

**ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY II**

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**PHILIPPINES FORESTRY OUTLOOK STUDY**

by

**Forest Management Bureau**



**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
REGIONAL OFFICE FOR ASIA AND THE PACIFIC**

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**INFORMATION NOTE ON THE ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY**

The Asia-Pacific Forestry Sector Outlook Study (APFSOS) is a wide-ranging initiative to gather information on, and examine, the evolution of key forestry issues as well as to review important trends in forests and forestry. The main purpose of the study is to provide a better understanding of the changing relationships between society and forests and thus to facilitate timely policy reviews and reforms in national forest sectors. The specific objectives are to:

1. Identify emerging socio-economic changes impacting on forest and forestry
2. Analyze probable scenarios for forestry developments to 2020
3. Identify priorities and strategies to address emerging opportunities and challenges

The first APFSOS was completed in 1998, with an outlook horizon to 2010. During its twenty-first session, held in Dehradun, India, in April 2006, the Asia-Pacific Forestry Commission (APFC) resolved to update the outlook extending the horizon to 2020. The study commenced in October 2006 and is expected to be completed by September 2009.

The study has been coordinated by the Food and Agriculture Organization of the United Nations (FAO), through its regional office in Bangkok and its headquarters in Rome, and implemented in close partnership with APFC member countries with support from a number of international and regional agencies. The Asian Development Bank (ADB), the International Tropical Timber Organization (ITTO), and the United Kingdom's Department for International Development (DFID) provided substantial financial support to implement the study. Partnerships with the Asia-Pacific Association of Forest Research Institutes (APAFRI) and the Secretariat of the Pacific Community (SPC) supported the organizing and implementing of national focal points' workshops and other activities, which have been crucial to the success of this initiative. The contributions of many other individuals and institutions are gratefully acknowledged in the main APFSOS report.

Working papers have been contributed or commissioned on a wide range of topics. These fall under the following categories: country profiles, sub-regional studies and thematic studies. Working papers have been prepared by individual authors or groups of authors and represent their personal views and perspectives; therefore, opinions expressed do not necessarily reflect the views of their employers, the governments of the APFC member countries or of FAO. Material from these working papers has been extracted and combined with information from a wide range of additional sources to produce the main regional outlook report.

Working papers are moderately edited for style and clarity and are formatted to provide a measure of uniformity, but otherwise remain the work of the authors. Copies of these working papers, as well as more information on the Asia-Pacific Forestry Sector Study, can be obtained from:

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## EXECUTIVE SUMMARY

### Factors impacting forests and forestry in the country

The forestry situation in the Philippines has been shaped and continues to be shaped by a number of forces. These drivers of change do not work separately but often in combination with each other. One factor creates a situation where another factor exerts its pressure on the sector.

Probably the combination of forces that had tremendous impact on the forestry sector is rapid population growth and destructive logging. Many of the population that had no place else to go in the lowlands migrated into the uplands. The influx of people in the uplands was made easier due to the presence of logging roads and logged-over areas became faster and easier to clear for agricultural purposes with the use of fire. This brought destruction to the forest and during the 1960s the rate of forest destruction reached as high as 300,000 ha annually. The Philippines is yet to come up with an effective population program and the rate of population growth is 2.35% a year. If the situation is not addressed, it is estimated that the population will double in 29 years. The intensity of logging activities has declined because the forest has declined. The migration into the forest, however, continues. It is estimated that the population in the uplands is more than 20 million.

The economy is also a driver of change. Since the middle of the 1990s the economy of the Philippines has been improving. This was brought about by strides in industrialization wherein foreign investors established factories and manufacturing facilities in the country. The economy has also been helped by the huge remittances of overseas Filipino workers which were reported to be more than US\$16 billion in 2007. With the increase in industrialization many prime agricultural lands were converted to industrial parks and economic zones. The increased purchasing power of families of overseas workers contributed to the increase in demand for housing. Factory workers also required housing. Thus, many of the agricultural lands were also converted to settlements and housing subdivisions including shopping centers. The industries could not create enough jobs for the rapidly increasing population. Many of the displaced farmers and those who could not find employment in the urban areas migrated into the uplands.

The improved economic condition of some families allowed them time for recreation. They also became aware of the health benefits of forests and made demands for recreational services. This also resulted in the establishment by the government of mini-parks especially in urban areas, the planting of green zones in government and school grounds and other spaces.

Another driver of change that has had great impact on the forestry sector is the energy situation. The escalating price of fossil fuel has made the Philippine Government focus its attention on the development of alternative sources of fuel. Thus, it passed the Biofuels Act of 2006 which mandates the replacement of a certain percentage of gasoline and diesel with biofuels. To supply the biofuels the government has started a program on the development of plantation of jatropha as a source of raw material for biodiesel. The government has targeted about 2 million hectares of jatropha plantations in forestlands. In response to this, the Department of Environment and Natural Resources (DENR) has allocated 375,000 ha of forestlands for this purpose. Since this area is within forestlands, this certainly will change the vegetative structure.

The increase in prices of fossil fuel has also directed the attention of people to the use of fuelwood for cooking and for industrial uses. This will certainly aggravate the forestry situation as more communities will gather fuelwood in the forest areas. It is expected that the price of fuelwood and charcoal will consequently increase the demands for fuelwood and

thus, more fuelwood collection from the forests. One positive note is that the government is now contemplating the establishment of fuelwood plantations. With increased prices of fuelwood and charcoal, the private sector may be encouraged to invest in fuelwood plantations.

It is also expected that the energy crisis will see the resurgence of biomass-to-energy systems that were tried in the late 1970s and early 1980s. These were not vigorously pursued because fossil fuel was still cheap then and the biomass-to-energy systems were inefficient and expensive to operate. Besides the biomass-to-energy technologies need improvement.

The deteriorating global environment and in particular the destruction of forest resources around the world has generated concern among governments. This has led to many conventions whose aims are to stop the destruction of biodiversity and habitats. The Philippines is party to many of these conventions.

The commitment of the Philippines to improve the environment of the country and pursue conservation and protection of biodiversity and its habitat saw the enactment of a number of laws. The implementation of these laws brought about the establishment of protected areas. As of July 2007 there were 77 terrestrial protected areas covering 1.85 million ha. Many more areas are lined up for proclamation as protected areas. Most if not all of the protected areas have natural second growth dipterocarp forests as components. While protected areas could provide protection and better management of the natural second growth forest within their boundaries, the proclamation of protected areas has certainly reduced the area of natural second growth forests for log production.

#### **Past trends and current state of forests and forestry**

The destruction of forest in the country resulted in the decline of the 17.8 million ha of forest cover reported in 1934 to only about 5.4 million in 2000. However, the forest assessment study conducted by the Forest Management Bureau (FMB) and the National Mapping and Resources Information Authority (NAMRIA) in 2003 showed that the total forest cover was actually 7.17 million hectares. The FMB-NAMRIA study included areas of 0.5 hectare while previously what were included were areas of 1 ha. Furthermore, previously reforestation/plantation areas were not included. Plantations in private lands were also included in the 2003 study as well as privately owned natural forests. In addition areas with at least 10% forest cover were included as forests.

Since 1960 the reported total reforested area was 1.78 million ha of which the government reforested 1.35 million ha. The Forest Assessment Study of 2003 reported that only 0.33 million ha could be seen from the satellite images. The main reason for the big difference is the low survival rates of forest plantations because of inadequate maintenance and protection activities particularly in government plantations. In addition, plantations may be difficult to identify from the satellite images. It is not known how much of the reported 0.33 million ha is protection plantation and how much is production plantation. Since the early 1990s when plantation development reached more than 100,000 ha a year the total area of plantation developed has been steadily decreasing. However, since 2000 the area of plantations developed by the private sector has been increasing while the government-developed plantations have been decreasing.

The Forest Assessment Report of 2003 also indicated that the growing stock (10 cm and larger in diameter) was 182 m<sup>3</sup>/ha in 2000 and was projected at 174.2 m<sup>3</sup> in 2005. At an estimated area of 7.162 million ha the estimate of growing stock in 2005 was 1.248 billion m<sup>3</sup>. The commercial growing stock (50 cm and larger in diameter) is estimated at 387 million m<sup>3</sup>.

Log production in the country has declined since the 1960s from a high of 11.1 million m<sup>3</sup> in 1974-1974 to 0.840 million m<sup>3</sup> in 2005. Before 1990, most of the logs harvested came from the natural forest. The contribution of plantations in log production has slowly increased until they became the major source of logs. In 2005, the contribution of plantations was 88% of the 0.840 million m<sup>3</sup> of log production. Furthermore, close to 84% (0.623 million m<sup>3</sup>) of the logs from plantations came from private lands. Only 0.105 million m<sup>3</sup> or 14% came from plantations in public forest lands. With the growing concern to conserve the natural forest and the increasing proclamation of protected areas it is expected that the contribution of plantations to log production will continue to rise.

From being a major log exporter in the 1960s-1980s the Philippines has become a net importer of logs. The country imported about 0.165 million m<sup>3</sup> of logs in 2005 while exporting less than 1000 m<sup>3</sup> of plantation logs.

The decreasing log production and the ban on the export of lumber produced from logs coming from the natural forest helped decrease lumber production from a high of 1.5 million m<sup>3</sup> in 1980 to only 288,000 m<sup>3</sup> in 2005. Similarly production of veneer and plywood decreased. Imports of lumber, veneer and plywood correspondingly increased from 1980, when practically there was no import of these commodities before that year. Imports reached 363,000 m<sup>3</sup>, 64,000 m<sup>3</sup> and 4,000 m<sup>3</sup> of lumber, veneer and plywood, respectively in 2005. It is expected that the country will continue to import these commodities in the next decade.

The two most reported and probably of greatest economic value among the non-wood forest products (NWFPs) are rattan and bamboo. The supply of rattan which is habitat-dependent has been declining with the decline of forest cover. Similarly, bamboo supply has been declining. There are very few records of rattan and bamboo plantation establishment. Those recorded were efforts by private investors. There are no government programs at present to develop these two resources. Recently there has been a growing interest in bamboo as shown by the holding of a national convention on this product. ITTO has been supporting research and development projects on rattan in the Philippines and other ASEAN countries.

A sub-set of NWFPs which has been growing steadily in demand especially in the foreign markets is herbal, cosmetics and body care products, and food supplements. The total export of the Philippines of these products according to the Chamber of Herbal Industries of the Philippines amounted to US\$43 million which is but a small portion of the US\$3.9 billion estimated global market. It is expected that this industry will continue to grow in the future.

### **State of forest resources in 2020**

The natural forests will have declined further because of continued illegal logging and poaching for fuelwood despite watershed rehabilitation efforts. However, the area of forest plantations especially by the private sector will have greatly expanded. This will be due mainly to the slight improvement in the investment climate in the forestry sector in the future. More protected areas will be proclaimed reducing the area of natural forest for timber production. Protected areas will be better managed in the future because of better organized Protected Area Management Boards (PAMBs) and more innovative systems of raising funds for their operation and management.

The vegetative structure of the forest will see some changes. *Jatropha* plantations, African oil palm, sugar cane, and coconut will be planted in large tracts of forestlands in an effort to produce raw materials for biofuels. It is also expected that fuelwood plantations will also be established in many parts of the forest areas. With increasing demand for recreation mini-forest and parks will be seen in urban areas and forest areas will become part of recreational facilities close to metropolitan areas. More ecotourism destinations will include forest areas. More areas will be devoted for the growing of herbal medicinal plants and sources of essential

oils for body care products as well as food supplements.

### **Demand and supply of forest products**

The apparent demand for logs declined in 2001 to 2003 before it started to increase until 2005. Log production was not sufficient to meet the demand and the Philippines imported logs to help meet the demand. The apparent demand for lumber has remained more or less steady since 2000. However, lumber production has been lower than the market demand since the 1990s. In 1995, lumber imports exceeded lumber production.

In the case of veneer the apparent demand has been steady since 2000. Importation of veneer started in 1995 but importation has been decreasing in the last 5 years. The country has been a net exporter of plywood although the quantity is minimal. The apparent demand for plywood has remained steady since 1995.

Rattan supply has been declining as a result of the reduction in the forest cover particularly the natural forest. The same is true with the supply of bamboo. There is an increasing demand for these two products because of the increasing demand for furniture and handicrafts in the world market.

### **Future of forest industries in the country**

The wood based industries in the near and medium term will be primarily made up of sawmill, veneer and plywood mills and pulp and paper mills utilizing wood as raw materials. The sawmill industry will be utilizing mostly plantation species with logs coming from the natural forest feeding the veneer and plywood industries. The future of the wood-based industries will depend largely on how successful the efforts will be in the development of industrial tree plantations. There is guarded optimism that the investment climate in the forestry sector will improve and translate into more forest plantation development.

The furniture industry will continue to be an exporter of high quality products using a mixture of various raw materials such as wood, bamboo and rattan. Similarly, the handicraft industry will be a consistent exporter mainly using rattan and bamboo as well as vines and other forest based raw materials.

The forest-based industry that will make great strides in the export market is the industry related to herbal, beauty care product and food supplement production.

### **Forests as a source of energy — current situation and anticipated changes**

Wood will remain a major source of energy especially for domestic cooking not only in the rural areas but in urban centers as well. It has been estimated that about 8 million families depend on wood for cooking. As population continues to grow the demand for fuelwood will also increase. With the increasing price of fossil fuel such as liquefied petroleum gas (LPG) more families will turn to wood and other biomass for cooking.

As the energy crisis worsens it is expected that more families will use fuelwood or charcoal for cooking and for other commercial use such as flue curing and wood drying. It is also anticipated that biomass and energy systems will emerge but will be expensive to operate and unable to compete with fossil-fuel run energy systems. This will increase the demand for fuelwood, increase its price, and thus make fuelwood plantations profitable. This will result in the establishment of fuelwood plantations, even in private lands, and will definitely increase the forest cover.

### **Emerging importance of the environmental functions of forest**

A major function of forests is the provision of sufficient and clean water. It is expected that one of the positive outcomes of the rice crisis in the country is the allocation of more resources for the rehabilitation and protection of important watersheds. It is also expected that with the realization of forests as sources of water, local government units (LGUs) will clamor for the devolution of small watersheds under their management. The rehabilitation of watersheds will also reduce soil erosion and improve land productivity in downstream.

With the improvement of the national economy there is an increasing demand for environmental services of forests. Forests are becoming eco-tourism destinations. They also provide opportunities for bird watching and similar activities. In the urban and urbanizing areas there is increasing development of mini-parks and planting of green zones. In fact at least 30% of the total area of a subdivision is required to be devoted to the establishment of mini-parks.

One other important environmental function of forests is serving as a habitat for biodiversity. The country has been proclaiming key biodiversity areas as protected areas. Most if not all of these protected areas have natural forests. It is expected that more areas will be proclaimed as protected areas.

One of the most important functions of forests is the provision of clean water. Because of its importance the DENR has made watersheds the planning unit for forestry activities. The Philippines has also formulated the watershed ecosystems framework as the strategy for improved watershed resource management that is demand driven with a community-based approach.

### **Social functions of forests**

Employment in the forestry sector has definitely decreased from the days when the forest cover of the country was bountiful and there were as many as 400 logging companies. However, there are other opportunities for employment that have opened in spite of or because of the decline of the traditional forestry sector. These are in the fields of environmental and forest conservation, in secondary and tertiary wood processing such as in furniture manufacture, handicrafts production, and in forest-related tourism. Now, there are more companies involved in small scale plantation development where employment could be found. Many individual farmers and communities have started to raise seedlings in nurseries in response to the growing demand from plantation developers. One company has started the production of cloned seedlings to supply high quality planting materials for plantation development in Mindanao. Another area where employment is being generated is the production of raw materials for herbal medicine, health and beauty care products as well as in supplemental foods. The processing of these products will also open employment opportunities.

### **Role of forests in the provision of public goods**

Forests serve as sinks for CO<sub>2</sub>, a greenhouse gas (GHG). With the establishment of a carbon market under the Clean Development Mechanism (CDM) of the UN Framework Convention for Climate Change, forests provide opportunities for developing countries like the Philippines to earn revenues from the establishment of plantations. The system for processing CDM projects has been put in place in the Philippines. There are several initiatives in the preparation of project proposals for submission as CDM project activities under the Kyoto Protocol.

