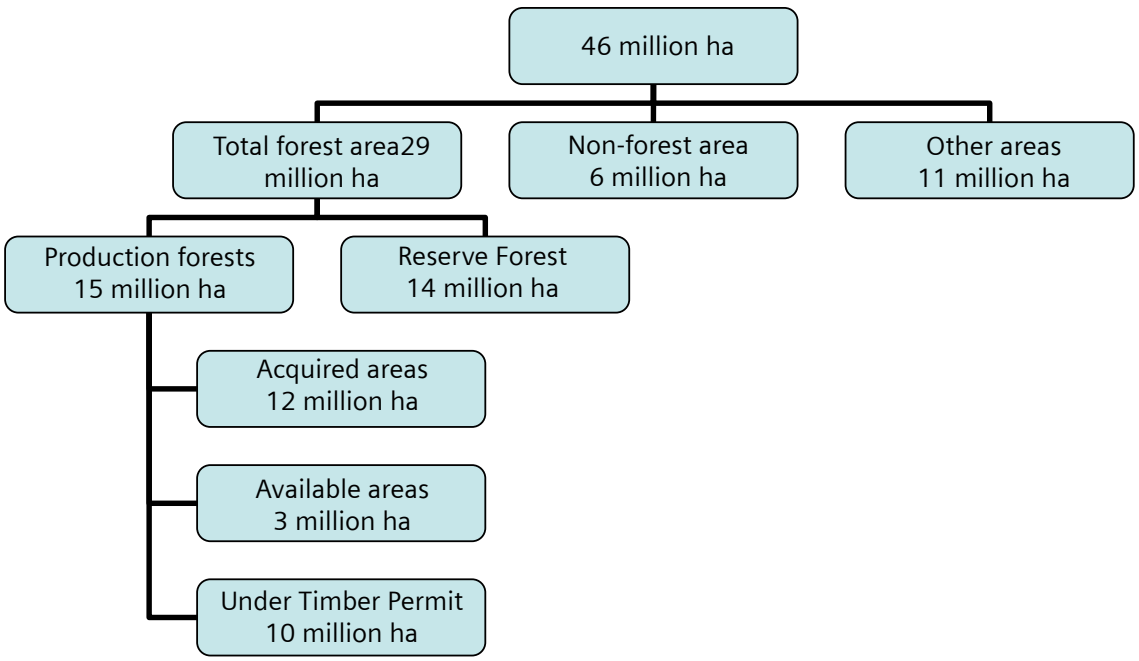
Excerpt of an email message from Forester Ricardo Umali from the Senior Foresters Group

Papua New Guinea Report

Alimel Bellet

Inspection Supervisor
PNG Forest Authority
Papua New Guinea

Overview of Forest Resources

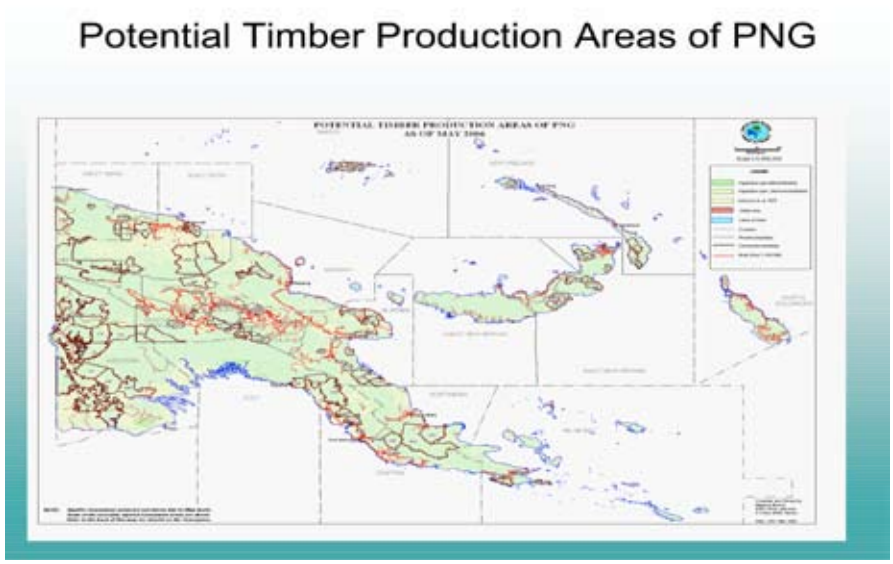


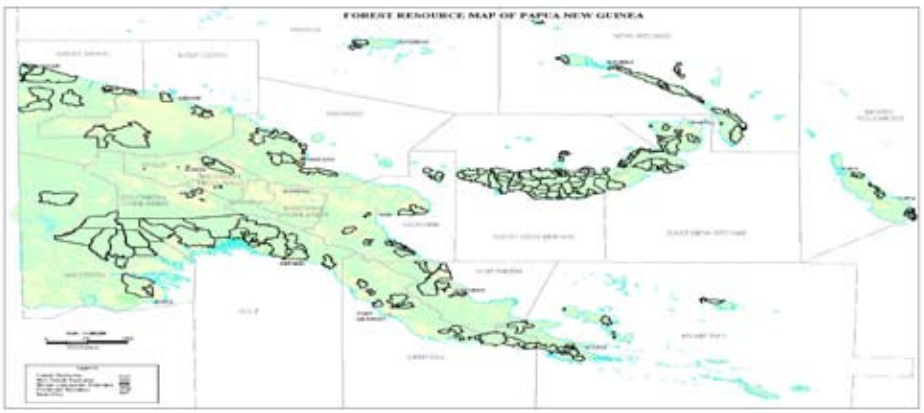
Estimated volume of sustainable forest production

Current committed cut – 8.9 million m3/annum

National sustainable cut – 3.5 million m3/annum

Estimated volume from agricultural clearing – 1.5million m3/annum





1. Forest Resource Management

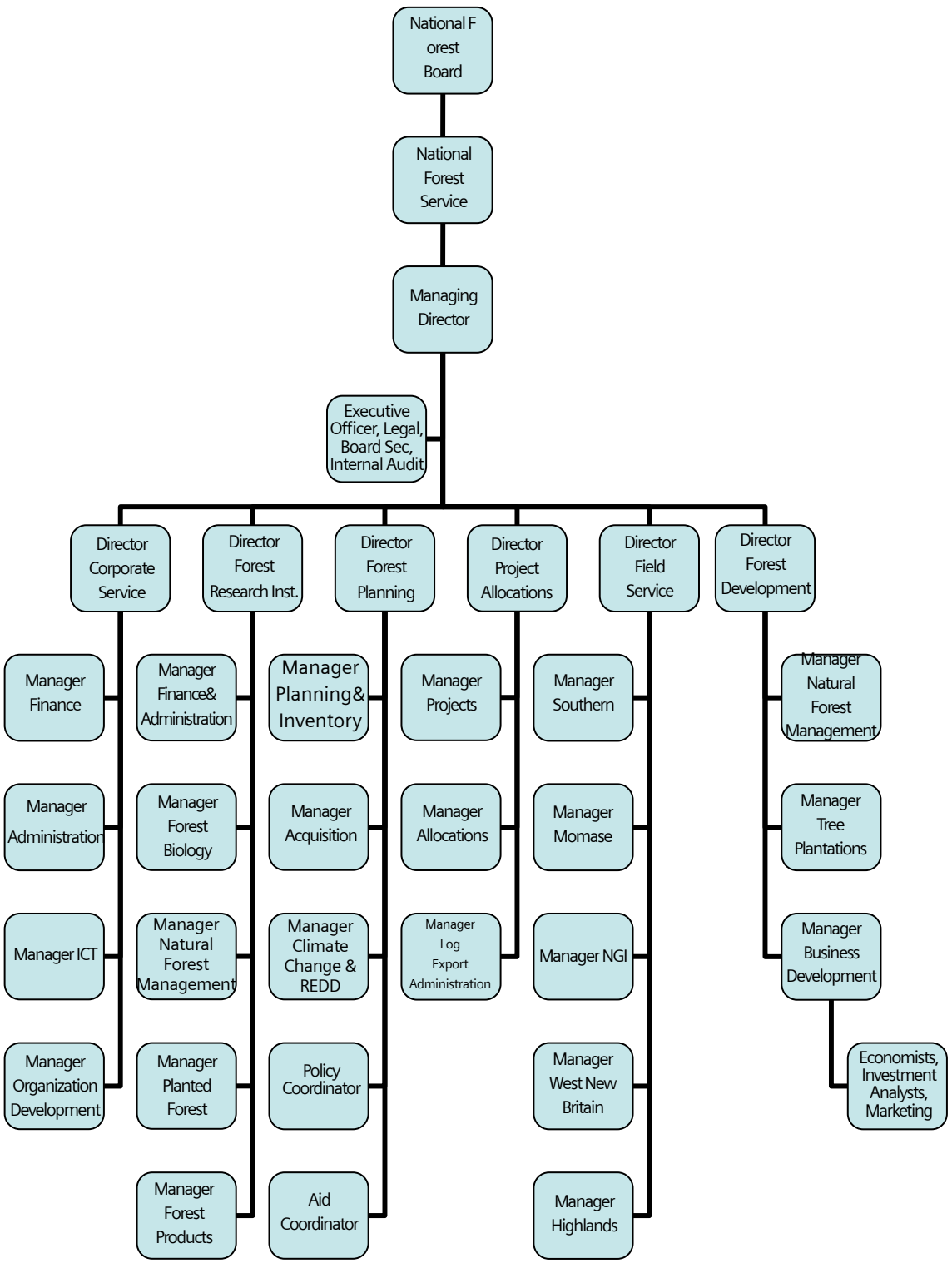
1.1. History

In the 1970s, all forest products (mainly timber from pine) were processed in one-ply mills. Supply was sufficient to meet domestic demand for construction and national development. In addition, a small surplus was exported overseas. Plantations now furnish all the raw materials these mills require.