The effect of climate change is global. The impact of what one country does to the environment is not in isolation. When the temperature rises because of the emission of GHGs its impact is global. Due to the increase in temperature, polar ice melts and consequently raises the level of the oceans. Countries that do not emit as much GHG will suffer the same consequences of increased ocean levels with other countries. On the other hand, the environmental activities in one country in mitigating climate change globally opens opportunities for developing countries in earning revenues in carbon trading under the Kyoto Protocol by developing reforestation and afforestation project activities.

**Creating a more appropriate society-forest relationship: what needs to be done?**

In a nutshell the objectives of the forestry sector are the provision of sufficient and clean water for domestic and other purposes, meeting the demand for other environmental services such as recreation and eco-tourism, improving productivity by reducing soil erosion, protecting and conserving biodiversity, meeting the demand for wood and NWFPs, contributing to food and energy security, improving the economic well-being of forest dwellers and upland communities and contributing to the overall economic development of the country.

The strategies identified to achieve these objectives include:

1. Effective governance in the forestry sector — this is predicated upon a number of factors, namely:
  - stabilizing forest policies and effective implementation of these policies
  - a shift from a regulatory mindset to a developmental mindset among DENR officials and field personnel
  - re-structuring of the Community Environment and Natural Resources Office (CENRO) to reflect the shift from a regulatory to a developmental mindset
2. Improve the climate for investments in the forestry sector
3. Impose on forest managers accountability for the forests under their jurisdiction and responsibility
4. Develop an effective and efficient system of environmental users' fees

## 1. INTRODUCTION

### Background

The forestry sector is still a significant force in the economy of the Philippines simply because of its sheer size. The forestlands of the Philippines occupy about 53% of the total land area of the country and its watersheds are the main sources of water for domestic, agricultural, industrial and commercial uses. Because of its significant potential contribution to the economic, social and environmental aspects of the Filipino life, the sector has been the subject of many studies, assessments, and analysis.

Two major studies made were the Master Plan for Forestry Development (MPFD) in 1990 and the Asia Pacific Forestry Sector Outlook Study [APFSOS] in the late 1990s for the 2000-2010 forestry direction. An evaluation of the MPFD was subsequently done and accomplishments of the sector, in pursuit of the MPFD, were embodied in the Revised Master Plan for Forestry Development (RMPFD) in 2003. Since these two studies, there have been factors, mostly outside of the sector, that have made in-depth impacts in the sector. Among these are the energy crisis, the rice crisis, and the continuing and unimpeded growth of the population. Within the sector, the emerging dominance of plantation grown logs as a source of local timber over that from the natural forest has significance with respect to giving priorities in forest development. The continuing proclamation of protected areas has reduced the available area for natural forest production.

APFSOS, on the other hand, sought to review and analyze the driving forces, both local and global, that are likely to have immediate as well as long-term impacts on the sector. It also sought to identify the future direction that the sector will take given the current factors affecting the sector, the goals of the sector and the strategies that must be adopted not only by the sector but also those outside in order to achieve the goals of the sector.

This present study is the country's contribution to the regional study [APFSOS 2020] that is being conducted by FAO.

### Objectives

The objectives of the Forestry Outlook Study are:

- To generate understanding on the current forestry situation in the country
- To determine the causes and factors that have brought about the current forestry situation and those that can affect the future forestry situation
- To determine the goals for the forestry sector in the next decade
- To identify strategies to attain the identified goals

### Scope and coverage

The Study reviewed the current status of the forest and forestry sector, examined the various drivers of change, within and outside the sector, and determined their impacts on the sector. Based on critical drivers of change, future scenarios of the sectors were built. Likewise, the goals of the sector in the next two decades were identified and strategies to attain these goals were determined.

### **Key questions/issues addressed in the country report**

The Study examined the key issues that have great impacts on the sector and those that can affect the direction of forestry in the future. The issues that were examined included the following:

- Forest cover and changes in forest cover
- Supply and demand (including exports and imports) for timber and NWFPs
- Biodiversity conservation and protected area management
- Wood as an energy source
- Service and social functions of forests
- Forest policies and institutional framework in forest management

### **Methodology**

The study reviewed documents such as plans, accomplishments, and reports of forestry activities, conducted participatory processes such as consultation meetings and focus group discussion, and field work activities to observe the actual situation of forests and forestry. The Study reviewed the current status of the forestry sector with respect to resources such as forest cover, timber supply, and production of forest products (logs, lumber, and plywood), local consumption and export. The existing forest policies and governance, institutional framework for forestry sector management, the various functions of forests such as service and social functions were likewise studied. Drivers of changes both within the sector and those outside the sector were identified and their impacts on the forestry sector were analyzed. Future forestry scenarios were built based on these drivers of changes. Based on the scenarios future directions and goals were likewise identified. Strategies were also identified on how desired future situations could be attained.

To facilitate the conduct of the study, particularly the preparation of the report, a Technical Advisor was commissioned by the Forest Management Bureau [FMB]. At the FMB of the DENR a National Steering Committee was created. The Committee is composed of Division Chiefs and selected technical personnel whose main functions are to provide data and information needed for the drafting of the report, review the Study outputs and arrange for consultation with important sub-sectors of the forestry sector which included the industry, academe, NGOs, people's organizations' (POs) representatives, LGUs, the National Commission on Indigenous Peoples (NCIP) and other government agencies and DENR bureaus and field personnel.

Consultations were conducted by the team among FMB employees, DENR officials, POs, and representatives from NGOs, LGUs, and industry representatives. Consensus building was a key feature in the preparation of the study particularly on the scenarios and the strategies on how to create a better future in the sector.

The proposed outline of the country report was followed as closely as possible. Deviations were made when they could not be avoided or topics not included in the outline were added where they would enhance the report.

### **Structure of the report**

The Report includes a comprehensive examination of the current status of the forests and forestry in the country. This deals with forest cover, the changes that have taken place and the factors that caused these changes such as destructive logging, slash and burn, poaching and wood collection for fuelwood and charcoal production. Production of logs, lumber and other

processed wood products as well as NWFPs were likewise analyzed including demand for these products. Imports and exports of forest products were similarly analyzed.

One of the important products from the forest, and whose volume far exceeds those of timber for construction but has not been given much attention, is fuelwood/firewood and charcoal. Its importance looms larger in the light of the deteriorating energy situation.

The social and service functions of forests were also studied with respect to how these functions are being promoted and enhanced by the DENR and other stakeholders such as NGOs, LGUs and the private sector. The present policies in the sector were also reviewed and examined with respect to general trends and legislation. Institutional arrangements in the management of forest resources, and the role of research and education in the changes taking place in the sector were also studied.

The drivers of change in the forestry sector were identified and studied in as much detail as possible. These drivers of change include population which has been a major and significant factor in changes in the sector with respect to forest cover, deterioration of the upland environment, and diminishing products from the forest.

Other drivers of change included in the study are: political and institutional environment, economic changes, energy demand and supply including alternative energy sources, impact of globalization and regional cooperation in the forestry sector, technological changes including those outside the sector and environmental issues and policies.

Based on the various drivers of change probable scenarios were built and their implications in the sector were analyzed. With the aid of the probable scenarios, directions in forestry were identified relative to forest resources (forest cover and wood and NWFPs), wood as an energy source, and service and social functions of forests.

Having identified future forestry directions, strategies were similarly identified on how to bring about changes in the sector to be able to realize the identified goals on a sustainable basis.

Based on the above analyses a summary and conclusions of the study were made.

## 2. CURRENT STATE OF FORESTS AND FORESTRY IN THE COUNTRY

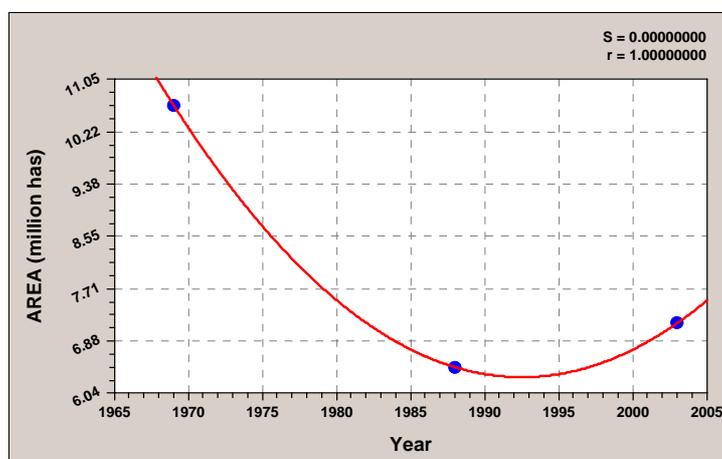
### Trends in forest resources

Based on a study conducted in 2003 by the Forest Management Bureau (FMB) and the National Mapping and Resources Information Authority (NAMRIA) using satellite remote sensing data, and using the global standard classification of forests<sup>1</sup>, the current forest cover of the country is about 7.17 million hectares. The distribution of the forest cover located in forestlands and in alienable or disposable lands including their categories as closed forest, open forest, mangrove and plantation forest<sup>2</sup> are shown in Table 1. Figure 1 shows the forest cover change in the country from 1969 to 2003.

**Table 1. Forest cover by categories (ha)**

	Forest area in forestland	% of total land area	Forest area in A&D lands	% of total land area	Total forest cover
<b>Total</b>	<b>6,521,548</b>	<b>22.08</b>	<b>646,852</b>	<b>2.19</b>	<b>7,168,400</b>
Closed Forest	2,495,833	8.45	65,039	0.22	2,560,872
Open Forest	3,578,526	12.12	452,062	1.53	4,030,588
Mangrove	165,425	0.56	81,937	0.28	247,362
Plantation	281,764	0.95	47,814	0.16	329,578

Source: Forest Resources Assessment Report, 2003.



**Figure 1. Forest cover in the Philippines**

Open forests include the young residual forest or that part of the old growth forest that had been logged with tree canopy cover of less than 40%. Likewise, parts of the sub-marginal forest that regenerated through the years but has not yet achieved the closed canopy stage are part of the open forest.

The mangrove forests which were reported as 0.112 million ha in 2002 were estimated at 247,362 ha in 2003. The increase is attributed to coastal resource rehabilitation efforts, the inclusion of mangroves in private lands and those with areas of 0.5 ha. The assessment showed a total area of forest plantations of 329,578 ha. There is, however, no indication of how much is under production forest and how much is protection plantations.

The area of forest cover as shown by the FMB-NAMRIA study in 2003 but reported in 2005 was estimated at 7.1684 million ha and is higher than the reported area in the Philippine Forestry Statistics which was only 5.39 million ha in 2002. The latter figure was mainly based from projections generated from the two forest resource inventories which were conducted in 1969 and 1988. The 2003 figure was based on the Forest Resources Assessment [FRA] study which was conducted by FMB with funding support from FAO and complemented by the satellite imageries of NAMRIA. Another possible reason for the increase was the inclusion of areas with forest that are 0.5 ha, [in the earlier statistics only those with 1 ha and larger were included], tree plantation in private lands and government reforestation areas.

**Distribution of forest areas by regions:** Table 2 shows the extent of forest cover by region. Region 4B comprising the island provinces of Mindoro, Palawan, Romblon, and Marinduque has the highest forest cover of 1.2 million ha followed by Region 2 with 1.1 million ha. The main reason for this is that the island of Palawan is still highly forested and logging has been banned since the passage of the Republic Act No. 7611 in 1992 or the Adopting the Strategic Environmental Plan for Palawan. Palawan contains about 61% of the reported forest cover of Region 4B. Region 4B has likewise the highest forest cover located in alien and disposable (A&D) lands amounting to about 0.13 million ha. Palawan likewise contains 50,072 ha (40%) of forest cover in A&D lands in Region 4B.

Region 7, the Central Visayas region has the lowest reported forest cover of only 74,869 ha. Logging started early at the turn of the 20<sup>th</sup> century in the provinces of Cebu and Negros and the former forest areas in Negros Island are now planted with sugar cane. The forest cover of the Cordillera Administration Region (CAR), Region 1, Region 2 and Region 3 has coniferous forests consisting of Benguet Pine (*Pinus kesiya*) or Mindoro Pine (*Pinus mindorensis*). The forest cover of all regions, except the CAR contains mangrove areas except that in the National Capital Region (Metro Manila); the mangrove area is rather limited owing to the highly urbanized nature of the area and the reclamation of the foreshore areas. There is about 0.74 million ha of forest cover within A&D lands.

The FRA 2005 report, however, also shows that the increase in forest cover is found largely in open broadleaved forest and not in closed broadleaved forest. The closed broadleaved forests are those areas with more than 0.5 ha and tree crown cover of more than 40 percent of the ground and do not have a continuous dense grass layer while the open broadleaved forest are those areas with a discontinuous tree layer but with a coverage of at least 10 percent and less than 40 percent crown cover. Hence, it is estimated that while the area of the forest cover has increased, the quality of the forest has decreased.

**Forest ownership:** There are very few records on the type of ownership of forest lands in the Philippines. The only information available on ownership of forest lands was that generated under the FRA report in 2005. Forest cover in A&D lands is shown in Table 2 and this amounted to 0.737 million ha. As stated earlier, Region 4B contains the highest area of forest located in A&D lands with Palawan containing about 40% of the area. Cagayan Province contains 73,132 ha followed by Aurora Province with 59,675 ha. Part of the forest in private lands is the 27,000 ha of natural forest located between the provinces of Aurora and Quezon.

The increasing forest cover in private lands can be attributed largely to the increased tree plantation in titled lands and those covered by “tax declaration” or lands claimed as privately owned. These are mostly industrial tree plantations which simply indicate the growing awareness of owners of the increasing value of plantations in the face of declining wood resources of the country. A few investors have leased private lands for the development of forest plantations. The NCIP has also been issuing titles over ancestral/domain land claims. Some of these claimed areas are under forest cover.

**Table 2. Forest cover in the Philippines 2003 (ha)**

Region	Within forestlands	In A&D lands	Total
Philippines	6,521,548	646,852	7,168,400
CAR	639,396	32,924	672,320
R1	155,485	34,316	189,801
R2	1,054,777	95,068	1,149,845
R3	550,920	38,575	589,495
NCR	2,057	763	2,820
R4A	224,627	65,046	289,673
R4B	1,118,487	76,657	1,195,144
R5	110,424	46,052	156,476
R6	214,292	50,222	264,514
R7	51,601	23,268	74,869
R8	481,153	38,695	519,848
R9	168,031	14,164	182,195
R10	315,497	21,996	337,493
R11	416,295	4,740	421,035
R12	329,581	19,653	349,234
CARAGA	479,833	43,459	523,297
ARMM	209,092	41,254	250,346

Source: Forest Assessment Report 2005.

**Privatization of forestlands:** Ownership of forestlands has been altered through the operation of Section 12 of Article III of the Indigenous People Rights Act (RA No. 8371) of 1997. The RA stipulates that “individually owned ancestral lands, which are agricultural in character and actually used for agricultural, residential, pasture, and tree farming purposes, including those with a slope of 18% or more, are hereby classified as alienable and disposable agricultural lands”. It is estimated that about 6 million ha of forestlands will be under Certificate of Ancestral Domain Title [CADT] and several thousands of hectares have already been titled. Given the number of applications filed, it is anticipated that more areas will be under CADT.

**Growing stock:** Growing stock refers to the volume over bark of all living trees 10 cm or more in diameter at breast height or above buttress. On the other hand **commercial growing stock** refers to that part of the growing stock of species that are commercial or have commercial potential under current market conditions and with a diameter at breast height of 50 cm (Global Forest Assessment 2005).

The estimated growing stock found in the Philippine forests is shown in Table 3. The growing stock has been declining since 1990 from 1.84 billion m<sup>3</sup> to about 1.25 billion m<sup>3</sup> in 2005, or a decrease of about 33% in a span of 15 years. Likewise, the commercial growing stock in Philippine forest has decreased by a similar rate, from 607 million m<sup>3</sup> to 387 million m<sup>3</sup> during the same period. The main reason for the decline in growing stock in Philippine forest is the continuing destruction of the forest cover. However, the estimated growing stock in forest plantations is about 57 million m<sup>3</sup>.

**Table 3. Commercial growing stock in Philippine forests**

Items	1990	2000	2005
Growing stock per ha (m <sup>3</sup> /ha)	174	182	174.2
Area in '000 ha	10,564	7,934	7,162
Growing stock in million m <sup>3</sup>	1,839	1,446	1,248
Commercial growing stock /ha (m <sup>3</sup> /ha)	57.4	56.2	54.0
Commercial growing stock in million m <sup>3</sup>	607	446	387

Source: Forest Resources Assessment 2005.