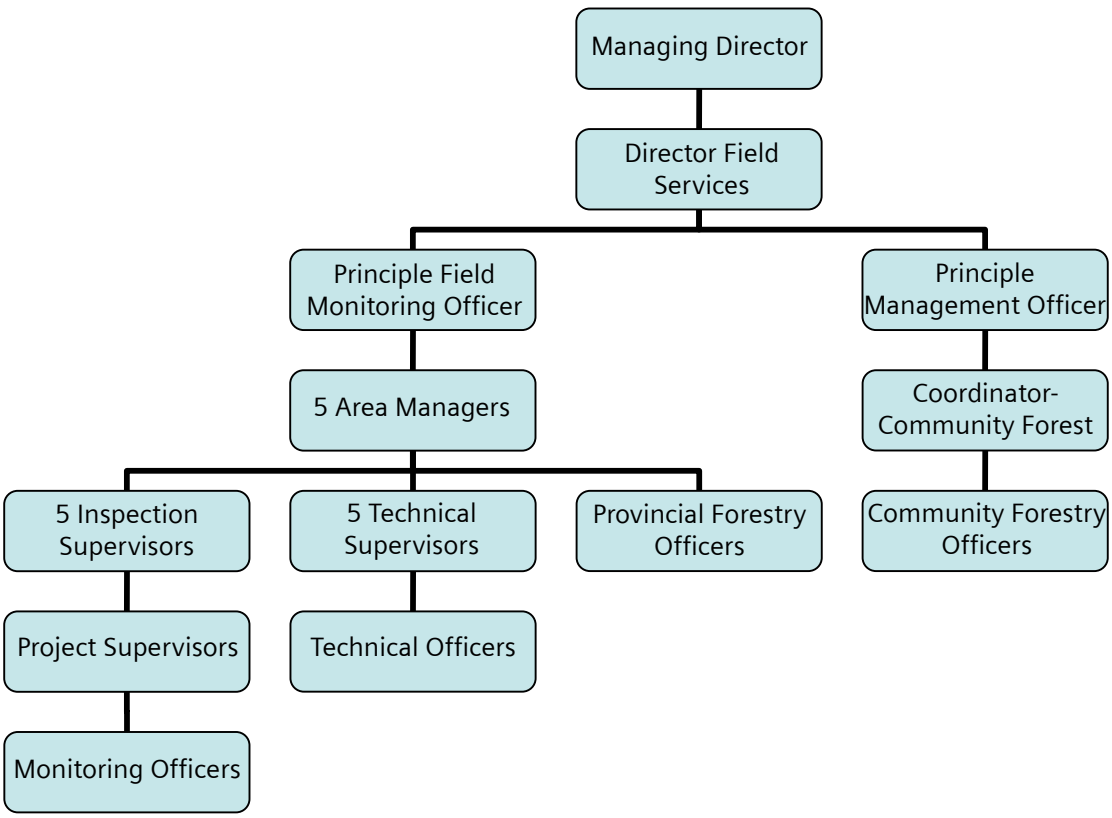
With the export of roundwood in the 1980s, foreign ownership (mostly Malaysian) dominated the sector and little emphasis was placed on sustainable forest management. Corruption plagued the timber industry, a situation which gave rise to a commission of inquiry and the promulgation of new forestry legislation.

The PNG Forest Authority was then created to replace the Forestry Department and provincial divisions. Supervisors are now located in all timber operation sites to inspect and monitor activities. Area managers provide these supervisors with resources and technical support to undertake their duties.

1.2. Organizational structure of the PNG forest authority



1.3. Organizational structure of field monitoring operations



2. Forest Policy and Legal Framework

The policy and legal framework to achieve sustainable forest management includes:

- 1991 National Forest Policy
- Forestry Act 1991 (amended) 1996, 2000,2005, 2007
- Forestry Regulations 1998 and 2008
- National Forestry Development Guidelines 1993 and 2009
- Code of Logging Practice and 24 key standards 1996
- Environment Act 2000
- Planning Monitoring and Control Procedures 1996
- Timber permits
- Project agreements

- Environmental plan
- Operational plans: 5-year work plans and annual logging plans

2.1. Commitment

The National Forest Policy 1991 sets the following objectives for the sustainable management of forest resources in PNG: 1) manage and protect forest resources as a renewable asset; and 2) utilize forest resources to achieve economic growth, create employment, enhance industry participation and increase viable onshore processing.

The Policy also states that areas designated as production forest will be developed on the basis of sustained yield. Furthermore, a balanced approach will be used to manage forests and carry out reforestation, including the option to establish forest plantations.

The Forest Authority has also adopted the ITTO criteria and indicators as a means to achieve sustainable forest management.

3. Lessons Learned, Challenges and Future Strategies

3.1. Successful experience, tools and lessons learned

Two projects in PNG are now harvesting a second rotation, almost 30 years after the first. They produce roundwood for export and process other products in domestic saw mills, such as veneer and plywood. However, most commercial operations in natural forests focus on the exportation of round logs and management is not often on a sustainable basis.

3.2. Challenges

- Land tenure: Although government has a constitutional obligation to ensure that forest resources are managed sustainably, it cannot dictate terms when ownership is customary, i.e., when land and resources belong to tribal groups. In such instances, owners within a group form a single legally constituted entity - the Incorporated Land Group - which then negotiates a forest management agreement with the Forest Authority. In turn, the Forest Authority selects an appropriate investor who is willing to develop the resource.
- Lack of resources: The annual allocation of funds to the Forest Authority is small compared with the revenue it generates to the treasury. Weak capacity, including in terms of logistics and communications, is a significant obstacle to its effective monitoring of timber operations in rural areas.

3.3. National strategies to achieve sustainable forest management in the next 5-10 years

- A sound policy and legal framework is in place.
- Stakeholders are consulted on the implementation of policy and programs.
- Stakeholders are also consulted before the timber allocation process is finalized.
- Links are forged with international organizations.
- Benefits to landowners, such as royalties, are increasing.
- Third Party monitoring of log exports is done by SGS Ltd.
- Log exports are being phased out and new allocation areas are processing 100%.
- Permanent forests estates are being established.
- REDD+ strategies are being developed and implemented.

The PNG Forest Authority is now testing a timber tracking system under a FLEG project funded by the ITTO (ITTO Project PD 449/07 Rev. 2). The project aims to develop:

- a tracking system which includes verifying chain-of-custody at the mill gate (domestic) and the shipyard (export) as well as managing information across different sources
- a timber legality and standard for PNG based on FLEGT guidelines and an industry code of conduct
- a training module to enhance the willingness and capacity of key stakeholders to detect illegal practices and assist with the prosecution and conviction of offenders.

Two forest enterprises, one foreign-owned and one national, have already applied to obtain FSC certification for their operations.

SUSTAINABLE FOREST RESOURCE MANAGEMENT IN SRI LANKA

H. M. A. B. HERATH

Divisional Forest Officer

Forest Department, Sri Lanka

1. Overview of Forest Resources

1.1. General

The Democratic Socialist Republic of Sri Lanka (Sri Lanka) is an island in the Indian Ocean to the south of India. It has a coastline of about 1,340 km and, according to 1995 satellite imagery (Legg and Jewell), its estimated area is 6,616,627 ha, including all inland water bodies. About 14% (0.55 million ha) of land is arable, 15% is under permanent crops, 7% is permanent pastures, 32% is forests and woodland and the remaining 32% is for other uses. The main agricultural products are rice, sugarcane, grains, pulses, oilseed, roots, spices, tea, rubber and coconut. Similar to other tropical countries, Sri Lanka has lost more than 60% of its forest cover (from more than 84% in 1881 to about 24% in 1992), with most of the decline occurring in the past two decades. Future trends are likely to be similar unless care is taken to conserve and develop current forest area.

1.2. Topography

Topography is irregular and dissected, with a central massif dominating the south. Pidurutalagala is the highest elevation above sea level (2,524 meters) and Adam's Peak, a pilgrimage destination, is the highest mountain (2,243 meters). The coastal belt which is less than 100 meters high varies in width and extends from the seashore to the foothills of the central massif. Rolling plains and isolated ridges make up the northern half of the island.

1.3. Climate

Climate is tropical and maritime. Mean temperature ranges from a low of 15.80C in Nuwara Eliya in the Central Highlands to a high of 290C in Trincomalee on the northeast coast. The average yearly daytime temperature is between 260C and 280C and between 40C and 70C at night. Rainfall is abundant and varies from 750 mm to 1850 mm annually. The monsoon winds of the Indian Ocean and Bay of Bengal influence rainfall and mark the country's four seasons.

1.4. Forests

Natural forests are classified into eight types: Lowland Mesophyllous Evergreen Dipterocarp Forests; Low Land Mesophyllous Evergreen Mixed Rain Forests; Lower Montane Notophyllous Dipterocarp Rain Forests; Lower Montane Notophyllous Evergreen Mixed Rain Forests; Upper Montane Microphyllous Evergreen Dipterocarp Rain Forests; Upper Montane Microphyllous Evergreen Mixed Rain Forests; Low Land Semi-Deciduous Forests; and Low Land Semi-Deciduous Wood Land/Thorn Shrub.

1.5. Forest cover

Total forest cover, excluding forest plantations, is around 30.9%, of which 23.9% is natural forest (Legg and Jwell, 1995) and about 7% is sparse and open forest. Forest plantations comprise an additional 1.3% of total land area.

1.6. Forest plantations

Large-scale tree planting started in late 1950s and, as of December 1996, forest plantations covered about 135,052 ha, about 87,000 ha of which belong to the Forest Department. The main species are teak, eucalyptus (mainly Eucalyptus grandis), pine (Pine caribaea) and mahogany. Most of the fuel wood, miscellaneous hardwoods and teak plantations are located in the dry zones while eucalyptus and pine plantations are mostly in the uplands and in the Galle and Ratanpura forest divisions. Mahogany plantations are situated in the Kurunegala and Kegalle civil districts. Legg and Jwell (1995) estimate the area of all mature and well established forest plantations at 72,340 ha (1.1% of land area or 4.6% of the area of natural forests under closed canopy). In addition, 1992 figures estimate that fuel wood plantations cover 18,002 ha, about 5,000 of which are located on tea estates and on land owned by tobacco companies.

1.7. Protected areas

Despite pressures from an increasing population, protected areas increased in number and size over the past two decades to about 1,888,781 ha or 28.5% of total land area. Some 13 forests in the wet zone are designated as conservation, along with the Knuckles forest in the wet and intermediate zone. The Forest Department manages about 56.5% of the network while the Department of Wildlife Conservation administers the remaining 43.5%.

2. Status of National Forest Resources Management

2.1. Historical review

Forest conservation was an integral part of the ancient Sinhalese civilization and much evidence to this effect is available in the chronicles of Sri Lanka - the Mahawamsa, the Rajaratnacari and the Rajawaliya, for example, and in the old stone edicts of Singhalese kings.

During the reign of King Vijaya (543 B.C.), social tree planting was common. Villages were well organized and planted home gardens with flowering and fruit trees. Records also show that Buddhist monks meditated in forests and wild animals were protected during the reign of King Devanampiyatissa (247 to 240 B.C.). Later, under several kings, rules for

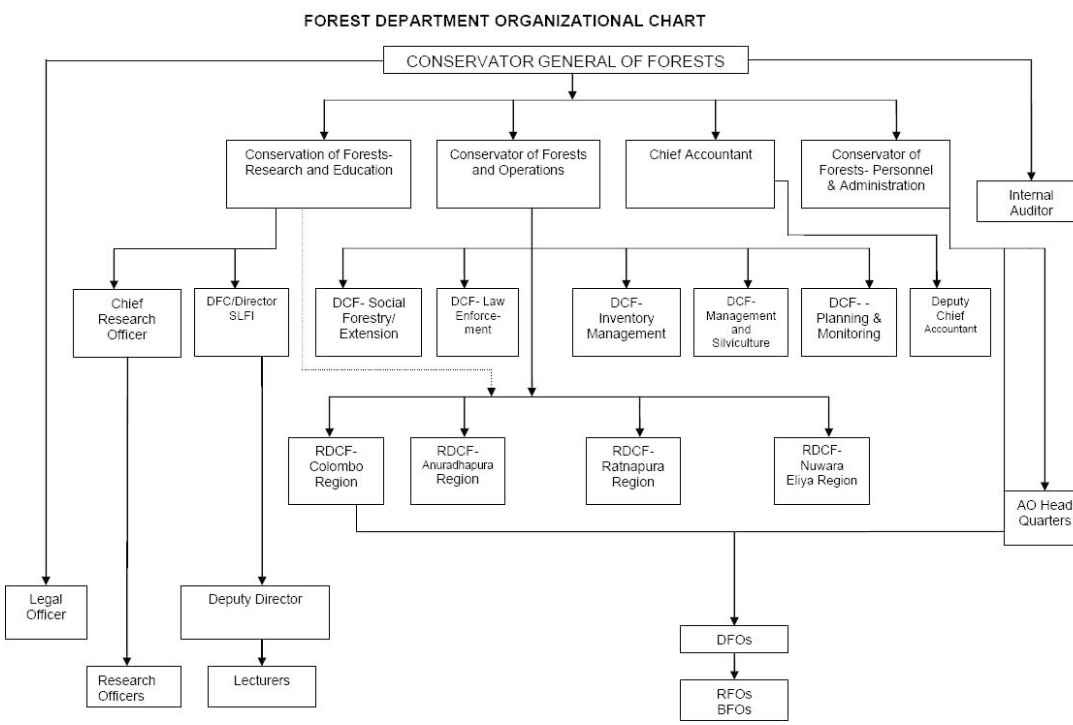
forest protection and for the use of forest products were drawn up and plantations were established. Forest officers were appointed and forests were granted to people for services rendered to the king or state.

Details of forestry activities during the Portuguese administration (1505 to 1658) are not available. The Dutch introduced teak trees to the island in 1680 but did not promote private ownership of trees. During the early British period, large tracts of forests on hills were cleared for the cultivation of coffee and timber felling was regularized in 1835. In 1904, the entire forest estate was placed under the control of the Conservator of Forests and a new ordinance to protect all forests was promulgated in 1907.

After independence from British rule in 1948, much progress was made in the sector, including the establishment of the Department of Wildlife Conservation in 1949 and the State Timber Corporation to harvest and market timber in 1968.

The forest policy of 1980 emphasized the need for sustainable forest management to supply timber and fuel wood and it encouraged the involvement of local communities in the development of woodlots and forest farms through social forestry. As a result of national and global concern over the depletion of forest resources, the government approved a new policy in March 1995 which is operative today.

2.2. Organizational structure of the Forest Department



AO = administrative officer, BFO = beat forest officer, DCF = deputy conservator of forest, DFO = divisional forest officer, RDCF = regional deputy conservator of forest, SLFI = Sri Lanka Forestry Institute.

3. Forest Policy Framework and Enforcement

3.1. Developing commitment

The government has stated its commitment to establish a participatory approach to the sustainable management of the permanent forest area; increase the protection and production of these areas; and enhance the access of forest communities - economically disadvantaged people in particular - to gainful employment and other income generating activities.

It further intends to advance social forestry as a means to involve stakeholders in the design, planning, and implementation of programs. Desired outcomes are to be achieved through:

i. Participatory forest planning, management, and awareness

ii. Sustainable forest resource development and management

iii. Institutional strengthening to improve sector performance through better technical knowledge of the Forest Department's professional and extension staff, beneficiaries, non-government organizations (NGO), and community-based organizations (CBO).

Activities to be carried out include the following:

Delineation, demarcation, survey, and mapping: Forest area will be surveyed and boundaries demarcatated with blocks to establish a permanent forest estate and facilitate integrated forest resources management.

Integrated management planning: The Forest Department, in consultation with stakeholders, prepared integrated forest resources management plans (IFRMP) which include forest mapping, classification, and assessments of growing stocks and species diversity. This information serves as a basis for determining management regimes, practices, and annual harvesting levels. Originally, IFRMPs were to be developed for each forest district.

Participatory forest resource development and management: This aspect includes community-based agro-forestry and social forestry development, improved management of current woodlots, and rehabilitation and management of degraded plantations.

Home gardens: The Forest Department supported the development of 12,231 gardens by providing timber trees, improved fruit trees, and medicinal plants.

Improved management of woodlots: The Forest Department planned to grant long-term tenure and help about 8,000 farmers to manage woodlots that were established under a previous participatory forestry project.

Participatory rehabilitation and management of protected forests: This component involves the development of buffer zones for multiple-use forestry and enrichment planting. It also includes the management of protection and other natural forests.

Production forest management: This aspect focuses on the improvement, rehabilitation, and management of degraded plantations; and the piloting of private sector management of state plantations under leasehold agreements.

3.2. Policies, laws and regulations

3.2.1. Summary of the National Forestry Policy

The National Forestry Policy of Sri Lanka is consistent with the National Economic Policy, the National Policy for Wildlife Conservation and the National Conservation Strategy. The scope of the policy is forestry in a broad sense, including its biophysical, environmental, social and economic components.

The objectives of the National Forest Policy are to:

- Conserve forests for posterity, with particular regard to biodiversity, soils, water and historical, cultural, religious and aesthetic values.
- Increase tree cover and productivity of the forests to meet the needs of present and future generations for forest products and services.
- Enhance the contribution of forestry to the welfare of the rural population and strengthen the national economy, paying special attention to equity.
- To achieve these objectives, the National Forest Policy provides guidelines for the management of state and private forest resources. Features for those which are state-owned include the following:
- All such resources will be brought under sustainable management both in terms of the maintenance of important ecosystems and the flow of forest products and services.
- The traditional rights, cultural values, and religious beliefs of people living within or adjacent to forest areas will be recognized and respected.