**Extent of forest under production status:** Classification of the forestlands of the Philippines into production and protection forests has yet to be completed. The extent of production and protection forests can be gleaned from the areas placed under various tenure as well as those proclaimed as protection forest. In 1992, the timber production areas were transferred from the old-growth (virgin) forest to second growth or logged-over areas (DAO No. 24 Series of 1992) with the old-growth forest becoming part of the protection forest. This area was estimated to be around 804,000 ha while the logged-over or residual forest was around 3.13 million ha. At that time, there were 71 Timber Licence Agreements (TLAs) with a total concession area of 2.311 million ha. The number of TLAs decreased to only 18 in 2005 with a corresponding reduction in area to only 0.825 million ha.

The Philippine Constitution provides that access to natural resources is only through joint venture, co-production and production sharing agreement. The TLA has been replaced by the Industrial Forest Management Agreement (IFMA), a production sharing agreement entered into by the government with corporations, cooperatives, and associations. In 2002, the reported extent of the old-growth forest was still 804,000 ha while the residual forest had decreased to 2.731 million ha. Many of the TLAs whose permits have expired are no longer renewed although they are permitted to convert into IFMAs subject to existing rules on implementation regulations.

Table 4 shows the forest areas covered by various types of tenure or permits. The total area covered is 7.81 million ha. The increase in tenured areas is mainly due to the increase in Community Based Forest Management Agreement (CBFMA) areas and IFMA/Industrial Tree Plantation Lease Agreement (ITPLA) areas.

The Philippines has been active in biodiversity conservation. One major strategy is the proclamation of biodiversity areas into Protected Areas by the President through an Executive Order, prior to legislation by Congress into law. As of July 20007 there were 77 proclaimed terrestrial Protected Areas covering about 1.85 million ha and many areas are still to be identified for proclamation.

Most of the proclaimed Protected Areas contain residual forests that were previously part of the production forest. Since the government will continue to classify biodiversity areas as Protected Areas the production forest areas are estimated to decline.

**Table 4. Area under production status**

Type of tenure	1992		2005	
	Number	Area (000 ha)	Number	Area (000 ha)
TLA	71	2,311	18	825
Pulpwood Permit			1	46
IFMA/ITPLA	142	443	178	713
TFLA	107	15	142	17
AFFLA	88	100	80	89
SIFMA	-	-	1,837	40
FLGMA	962	365	395	109
CBFMA	-	-	5,503	5,970
<b>Total</b>		<b>3,534</b>		<b>7,809</b>

Source: Philippine Forestry Statistics, 1992 and 2005.

**Forest plantations:** Despite the huge amount of money spent by the government on tree plantation development, its accomplishment has yet to be desired. The first reforestation project was in 1910 (Pulhin 2003). Table 5 shows the extent of forest plantations developed by the government (basically by the DENR) and by non-government organizations generally through TLAs, IFMAs, other forest agreements, private land owners, CBFMAs and others. The total area of plantations developed since 1960 by both government and non-government agencies is only 1.783 million ha. The actual total area of existing plantations, however, is not known except for the 2003 estimate under the Forest Resources Assessment (Table 1). Some plantations were reported to have been burned while others were destroyed by natural calamities such as floods and typhoons. In the case of Region III most of the plantations were destroyed by volcanic eruption (Mt. Pinatubo) while others were destroyed by stray animals. Furthermore, some plantations had very low survival rates because of drought as well as inadequate maintenance and protection. It is also possible that some of the areas that had been reported earlier were actually replanted areas but reported and recorded as new plantations and therefore were double-counted. A study conducted within the RP-German inventory project in 1986 showed that only about 25% of the reported planted areas were actually stocked.

The 2003 Forest Assessment Study reported that there were a total of 329,578 ha of forest plantations as discerned from satellite imageries studied. This is lower than 25% of the reported total plantations developed from 1960 to 2005. About 281,764 ha were reportedly found in forest lands while 47,814 ha were found in A&D lands.

**Table 5. Areas reforested by the government and private sector**

Year	Government	Non-government	Total
2005	7,187	9,311	16,498
2004	12,436	7,902	20,338
2003	13,195	1,893	15,088
2002	20,681	4,939	25,620
2001	26,524	4,920	31,444
1996-00	154,313	70,187	224,500
1991-95	144,126	123,501	267,627
1986-90	327,896	132,163	460,059
1981-85	139,499	129,999	269,498
1976-80	147,259	157,081	304,340
1971-75	31,350	6,000	37,350
1966-70	38,904	-	38,904
1960-65	72,019	-	72,019
Total	1,135,389	647,896	1,783,285

Source: Philippine Forestry Statistics [2004].

The disaggregated area of forest plantation established by various sectors is shown in Table 6. As shown in the table the area reforested by the government is decreasing while there is an increasing trend in the area of plantations developed by the private sector. It is not known how much of the area planted by the government sector is located in production or protection forests. It is assumed that most if not all of the areas planted by the private sector are located in production areas and are therefore available for harvest when they become mature.

Table 7 shows the disaggregated area reforested by the non-government sector. Emphasis is being made on this plantation area as a potential source of logs. There is an increasing trend in the total area planted by the non-government sector. It can also be seen that there was a big jump in the area planted in private lands. This is significant because it shows that the increasing interest to develop commercial plantations for wood production by the private sector has expanded to private lands. It is an indication of the growing profit potentials in wood production.

**Table 6. Area reforested by sectors**

Year	Grand Total	Government sector			Non-government sector			
		Total	DENR	OGA	Total	TLAs	IFMA/ SIFMA CBFMA TFLA PLA ITPL	Others
2005	16,498	<b>7,187</b>	7,187		<b>9,311</b>	341	6337	2633
2004	20,338	<b>12,436</b>	12,435		<b>7,902</b>	2,836	4,431	635
2003	15,088	<b>13,195</b>	6,565	6,630	<b>1,893</b>	842	1034	17
2002	25,620	<b>20,681</b>	9,111	11,570	<b>4,939</b>	564	3,850	525
2001	31,444	<b>26,524</b>	25,484	40	<b>4,920</b>	1,410	2,721	789
2000	27,632	<b>21,740</b>	19,059	2,681	<b>5,892</b>	1,989	3,421	482

Source: Philippine Forestry Statistics.

**Table 7. Area reforested by non-government sectors**

Year	Grand total	TLA	IFMA	SIFMA	TFLA/ AFFLA	Private lands	CBFMA	Others
2005	9,311	341	5,973	263	101	2,633	-	-
2004	7,902	2,836	2,877	204	1,350	205	-	430
2003	1,893	842	924	-	110	17	-	-
2002	4,939	564	1,678	1,790	264	101	52	490
2001	4,920	1,410	1,431	997	139	320	103	520
2000	5,892	1,989	2,142	560	94	206	429	472
<b>Total</b>	<b>34,857</b>	<b>7,982</b>	<b>15,025</b>	<b>3,814</b>	<b>2,058</b>	<b>3,482</b>	<b>584</b>	<b>1,912</b>

Source: Philippine Forestry Statistics.

**State of forest management for wood production:** Wood production in the country is generated from the remaining residual natural forests (since harvesting from the old-growth or virgin forest has been banned since 1992) and from tree plantations located in production forestlands and in private lands. There are several harvesting permits granted by the government. One is through the TLA which beginning 1987 has been phased out on account of the provision of the Constitution that access to natural resources (including forest resources) is either through joint venture, co-production and production sharing agreements. The remaining TLA will expire in 2011.

A new mode of forest management which allows harvesting of forest resources is through the IFMA which is a production sharing agreement with duration of 25 years renewable for another 25 years. The IFMA integrates development activities with timber harvesting and thus, is a more development oriented forest management scheme than the TLA. The maximum area is 40,000 ha. The tenure holder is required to rehabilitate residual forests and develop forest plantations using fast growing species suitable to the area. For areas that are highly inadequately stocked, the IFMA holder is allowed to replace the natural forest with forest plantations. The IFMA holder is likewise allowed to plant agricultural crops as long as the area utilized for such purpose does not exceed 10% of the total IFMA area.

For individuals, families or organizations that are not capable of developing large tracts of forestlands, the Socialized Integrated Forest Management Program (SIFMP) is designed for them. The tenure issued under this program is the Socialized Integrated Forest Management Agreement (SIFMA). The maximum area granted under this tenure is 10 ha for individuals or families, 500 ha for organizations and cooperatives (DAO No. 96-24). The requirements for development of SIFMP areas are similar to the IFMA.

Communities granted CBFMAs over forestlands that include residual natural forests can also access timber through a Resource Use Permit (RUP). Likewise, privately-owned lands with naturally growing forest trees can harvest the trees through a Private Land Timber Permit/Special Private Land Timber Permit (DAO No. 2000-01). The government has also granted Tree Farm and Agro-Forestry Farm leases. Holders of these leases can also harvest timber from their plantations.

The state of forest management for wood production is not as desired. Firstly, TLA areas whose permits have expired and have not been converted to IFMA or CBFMA become open access areas. Since the government has limited resources to protect and to issue immediately appropriate tenure agreement on these areas, they are at risk of being illegally occupied or their forest resources destroyed. Secondly, policies governing forest are not responsive to the needs and concerns of communities and are often viewed as highly centralized. This is

evidently manifested during disaster such as when flashfloods or landslides occur in one province, the government often unilaterally suspends all harvesting permits nation-wide to include areas which are not affected by such calamities. A case in point is when the province of Aurora and the northern part of Quezon Province were hit by flashfloods and landslides, the DENR issued the cancellation of all logging permits in Quezon Province and the suspension of all permits in the rest of the country (Memo from Secretary, 2004). Until present, the harvesting of trees from the natural forest is banned throughout the country except in Regions XI and XIII.

Likewise, the RUPs of CBFMA holders have been suspended nation-wide by the government because of reports that some CBFMA holders have allegedly practiced illegal activities in their areas.

This instability of government policies especially in timber harvesting has undermined the protection of the forests. Tenure holders uncertain about the continuity of their permits are discouraged to invest in forest development activities in forestland areas. The government, however, is more lenient on tree plantations in private lands. These are not covered by suspensions and harvesting only requires the tree owners to submit a Self Monitoring Form to the Community Environment and Natural Resources Office [CENRO]. CENRO personnel, however, have to check the products to be transported.

**Economic viability of forest management for wood production:** The economic viability of forest management for wood production in the natural second growth forest has become questionable. This is mainly brought about by the unilateral cancellation or suspension of harvesting permits whenever climatic disasters occur even if the locations of the disasters are far removed from the areas of operation of the permit-holders. The suspension of operations spells enormous cost in terms of idle equipment and personnel. The lifting of suspension of harvesting permits is on a case to case basis which makes the operations of the permit-holders very uncertain.

On the other hand, such suspension or cancellation does not apply to tree plantations especially those in private lands. The apparent demand for logs is projected to increase. This demand is based only from the production of only about 841,000 m<sup>3</sup> in 2005. This shows that there is a good market for logs in the Philippines. In fact, the Philippines imported 165,000 m<sup>3</sup> of logs in 2005. Plantation logs made up about 84% of the total log production of the country in 2005 and 74% of the log production came from plantations in private lands. Management of tree plantations for wood production appears to be economically viable. Forest plantation for wood production can be further encouraged if incentives such as tax holidays on revenues, or provision of low-interest, and long-maturing loans for plantation development are provided in addition to non-payment of forest charges and the ability to export plantation logs. There are, however, no comprehensive data on total and annual investments in commercial forest plantations both in public and private lands.

**Overall state of forests and key problems that undermine sustainable forest management:** The state of forests in the Philippines is improving. Private investments are growing in plantation development as indicated by the increasing tree plantations established by the private sector. In biodiversity conservation more areas are being proclaimed as protected areas indicating the increasing demand by people to ensure protection and preservation of the environment.

However, there are several factors that continue to undermine sustainable forest management. Among these are unabated illegal logging and poaching, slash-and-burn farming, and the undefined limits of forest lands which make it difficult to undertake planning of sustainable forest management and provide proper protection to forest areas. The absence of legislated forest policy has made it easy for forest administrators to change these policies and has

resulted in the instability of policy implementation. The limited livelihood options in the uplands drove people to practice destructive activities to survive. Successfully addressing these situations would greatly improve the chances for sustainable forest management in the Philippines.

## Wood and wood products

### *Current level of production and consumption of wood products*

The succeeding sections will highlight the production of logs and consumption of wood products in the country.

**Log production:** Log production in 2005 was about 841,000 m<sup>3</sup> (Table 8). This was only about 13% of the total log production in 1980 which was reported at 6.368 million m<sup>3</sup>. Since then, there has been a steady decrease in log production. This was brought about by the decreasing forest area, the prohibition to log on certain areas [1,000 meters above sea level, old growth forest areas], and the non-renewal of TLA on account of a Constitutional provision that access to natural resources can only be through either joint-venture, co-production or production sharing agreements. In addition, the government transferred production in second growth forest in 1992 (DAO No. 24 Series of 1992). The virgin forest became part of the National Integrated Protected Area System (NIPAS). This further shrunk the area of natural forest available for timber production. The latest reported total second growth forest was in 1997 and at that time it was 2.731 million ha. The production forest of the country in 1980 was reported at 10.7 million ha<sup>3</sup>. Part of the second growth forest is also found in proclaimed national parks and protection areas.

**Table 8. Production of round wood (000 m<sup>3</sup>)**

Year	Total	Natural	Plantation
2005	841	96	745
2004	768	217	551
2003	506	178	328
2002	403	89	314
2001	571	161	410
2000	800	229	571
1995	758	NA	NA
1994	957	NA	NA
1993	1,022	NA	NA
1992	1,438	NA	NA
1991	1,922	NA	NA
1990	2,503	NA	NA
1985	3,568	NA	NA
1980	6,368	NA	NA
1974 -75	11,156	NA	NA

Source: Philippine Forestry Statistics.

Log production varied considerably among the regions of the country. The bulk of production in 2005 came from Region 13, the CARAGA region (northeastern part of Mindanao)

contributing 606,182 m<sup>3</sup> or 72% of the total log production of that year (Table 9). Region 13 has the largest area of active TLAs of 236,288 ha and the largest IFMA area of 184,918 ha. Despite the large area under tenure and available for timber harvesting the total log production from the natural forest by TLAs and IFMAS was only 93,452 m<sup>3</sup> or only about 15% of the total log production of the region (Table 11). On the other hand, Region 4B had the lowest log production (99 m<sup>3</sup>) among the regions despite having the largest forest cover (1.068 million ha) in the country. One reason for this is that many of the forest areas in Region 4B are inside protected areas where logging is prohibited such as the whole island of Palawan, which contains more than 700,000 ha of forest cover. Furthermore, all the TLAs of Region 4B have been cancelled.

Aside from TLAs, IFMAs and SIFMAs there are other tenure instruments that are granted authority to harvest logs from the natural forest and from forest plantations. Their corresponding log productions in 2005 are shown in Table 10. The highest log production was contributed by those issued with the self-monitoring form/certificate of verification. These are plantation owners who are allowed to harvest their plantations and are not required to obtain a harvesting permit from the DENR but merely submit to DENR the accomplished self-monitoring form that indicates the species, total volume harvested and the location of the area where the logs were harvested. These are plantations under tree farm and agro-forestry farm leases and in private lands.

**Table 9. Log production in 2005 by region**

Region	Volume, m <sup>3</sup>
CAR	1,226
1	2,507
2	2,439
3	1,982
4A	504
4B	99
5	1,564
6	32,458
7	13,144
8	5,013
9	18,090
10	50,508
11	85,395
12	19,897
CARAGA	606,182
<b>Total</b>	<b>840,980</b>

Source: Philippine Forestry Statistics, 2005.

**Table 10. Log production by type of timber license permit (2005, m<sup>3</sup>)**

Type of license	Total	Naturally grown	Planted
TLA	51,930	51,930	0
SCP – public/private lands	456	22	434
CBFMA/ISF	11,079	847	10,232
S/PLTP private/ natural forest	1,945	1,945	
SMF/CV private/public plantations	623,839	30	623,809 <sup>1</sup>
IFMA public lands	146,965	41,522	105,443
Others	4,766	28	4,738
<b>Total</b>	<b>840,980</b>	<b>96,324</b>	<b>744,656</b>

Source: Philippine Forestry Statistics.

<sup>1</sup>Private lands, Certificate of tree plantation ownership (SMF).