- The natural forests will be allocated firstly for conservation and secondly for regulated multiple-use production forestry.
- For the management and protection of the natural forests and forest plantations, the state will form partnerships with local people, rural communities and other stakeholders, where appropriate, and introduce tenure arrangements.
- The establishment and management of industrial forest plantations on state lands will be entrusted progressively to local people, rural communities, industries and other private bodies, keeping pace with institutionalizing effective environmental safeguards.
- Degraded forest land will be rehabilitated as forest for conservation and multiple-use production where it is economically and technically feasible, mainly for the benefit of local people.
- Planned conversion of forests into other land uses will take place only in accordance with procedures defined in legislation and within accepted conservation and scientific norms.
- Tree growing on homesteads and other agro-forestry practices will be promoted as a main strategy to supply wood and other forest products to meet household and market needs.
- The establishment, management, and harvesting of industrial forest plantations by local people, communities, industries and other private sector entities will be promoted.
- The state will promote tree growing by local people, rural communities, NGOs and other non-state bodies for the protection of environmentally sensitive areas.

In addition to these provisions, the NFP has specific guidelines related to wood and non-wood forest products, industries and marketing; institutional support for forestry development, including to NGOs; inter-sectoral linkages; and international forestry related conventions. The document also outlines strategies for their implementation (see section 4.3).

3.2.2. Laws and regulations relating to forests

The capacity to enforce rules and regulations for the protection and conservation of forests is continuously declining in Sri Lanka, a situation which is leading to further deforestation and forest degradation. However, efforts and investments to conserve biodiversity in selected areas are on the rise and a good network of well conserved forest resources is being established. Other laws that affect the management of forest resources are as follows:

Forest Ordinance No. 10 (1885): This ordinance tightened control on and access to forest resources and allowed only limited public access to reserved forests. Its primary aim was to control exploitation and manage resources on the basis of sustained yield. However, the act was also used to establish wildlife sanctuaries in Yala and Wilpattu forests. Forest Act No. 16 (1907) replaces this ordinance and, although amended several times, its initial structure remains intact and forms the basis of present laws relating to forests and plant protection. Provisions place government interests ahead of those of the public and local communities and do not address trees outside forests. The Forest Department is responsible for its implementation and also regulates the sale and transport of forest products, including timber.

Land Settlement Act (1931), Land Development Act (1935) and Crown Lands Act No. 8 (1947): These acts deal with the control and allocation of lands. Implementation of the first 2 laws has had a particular impact on forests in that many decisions did not consider either the ecological aspects of forests or the land that supports them. This omission has led to irreversible erosion and ecosystems fragmentation in some areas.

Soil Conservation Act No. 25 (1951): This law was amended in 1953 and again in 1981. It pertains to the conservation of soils, including the protection of land against damage by floods and drought. Although the Department of Agriculture administer it, many agencies are involved in its implementation. Overlapping jurisdictions, unclear assignment of responsibilities and power struggles are adversely affecting forest and soil resources.

Timber Act No. 2 (1822): This act was the first forest legislation enacted by the British. It mainly dealt with timber harvesting and prohibited the cutting of trees on crown land and of jak trees on private land without a licence. Many amendments and new legislation have since replaced it.

Wastelands Ordinance, 1849 (amended 1879): The state appropriated large tracts of forest, common village and family property, as well as land used for shifting cultivation. In this regard, it paved the way for future state control over the management of forest resources. Prior to British rule, the forest belonged to the king who recognized his subjects' rights to tenure, access and local control for grazing, collection of firewood and shifting agriculture. This act not only ignored local social institutions, customary title and traditional tenure but, due to weak capacity of the state to enforce it, confusion over tenure in some forest reserves remains a problem in many parts of the country.

National Heritage and Wilderness Areas Act No. 3 (1988): The government enacted this legislation to address the failure of the Forest Act to conserve national heritage and wilderness, including biodiversity. The Forest Department administers this act that aims to protect state lands that have unique ecosystems, genetic resources and outstanding natural features.

Fauna and Flora Protection Act No. 2, 1937(amended): The original law was designed to protect game rather than wildlife but the current version, under the Department of Wildlife Conservation, aims to protect wildlife and flora in national reserves.

The National Environmental Act: This act mandates the Central Environmental Authority to enforce rules and regulations pertaining to environmental protection, including the need to conduct environmental assessments for certain activities, especially with regard to the extraction of timber.

4. Lessons Learned, Challenges and Future Strategies

4.1. Successful experiences, tools and lessons learned

Forest cover in Sri Lanka, as with most other countries in South and South East Asia, is decreasing. Annual loss between 1990 and 2005 is estimated at 1.3%. Key reasons include the need for new land on which to practice shifting cultivation, illegal exploitation of timber, damage from wildfire and conversion to other uses. The result is that most forests in the dry and intermediate zones are only remnants. The role of the Forest Department, therefore, has become one of policing – attempting to prevent unauthorized exploitation and prosecuting offenders. With limited human and other resources, damage to forests continues. Although the bond between people and forests may not be as strong as in past generations, many communities still depend on them for the products they provide and many more rely on them, especially in catchment areas, to supply water for irrigation tanks and to recharge the table.

One of the main underlying causes of deforestation and forest degradation is poverty which is often associated with landlessness, insecure tenure and population growth. As rural communities became culturally decoupled from the land, they are exploiters and illegal extractors instead of the guardians they once were. This change is a source of conflict between communities and the Forest Department which focuses on protection. Because the government understands that forestry officers and other resources are insufficient to adopt an enforcement and prosecution approach to protect forest resources, authorities are increasingly turning to community-based forest management to address difficulties that arise from population growth and the added pressure it places on resources; scarce natural resources (e.g. forest products, arable lands, livestock fodder); social and political conflicts; and inappropriate policies. Participatory approaches are also gaining in popularity as a result of traditional systems which have proven effective and of positive experiences in terms of improved management.

Among the many projects to introduce community-based forest management since 1990, the Sri Lanka-Australia Natural Resource Management Project has been the most

successful. Operational guidelines and 25 participatory tools were developed and tested in the field. Guidelines on micro-financing and on the establishment of small enterprises were also drafted. Based on this work, 55 community-based organizations were registered in Divisional Secretaries, 55 forest management plans were approved and all of these organizations entered into 25-year agreements with the Forest Department. From these arrangements, 2,500 households are engaged in managing more than 7,000 ha of forest land.

4.2. Lessons learned

- Community forestry is the preferred approach to forest management, at least in suitable areas in the dry and intermediate zones, and should be expanded.
- The selection of sites is critical to ensure the stability of communities and sustainable management. Community engagement, commitment and dependence on forest resources are also prerequisites.
- Management units should encompass village residents, their agricultural land, water storage and tank systems (along with the forested catchments), and other natural and plantation forests.
- Under community management, fires in the dry and intermediate forests were eliminated, making this approach perhaps the most effective tool in forest protection and regeneration.
- The direct involvement of Forest Department staff in assisting communities has dramatically and positively changed the attitudes of both parties.
- The substantial investment in training that the Sri Lanka-Australia project made has improved staff behaviour and paved the way for a major shift in policy orientation.
- Long-term environmental stewardship requires that participants receive tangible benefits in the short term, including micro-financing and capacity to develop small businesses.
- Rural women are valuable partners in community development and natural resource management so that every effort should be made to ensure their ongoing participation.
- Most communities are willing to supply increasing amounts of labour and materials to forestry initiatives as well as contribute to infrastructure and services.
- Once institutional capacity is built, communities have confidence in dealing with service providers and have a mechanism to engage with a large number of

households,

- Community forestry facilitates an integrated and coordinated approach to forest management through community-based organizations.
- The implementing agency must take ownership of a forestry monitoring/evaluation system and integrate it within its broader monitoring and evaluation framework.

4.3. Challenges

Deforestation and forest degradation are key issues facing the forestry sector in Sri Lanka today. To meet the needs of a growing population, additional forest land is being converted to increase agricultural productivity through, for example, the establishment of tea, coconut and rubber plantations. The only significant natural causes of deforestation and forest degradation are fire and cyclones.

The closed canopy forest cover dropped from about 44% in 1956 to 24% in 1992 - an annual average conversion (planned and spontaneous) of about 42,000 ha. From 1992 to 1999, deforestation averaged around 17,000 ha per year, or 0.8%. This reduction is primarily because most large-scale agricultural expansion schemes were completed by 1990.

Between 1965 and 1990, natural forests were overexploited for timber production and the commercial selection system that was in place caused severe forest degradation in terms of stand structure and species composition. The absence of a national land-use policy and principles for land-use management contributed to further deforestation and degradation of land resources. In addition, boundaries were surveyed and demarcated only in gazetted forest areas - about 66% of the total. Boundaries in the remaining 34% (proposed forest reserves and other state forests) are not clearly defined, giving rise to illegal logging and encroachment due to scarce land, widespread poverty and high unemployment. The meagre resources of the Forestry Department to fulfil its mandate is another constraint. Shifting cultivation, still a traditional practice in remote areas, is responsible for large swathes of secondary forests being cleared every year, particularly in the dry and intermediate zones.

- **Other key constraints are:**

  a. Ineffective management of forest plantations

  b. Inadequate legal framework for participatory forest management

  c. The lack of participatory forest management and benefit-sharing mechanisms

  d. Weak support and incentives for private sector involvement in forest plantation development

  e. Outdated and inefficient machinery in the wood industries that generate much waste

f. Inadequate attention paid to non-timber forest products

The State Timber Corporation's monopoly on timber extraction on state forestland

Inappropriate national accounting systems which do not consider the full value of forest products and services.

In light of increasing demands on the sector, its diminished capacity to sustainably meet the needs of society is a major problem.

• The most serious consequences of deforestation and forest degradation include:

a. Loss of biodiversity and habitats

b. Scarcity of wood, including fuel wood

c. Soil erosion and loss of fertility

d. Irregular water supply due to reduced flows in the dry season

e. Shortened life span of irrigation and hydro power reservoirs

f. Reduced carbon sequestration.

4.3. Sustainable forest management strategies in the next 5-10 years

• Forest management, including harvesting

a. All state forest resources will be managed sustainably to maintain important ecosystems and a continuous flow of forest products and services.

b. Natural forests will be allocated primarily for conservation (including soil and water and watershed protection) and secondly for regulated multiple-use production forestry.

c. For the management and protection of natural forests and forest plantations, the state will form partnerships with local people, rural communities and other stakeholders, where appropriate, and will introduce tenure arrangements.

d. The establishment and management of industrial forest plantations on state lands will be entrusted progressively to local people, rural communities, industries and other private entities, keeping pace with the institutionalizing of effective environmental safeguards.

e. Degraded forestland will be rehabilitated as forest for conservation and multiple-use production where economically and technically feasible, mainly for the benefit of local people.

- **Forest and biodiversity conservation**

  The general public and industries will be educated about the importance of forestry, of conserving biodiversity and of protecting watersheds.

- **Investment in forest industries and wood processing**

  Efficient forest product utilization, development of competitive forest industries based on sustainable wood sources and the manufacturing of value-added products will be promoted.

- **Non-wood forest products**

  Effective measures to protect the forests and prevent illegal trade in wood, non-wood forest products and endangered species of flora and fauna will be institutionalized.

- **Trees outside forests**

  a. Growing trees on homesteads and other agro-forestry activities will be promoted as a main strategy to supply wood and other forest products to meet household and market needs.

  b. The state will promote tree growing by local people, rural communities, NGOs and other non-state bodies for the protection of environmentally sensitive areas.

  c. The state will facilitate the harvesting and transport of forest products grown on private lands.

- **Participation and devolution of forest management responsibilities**

  a. For the management and protection of natural forests and forest plantations, the state will form partnerships with local people, rural communities and other stakeholder, where appropriate, and will introduce tenure arrangements.

  b. The establishment and management of industrial forest plantations on state lands will be entrusted progressively to local people, rural communities, industries and other private sector bodies, supported by effective environmental safeguards.

  c. Growing trees on homesteads and other agroforestry activities will be promoted as a main strategy to supply wood and other forest products to meet household and market needs.

  d. Greater responsibility will be given to local people, organized groups, cooperatives, industries and other private bodies in commercial forest production, manufacturing and marketing.

e. Nature-based tourism will be promoted to the extent that it does not damage ecosystems and in so far as it provides benefits to the local population.

f. The National Forestry Policy will be kept up to date and implemented in a participatory and transparent manner.

Sustainable Forest Management in Thailand

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Thailand

Introduction

The Kingdom of Thailand is located in Southeast Asia between latitudes 500 35' - 200 15' north and longitudes 970 30' - 1050 45' east. Total area is 513,115 km2. Mountainous areas in the north form the headwaters of its most important river, the Chao Phraya. Highlands in the northeast run eastward to the Mekong River and act as a natural border with Lao PDR. The long southern peninsula separates the South China Sea in the east and the Andaman Sea in the west.

Its climate is tropical, dominated by the southwest monsoon from May to October which brings high rainfall and humidity to the region. Average annual rainfall ranges from 1,250 mm in the northeast to more than 4,000 mm in the peninsula. Dry season runs from November to April, with relatively cool temperatures until February. March through May is dry and hot. Average annual temperature is 28.90 C.

From 1961 to 2007, population increased from 30 million to 65 million. Annual growth rate is 0.66%. Population density is approximately 126/km2: 1,269 people in municipal areas and 89.1 in non-municipal areas. The National Economic and Social Development Board estimated GDP per capita in 2007 at US$ 9,200.

1. Forest Resources and Distribution

Thailand has two types of forests: evergreen and deciduous.

• The evergreen forest is subdivided into tropical evergreen, pine, mangrove and beach.

a. Tropical evergreen forest is found in the moist part of the country and consists of the tropical rain forest, the semi-evergreen forest and the hill evergreen forest.

b. Pine forest has two species: Pinus merkusii, locally called Son Song Bi (the two-needle pine) and P. kesiya, locally called Son Sam Bi (the three-needle pine).

c. Mangrove forests occur along the east, central and southern coasts. The predominant species are Rhizophora spp, Xylocarpus spp, Avecennia spp, Bruguiers spp, and Nypa spp.

d. Beach forests occur along the sandy coastal plains, especially in the southeast. The main species iare Diospyros spp, Croton spp, Lagerstroemia spp and Casuarina spp.

• Deciduous forest is found throughout the country and is subdivided into mixed deciduous (with and without teak) and dry dipterocarp.

a. Mixed deciduous forest is among the most commercially valuable in Thailand. Teak is the dominant species in the northern region: Tectona grandis, Xylia kerrii, Pterocarpus

macrocarpus, Afzelia xylocarpus and Dalbergia spp (rose wood).

b. Dry dipterocarp forest is found in areas which receive less than 1,000 mm of rain, in sandy or gravely lateritic infertile soils. The predominant species are Dipterocarpus tuberculatus, D. obtusifolius, Shorea obtusa, and S. siamensis.

Their distribution is as follows:

a. Tropical Evergreen Forest 52,679 sq. km. (10.25% of country area)

b. Mix Deciduous Forest 87,445 sq. km.(17.01% of country area)

c. Dry Dipterocarp Forest 18,570 sq.km. (3.61% of country area)

d. Swamp Forest 304 sq.km. (0.06% of country area)

e. Inundated Forest 256.8 sq.km. (0.05% of country area)

f. Beach Forest 125 sq.km. (0.02% of country area)

g. Pine Forest 462 sq.km. (0.09% of country area)

h. Bamboo Forest 1,504 sq.km. (0.29% of country area)

i. Mangrove Forest 2,463 sq.km. (0.48% of country area)

2. Forest Resources Management

2.1. Historical review

Four stages characterize the history of Thai forestry:

- Early exploitation (mid-1890s to early 1930s): This period saw the start of commercial logging to meet domestic and foreign demand for teak. The Royal Forest Department (RFD) was established to regulate exploitation, particularly in teak forests in the north.
- Expanding exploitation and management (1930s to early 1960s): Logging was an important economic activity which generated foreign exchange, capital for national development, and government revenue. Clear felling also made land available for agriculture. RFD attempted to bring forest exploitation under management by enacting laws, enforcing them and training staff.
- Declining exploitation (1960s to mid-1980s): Logging peaked, the sector became export oriented, agriculture expanded, and national economic development grew. Coupled with weak control and excessive logging, often illegal, forests continued to disappear at an alarming rate. Measures were introduced to rationalize forest

management but were not successful.

- Logging ban (1989 onwards): Widespread awareness of the adverse effects of forest exploitation led to a ban on logging. The forest had declined to a point where the nation decided to conserve resources rather than further exploit them.

According to the Forest Act (1941), "forest" is defined as land that has not been taken up or acquired by any other means in relation to land law. Rapid population growth and economic development between 1960 and 2006 resulted in forestland decreasing from 53.33% to 30.92% of land area - an average annual loss of 1%, or more than 2,000 km2. The worst loss (6.2% annually) occurred between 1976 and 1982 as a result of the conflict between democracy and communism. In an attempt to reduce the opposition's base, government encouraged people to settle in zones which the communists seized and it gave them support in terms of infrastructure and basic needs. This policy promoted much slash and burn agriculture until hostilities ended in 1985.

2.2. Organizational structure

Thanks to both a strong environmental movement and government commitment, awareness of the need for forest conservation is much greater. With regard to administrative aspects, Thailand recognizes the role of national institutions in matters pertaining to the environment and natural resources but also considers it important to decentralize authority to the local level.

King Rama V founded the RFD in September 1896 to oversee teak concessions which were mainly awarded to western entrepreneurs. The Department began as an independent unit but, in the past several decades, has been under the control of various ministries. In 1941, RFD was placed under the Ministry of Agriculture and Cooperatives (MOAC) until it was transferred to the new Ministry of National Resources and Environment (MONRE) in 2002 and divided into two departments: RFD and the Department of National Parks, Wildlife and Plant Conservation (DNP). The management of mangrove forests was transferred to the Department of Marine and Coastal Resources and other duties were assigned to the Office of the Permanent Secretary.