**Table 11. Log production in Region 13 for 2005 (m<sup>3</sup>)**

Tenure	Natural forest	Planted	Total
TLA	51,930	0	51,930
IFMA	39,209	96,148	135,357
CBFMA	562	2,943	3,505
SMF/CV	0	413,464	413,464
PLTP	1,927	0	1,927
<b>Total</b>	<b>93,628</b>	<b>512,555</b>	<b>606,183</b>

Source: Philippine Forestry Statistics, 2005

In the 1970s, the Paper Industries Corporation of the Philippines (PICOP) established tree farms for the production of pulp wood using falcata (*Paraserianthes falcataria*) which PICOP later purchased to supply raw materials for its pulp and paper factories. PICOP provided free seedlings and technical assistance to the farmers. The presence of an assured market and assistance extended by PICOP has stimulated the farmers to raise pulpwood in their private lots. Subsequently, others applied for tree farm and agro-forestry farm leases from the government.

While the production of pulp and paper by PICOP declined through the years other markets opened up such as veneer and plywood production as well as furniture production. Thus, the tradition of plantation development has been sustained in the region. Even to this day private plantation development continues using *Gmelina arborea* in addition to falcata.

The other regions with significant log production coming from plantations are Region 11 (Southeastern Mindanao 70,947 m<sup>3</sup>), Region 10 (Northcentral Mindanao 50,508 m<sup>3</sup>), and Region 6 (Western Visayas 32,458 m<sup>3</sup>). The Autonomous Region of Muslim Mindanao (ARMM) had no report on log production in 2005.

**State of forest industries:** The state of forest industries in the Philippines can be seen from the changes in the number of processing mills over the years as shown in Table 12. There has been a significant decline in the number of active sawmills, from 209 in 1980 to only 30 in 2005. This is reflective of the state of the forest industry as a whole. In 1980, 124 or 59% of

the active sawmills had forest concessions. In 2005, only 7 of the 30 sawmills had their own concessions. Many sawmills closed simply because of the absence of raw materials. No new sawmill equipment has been installed lately. The major supplier of sawmills in the country has closed down because of declining business. The small firms that remained are doing repairs of existing sawmills and installation of locally manufactured mini-sawmills (those with daily rated capacity of 10,000 bd ft).

In the case of veneer and plywood manufacture the number of processing mills has remained more or less constant. Before 1990, the Philippines was exporting part of its production. There was no importation of veneer prior to 1990. After that year, the country started importing veneer mainly to meet the needs of the plywood industry. This was indicative of the constantly decreasing volume of log production in the country, particularly veneer logs. Plywood production remained more or less constant since the 1980s up to 2005. Importation was insignificant while exportation fluctuated after 1990. It is apparent that plywood production was basically to meet local demand with a limited amount finding its way into the export market.

The primary wood processing industries have not modernized their equipment except for a few veneer factories that installed new lathes that can process veneer logs down to smaller cores. Again, the main reason for this is the decline in raw materials. The continued use of old equipment resulted in low efficiency and production of low quality products.

**Production and consumption of wood products:** The total production of major processed wood products is shown in Table 13. There has been a drastic reduction in the volume of lumber produced since 1982 while the production of veneer and plywood has remained at about the 1982 level.

**Export of logs and processed wood:** The export of logs and finished products is shown in Table 13. Prior to 1995, the Philippines was a major exporter of logs, lumber, veneer and plywood. When the forest areas available for timber harvesting had dramatically declined because of forest destruction and the banning of timber harvesting in the old growth (virgin) forest the production of logs declined. This resulted in the drastic reduction in the volume of exported logs. The export of logs decreased from 721,000 m<sup>3</sup> in 1980 to less than a thousand cubic meters in 2005 and a reduction in export value from US\$92.058 million to merely US\$3,000. Likewise, the production of lumber has declined tremendously since 1980 resulting in the reduction of the volume of exported lumber from a high of 742,000 m<sup>3</sup> to only 130,000 m<sup>3</sup> in 2005.

**Import of round wood and processed wood products:** To augment the amount of logs produced locally, wood product manufacturers have been importing logs, lumber, veneer and plywood. Table 13 shows that in 1982, the country imported only 18 m<sup>3</sup> of round wood valued at US\$5,000. This ballooned to 695,000 m<sup>3</sup> in 1995 valued at US\$82.036 million.

The data on the production of logs, lumber, veneer and plywood since the early 1980s to 2005 clearly show that the country has turned from a huge producer and exporter of logs to a net importer of logs. In 2005, it imported about 165,000 m<sup>3</sup> of logs. This is also true in the case of lumber and veneer; the country is now a net importer of these two commodities. In plywood, the country has slightly higher export of this commodity than imports.

**Table 12. Number of wood processing plants**

Year	Sawmill	Veneer	Plywood
2005	30	22	32
2004	36	20	32
2003	31	18	32
2002	36	16	34
2001	44	19	30
2000	45	19	27
1995	78	6	31
1990	152	15	45
1985	174	7	38
1980	209	23	33

Source: Philippine Forestry Statistics, FMB.

**Table 13. Production (P), import (I) and export (E) of logs, lumber, veneer and plywood (000 m<sup>3</sup>)**

Year	Logs			Lumber			Veneer			Plywood		
	P	I	E	P	I	E	P	I	E	P	I	E
2005	841	165	a	288	363	130	133	64	6	314	4	17
2004	768	177	2	339	247	124	180	51	7	386	2	42
2003	506	356	a	246	338	119	152	91	4	351	5	10
2002	403	434	1	163	401	91	172	75	6	350	0.65	7
2001	571	551	5	197	371	105	135	105	3	292	0.402	a
2000	800	585	a	150	359	120	178	119	5	286	1	2
1995	758	695	-	286	379	84	19	26	32	290	0.242	a
1990	2,503	381	51	841	4	77	49	0.097	47	397	3	176
1985	3,568	0.004	653	1,062	0.218	512	77	-	69	350	-	241
1982	4,674	0.018	807	1,200	0.275	591	159	-	98	422	0.005	242

Source: Philippine Forestry Statistics, FMB.

**Apparent demand for logs and processed wood:** Apparent demand refers to the total local production of the commodity plus imports of that commodity less the amount exported. The apparent demand for logs, lumber, veneer and plywood since 1982 to 2005 is shown in Table 14. The apparent demand for logs has been decreasing since 1982 from a high of 3.867 million m<sup>3</sup> to a low of 0.861 million m<sup>3</sup> in 2003. It has increased slightly since 2004 and 2005. These logs conceivably went into the production of lumber, veneer and plywood as well as use for poles and piles. The decrease in apparent demand was a reflection of the increasing price of wood and the increased use of concrete and metal in construction. The slight increases in apparent demand for logs in 2003 to 2005 could be an indication of the changing preferences of home owners in the use of more environmentally friendly construction materials, materials that use less energy and are less polluting in their manufacture of which wood is one compared to steel and concrete.

**Table 14. Apparent demand for logs, lumber, veneer and plywood (000 m<sup>3</sup>)**

Year	Logs	Lumber	Veneer	Plywood
2005	1,005	521	191	301
2004	943	462	224	346
2003	861	465	239	346
2002	836	473	241	343
2001	1,117	463	237	291
2000	1,384	389	292	285
1995	1,453	581	13	289
1990	2,833	768	2	224
1985	2,915	550	7	109
1982	3,867	609	61	180

Source: Philippine Forestry Statistics, FMB.

### Wood as a source of energy

One of the major wood requirements of the country but which is not included in most area development plans is fuelwood. While utilization of other fuels such as liquefied petroleum gas (LPG) and electricity are better publicized the consumption of fuelwood, either as firewood or as charcoal is substantial. It has been estimated that about 8.142 million households use fuelwood for cooking, heating water and for other purposes (Rebugio et al. 2000). About 99% of the households use fuelwood for cooking. The average annual household consumption of fuelwood in 1995 was 1,804 kg. Assuming that there are 6 persons in a household and that the specific gravity of the fuelwood is 0.5, the average annual fuelwood consumption would be about 0.6 m<sup>3</sup> per capita. The total fuelwood consumption of the 8.142 million households would be 29.38 million m<sup>3</sup>. Other sources of biomass for fuel are rice hull, bagasse and coconut residues. As expected rural households have higher per capita consumption of fuelwood (380 kg) than urban households (339 kg).

Fuelwood is also used by small and large scale industries. Small scale industries include tobacco flue curing, baking, potteries, brick making and furniture making. Among these small scale industries, bakeries are the largest user of wood fuel. The estimated consumption of fuelwood by bakeries was 4.82 million m<sup>3</sup> in 2000 while the consumption in flue curing was 0.66 million m<sup>3</sup>.

One large scale industry that uses fuelwood is the sugar industry. There are 21 sugar mills in Central Visayas using fuelwood to supplement bagasse to run their mills. The estimated annual fuelwood consumption of the sugar industry in the Philippines in 1995 was 0.6 million m<sup>3</sup>.

The average total fuelwood consumption per year by households, small and large scale industries is 35.46 million m<sup>3</sup>.

Based on an average price of PhP319.73 (PFS, 2005) per m<sup>3</sup> the total value of the fuelwood consumed by the 8.142 million households and by small and large scale industries annually would come to PhP11.338 billion.

In addition to fuelwood, households also use charcoal for cooking and ironing. Charcoal is mostly produced from wood and from coconut shells. The above study estimated that 4.941

million households use charcoal at an average household consumption of 166 kg. At 25 kg per sack, the total consumption per household would be 6.64 sacks per year. The total amount of sacks of charcoal used by households per year would be 32.81 million sacks. At an average price of PhP100.21 per sack (PFS, 2005), the total value of charcoal consumed by households would be PhP3.288 billion.

There are several sources of wood fuel. These include; natural forests, brush lands, and mangrove areas. In addition, wood fuel can come from residues in logging and wood processing. Plantings along private land boundaries and in agricultural lands are other sources of fuelwood.

The 2003 Revised Master Plan for Forest Development (RMPFD, 2003) estimated the potential supply of fuelwood from various sources as shown in Table 15. The sources include public forests, mangrove areas, agricultural areas and from wood wastes. In 1990, the estimated supply of fuelwood from all sources was 22.97 million m<sup>3</sup>. In 2000, the estimated supply was 25.18 million m<sup>3</sup> and the supply is projected to increase at 1% per year.

**Table 15. Potential supply of fuel wood (million m<sup>3</sup>)**

Sources	1990	2000	2005
Public forests (uplands)	8.90	9.81	10.30
Mangrove	0.24	0.22	0.20
Agricultural areas	12.69	13.99	14.69
Wood wastes	1.14	1.16	1.19
<b>Total</b>	<b>22.97</b>	<b>25.18</b>	<b>26.38</b>

Source: Revised Master Plan for Forestry Development 2003.

**Fuelwood production:** There are no data on the production of fuelwood. However, logging wastes and residues which are potential sources of fuelwood have been documented in the Philippine Forestry Statistics as shown in Table 16. The amount of logging wastes and residues has steadily decreased through the years. This is a result of the decline in the production of logs. The amount of logging wastes and residues is but a small portion in the total fuelwood supply. The supply of fuelwood from the forests (logging wastes and residues and from brush lands) accounts for an estimated 39% of the total fuelwood supply.

Mangroves used to be the main source of fuelwood when the mangrove forests were still widespread and plentiful. They were the favorite of bakeries in Manila since the wood of mangroves has high density and high heating value. The wood of mangroves is also the raw material for the production of rayon. Mangrove wood was exported for the production of rayon and other cellulose chemical products.

**Substitution with alternative fuels:** One of the leading sources of fuel wood is from agricultural areas. The notable source of fuelwood is from coconut plantation especially fronds, husks and coconut shell. Boundary plantings with ipil-ipil (*Leucaena leucocephala*) and kakawate (*Gliricidia sepium*) are another source of fuelwood from farms. It is estimated that fuelwood from agricultural farms accounts for about 55% of the total fuelwood supply of the country. The balance of fuel comes from other biomass sources such rice husks, bamboo and others.

**Table 16. Logging wastes and residues (000 m<sup>3</sup>)**

Year	Total	Damaged residual	Tops and branches	Stumps	Abandoned logs	Butt and trimmings
2005	138	37	56	37	7	1
2004	126	34	51	33	6	2
2003	68	22	19	22	4	1
2002	66	18	27	17	3	1
2001	97	26	39	26	5	1
2000	131	35	53	34	7	2
1995	611	305	206	61	23	16
1990	2,000	1,000	674	201	75	50
1985	2,854	1,427	963	286	107	71
1980	5,082	2,541	1,715	508	191	127

Source: Philippine Forestry Statistics, FMB.

**Trends in fuel wood production:** One of the investment areas being promoted in the forestry sector is the establishment of fuel wood plantations. The plantations can be by people's organizations such as the CBFMA cooperatives and by private investors. To encourage the establishment of fuelwood plantations some incentives are being planned to be provided such as the provision of planting materials at cost and a liberalized provision of cutting/harvesting permits through log monitoring forms and verification. Region 3 of DENR is planning a project on fuel wood plantation establishment. Judging from the total value of fuelwood consumed every year, fuelwood production could be a profitable commercial endeavor.

Another strategy for production of fuelwood is to provide incentives to tenure-holders such as IFMAs, SIFMAs, TLAs and FLGMAs to set aside a part of their area for fuelwood production. An incentive could be non-payment of government share in the produce. For private lands used in fuelwood production, the incentive could be exemption from payment of real estate tax on the land and exemption from forest charges.

## **Non-wood forest products**

### ***Production of non-wood forest products***

The major NWFPs in the Philippines are rattan and bamboo. Rattan has been a traditional and major source of raw material for the manufacture of fine and high-end furniture. It was also a major export forest product until the export of unprocessed rattan poles was banned in 1988 (DAO No. 21, 1988). The main reason for the ban was the diminishing supply brought about by the diminishing forest cover. The ban was to ensure the rattan furniture industry of raw material supply. Other Southeast Asian countries also banned the export of raw rattan poles.

The DENR reported that in 2000 the Forestry Sector Project (FSP) (PFS, 2000) was able to develop an aggregate of 11,959 ha of rattan plantation. However, except for the rattan plantation of about 4,000 ha established at PICOP under bagras (*Eucalyptus deglupta*) there are no other documented reports of rattan plantation of significant size. Recently, the DENR-implemented Southern Mindanao Integrated Coastal Zone Management Project (SMICZMP) supported by the Japan Bank for International Cooperation (JBIC) in Davao del Sur, South Cotabato and Sarangani Province developed 200 ha of rattan plantations. ITTO is currently supporting a rattan development project covering the Philippines and other Southeast Asian

Countries. The project is expected to develop about 60 ha of rattan plantations (ITTO, 2006) in the Philippines.

Bamboo-based furniture is one of the fastest growing furniture exports of the country with a growth rate about 15% annually. Bamboo is also used in the manufacture of export handicrafts. It is also used for construction. It is estimated that as of 2000, there was only an aggregate of about 52,000 ha of bamboo mostly naturally growing consisting of 5 major species, namely: kawayan tinik (*Bambusa blumeana*), kawayan kiling (*B. vulgaris*), bayog (*Bambusa* sp.), giant bamboo (*Gigantochloa aspera*), and bolo (*G. levis*). Philippine bamboos are dwindling because of the absence of systematic management of the resources, lack of concerted effort to develop the resource, and inefficient utilization of bamboo. The potential supply from the natural bamboo stands is placed at 35.9 million culms.

The reported production of bamboo does not show much trend. The production in 1980 (327,000 pieces) is about the same as the production in 2002 and 2003. However, production in 2000 was extremely high (2,337,000 pieces). The highly fluctuating reported production manifests the difficulty of obtaining data from the field. In the case of rattan, the production in 2005 seems to match the production in 1980 when there was higher forest cover. The reported production in 1980 was 12.756 million lineal metres (lm) while the production in 2005 was almost the same, 12.97 lm. About 93% of the total unsplit rattan production in 2005 came from only 11 provinces. These are the provinces that have 100,000 ha of natural forest cover.

The other NWFPs included in the report are almaciga resin otherwise known as Manila copal in the trade, anahaw leaves, buri midribs, nipa shingles, diliman and other vines and split rattan. Almaciga resin comes from *Agathis philippinensis* and is used in the manufacture of varnish and paints. The tree is protected and cutting is prohibited, unless it is in the rights of way of logging roads, precisely because of the resin. Anahaw (*Livistona rotundifolia*) leaves are used for roofing. Buri midribs come from the fronds of *Corypha elata* and they are used in the manufacture of fine hats called “buntal hats” which are exported. They are also used in the manufacture of handicrafts. Nipa shingles come from the leaves of *Nipa fruticans*, a mangrove species that grows well along the banks of the mouths of rivers. It is used as thatch. The sap of nipa is also used in the manufacture of wine locally known as “lambanog” and has recently become an export product. Many vines are gathered from the forests for tying purposes as well as for the manufacture of handicrafts.

Another resin that has been in commerce for a long time now is Manila elemi that comes from pili (*Canarium ovatum*). It is also used in the manufacture of varnish and paints. In addition to the resin, pili is also important because of its fruits. It is the base of the pili nut industry in the Bicol region where it grows in abundance. The kernel of pili nut is used in the manufacture of delicacies.

There is no program on the growing of almaciga and pili. In the case of pili there are male and female trees. There has been no study on which of the two produces more resin and which of the resin is more suitable for varnish and paint manufacture. Unless there is a program on the propagation and establishment of plantations of these species it is expected that the natural sources of these resins will decline in the near and medium term.

**Export of NWFPs:** Some of the NWFPs find their way into the export market. Almaciga resin or Manila copal has been traded a long time ago and that is how it got the name Manila copal. It is exported to Taiwan P.O.C., Hong Kong S.A.R., Singapore, Europe and the Middle East. The export of Almaciga resin is slowly but continuously declining indicating the dwindling number of almaciga trees in the forest. Although cutting of the species is banned it can be harvested when found along rights of way when building logging roads.

There is a substantial amount of reported export of Manila elemi although it does not appear in the reported production of NWFPs. The reason for this is that most pili trees are found in private lands and owners do not need to obtain a permit to gather the resins and to report the production. However, when exported it is entered into the records of the Department of Trade and Industry and the Bureau of Customs. It is exported to Europe and Japan.

Bamboo poles are also exported to Australia, Canada, Europe, Guam, Hawaii and the Middle East. Manufactured items from buri such as placemats and hats are exported to Europe, the Middle East, Central and South America and the United States. The export of raw rattan poles has been banned since 1988. However, there is still a small amount that is reported as exported. The historical quantity and value of exports of NWFPs are shown in Table 17.

**Table 17. Export of non-wood forest products (000 kilograms, 000 US\$)**

Year	Buri (manufact'd)		Almaciga resin		Elemi gum		Bamboo		Rattan poles	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
2005	234	208	191	154	165	237	74	73	4	9
2004	NA	NA	230	222	144	193	39	24	a	-
2003	291	170	199	175	361	528	54	113	1	4
2002	357	205	209	150	272	482	65	28	a	a
2001	167	90	204	161	246	528	30	36	17	18
2000	216	169	319	242	377	696	19	39	-	-
1995	6	6	328	252	259	621	9	22	1	4
1990	1	3	288	211	611	1,064	16	15	a	1
1985	NA	NA	600	296	154	104	17	37	a	10
1980	4	20	683	377	212	133	a	1	a	a

Source: Philippine Forestry Statistics, FMB.

**Import of NWFPs:** While the country exports NWFPs it also imports these products. Some of the NWFPs that are imported and the quantity as well as value of the imported goods are shown in Table 18. The Philippines imports Manila elemi from China and Republic of Korea, bamboo from China, Taiwan P.O.C. and Vietnam, rattan poles from China, France, Hong Kong S.A.R, New Zealand and Singapore and rattan split and core from China, Malaysia, Indonesia and Singapore. There is no clear trend in the volume of imports of the various NWFPs as this has been fluctuating over the last 5 years. In the case of almaciga resin, only in 2001 and 2002 were there reported imports of this commodity and since then there have been no reported imports. Reports of imports of rattan (poles and splits), bamboo and elemi were only available during the last 10 years. It is not clear why the Philippines is importing the above NWFPs.

**Herbal industry sector in the Philippines:** The NWFPs that have become prominent in the last 4-5 years are those that provide the raw materials for herbal medicine, cosmetics and beauty care products, and food supplements.

There is no estimate of the value of these products sold locally. The growing natural cosmetics and beauty care industry which is said to have a global market of US\$3.9 billion is predicted to rise in market value to US\$5.8 billion by 2008. The total export value of these products from the Philippines in 2002 was US\$43 million (Table 19).

Because of the growing demand for herbal products both locally and abroad, manufacturers of these products organized the Chamber of Herbal Industries of the Philippines (CHIP) in 2001. There were about 150 companies engaged in the production of herbal products in 2001 employing about 20,000 people. The DENR has estimated that there are about 1,000 plant species providing raw materials for herbal product manufacturing.

Prominent among these group of plants are those that produce essential oils. Some of these are trees while others are shrubs and herbs. These include ilang-ilang (*Cananga odorata*) a small tree, citronella, lemongrass (herbs), etc. They produce essential oils used as fragrance for soaps and body lotion.

**Table 18. Imports of non-wood forest products (kg, US\$)**

Year	Almaciga resin		Elemi gum		Bamboo		Rattan poles		Rattan split & core	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
2005	NA	NA	16,750	8,047	95,628	127,037	102,796	299,664	228,791	547,199
2004	NA	NA	68	156	107,271	73,668	202,040	692,693	167,690	405,157
2003	NA	NA	NA	NA	102,748	102,652	158,838	422,260	415,598	1,111,138
2002	544	778	2,400	2,538	236,812	205,782	234,970	372,280	388,244	1,087,402
2001	1,196	6,924	NA	NA	200,156	211,891	130,935	180,400	472,930	933,368
2000	NA	NA	27,360	94,939	143,187	64,951	103,240	314,739	137,633	657,815
1995	NA	NA	NA	NA	59,173	33,539	138,013	423,783	109,633	332,505
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1985	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1980	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Source: Philippine Forestry Statistics, FMB.

**Table 19. Estimate of export value of herbal products (US\$ million) in 2002**

Products	Export Value
Herbal cosmetics	25
Bath soap, biodegradable laundry soap	20
Herbal medicine/food supplement	8
<b>Total</b>	<b>43</b>

Source: Chamber of Herbal Industries of the Philippines.

CHIP articulated issues and concerns faced by the industry during a consultative workshop on forest based industries in the country held in June 2003. Among these were: lack of focused research and development on the propagation, harvest and post harvest and sustainable management of herbal medicinal plants and beauty care plants; the need to preserve the habitat of these plants; lack of quality planting materials; and no data base on medicinal and beauty-care plants. Other sentiments of the industry group is that the herbal medicine industry is under threat from large pharmaceutical corporations, cosmetics and food supplement producers and medical practitioners have not accepted the use of herbal medicines in primary health care.

### The service functions of forests

In recent years, there has been increasing awareness among people of the service functions of forests. These include serving as recreation areas, sources of water for domestic consumption, irrigation, and power, and in addressing climate change.

**Significance of forest based recreations:** Forests have the effect of lowering temperature making them a comfortable place to relax and spend leisure time in. They host birds and other animals and thus are places for bird watching and similar activities. The continued use of forests for recreational activities could be jeopardized if their use is not properly regulated and monitored. Sustainable use of forest for its recreational services requires discipline from the

users. Recreational areas are now being established in most urban centers that normally include the planting of forest trees and other green zones in response to the growing demand of the Filipino population that is beginning to become more environmentally and health conscious. In late 1990s, the DENR also initiated the establishment of Environmental Rest Area Parks along highways and provincial roads to provide commuters with rest areas while traveling. These rest areas are planted with trees and ornamental plants.

**Urban forestry:** As early as the middle of the 1970s Presidential Decrees (PD No. 953, 1976) and Letters of Instruction from the President (LOI No. 1312, 1983) were issued promulgating the greening of private lands, especially residential subdivisions and the establishment of forest parks by local governments throughout the Philippines. The past presidents of the country had their own version of urban greening starting from President Marcos down to President Gloria Arroyo (MO No. 198 and 199, 1988; EO No. 118, 1993; Proc. No. 643, 2003). Metropolitan Manila has been the center of greening movements and various strategies have been implemented such as adopt-a-street or park program and the protection of existing old trees. There is also a program on identifying and marking the oldest and tallest trees throughout the Philippines.

*A people's organization in Ilagan, Isabela has entered into a contract with an herbal soap and lotion manufacturer, the Herbakh Philippines, to supply essential oils. The PO has established plantations of citronella and lemon grass. The essential oils extracted sell for PhP1,000 a liter. Oil of ilang-ilang sells for PhP10,000 a liter. The PO has already established with the help on an NGO a 34-ha ilang-ilang plantation which is now more than 4 years old. It is expected that the growing of plant sources of essential oils for cosmetics will continue to grow in the near and distant future and provide sustainable sources of income for upland communities.*

President Arroyo issued a proclamation dated June 2, 2003 enjoining the active participation of all government agencies including government-owned or controlled corporations, the private sector, schools, civil society and citizenry in tree planting activity and declaring June 25 of each year as Philippine Arbor Day. On July 19, 2007, the President launched the Green Philippines Program which encouraged the planting of 20 million trees all over the country.

In response to the greening movement in Metro Manila, the DENR National Capital Region (NCR) created a new division under the Forest Management Service called the Urban Forestry Division. Its main responsibility is to develop and implement an urban forestry program in Metro Manila. The *Hardin ng Bayan* (city garden) became the center piece of the program. Local government units in Metro Manila were co-opted in the implementation of the program. They identified sites where the greening project could be implemented including school grounds, government compounds, local parks and compounds of military establishments, industrial and commercial firms.

In other DENR regions the function of establishing urban forests is assigned to the Forest Resources Development Division.

The Ecosystems Research and Development Bureau (ERDB) of the DENR has published a list of species suitable for urban forestry (ERDB, 2006).

**Forests and water:** Forests and watersheds play a very significant role in sustaining the country's life support systems as well as in the production and effective management of economic resources.

The importance of watersheds in the Philippines is highly recognized. The country's total land area comprises some 421 river basins/watersheds. Of these, 18 are considered the country's major river basins. Among the more important ones are the Agno, Cagayan, Pampanga and Bicol River Basins in Luzon, Ilog-Hilabangan River Basin in Visayas, and the Agusan and

Mindanao River Basins in Mindanao. At present, there are about 126 proclaimed watershed reservations for purposes of protecting and improving their water quantity, quality and security. Eighty-six of these proclaimed watershed reservations comprise the initial components of NIPA which are currently undergoing review in terms of biodiversity importance aside from their value as water sources for final inclusion under the System. Moreover, there are about 140 priority (critical) watersheds supporting national irrigation systems.

These watersheds are tapped as vital sources of water supply for domestic, irrigation, and industrial purposes including hydroelectric and geothermal power generation. Water supply and availability is influenced by the Philippine climate generally characterized by wet and dry seasons (PTFWRDM, 1987). The country's estimated water supply (dependable) is 975 million m<sup>3</sup> per day (MCM/day) while the water demand is 310 MCM/day, primarily from surface water. Moreover, watersheds provide the socio-economic base for a growing population through the utilization of watershed resources. On the environmental aspect, watersheds if properly managed, help maintain ecological balance, minimize the occurrence of floods and droughts, and mitigate the effects of adverse climatic changes.

Although the DENR is the primary government agency responsible for the administration and management of watershed areas, other government institutions such as the National Irrigation Administration (NIA), National Power Corporation (NPC), and Philippine National Oil Company (PNOC) exercise jurisdiction over 684,948 ha of watersheds supporting major development projects (e.g. irrigation, hydropower, geothermal). In addition, the DENR has entered into agreement with the Local Water Utilities Administration (LWUA) on the co-management of certain watersheds supporting facilities of local water districts. Moreover, the DENR issued Administrative Order No. 30-92 (DOA No. 30, 1992) which implements the provisions of the Local Government Code on the devolution of certain environmental and natural resources (ENR) functions such as "small/community" watersheds.

The Philippines has formulated the strategy for Improved Watershed Resources Management which is demand driven, community-based approach to watershed management considering national priorities and local stakeholders' concerns. As an off-shoot of the strategy, the DENR has adopted the watershed and ecosystems management approach (landscape/holistic approach) as an overarching strategic framework for ENR planning and management through the issuance of Department Administrative Order No. 99-01 (DAO No. 99-01, 1999).

**Conservation of biodiversity:** Per square kilometre, the Philippines probably contains more biodiversity than any country in the world. It has several centers of biodiversity and endemism and its biological richness has been described by Heaney and Regalado (Heaney et al. 1998) as "Galapagos times ten". The country has more than 52,177 described species and the number continues to be updated (Mittermeier et al. 1997). Half of the described species are found nowhere else in the world. The Philippines is considered one of the 18 mega-diversity countries which together contain 70-80% of global biodiversity. More than half of the recorded 1,130 terrestrial wildlife species are found nowhere else in the world.

The diversity of plants in the country is equally amazing. There are between 10,000 and 14,000 species of vascular and non-vascular plants more than half of which are endemic in the country.

However, the country is also one of 25 bio-diversity hotspots in the world. One of the reasons for this is the destruction of the habitat of wildlife. More than 93% of the Philippines' original forest cover has been lost in the last 500 years. The more than 500,000 ha of mangrove areas at the turn of the 20<sup>th</sup> century have been reduced to only about 247,000 ha. As a result, about 418 threatened species were already listed in the 2000 IUCN Red List.

To address the conservation of biological diversity of the country the Philippine Congress enacted in 1992 RA 7586 “the establishment and management of the National Integrated Protected Areas System (NIPAS)” (RA No. 7586, 1992). The purpose of this Act is to secure for the Filipino people the perpetual existence of all native plants and animals through the establishment of an integrated system of protected areas within the classification of national parks as provided for in the Constitution.

Before the enactment of the Law there had been several areas proclaimed, designated or set-aside through laws, presidential decrees, proclamation or executive orders as watersheds, national parks, game refuges, bird and wildlife sanctuaries, wilderness areas, strict nature reserves, mangrove reserves, fish sanctuaries, natural and historical landmarks, and protected and managed landscapes/seascapes. These areas were designated under the Act as initial components of NIPAS. Areas identified as virgin forests also form part of the initial components of the System. Hence, there are 203 sites identified as initial components comprising NIPAS which presently are at various stages of review and assessment to ascertain their suitability under the System.

As of July 2007, there were 107 protected areas proclaimed by the President under NIPAS covering 3.34 million ha; 77 are terrestrial (1.85 million ha) and there are 30 marine protected areas (1.49 million ha). Of the 107 protected areas under the System, Congress has already enacted laws specifically establishing 10 of these as protected areas. About 16 more protected areas have been submitted to Congress by the DENR for enactment to date.

One of the salient provisions of the NIPAS Act is the participatory management of protected areas by various stakeholders. The mechanism for participation of stakeholders is made possible through the Protected Area Management Board (PAMB) which the Law provides for its creation in every protected area under the System. The Management Board actually consists of representatives from the LGUs, NGOs, the academe, other government agencies, local communities and indigenous people, as may be applicable, with the DENR as the chairperson. The Management Board serves as the site policy making body for the particular protected area upon the technical guidance and advice of the DENR. In terms of effective management, 17 protected areas under the System need immediate organization through the PAMB as required in RA 7586.

Protected areas extend to their buffer zones or peripheral areas that are subject to special development control in order to avoid or minimize harm to the protected areas. The rights of local communities in protected areas are recognized and respected pursuant to the NIPAS Act. They are considered stewards of the lands they occupy or use within the protected area. However, areas of use should as much as possible be located within the multiple use or buffer zones of protected areas where sustainable development activities are allowed to support the livelihood of the local communities. Such recognition is made possible through the survey and registration of occupants done in the course of preparing the management plan and culminates with the issuance of the Protected Area Community Based Resources Management Agreement (PACBRMA) with local communities.

The Law likewise recognizes the rights of indigenous peoples within protected areas. A Joint Memorandum Circular between DENR and the NCIP was issued on May 9, 2007 (JMC No. 2007-01, 2007) in order to harmonize the management of overlapping protected areas and ancestral domains/lands. The Joint Memorandum Circular provides that overlapped areas of ancestral domains/lands and protected areas be identified jointly by the DENR and the NCIP in close consultation with the concerned Indigenous Cultural Communities/Indigenous Peoples (ICC/IPs). An integrated management plan shall be prepared by a Technical Working Group created for that purpose. The overlapped areas shall be managed in accordance with the prepared management plan. The ICC/IP shall have primary responsibility to maintain, develop, protect and conserve the overlapped areas with assistance from the DENR and the

concerned government agencies pursuant to the Indigenous People's Rights Act (RA No. 8371, 1997).

Protected areas or portions thereof that were under the jurisdiction of government agencies other than the DENR prior to the enactment of RA 7586 shall continue to remain under those agencies. However, those agencies shall coordinate with the DENR in the preparation of management plans for the protected areas. There are actually six areas comprising the initial components of the System that are under the management authority of other government agencies such as the National Power Corporation, Department of Tourism, Philippine Estate Authority, and National Parks Development Commission, among others.