When DNP was established, it was given the following responsibilities:

i. conserve, protect and maintain forest resources and wildlife in balance for their sustainable use and maximum economic and social benefits

ii. rehabilitate and restore degraded natural resources and ecosystems in forest areas

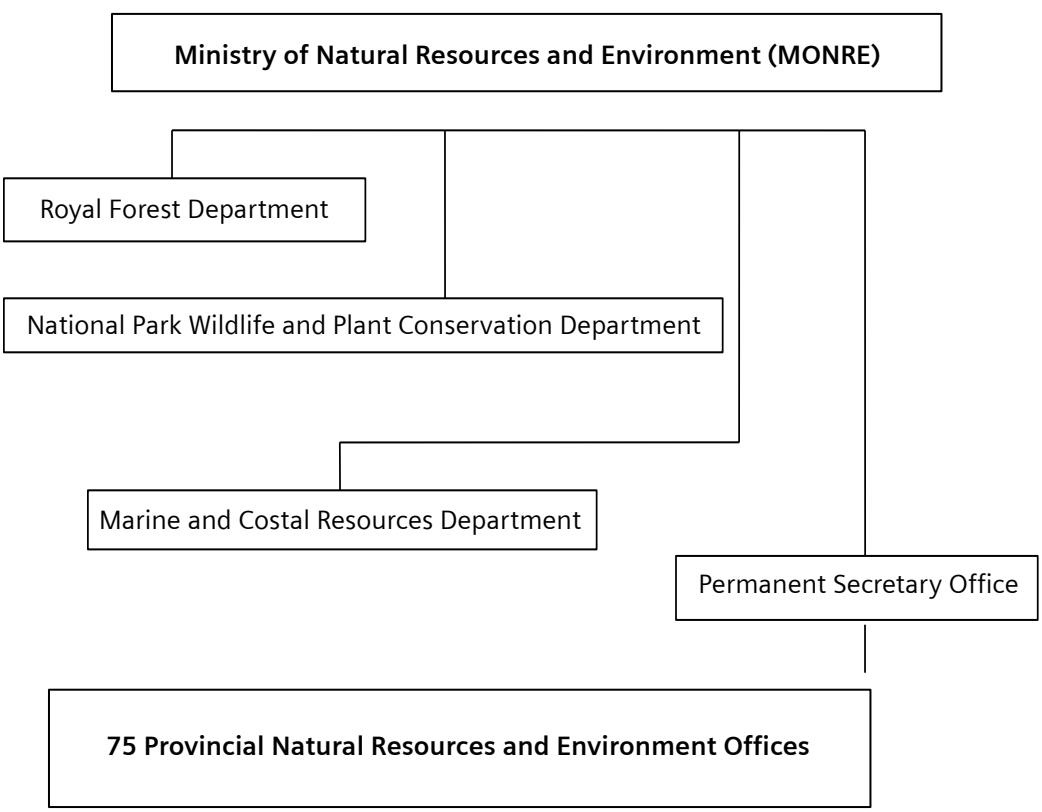
iii. monitor and prevent forest encroachment and enforce the forest law, forest reserve law, national park law, and wildlife resources and biodiversity law

iv. study, research and develop ways to conserve, manage and rehabilitate forest, wildlife resources and biodiversity

v. establish methodologies and standards to conserve, manage and utilize forest wildlife resources

vi. provide information and technology transfer.

With regard to the formulation of policy and the functions of planning and management, authorities have overlapping responsibilities (e.g., National Economic and Social Development Plan and the Environmental Plan). While MONRE's 3 departments noted below have the daily administration and control of forest resources and biodiversity over more than half the country, its Office of Natural Resource and Environmental Policy and Planning also has the mandate to plan nature conservation and biodiversity protection. Hence, problems arise when policies are translated into laws which ministries then must administer. Implementation is further hampered because matters pertaining to the health of the environment do not take precedence over many regulations governing land use which fall under different ministries.



In practice, MONRE coordinates inter-ministerial policies through the National Environment Board which the Prime Minister chairs. Conflicts over land use due to overlapping mandates emerge frequently - for example, mining, road construction, and infrastructure development in class 1 watersheds. Often, disputes must be settled by cabinet resolution. Cooperation among authorities is needed while overlapping mandates and policies should be revised through a national steering committee or through departmental committees, sub-committees and task forces.

Local administration

Government policy is to promote decentralization and strengthen the line of command from provincial governors to districts and sub-districts, i.e., elected bodies at four levels which work with line officers of the public administration: parliament, provincial assembly, TAO (1 tambol = 10-15 villages) and village. Specialized agencies once had their own territorial units but since the establishment of MONRE, RFD staff have been assigned/seconded to provincial offices and given additional duties related to environmental regulations and natural resource management. As a result, less human resources are available for forestry and this is a major cause of concern.

Local authorities consist of provincial administrations, district organizations, and TAOs. By the end of 1999, authority was passed to the grass-roots through the 6,800 TAOs which had been established throughout the country. The TAO Act of 1994 and the 1998 Decentralization Act give TAOs the mandate and duty to protect and maintain natural resources and the environment within their jurisdiction. However, they have exercised little power to date because most are still concentrating on infrastructure development. The role of other local authorities in the management of natural resources and the environment is not specified in law.

3. Forest Policy Framework and Enforcement

3.1. Commitment

The Royal Forest Department strives to achieve sustainable forest management, as outlined in the National Forest Policy (1985), including in terms of maintaining 40% forest cover (25% conservation forests and 15% economic forests). RFD and other forest agencies in MONRE are implementing annual plans which cover the following aspects:

- **Forest Conservation**

The important forest conservation areas in Thailand are national parks, wildlife sanctuaries, no hunting areas, forest parks, biosphere reserves, class 1 and class 2 watershed areas, botanical gardens, arboretums and experimental sites. For national parks and

wildlife sanctuaries, specific laws and regulations stipulate their protection, control and management.

Major forest conservation areas in Thailand			
Conservation type	Number	Total area (ha)	% of the country area
National park	110[1]	5,513,532	10.75
Wildlife sanctuary	57	3,657,872	7.13
No hunting area	60	523,304	1.02
Forest park	113	123,671	0.24
Botanical garden	16	4,137	0.01
Arboretum	55	4,265	0.01

Source: Department of National Parks, Wildlife and Plant Conservation, 2008

• Watershed Management

The watershed areas in Thailand range from class 1 to class 5, according to the features and degree of ecosystem control required. Classes 1 and 2 are the most important and, in June 1987, Cabinet declared them as head watersheds. They cover 13,585,897 hectares or 26.4% of total land area. Due to variations in topography, geology, climate and forest types, the country is divided into 25 main watersheds. In addition, regulations control land use in each class of watershed in order to minimize impacts on water quantity, quality and duration of flow.

• Forest Protection and fire control

The RFD has a total of 495 forest protection units across the country, 433 of which are supervised by 13 bureaus and 6 branches. An additional 62 provincial coordination units are attached to the Forest Protection and Fire Control Bureau. Fire control units monitor, fight and prevent forest fires which mainly occur in the north and northeast regions. These units also encourage public participation in fire control, perform public relations and mount fire prevention campaigns.

Cabinet Resolution, dated 16 September 1997, establishes guidelines for land and forest resources management by location and Resolution, dated 30 June 1998, seeks to address land use problems in forest areas, including the lack of land for agriculture. The RFD's Forest Land Management Bureau is responsible for this project and, to date, about 300,000

people have been given the Sor Thor Khor certificate which entitles them to live and farm in national reserved forests.

• Community forestry

Community participation in natural resource management is a new concept which is embedded in the 2007 Constitution and in the Tenth National Economic and Social Development Plan (2007-2011). Strategies for the development and stabilization of the resource base and the environment follow three approaches: maintenance of the resource base and of the balance of ecosystems; the creation of sound environmental conditions that enhance the quality of life and promote sustainable development; and measures to increase the value of biodiversity and improve local wisdom so that sustainable, balanced and fair conservation and utilization of natural resources can be achieved. Approximately 6,000 community forest management projects were approved between 2000 and 2006.

Community forestry refers to any activity that involves people in forest plantations and in villages that lack wood or other forest products. It includes farm forestry, household enterprises and heavy industry that use material from forests as well as forest activities that provide a community with income. Two types of community forests are found in Thailand. The first concerns natural or traditional forests where local people have tenure to care for and protect them from encroachment or alteration so they continue to meet the community's demand for food, wood, culture, customs, and norms. The second concerns rehabilitated or planted forests where local people take responsibility for their management to achieve similar benefits: conservation of soil and water, food and wood supply, recreation and leisure, beautification of public areas and income generation.

• Biodiversity

Thailand is among the few countries where tropical forests are scattered throughout the land. Thus, it is rich in biodiversity, possessing approximately 7% of the world flora and fauna, of which more than 2,000 species are endemic. In addition, about 15,000 species of flora found here account for 5.56% of the world's total. It also has about 633 species of ferns, more than 1,000 species of orchids, more than 3,000 species of fungi, and more than 1,000 species of medicinal plants. In terms of fauna, it harbours an estimated 1,408,500 species or 2.6-10% of the world's total. When the government ratified the Convention on Biological Diversity in October 2003, with effect in January 2004, Thailand became the 188th party to join.

• Research

The Royal Forest Department is aware of the need to conduct research for national development of the sector. In this regard, research on silviculture and genetic improvement to increase plantation yield has been carried out for several economically important tree

species, particularly teak.

• Reforestation

As part of its mandate to reforest, the Royal Forest Department annually establishes plantations of both teak and other timber species. The purposes are for commercial ventures, watershed improvement, restoration of degraded reserved forests, environmental conservation and Royal Initiative Projects. By 2007, the government had planted 1,302,647 hectares.

Farmers and private landowners established the first forest plantations of fast-growing species for commercial purposes more than 40 years ago (Eucalyptus camaldulensis and Casuarina equisetifolia). Soils with low pH in some provinces around Bangkok are unsuitable for agriculture production so that tree plantations are viewed as a viable alternative. Most small timber from these sources is used as scaffolding in construction and for temporary fencing posts.

Some commercial companies and semi-private enterprises assist the RFD to establish forest plantations - the Thai Petroleum Industry, the Telecommunication Authority of Thailand and the Thai Cement Company, for example. Local communities, schoolchildren, monks, educational institutes and villagers also unite to plant trees on disturbed forestlands during special events every year. The RFD supports many royal projects to plant trees on various occasions and its nurseries across the country distribute millions of seedlings to individuals, institutes and communities free of charge to provide additional sources of timber. In 2000, forest plantations in Thailand covered an estimated 950,000 ha. To date, the private sector has invested little in forest plantations so that the amount of wood produced is not sufficient to meet domestic demand. Thus, the country continues to depend on imports.

In the 1990s, the RFD implemented a reforestation project to promote tree planting of selected indigenous species. However, farmers have largely replaced these stands with annual cash crops because, under current regulations and inadequate incentives, long-rotation trees are less profitable than crops and faster growing species.

RFD, in cooperation with FAO, determined that (i) livelihood opportunities using long-rotation tree species are under-developed; (ii) mono-cropping or over concentration of annual cash crops are causing soils to deteriorate; and (iii) farmers have limited access to timber, especially high quality timber, for housing and furniture. This situation is attributed to outdated regulations and lack of government assistance to plant and process long-rotation species.

More specifically, the requirement to obtain a permit to harvest teak, but not other crops, acts as a disincentive to plant long-rotation species and government incentives (including subsidies) are less attractive compared with those offered for para rubber, cassava and

sugarcane, for example. In addition, access to credit is difficult. Barriers also hinder the processing and marketing of wood materials: limits on the amount of teak to be possessed and lack of government programs to establish small and medium enterprises which, in turn, leads to weak markets for long-rotation species. Therefore, regulations need to be revised or replaced and RFD requires additional capacity to offer technical support in these areas.

To address such problems, RFD and FAO launched "Participation of tree plantation farmers in sustainable forest management" in 2009 to provide a better environment for planting, harvesting, and processing long-rotation tree species.

3.2. Forest policies, laws and regulations

Before the 1985 forest policy, various pieces of legislation shaped the sector. As noted earlier, when forests were brought under state ownership and management, it established the permanent forest estate either as protected areas or forest reserves. Concessions were then awarded to private operators and state-owned forest industries were disbanded when logging was prohibited. With the new policy, the institutional structure was strengthened and various programs were introduced. Revisions to legislation on land and agriculture also had an impact on forest policy implementation.

The National Forest Policy (1985) was prepared after extensive public input. The document provides a consolidated framework to guide the sector and places it within the context of overall national development. Reforestation and afforestation are important strategies to meet future wood demand and partnership with the private sector in tree planting to achieve this goal is promoted. The policy also calls for short, medium and long-term plans to develop forest lands and forest industry; the thorough review and revision of forest laws and regulations; community participation in forest management; and close cooperation with the private sector.

In addition, the policy urged all government entities and the public to collaborate with RFD in defining and maintaining a forest resource base to support the needs of society. However, it is silent on the root causes of deforestation and poverty in forest areas and it does not explicitly identify measures to involve rural people. Moreover, it does not address the growing imbalance between supply and demand of industrial wood and wood fuels; illegal harvesting; or the needs of people living in and around forests, often without permits or tenure rights. As a result, forest degradation continues. Serious consequences in the late 1980s which led to a logging ban in natural forests brought about a shift towards conservation and protection, still in place today.

- **Key Measures of the 1985 National Forest Policy**

  a. Shared forest management between government and the private sector

b. An administration system compatible with the changes in the forest situation

c. Target of 40% forest cover (15% conservation forests and 25% commercial forests)

d. Joint forest development and management for direct and indirect benefits

e. Reduction in forest destruction through improved technology

f. Integration of the Forest Development Plan into the National Development Plan

g. Acceleration of city planning and designation of forest utilization zones in each province

h. Appointment of a National Forest Policy Committee under the Forest Act

i. Intensification of private forest plantations to meet the needs of forest industries

j. Inclusion of forested slopes of 350 in the definition of forests areas

k. Incentives for private forest plantations

l. Human resources development and settlement based on nature conservation

• Macro policies

Over the last four decades of national development, Thai society has had to continuously adjust to changing socio-economic conditions. The First and Second National Economic and Social Development Plan (1961-1970) emphasized economic growth through investment in infrastructure, including road, electricity and water supply networks. Despite impressive economic growth, both income distribution and the quality of life in rural areas deteriorated. Hence, the third plan (1971-75) paid more attention to social development, reduction in population growth, and income distribution. Political uncertainty and an energy crisis during the fourth plan (1976-1980) brought about severe deficits in the balance of trade and current account. In response, the fifth and sixth plans (1981-1990) emphasized economic stability, structural adjustment and poverty eradication. The seventh plan (1991-1995) saw a shift to sustainable development to maintain economic growth and stability, improve income distribution, develop human resources, and enhance quality of life and the environment. The eighth plan (1996-2000) moved from a growth to a people-centered orientation. A more holistic approach was taken to national planning, one which provides for stakeholder participation. However, due to the Asian economic crisis (1996-1998) the plan was revised to address the urgent need for economic stabilization, social protection and structural adjustment.

3.3. Law enforcement and implementation of regulations and policies

The Government of Thailand has stringent laws to protect and conserve forest areas, including water and biodiversity. The five main pieces of forestry legislation are as follows.

- Forest Control Act, 1941 concerns logging operations, the collection of non-wood forest products, transportation of timber and non-timber products, sawnwood production and forest clearing.
- National Park Act, 1961 covers the determination, protection and maintenance of national park land and the establishment of a National Park Committee.
- National Reserved Forest Act, 1964 includes the determination, control and maintenance of the National Reserved Forest.
- Wildlife for Preservation and Protection Act, 1992 provides for the preservation of national

  wildlife, establishes a Protection Committee and identifies 15 species of reserved wildlife.
- Reforestation Act, 1992 covers the determination of areas to be reforested and the registration of private reforested land for exemption from royalties on forest products.

Besides heavy penalties under these Acts, other provisions ensure that any crime or illegality pertaining to forestry and wildlife is controlled and offenders convicted. More than 20 laws and a number of Cabinet decisions relate to forest and resource management. Section 39.23 of the Forestry Act, 1941 stipulates that whoever moves timber or forest products must have a pass issued by an authorized officer, in accordance with terms specified in the regulations.

3.4. A case study on community forestry

• Evolution of the program

As early as the 1970s, RFD recognized community or village forestry as a strategy for the sustainable management of the nation's forest resources. In 1991, it established a Community Forestry Division (now renamed Office of Community Forest Management) to plan and promote the approach and involve local communities, organizations, NGOs, other civil society groups and various institutions in implementation.

• Status of the program

Some 11,400 villages (15.5% of the country's total), mostly in the north and northeast regions, are managing an estimated 196,667 ha of community forests in national forest

reserves (112,869 ha) and other forest areas (83,798 ha). About half the villages (5,331) are reported to have formally registered with RFD (Wichawutipong, 2005).

• Benefits

Due to the logging ban, villagers are not allowed to fell any living trees (green wood) from natural forests for household or commercial purposes. However, they may harvest timber and fuelwood from plantation forests but require a permit from RFD for teak and other reserved species. They can gather, free of charge, dry and dead wood in natural forests for subsistence needs but, considering that these areas are the only source of energy for cooking and heating for millions of people, the amount collected is significant. At no cost, they can also gather non-timber forest products such as mushrooms, rattan, bamboo and bamboo shoots, wild vegetables, flowers, fruit and nuts, and medicinal plants.

• Procedure to a Establish Community Forests

A number of steps must be completed before a community forest is registered to a group:

a. Local residents establish a group of at least 50 people (18 years or older) which discusses and agrees on activities

b. The Mayor, General Secretary and Forestry Officer of the district review the application for completeness and forward it to the provincial authority.

c. The Governor, after authorization from the provincial office of Natural Resources and Environment, appoints a Forestry Officer to conduct a field investigation, together with Kamnan and/or Poo Yai Ban and select community members.

d. The Director General of the RFD approves or rejects the proposal, informs provincial officers and issues instructions to implement the decision.

e. The Governor declares an area for the approved community forest, as per the National Forest Reserve Act 1964 (Decree 15), and informs the parties concerned.

f. The local group, with the help of forestry officers, demarcates forest boundaries and posts signs with rules, regulations, sanctions and a list of restricted forest products.

g. Forestry officers provide technical assistance and work closely with the group.

• Rationale and Good Practices of Community Forestry

Community involvement in forest management is justified on following grounds:

a. Proximity: Those in close contact with the forest are best placed to ensure its stewardship.

b. Impact: Those whose livelihoods depend on the forest should be involved in its management.

c. Equity: Forests should be managed to ensure adequate resource flows to the rural population.

d. Multiple needs: Management for timber alone may be incompatible with rural needs.

e. Capacity: Forest communities may be better forest managers than government agencies.

f. Biodiversity: Multi-purpose forest management can lead to better conservation of biodiversity.

g. Cost-effectiveness: Local involvement in management may cut significant costs to the state.

h. Governance: Community checks and balances can improve the delivery of state services.

i. Sustainability: Local participation and decentralization can promote sustainability.

• Tenure and Use Rights

Ownership and secure use rights to forest and forest products are basic requirements for successful community management. Firstly, forest boundaries and eligible households must be clearly identified. Secondly, communities should be vested with both rights and responsibilities to manage and protect the forests allocated to them, including from outsiders and residents who breach the rules. Current Thai policy to grant/lease reserve forest land to individuals and private companies for commercial tree plantations may limit community forestry development. Other options should therefore be considered when communal management can better achieve sustainable management objectives. A sound regulatory framework is also a critical component of community forestry.

• Organizing Communities and Forest-based Community Enterprises

Community forestry is about both forests and people and it can only move ahead if individuals and groups, with different interests and means of livelihoods, act together. Many Thai forest communities are ethnically and socio-economically diverse but need to organize themselves to ensure a sustainable supply and an equitable distribution of forest goods and services.