**Forests and climate change:** The role of forests on climate change is very well disseminated in the country. The Kyoto Protocol which the Philippines ratified in February 2005 has helped spread the information on the effects of forest in mitigating climate change through the sequestration of carbon dioxide from the atmosphere. At the academic level, studies have been conducted on the efficiency of various species in sequestering carbon dioxide (Tandug 2006). The above ground biomass and carbon density of forest cover have also been studied on old growth mossy forest, pine and mangrove forest (Lasco et al 2003). Studies on the impact of logging on carbon stocks were made at the logging concession of the Surigao Development Corporation (SUDECOR) in Mindanao. Results of the studies showed that 21 years after logging the carbon stock increased to more than 141 tonnes C per hectare. The carbon stock of a mature logged-over forest can be as high as 200 tonnes C per hectare (Lasco et al 2000).

Because of better knowledge on the role of forests on climate change more tree planting activities are being conducted by the private sector in private lands. The World Bank is supporting a project with the Laguna Lake Development Authority (LLDA) which has a component that helps stakeholders (LGUs and communities) to establish reforestation projects for accreditation under the CDM project under the Kyoto Protocol.

## **Policy and institutional framework**

### ***General trends as regards forest policies and legislation***

**Forest management:** The initial approach to engage the private sector in forest management was through forest concessions. The government awarded TLAs for harvesting of timber to private companies. It is also the responsibility of the tenure holder to protect the concession area and conduct enrichment planting in logged over areas or reforestation where necessary. The presence of logging roads made it easier for lowland farmers to access logged-over areas where they practiced slash and burn. Most of the TLA-holders had difficulty keeping their areas free of these farmers. Initially, they were largely ignored but when their numbers swelled to the millions and the destruction they wrought in the forest areas became alarming, the government instituted programs to reduce their damage if not totally eliminate it and at the same time provide them legal access to forest resources.

The first of these major programs was the Integrated Social Forestry Program (ISFP) (LOI No. 1260, 1982) that allowed individual farmers and later communities to cultivate the areas they were occupying but had the responsibility of protecting the forest and planting forest trees. They were provided minimal financial support and technical assistance such as in seedling production and plantation establishment. They own the trees and crops that they plant and are allowed to harvest and sell the same.

The ISFP has provided limited equitable access to forest resources to program participants because they were not permitted to harvest timber from the natural forest, the privilege was granted only to large concessionaires. The ISFP, however, showed that in several

communities large areas were developed providing greater benefits to individual households. The government eventually issued Executive Order No. 263 which established the Community-Based Forest Management Program (CBFMP) (EO No. 263, 1995) as the national strategy for sustainable development.

Organized communities are granted tenure over the forestlands they are occupying or where they obtain their livelihood for an initial 25 years, renewable for another 25 years. The community, however, is obligated to prepare and implement a management and development plan for the covered forestlands. In exchange the community is provided the privilege to make use of the land and harvest timber and other resources from the natural forest, albeit with the necessary permits from the DENR.

Republic Act No. 7160 (RA No. 7160, 1991), otherwise known as the Local Government Code, grants authority to local governments to manage forestlands such as small watersheds and social and community-based projects. In response to this provision of the act, the DENR devolved to the LGUs the Integrated Social Forestry projects, except one in each province which served as a research and training laboratory and those projects funded under foreign assistance (DAO No. 30, 1992). The devolved functions included enforcement of forest laws, rules and regulations in community based forestry projects, communal forests and small watersheds.

For decades there had been claims that the rights of indigenous peoples had not been recognized even in their own land. This situation has been aggravated by their lack of knowledge of what their rights and responsibilities are.

In 1993 DENR issued DAO No. 2 Series of 1993 (DAO No. 2, 1993) on the rules and regulations for the identification, delineation and recognition of ancestral lands and domain claims. Through this issuance, the DENR expressed its policy to recognize ancestral lands and domain claims in the forestlands. It was the purpose of the DENR through the administrative order to protect the tenure of indigenous and cultural communities over their ancestral lands and domains, pursue the constitutional mandate for equitable access to natural resources and ensure sustainable development of forest resources within ancestral lands and domain claims. For this purpose, the DENR issued Certificates of Ancestral Lands Claims (CALC) and Certificates of Ancestral Domain Claims (CADC) for a total of 2.5 million hectares.

The Philippines later passed the landmark legislation, the Indigenous Peoples Rights Act (IPRA Law) (RA No. 8371, 1997), which recognizes, protects, and promotes the rights of indigenous communities and indigenous peoples.

RA No. 8371 effectively transferred the supervision of the management of ancestral lands and domain claims to the NCIP. The law authorizes the NCIP to issue a Certificate of Ancestral Land Claims and a Certificate of Ancestral Domain Titles.

Government owned and controlled corporations (GOCC) have also been granted authority to manage forestlands. Executive Order No. 223 (EO No. 223, 1987) vested to the Philippine National Oil Company (PNOC) jurisdiction, control, management, protection, development and rehabilitation over the watershed areas of geothermal reservations where PNOC has geothermal projects, plants, and properties. Similarly EO No. 224 (EO No. 224, 1987) vested to the National Power Corporation (NPC) the same privileges and authorities vested to the PNOC. The National Irrigation Administration (NIA) also has similar authorities over watersheds where it has its irrigation projects.

**Forest utilization:** In forest utilization, the 1987 Constitution provides that access to natural resources can only be through one of the following: joint venture (with the government), co-production, or production sharing agreements. The TLA is neither of these and therefore, has

to be phased out. Existing TLAs, however, have to be respected until the agreement expires or is terminated. The last TLA expires in 2011. In its place, the DENR has established several tenure instruments, in addition to the existing CBFMA, that mandates the tenure holder to develop the forest area and grants harvesting privileges in the natural forest.

In 1993, DENR established the IFM program that issued the IFM Agreement as the tenure instrument under DAO No. 60 (DAO No. 60, 1993). This is a production sharing agreement but anti-logging advocates viewed this as a euphemism for the TLA. The IFM program, however, while it granted tenure holders the privilege to harvest second growth natural forest, has also obligated the development and protection of forest areas. The provisions of the DAO have undergone several revisions and amendments and its final form is contained in DAO No. 99-53 (DAO No. 99-53, 1999). The tenure has duration of 25 years renewable for another 25 years. The maximum area granted under this agreement is 40,000 ha. A grantee can have more than one IFMA area as long as the combined area does not exceed 40,000 ha. The minimum area that may be granted is 500 ha.

To further democratize access to forest resources, especially to small to medium investors and even to small farmers, the Socialized Industrial Forest Management Agreement (DAO No. 24, 1996) was instituted. The area that may be granted is as low as 1 ha for individuals or families to a maximum of 500 ha for cooperatives and associations. The responsibilities given to the IFMA holder of developing, managing and protecting the forest are also mandated to the SIFMA holder.

The DENR has also issued Agro-forestry and Tree Farm leases to small farmers who would like to establish small tree plantations including the planting of agricultural crops and fruit trees.

To encourage people to plant trees in their private lands, the former Ministry of Natural Resources (MNR) issued Administrative Order No. 4, Series of 1987 (MAO No. 4, 1987) which lifted restrictions on harvesting, transportation and sale of firewood, pulpwood and timber in private lands. The policy on harvesting, transport and sale of timber planted in private lands has likewise undergone several revisions and the latest version is DAO No. 2004-04 (DAO No. 2004-04, 2004).

The DAO provides that the transport of the wood and/or wood products of planted trees, regardless of volume, shall no longer require a permit to transport from the DENR but only certification by the local tree farmers association, cooperative, federation, or in the absence of any, by the individual tree farmer concerned, duly authenticated and affirmed under oath by a private Registered Professional Forester. In the absence of a private Registered Professional Forester, a government Registered Professional Forester, but not from the DENR Forestry Sector, may be allowed to authenticate and affirm under oath the contents of the aforesaid certification.

For access to natural forest found in private lands the DENR has issued the Private Land Timber Permit (DAO No. 2001-21, 2001). If the naturally growing timber is premium species (narra, dao, kamagong, etc.) the permit issued is the Special Private Land Timber Permit.

To consolidate all these policies and pursue sustainable forest development more effectively, the DENR has submitted to Congress for enactment the Sustainable Forest Management (SFM) Bill. Unfortunately, after almost 20 years, Congress has not been able to enact it into law.

In both houses of Congress there are members who advocate a total logging ban. Members of Congress, however, who are owners of logging concessions are opposing the logging ban resulting in an impasse that has lasted over almost two decades. In the present Congress, the

bill has been endorsed by the Committee on Natural Resources in the House of Representatives while in the Senate it is still being discussed at the Committee level. Owing to the non-passage of the SFM bill and because the Revised Forestry Code (PD 705, 1975) is out-dated the Office of the President has issued Executive Orders and the DENR has been issuing Administrative Orders to lay the foundation and implement guidelines for sustainable forest management and development. These include EO 318 [Promoting Sustainable Forest Management in the Philippines], EO 606 on Sustainable Upland Development, among others.

**Biodiversity conservation:** In 1992, the DENR issued AO No. 24 Series of 1992 (DAO No. 24, 1992) transferring the harvesting in natural forest from virgin or old growth forest to second growth forest. This effectively banned logging of the old growth forest for conservation purposes. In addition to the old growth forests, the DAO prohibits logging in areas above 1,000 m asl in elevation, in all mossy forests as well as in areas with slopes 50% or higher.

In the same year, the Congress of the Philippines passed RA No. 7586 (RA No. 7586, 1992) or the National Integrated Protected Area System or NIPAS Law. The law provides for the establishment of an integrated protected areas system which encompasses outstandingly remarkable areas and landscapes or biologically important areas that are the habitats of rare and endangered animals and plants whether wetlands, marine or terrestrial. Those covered by these areas are withdrawn from all forms of utilization except in designated border areas or buffer zones and areas that are categorized as sustainable or multiple use zones.

As of July 2007, there were 107 declared protected areas, 77 of which are in forest lands covering about 1.85 million ha.

In July 30, 2001, Congress also passed into law RA No. 9147 (RA No. 9147, 2001) which provides for the conservation of wildlife resources and their habitats. The law further provides that the country prepares a list of threatened species. In January 2007, DENR published a list of threatened species (DAO No. 2007-01, 2007).

#### ***Recent policy changes that have impacted on forests and forestry***

Several laws, rules and regulations that have impacts on forestry and the forestry sector in the last 20 years are discussed below.

**Republic Act No. 7160 or the Local Government Code (LGC):** The law transferred some forestry functions to local governments such as management of community-based forest management, management of small watersheds that are sources of water for local communities, and communal forests. It also mandates LGUs to assist the DENR in the protection of forests and forest resources and in the apprehension of persons caught committing destructive acts on forest such as illegal harvesting timber and burning of forests. The DENR has already devolved some of these functions and also entered into co-management agreement over some forestlands with LGUs.

**Republic Act No. 7586 or the National Integrated Protected Areas System or NIPAS Law:** This is another policy of the government with far reaching implications in the management of forests and natural resources in the country. Proclaimed protected areas are withdrawn from all forms of utilization except in designated border areas or buffer zones and areas that are categorized as sustainable or multiple use zones. While the proclamation of protected areas reduces the forest areas available for utilization, it ensures the conservation and protection of biologically important areas. As of July 2007, 77 forestland areas have been proclaimed as protected areas covering 1.85 million ha and a number of areas have been lined up for submission to the President for proclamation.

A supplementary law on environmental conservation that may have far reaching impact on forest resources is RA No. 9147. As stated earlier the law provides for the establishment of a list of threatened species and their categories. Such a list has been issued through DAO No. 2007-01. Included in the list are many of the dipterocarp species that are the main species, commercial timber species and species that are the basis of livelihood and income-generating activities of farmers. Later the DENR amended the DAO to allow the cutting of these species on areas covered with tenure instruments and subject to existing rules and regulations on harvesting of forest resources. However, other species that are equally important to upland communities and the wood industry could be added to the list later compromising the ability of the wood industry sector to meet the needs of the country for wood or of upland communities to pursue their livelihood activities.

**Republic Act No. 8371 or the Indigenous People's Rights Act:** This law effectively classified ancestral lands and domains that are agricultural in character and used for agricultural, residential and grazing purposes as well as those used for tree farming even if the slopes are greater than 18% as A&D agricultural lands. The law also allows IPs to have their ancestral lands/domains titled. About 6 million ha area are being claimed as ancestral lands or domains inside forestlands and could be later issued with CADT.

**Republic Act No. 9367 or the Biofuels Act:** The impact of this Act on the forestry sector is the growing of sources of biofuels in forestlands. Already the DENR has provided 375,000 ha of forestlands to PhilForest, a subsidiary of the Natural Resources Corporation which is the corporate arm of the DENR, for the planting of jatropha for the production of biodiesel. The forestlands are also being considered for the establishment of coconut and oil palm plantations for the production of raw materials for the manufacture of coco-methyl ester, a biodiesel. This will transform the vegetative structure of the forestlands.

**Republic Act No. 7942 or the Philippine Mining Act of 1995:** This law provides that mining operations can be conducted in forest areas except those expressly prohibited by law such as those prohibitions under NIPAS and other laws, rules and regulations.

***Institutional arrangements for forest management — the role of the public and private sectors***

The institutional arrangements for the participation of the general public and private sectors pertain only to those outside tenure holders.

There are several platforms through which these two groups of stakeholders can participate in the management of forest resources. Some of these institutional arrangements are not direct participation in forest management but as part of the entire structure of forest management of the country. One of these platforms is the PAMB. The PAMB is the on-site policy making body of protected areas. Its composition includes NGOs, IPs if any are residing inside the PA, the academe and the private sector. Although the members of the PAMB do not directly manage the PA they are responsible for the policies in the management of the PA and also in monitoring the implementation of the management plans for the PA.

Another institutional arrangement in the management of forest resources is through the Multi-sectoral Forest Protection Committees (MFPC) (DAO No. 53, 1994). The Committees are watchdogs in the management of the forests. They gather information on illegal logging, advocate forest protection and conservation as in the safeguarding of the environment. The membership comes from the general public such as the church group, business sector, NGOs, and from the public sector such as the military/police, and the academe. The MFPC has been responsible for the curtailment of illegal logging in several areas of the country.

A multi-partite Monitoring Team composed of representatives of POs, NGOs, academic and

religious organizations, and other interested groups has been tasked to serve as oversight body that undertakes monitoring activities on IFMA areas. This is one of the provisions indicated in the Environmental Compliance Certificate issued to IFMA areas.

*State of research and education and extension in the forest sector*

**Forestry education:** Currently, there are 52 state supported colleges/universities and 2 private schools offering forestry education. All offer baccalaureate courses, 7 offer technician level programs, while only 8 offer graduate programs (RMPFD, 2003). Roughly, 275 registered Professional Foresters are added every year. As of April 2001, there were 7,451 registered foresters in the country.

The proliferation of schools/colleges of forestry supported mostly by the government has dissipated resources for quality forestry education. Some schools lack funds to buy equipment for laboratories for teaching and research. They also lack books and periodicals and other reference materials in their libraries. As a result, the quality of teaching and research leaves much to be desired and the graduates of these schools lack the qualifications needed for forestry and related work in the field. The quality of education provided by some schools is reflected in the percentage passing of their students of the Forestry Board Examination. The average percentage of graduates is about 40% with many schools posting zero passing rates.

This is also reflective of the non-responsiveness of the curricula of many forestry schools. While the Commission on Higher Education (CHED) reviews the curricula, faculty and resources of schools of higher education including forestry schools to determine their qualification to offer certain courses it has not always been easy to suspend schools from offering certain courses much less close these schools.

To raise the level of forestry education in the country the CHED has instituted a system of classifying qualified schools as centers of excellence in forestry education. Of the 52 forestry schools in the country, only 4 have been selected as centers of excellence in forestry education.

To update its foresters on the new knowledge and information and current trends in forestry technologies and practices in forestry, the DENR conducts refresher courses for its staff. In-service training covers watershed-based integrated natural resources planning and management, forest land-use planning, seed technology and planting stock production, forest research and development, reforestation and soil conservation techniques, plantation management, forest resource inventory techniques, and many others. The CENRO Academy is also aimed at enhancing management competency of supervisors and middle executives of the DENR in ENR governance including the governance of forest and forestry.

Seminars/workshops and skills enhancement training are likewise provided by the DENR to upgrade the skills of foresters and other personnel in implementing new policies and strategies in forest management. Training courses are conducted on protected area management in support of the NIPAS Act. Community organizing and development courses for foresters and enhancement training for DENR Project Managers of CBFM projects are also held to equip them with the necessary skills in implementing the CBFM program. In addition, the DENR provides scholarship grants to its employees including foresters for them to pursue short and full degree courses.

The UPLB College of Forestry and Natural Resources (UPLBCFNR) offers a graduate program on natural resource conservation as well as short term courses on the same subject. In addition, the DENR in collaboration with the Development Academy of the Philippines has been implementing since 2004 a graduate program leading to a Masters Degree in Public Administration major in biodiversity conservation and management.

**Forestry extension:** The forestry extension and communication program in the Philippines was boosted by the passage of RA 3523 in 1960 (RA No. 3523, 1960). This law authorized the then UP College of Forestry to undertake a nationwide forestry information and extension program. A Forestry Extension Division was created when the Bureau of Forestry was reorganized into the Bureau of Forest Development. The Division planned and coordinated forestry information and extension activities in the country through its counterpart units in the field. However, when the Integrated Social Forestry (ISF) Program was launched under LOI 1260 in 1982, the forestry extension division was abolished and absorbed as one of the sections of the Social Forestry Division. Later, under the reorganized DENR, forestry information and extension was integrated into the relevant units of the Department.

The forestry information and extension program has focused more on promoting the various programs of the DENR, on forest production and processing technologies as well as on general topics of forest protection and conservation. Its effectiveness, however, is being hampered by lack of adequate resources to carry out an extensive information and extension program.

**Forestry research:** Forestry research in the Philippines is part of a national integrated research system in agriculture and natural resources. Its planning and implementation is coordinated by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD). Implementation of research is through research institutions and the academic community. Forest production research is being conducted by the Ecosystems Research and Development Bureau (ERDB) of the DENR and other academic institutions. Forest utilization research is being conducted by the Forest Products Research and Development Institute (FPRDI) of the Department of Science and Technology (DOST) plus academic institutions. There are few forestry companies that are conducting their own research.

The research institutions and the academic community are conducting their own technology transfer activities by holding technology fora for forest-based industries.

The research budget for forestry is quite limited. The main research institutes for forestry research, the ERDB and the FPRDI have a combined budget for 2007 of PhP149.35 million (roughly US\$3.25 million). PCARRD contributed to the 2007 research budget of the forestry sector PhP4.5 million or about US\$98,000. Research institutions augment their research budgets through grants from donor agencies. They also enter into research contracts with the private sector.

### **Key issues and an overview of the overall state of forest and forestry**

The following are some of the key issues in the forestry sector in the Philippines.

#### ***Unstable forest policies***

One of the main reasons why Philippine forestry has difficulty moving forward is because of unstable forest policies. This stems from the failure of Congress to pass the Sustainable Forest Management Act (SFMA). The SFMA defines the major policies that underpin development in the forestry sector. These include policies on the logging ban, devolution of management of part of the forestlands to stakeholders, policies and incentives on plantation development in public and private lands including harvesting and transport of harvested forest products, delineation of the limits of the public forests, and policies on forest industries.

The SFMA would provide stability in forest policies, rules and regulations. Because forest policies keep on changing, the stakeholders are often not aware of what the current forestry

policies are. Often policies are issued and almost immediately are recalled or amended but with limited consultation with concerned stakeholders.

***Limited government support in the rehabilitation of watersheds***

In the 1990s, the government launched a massive program to reforest denuded areas especially important watersheds. Large areas have been planted. The tree plantations established, however, have very low survival rate because of limited maintenance and protection. The government has continued to implement watershed rehabilitation projects, but funds are not sufficient to cover all the important watersheds. In the midst of the rice crisis where the government has to resort to importation of rice there should be allocation of more funds for watershed rehabilitation for irrigation of rice fields and for other important purposes.

***Continued poaching and illegal logging***

Another major issue is the inability of government and forest managers to stop timber poaching and illegal logging. A little over half of the land area of the country is considered to be forestlands. Although a large percentage of the area is already under the jurisdiction and management of other government agencies and institutions as well as government owned and controlled corporations, still the area under the direct supervision and control of the DENR is quite large. The DENR does not have enough personnel to supervise all the areas under its jurisdiction. The situation has been exacerbated with the implementation of EO 366 which prohibits the hiring and promotion of personnel. And so without its physical presence in the area forests are subjected to continuous poaching by local residents close to the forest and by illegal loggers. This is an argument for devolving management of forestlands to qualified LGUs and other stakeholders such as organized communities.

***Plantation development is not moving forward as desired***

Although the greater bulk of logs produced in the country has come from plantations during the past few years the existing area of commercial tree plantations is not sufficient to supply the needs of the country. The country still imports logs, veneer and plywood to supplement local production. It has been estimated that to meet the country's needs for wood products there should at least be about 600,000 to 650,000 ha of plantations (RMPFD, 2003). The reported area of plantations is about 330,000 ha. The country should have at least 1,000,000 ha of plantations to satisfy local demand for wood and be able to export logs.

The area of plantations developed annually is minimal — only 16,500 ha (PFS, 2005), with the area planted by the non-government sector exceeding that of the government. At least 100 000 ha of commercial plantations should be developed annually for the country to be able to export logs and other wood products. Most government sector plantations are for forest conservation and not for commercial purposes. The government should encourage the private sector to establish commercial plantations in tenured government lands as well as in private lands. The government can do this by establishing the proper environment for investment such as making policies stable, supportive and effectively implemented, reducing transactional costs, reducing unnecessary requirements especially for plantations in private lands, and providing incentives to plantation developers.

***Limited investments in CBFM areas***

The main strategy for managing forestlands and resources is through community-based forest management (EO No. 263, 1995). Organized communities are provided tenure over portions of the forestlands on which they are dependent for livelihood. However, the government has been unable to provide adequate financial assistance to people's organizations (POs) to

develop their area except when the area is part of a foreign assisted project. Even in the case of areas assisted under foreign assisted projects, the support usually ceases when the project terminates and therefore its continuity is always a problem. The CBFMA that the DENR signs with the community allows investors to partner with the POs in the development of their areas. However, seldom if ever do such investments take place. The CBFM areas therefore remain undeveloped and contribute few financial benefits to the community.

In an attempt to initiate livelihood projects in CBFM communities the DENR established the CBFM-Livelihood Assistance Project (CLASP). However, the budget provided for CLASP was only PhP5 million for three years which is insignificant compared to the requirements of the communities. After three years of implementation, the DENR has established 103 projects all over the country and provided technical and financial assistance ranging from PhP50, 000 to PhP150, 000. Lessons learned from their implementation, however, indicate that the capital provided to CLASP projects has been very limited. Hence, the DENR should request for more funds for these projects from Congress and also partner with other government agencies that have bigger funds for projects similar to CLASP. In fact the DENR has a standing Memorandum of Agreement with the Department of Science and Technology (DOST) signed in 2004 for the latter to provide financial assistance in the establishment of enterprises in CBFM communities.

#### ***Reduced investment in the forest-based industries sector***

With reduced resources in the natural forest and with the slow development of forest plantations the forest-based industries have had no incentive to modernize their processing equipment. This has resulted in inefficient processing of wood to lumber and other forest products which makes them less competitive in the local and foreign markets. Furthermore, the forest-based industries have been de-listed in the Omnibus Investment Code by the Board of Investments. As such, these industries are no longer entitled to the incentives provided in the Omnibus Investment Code.

To provide assistance to the wood-based industries, the DENR has recently submitted to the President for approval a recommendation for the establishment of the Philippine Timber Industries Board.

#### ***Balance in forest production and forest protection areas***

As of July 31, 2007, there were 107 proclaimed protected areas under NIPAS of which 77 were terrestrial covering about 1.85 million ha. There are still several areas waiting for proclamation based on the identified Key Biodiversity Areas (KBA) of the Philippines. There are 128 identified KBAs covering 6 million hectares of the total land area of the country which currently serve as the basis for proclamation as protected areas under NIPAS. The proclamation of protected areas should be rationalized to arrive at a balance between production and protection forests.

#### ***Open access forest areas***

There are at least 3 million ha of forestlands that are not under tenure of any kind and therefore are open access areas. These are areas of expired or terminated TLAs or former pasture/grazing areas. The DENR has not placed these areas under tenure and they are not provided any protection and remain at risk of illegal cutting and encroachment and occupancy by upland farmers.

#### ***Management of forest areas covered by ancestral land titles***

While awarding of forestlands to IPs is a welcome development, the management of these

areas becomes an issue. The IPs do not possess the management experience of large tracts of forestlands since their experience with respect to the forest is as source of subsistence and livelihood. The disposition of forest products inside these areas still remains with the DENR and when the IPs insist on their rights vested on ownership of the land containing the forest products, there is potential conflict in this situation. The DENR, therefore must diffuse this contentious issue before it becomes unmanageable.

***The state of forest resources is not effectively monitored by the government***

Effective management of the forest is based on proper planning using reliable and accurate information on the state of the resources. Tenure holders are responsible for the planning and implementation of management plans for their areas. For open access, it is the government's responsibility to manage these areas. Overall, the government should be able to monitor the state of forest resources in the country, determine any activities within the forestlands, and keep track of the change in forest cover especially within tenured areas. Tenure holders should be made accountable for any untoward activities within their areas. One effective way of monitoring the state of forest resources is the use of remote sensing such as satellite images. Unfortunately, the DENR does not have the resources to acquire satellite images on a continuous basis for monitoring purposes.

Consequently, planning activities for the forestry sector mainly used information from secondary sources and for spatial data these are largely generated from maps that have been prepared earlier and therefore, already outdated. The difficulty to locate areas on the ground for areas identified as potential areas for agroforestry development is a clear manifestation of the need to generate updated and reliable forestry information. The absence of some forestry information has also hindered the government in preparing a comprehensive plan for bamboo, rattan, and other NWFPs.

***Overview of the overall state of forest and forestry***

The forest cover of the country has declined tremendously since the early part of the 20<sup>th</sup> century when the forest cover was more than 50% of the total area of the country. This has been the result of destructive logging and the practice of shifting cultivation from 1950 to 1980.

The government has instituted structural reforms in the management of forest areas such as the democratization of access to forest resources. Organized upland communities are granted authority to manage and protect the forest in the belief that communities will manage the resources well especially when granted permission to harvest forest products from them. Co-management agreements have also been forged with local governments in the management of forestland areas. However, upland communities have been unable to develop their areas effectively because of lack of funds and the government in turn, has been unable to provide financial assistance (an exception is funds provided under foreign assistance).

The government has also supplanted the TLA as an instrument of commercial access to forest resources with the IFMA and the SIFMA in pursuance of the mandates of the Constitution that access to natural resources can be only through joint venture, co-production or production sharing agreements. The TLA is neither of these and many have not been renewed after their expiration or termination for cause. Unfortunately, the former TLA areas have not been placed under other tenure and therefore, have become open access areas which are at risk of illegal logging and encroachment.

The government attempted to increase forest cover and improve the state of forestry by implementing massive reforestation of denuded forest lands in the 1990s. The reforestation efforts have also engaged non-government and people's organizations in the tree planting

activities. However, it has not been too successful on account of limited protection of the reforested areas and limited after-planting maintenance.

Establishment of commercial tree plantations by the private sector has been slow. Given the current pace of about 10,000 ha developed annually it will take years before the area of plantations needed to meet the local demand for logs will be established. The government has provided some incentives to plantation developers such as non-payment of forest charges and the export of plantation logs. However, this has not been sufficient to encourage the private sector. More incentives should be provided such as stable policies on forest plantations, reduced transactional costs and assistance in the identification of available areas and processing of documents. For smallholder plantation developers, especially those on private lands, financial assistance should be provided.

The forest-based industries are in a state of stagnation with only the plywood sub-sector showing some signs of improvement. The country continues to export plywood. In the lumber sector only that produced from plantation grown timber is allowed to be exported. The lifting of the moratorium on the establishment of new sawmills will provide incentives for plantation developers to establish their own sawmills to process the logs from their plantations and benefit from the value added of the lumber produced.

The non-wood industries continue to grow. The handicraft and furniture industries continue to be competitive in the foreign markets. They also continue to generate employment. The herbal and body care industry is also expanding. The value of its exports is increasing annually.

While the country continues to proclaim protected areas some of these areas do not have a functioning PAMB or a designated Protected Area Superintendent (PASu), the on-site manager of the PA. A few of the PAs are able to generate their own funds for operation and management. Through the Integrated Protected Area Fund [IPAF], PAs are able to plow back the income that they have generated for the protection and development of the area.

### 3. DRIVERS OF CHANGE IN FORESTS AND FORESTRY

#### An overview of the changing characteristics of society, highlighting key trends

The rapid changes in communications particularly television that has brought current events into the living room have helped shape people's perception on the forests and forest resources and their importance in the lives of people. The images of raging floods or landslides destroying life and property have helped to dramatize the significance of forests in averting such calamities. The media have also helped tremendously in highlighting the other environmental benefits of forest such as temperature amelioration, helping to reduce global warming through sequestration of carbon dioxide and the health benefits that they can provide.

More mini-forest parks in urban areas and large towns are being established and more people are spending more time to enjoy the scenery or merely go there to relax. This is exemplified by the truck-loads of people who go to Mount Makiling, one of the nearest forest areas outside of Metro Manila (60 km away) and equally near forest areas for week-end excursions.

This development has increased the ranks of people who believe that harvesting the forest has an overall negative impact on the environment. This is going to make difficult the passage of the Sustainable Forest Management bill into law by Congress.

#### Demographic changes

Based on the 2000 census on population and housing in the Philippines, the population was 76.499 million. The population has grown by leaps and bounds as shown in Table 20. It is 10 times more that of 1903 when the first census of the population was conducted.

The average population growth rate started to decline in 1970 after a sharp increase in 1948-1960 when it reached 3.07 percent. The recorded highest growth rate was in 1995 to 2000 when it was 3.86 percent. It has been projected that if the average growth rate of the Philippines continues the population will be double in 29 years (NSO, 2002).

There is a strong relationship between population and forest cover in the Philippines. When the population was about 16 million in 1935 the estimated annual deforestation rate was about 100,000 ha. This increased rapidly to above 150,000 in the 1940s and 1950s when the country experienced a postwar boom in population growth<sup>1</sup>. It peaked to about 300,000 ha per year in the late 1960s (Figure 2).

Migration into the uplands started at the turn of the century but massive migration took place in the 1960s when the forest areas were opened up by logging and facilitated by the presence of logging roads. It was estimated that the upland population is more than 20 million people comprised of indigenous people and migrants (Sajise, 1998). Of these, 11 million are estimated to be residing within the official forest lands (Cruz et al 1992). Employment in the lowlands has not kept pace with the rapid increase in population. People have sought employment in the urban areas.

**Table 20. Population of the Philippines up to the last census (000)**

	1948	1960	1970	1975	1980	1990	1995	2000
Phil	19,234	27,088	36,684	42,071	48,098	60,703	68,617	76,499

Source: National Statistics Office, 2000.

Others have moved to the uplands in search for lands to till. They have cultivated the

forestlands by burning the remaining forest to clear the land and for planting of short rotation crops such as rice and corn with some perennials like coconut and fruit trees. In the early stages of migration the land was allowed to fallow until it could recover some of its fertility. However, as the population in the uplands increased and the competition for land became intense, the fallow period became shorter and the land became degraded. Where there are still areas available the farmer would then move and repeat the cycle of destruction.

The Philippines does not have an effective population program. Until it does, the population will continue to expand and the forestlands will be under threat of occupancy and destruction through improper land cultivation and conversion to other uses.