• Networking and Association of Community Forest Groups

As the number of community forests increases and more experience is gained, communities need to develop networks, share experiences and learn from each other. In particular,

communities which have yet to establish community forests could benefit from visiting those in operation. As community forest groups expand in number and area, RFD staff will find it increasingly difficult to meet their needs for information and other support.

4. Lessons Learned, Challenges and Future Strategies

4.1. Successful Experience, tools and lessons learned

• Deforestation and forest encroachment

Forest resources provide a multitude of goods and services, including pulp, timber, non-timber products, medicinal and edible plants, as well as other raw materials such as rattan and bamboo. More than 1,000 recorded species of plants contain medical properties and 30,000-40,000 households harvest them on a full-time basis. Furthermore, 60% of the rural population or roughly 30,000 communities living near forests rely on edible plants for their daily needs and more than 500 species of these plants are sold in local markets throughout the country.

In terms of trade, Thailand has a long history of using its forests for commercial purposes, dating back to the mid-19th century when the first logging concessions of teak were issued to private enterprises. The removal of mature timber stands allowed immigrants and forest dwellers to settle. However, the drivers of deforestation shifted in the 1980s when rapid economic growth replaced subsistence crops with cash crops. In 1989, alarmed by the high conversion rate of forestland, the government revoked all terrestrial concessions by decree. However, the logging ban was not enough to bring forest loss to a halt. At the present time, decreases in forest area are mainly due to agricultural expansion, other land uses, intensified shifting cultivation, and poaching.

Currently, more than 1 million households are living within Thailand's National Forest Reserves. The forest dwellers depend on the forest mainly for non-timber forest products and as a safety net in times of hardship. The forests also provide a source of cash income, a capital asset and employment. Deforestation and forest encroachment decreased noticeably after the Royal Thai Government imposed a logging ban in 1989 and began to protect forests. Rural poor people and owners of land bordering natural forests who tried to expand their farms into those areas have been accused of deforestation and encroachment. Some argue that, with no visible signage, it is difficult to identify the boundaries. In addition, the tribes and minority ethnic Thais who live in the mountainous areas consider shifting cultivation a traditional way of life, mostly in catchment areas in the north and northeast - a practice which affects soil fertility upstream and water quality downstream. The RFD and other agencies, especially through the Royal Initiative Project, have tried to mitigate the harmful consequences of these activities by teaching soil conservation techniques

and offering promising crops to support a better living for settlers. Meanwhile, extension workers, including NGOs, have raised awareness among forest dwellers of the importance of soil and nature conservation and are implementing strict control measures. These and other endeavors are helping to slow the rate of deforestation.

In the dry season, the forest ecosystem is vulnerable to fire - a major cause of forest degradation. Fires are the cheapest way to clear land in upland farming; they stimulate the growth of young leaves and grass for cattle grazing; and make it easier for hunters to kill wild animals. Small fires to burn ground vegetation are also used as a means to prevent bigger fires that could be detrimental to forest trees. Uncontrolled and unmanaged fires, however, cause significant damage to forests every year. In this regard fire prevention and fire fighting is one of the RFD's most costly activities.

• Forest Plantations

A plantation of teak (Tectona grandis) of less than 1 ha was first established in northern Thailand, in Mae Paan Forest, Phrae Province, in 1906. As of 2006, the RFD had planted 823,235 ha, while Forest Industry Organizations and the Thai Plywood Co. Ltd. - planted 41,051 and 4,150 ha respectively.

• Protected areas

According to the National Forest Conservation Act (1964), 9,394,151 ha or about 59% of forestlands are declared national conserved forests to protect them from clearing, degradation and occupation as well as to conserve them for amenity, recreation, education, and genetic resources. After the RFD was restructured in 2002, responsibility for protected areas was transferred to the National Park, Wildlife, and Plant Conservation Department. By 2005, 103 national parks, 84 forest parks, 55 wildlife sanctuaries, 56 non-hunting areas, 16 botanical gardens, and 55 arboreta were spread across the country. They are all protected and strictly controlled by laws such as the National Park Act, 1961 (amended in 1992) and the Wild Animal Reservation and Protection Act, 1960 (amended in 1992).

• Timber production, imports and exports

Before the logging ban in 1989, timber production was about 2 million m3 per annum, sufficient for national consumption and export. Since that time, however, especially in the 1990s during Thailand's economic development, the supply of hardwood falls short of domestic demand, as does the demand for other industrial wood products (e.g., sawn-timber, plywood, veneer sheets, wood panels, and particle board). Although some timber is available from forests that are cleared for infrastructure development (e.g., roads and dams) or from the confiscation of illegal logs, forest plantations are another source, as well as rubber wood from old plantations. By 2007, Thai traders imported 1.9 million m3 of logs and sawn-timber from 71 countries to satisfy domestic demand, mainly Malaysia, Lao

PDR and Myanmar. By the same token, Thailand exported 1.8 million m3 of logs and sawn-timber to 66 countries, mainly China and Malaysia.

4.2. Challenges

Consistent with MONRE's strategies, RFD is focusing on forest protection and fire control, forest land management, forest rehabilitation and reforestation, participation, capacity building for administrative functions and services, research and the application of modern technologies. However, changing government priorities call for frequent shifts in policy and direction. Budgets are small compared with RFD's mandate and responsibilities. Therefore, participation and collaboration are important elements to achieve sustainable forest management and to balance forest protection with the subsistence needs of forest dwellers.

• Challenges regarding Community Forests

In two decades, only about 1.01% of forests has been brought under community management. At this pace, the program will have limited impact on the livelihoods of forest dependent people and the country's forest resources. Key issues and constraints include:

Trust and confidence in local communities: Some authorities and many NGOs have little trust and confidence in the capacity of local communities to act as custodians of forests. They blame people living in and around forests for their degradation and fear that community forestry might worsen the problem.

Illegal Immigrants: The number of illegal immigrants is reported to be on the rise, especially in the protected areas bordering Myanmar, Laos and Cambodia. This increase is driven by better living conditions in Thailand (including the potential to earn off-farm income) and the fact that the same ethnic groups are found on both sides of the border.

Privatization of Land: Programs to grant land to individuals are well justified because they provide more stability and clear boundaries guard against misuse. The downside is that titling may expand into forest areas that would otherwise be assigned to communities.

Tenure and Use Rights: All natural forests - regardless of their status as protected area or national forest reserves – are owned by the state and controlled by two government agencies: DNP and RFD. In protected areas, local communities have no formal use rights, although they are allowed to collect basic forest products such as fuelwood and some NTFPs for household consumption, free of charge.

Financial Support: There is no financial support to community forestry but RFD assists villages in other areas - forest demarcation, preparation of operational plans and planting materials, for example. The current approach to community forestry focuses on planting trees and protecting forests. Utilization is mainly seen in terms of meeting subsistence

needs, although people collect NTFPs within and outside community forests and are trading them in local markets.

4.3. National forest management strategies in the next 5-10 years

Self-sufficiency is one of the key principles of national development and forestry offers a major opportunity to achieve it. The following goals could form the basis of a sustainable forest management strategy inThailand:

- Net deforestation is arrested and 35 to 40% forest cover maintained.
- Most degraded areas are rehabilitated and provide commercial and environmental goods/services to Thai society.
- The role of forests in poverty reduction is enhanced through income and employment generation and improved rural livelihoods.
- Traditional knowledge of forest utilization and conservation is effectively employed to reduce poverty in forest areas.
- Community forests are granted secure usufruct/tenure rights and provide goods and services to meet the needs of households as well as of domestic and export markets, thereby generating revenue.
- Most wood for household and industrial use is obtained from sustainably managed plantations on private smallholder lands, community forests and industry owned lands.
- Rubber wood will continue to be an important raw material for wood industries but to a lesser extent than at present. Part of the supply will come from plantations established for timber or joint timber and latex production.
- The wood-based industry assumes a more active role in developing its supply of raw material, including through partnerships with tree farmers and community forests.
- All harvesting operations are verifiably legal and certifiable.
- The area of trees outside forests increases and the sale of their products (timber, fuelwood and NTFPs) are valuable sources of income for landowners.
- Transparency and the organization of roundwood sellers make markets for forest products more efficient and bio-energy, including for commercial use, is a significant output.
- A sustainable supply of raw materials and efficient value-added processing maintain

the competitiveness of the Thai furniture industry, the wood-based panel industries and pulp and paper production in international markets.

- Bamboo and rattan becomes an integral part of forest management plans and are planted in private and community forests.
- Protected areas are managed to secure and improve the livelihoods of people living in and around them, including by offering employment in park management and in a growing ecotourism industry.
- Forest environmental services to mitigate climate change and conserve biodiversity, soil and water are enhanced and, as appropriate, remunerated.
- A forest policy process involving all stakeholder groups is established, the National Forest Policy revised periodically, and implementation spelled out in the national forest program which is further elaborated at the provincial level.
- Decision-making at all levels is based on adequate information, including periodic forest resource assessments and regular reporting and monitoring systems.
- Indigenous knowledge and wisdom is duly considered in making decisions on the management and use of forest resources.
- Forest Industry Organizations and Thai Plywood are privatized.
- Forest communities and forest owners are effectively organized and able to arrange extension services to meet their needs.
- Civil society is better organized and educated on forestry issues and its participation in forest conservation and development is increased.
- The private sector establishes associations and moves away from pursuing individual interests to identifying and promoting common goals.

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