### **The political and institutional environment**

#### ***Role of stakeholders in the management of forestlands and resources***

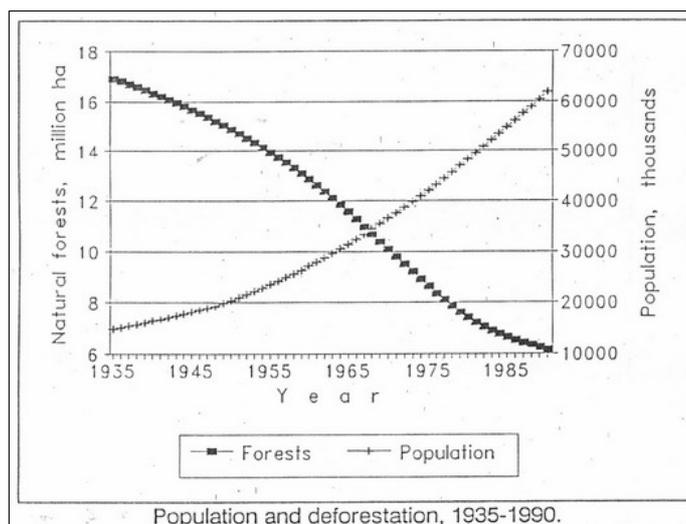
##### *Role of tenure holders*

The DENR has been mandated to manage the forestlands and resources of the country. However, because of the extent of forestlands which is more than half of the land area of the country, the DENR and its predecessor agencies have co-opted other stakeholders in the management of forestlands and resources. In the early years, the TLAs were given the task of protecting the forest as part of their responsibility in addition to obligations that were added later on.

The TLA is being replaced by other forms of tenure that are consistent with the Constitutional mandate that access to natural resources is through joint venture, co-production or production sharing agreements. The TLA is neither of these. The new forms of tenure are the CBFMA, SIFMA, IFMA and Forest Lands Grazing Management Agreements (FLGMA), tree farm lease and agroforestry farm lease. Tenure holders have accompanying responsibilities, such as to protect their forest areas in addition to developing forest plantations as well as agro-forest areas. There are about 3.42 million ha under tenure by the aforesaid agreement holders.

Unless the tenure holders manage their areas properly 3.42 million ha are under threat of deforestation. The DENR must inculcate in them their responsibilities and be able to monitor their performance. The DENR must be firm in making the tenure holders accountable for the state of forest resources under their stewardship.

Indigenous people by virtue of the provisions of RA No. 8371 were given the right to possess and own (to title) ancestral lands and domains. As of September 20, 2007 there were 5.9 million ha covered by certificates of ancestral land/domain titles (CADT/CALT)<sup>2</sup>. A large part of these areas contains forests. Management of these areas has been transferred to the IPs and the DENR has been assisting them in the preparation of forest management plans. The DENR in cooperation with the NCIP, the agency mandated to assist in the affairs of IPs, has to build the capacities of IPs in forest management otherwise the areas under their care will be subjected to harmful activities.



**Figure 2. Population versus deforestation, 1935-1990**

Source: Master Plan for Forestry Development, 1990.

### *Management of protected areas*

Several stakeholders participate in the management of Protected Areas through the PAMB. The PAMB reviews and endorses the DENR's management plan and management manual for the PA; decides on planning, resource protection, and general administration of the area; approves proposals, work plans, guidelines for management of the PA; delineates the PA boundaries; buffer zones and ancestral domains within the PA; promulgates rules and regulations to promote programs and projects on biodiversity conservation; and ensures implementation of the management plan.

The day-to-day operation of the PA is the responsibility of the PASu. His functions among others, are: to serve as chief operating officer for implementing the management plan for the PA; establish partnership with local communities; develop and implement park information, education and the visitor program; enforce rules and regulations to protect the area; and seize and confiscate illegally collected forest products.

The efficient and effective management of PAs depends on the performance of the two levels of PA management, the PAMB and the PASu. The policies adopted by the PAMB must be in consonance with the needs of the residents within and at the boundary of the PA. The PASu must implement the policies fairly and firmly. Otherwise the PA would be under threat from the communities within and around the area.

### *Management of forestlands by Government Owned or Controlled Corporations (GOCCs)*

About 685,000 ha of forestlands, particularly watersheds, are under management of government owned or controlled corporations. These are basically energy generating corporations such as the National Power Corporation (NPC) (EO No. 224, 1987) which has jurisdiction over watersheds where hydro-power generating plants and a number of geothermal power plants are located, and the PNOG (EO No. 223, 1987) which is operating geothermal power plants. The National Irrigation Administration (NIA) also has jurisdiction over watersheds supplying water to dams and providing water to irrigation systems.

These three agencies are mandated to protect and rehabilitate the watersheds under their jurisdiction. They are also required to provide assistance to settlers within their watersheds. The GOCCs are aware of their responsibilities. The NPC is currently issuing invitations to

consultancy companies for the preparation of watershed management and development plans for watersheds under its responsibility.

### ***Role of Non-Government Organizations***

Non-government organizations (NGOs) do not manage forestlands and resources directly. They assist in the training of families and communities during community organizing. The involvement of NGOs in forest management started during the implementation of the DENR of the ISFP (DAO No. 97, 1988). Under the program the NGOs were called upon to provide assistance in the conduct of census of forest occupants, community organizing, information and technology dissemination, and in monitoring and evaluation of agro-forestry projects. They also assisted the communities in sourcing markets for their products, social services such as health services, initiation of livelihood projects and in sourcing credit.

They also serve as members of the PAMB and assist in the formulation of the management plans and in the monitoring of the implementation of such plans of protected areas. As members of the Multi-sector Forest Protection Committees, they are responsible for gathering and providing information to relevant authorities including the police and the DENR about illegal logging and transport of illegally cut logs and other forest products. The vigilance of the NGOs in the protection of forest will go a long way towards assisting the government to pursue sustainable management of the resource.

### ***Role of Local Government Units in forest protection, conservation and management***

In addition to their role in the management of protected areas, RA 7160 or the Local Government Code provides that LGUs share with the National Government in the management of forest resources (RA No. 7160, 1991). Furthermore, the Code provides that municipalities implement community-based forestry projects which include integrated social forestry programs and similar projects subject to the supervision, control and review of the DENR. The provincial governments are tasked with the enforcement of forestry laws limited to community-based forestry projects and other laws for the protection of the environment subject to supervision, control and review of the DENR.

Pursuant to these provisions of the Local Government Code, the DENR devolved the ISF projects to LGUs except those that were partially or wholly funded by foreign donors and those that were located in protected areas and critical watersheds (DAO No. 30, 1992). Along with the ISF project, Community Development Officers (CDOs) and Community Development Assistants (CDAs) were also devolved in addition to the budgetary appropriations for the projects.

LGUs have also entered into Memoranda of Agreement with the DENR and communities in the management of watersheds. They are also providing training programs to People's Organizations on livelihood projects and in some instances provide capital to start livelihood projects. Pursuant to their duties as provided for in the Local Government Code in enforcing forestry laws, LGUs have also issued ordinances on the protection of forests and watersheds and imposing penalties on illegal logging and slash and burn activities. In one instance, the municipal LGU is in the process of issuing an ordinance for the collection of an environmental fee of at least PhP200 (US\$4.00) from tourists for the conservation of the environment in the area.

### ***Role of civil society organizations***

Civil society organizations (CSOs) are assisting the government to implement forest laws and regulations. The DENR has initiated the organization of Multi-sector Forest Protection Committees (MFPCs) which include representatives from the church, academe, the

military/police, the LGUs, NGOs and CSOs. They have been successful in lowering the incidence of illegal logging in some parts of the country. However, the organization is hampered by the lack of logistical support to carry out its mandates.

### ***Role of educational and research organizations***

Government research and educational institutions provide assistance in the sustainable management of forest resources. Sustainable forest resource management requires new technologies to keep pace with the changing structure of forests, changing managers and changing uses of forests. Sustainable forest management also requires competent personnel. Forestry educational institutions train students, many of whom eventually become forest managers or forest officers implementing forest laws and regulations.

To be able to compete in the local and foreign markets forest based products such as lumber, veneer and plywood, furniture and handicrafts must comply with product standards. The Bureau of Product Standards (BPS) under the Department of Trade and Industry (DTI) is responsible for establishing product standards and in monitoring whether the standards are met by local products.

### ***Role of the Philippine Congress***

The basic policy on forest and forestry must emanate from the Congress of the Philippines. The Revised Forestry Code (PD 705, 1975) was issued as a decree in 1975, during the Martial Law years when Presidential Decrees had the force of law. Since then, no comprehensive forestry laws have been legislated. Most of the forestry regulations are administrative issuances of the DENR in pursuance of the provisions of enacted laws such as the NIPAS Law, the IPRA Law, the Local Government Code, the Wildlife Conservation and Protection Law, the Mining Act, and several other laws. Often these issuances are changed within a short period of time so stakeholders are often confused as to which of these policies are still in effect.

The proposed comprehensive law on forestry, the Sustainable Forest Management Bill, has not been enacted by Congress. The bill was submitted to Congress 20 years ago. Congress has not been able to agree on whether to implement a total logging ban or a partial logging ban that would allow harvesting of forest plantations. In addition, there are conflicting interests in Congress since many members are owners of logging concessions. Until that comprehensive law on forestry is enacted forest policies are bound to change with short notice leaving most forestry stakeholders confused.

### ***Role of the media in information dissemination***

The media has a tremendous role in forming opinions of the general public. This is also true in forestry. Each time landslides and flash floods occur anywhere in the country media more often than not blame them on logging and deforestation and immediately point to the DENR as the culprit. The DENR has the obligation to educate members of the press about the situation in forestry and the real causes of landslides and flash floods.

### ***Overall trends and tendencies in governance***

The direction of forest governance in the Philippines is devolution and active participation of various stakeholders. For decades forest management has been largely lodged with the government through the Bureau of Forestry and later the Bureau of Forest Development and currently through the DENR, particularly the Forest Management Bureau and its regional offices. Slowly, the government has realized that it cannot manage the resources alone and needs to co-manage them with various stakeholders.

Devolution has many faces. Many functions have been devolved to LGUs such as the management of community-based forest management and management of small watersheds. LGUs have also been mandated to enforce forestry laws. Communities have also been given authority to manage a large portion of the forestlands through the CBFMA and small commercial areas are being managed under the SIFMA. The IPs have been awarded titles to their ancestral lands/domains which include forests. The government has transferred on-site management of watersheds to GOCCs such as the PNOC, NPC and NIA.

In the case of forest product utilization the trend is towards deregulation and democratized access to forest resources. While before only large logging concessionaires were awarded the privilege to harvest timber, now communities through the CBFMA and SIFMA can harvest timber from the natural forest. The DENR has also issued administrative orders removing the requirement for a cutting permit for planted trees in private lands and a permit to transport them. Similarly, the DENR has lifted an earlier moratorium in the establishment of new sawmills which is a step towards deregulation of forest product utilization.

In biodiversity conservation the trend is towards more vigilance in the protection of threatened flora and fauna. The government continues to proclaim areas containing biodiversity as Protected Areas. Recently the DENR issued an administrative order listing threatened plant species and their categories.

### **Economic changes**

#### ***Growth rates of income including changes in its distribution***

Changes in the income level of families from 1991 to 2000 are shown in Table 21. The number of families with income level below PhP10,000 a year to PhP30,999 decreased during the period while the number of families with income level of PhP40,000 and over increased over the same period. There were over 14 million families in 2000 that had income of PhP40,000 and higher. Although the indicated income levels are in current figures these still provide some degree of comparison and give an indication on the increase in income level of families.

The increase in the number of families with increasing income is reflective of the improving economy of the country. With more family income there is an increase in the demand for goods and services which redounds to the increase in demand for production space (factory sites) and for housing. Furthermore, some foreign corporations have established factories in the Philippines for the production of consumer goods that are exported. Thus, agricultural lands have been converted to industrial parks and subdivisions. These corporations have provided employment opportunities. But for those displaced and employable farmers who have no place else to go, they flock to the uplands to eke out a living. The uplands have also become more accessible by the presence of logging roads. This has resulted in the destruction of forest cover as the displaced farmers practice their brand of agriculture in upland areas.

The contribution of various sectors to the economy of the Philippines is shown in Table 22. The service sector outperformed the rest of the sectors of the economy contributing PhP6.16 billion in 2006. The forestry sub-sector's contribution has been steadily declining since 1985 when the percentage share of the sector to the GNP was 0.13% compared to only 0.06 in 2005. This manifests the declining importance of the sub-sector since the forest resources of the country have been reduced from close to 17.8 million ha of commercial forest in 1934 to only about 7.2 million ha in 2005, a large part of which is Protected Areas, 2.3 million ha of production forest in addition to plantation forest.

**Table 21. Number of families by income (actual figures)**

Income range	1991	1994	1997	2000
<b>Philippines</b>	<b>11,975,400</b>	<b>12,754,944</b>	<b>14,192,462</b>	<b>15,269,655</b>
Under Php 10,000	306,400	149,537	66,917	35,556
10-19,999	1,647,500	933,267	482,827	329,012
20-29,999	2,145,600	1,644,422	1,132,664	836,651
30-39,999	1,731,700	1,652,896	1,473,041	1,170,541
40-40,999	1,250,900	1,391,055	1,438,575	1,388,507
50-59,999	978,700	1,133,426	1,163,897	1,196,126
60-79,999	1,234,400	1,698,025	1,828,642	1,983,219
80-99,999	772,400	1,074,314	1,285,026	1,496,280
100-149,999	1,017,000	1,501,550	2,072,417	2,431,060
150-249,999	593,400	1,054,063	1,853,665	2,382,193
250-499,999	237,300	419,355	1,063,498	1,528,433
500,000 and over	60,000	103,035	331,293	492,077

Source: National Statistics Office, 2000.

**Table 22. GNP at 1985 constant prices (PhP million)**

	1985	1990	1995	2000	2005	2006
GDP	5,711,883	720,690	802,224	972,960	1,209,473	1,274,415
GNP	551,428	716,929	824,525	1,037,858	1,320,681	1,402,727
<i>Agriculture</i>						
Agric-fisheries	131,557	153,414	171,069	192,457	229,852	238,704
Forestry	8,987	7,320	1,779	1,372	910	1,454
<i>Industry</i>						
Mining	200,548	255,548	283,858	345,041	399,076	418,209
Service sector	11,893	11,091	10,035	10,833	20,032	18,835
	230,781	304,408	345,518	435,462	579,635	616,049

Source: National Statistics Office, 2006.

Another indicator of the current relative importance of the sub-sector is the amount of employment it is providing. Table 23 shows the level of labor force of the country, the number of persons employed from 1988 to 2005, the employment in various sectors of the economy, the number of unemployed, the percent change in labor force and labor participation. The unemployment rate has been increasing since 1988 from 8.3% to 10.3 percent. The absence of viable employment especially in the rural areas has driven much of the population to the uplands to farm and to extract wood from the forest for firewood and charcoal production contributing significantly to the decline of forest cover.

Although the labor force in forestry has decreased tremendously on account of the reduced number of logging companies and those engaged in sawmilling and veneer and plywood production, there are sub-sectors in the wood-based industries such as the furniture and handicraft industries that are demanding more labor because of the improved foreign market situation. The nature of the work in these sub-sectors demands some skills and artisanship that not all types of labor can provide. Those that do not qualify and do not have land to till find income generating activities generally in nearby forests.

The establishment of commercial plantations by the private sector, however, has provided opportunities for employment such as in nursery and seedling production, seed collection, plantation establishment and maintenance and later in timber harvesting. Recently a private

investor has established a company in Mindanao that produces cloned seedlings for plantation developers.

**Table 23. Employment in various sectors**

	1988	1990	1995	2001	2005
Labor force (000)	23,451	24,525	28,040	33,354	36,642
Employed (000)	21,497	22,532	25,698	30,085	32,875
Agriculture <sup>1</sup>	9,920	10,185	11,323	11,253	12,171
Manufacturing	2,238	2,188	2,571	2,892	3,043
Mining	157	133	95	103	116
Others	9,182	10,026	11,709	15,838	17,544
Unemployed (000)	1,954	1,993	2,342	3,269	3,766
Unemployment rate (%)	8.3	8.1	8.4	9.8	10.3
Labor force ann. change (%)	2.5	2.8	2.0	7.9	2.8
Labor force participation rate (%)	65.4	64.5	65.6	67.5	66.9
Male	83.2	81.8	82.1	82.3	-
Female	47.9	47.5	49.0	52.8	-

<sup>1</sup>Includes agriculture, fisheries and forestry.

Source: National Statistics Office, 2005.

### *Agriculture and forestry interface issues*

The structure of vegetation in the uplands has been changing since shifting cultivation was established and the first hectare of forest had been logged. And this structure is continuously changing as more pressure is put to bear on forest areas for agricultural purposes. Among the critical threats is the expansion of corporate plantations of various types, e.g. banana, pineapple, asparagus, and papaya. Pineapple, banana and papaya plantations are seen in mountain slopes and valleys even within proclaimed watersheds and protected areas. This incursion into the forest land is an economic boon to upland farmers since corporations pay rentals in advance for the use of land claimed/occupied by upland farmers. It is, however, a great threat to further changes in land use and vegetative cover of the land.

The plantation of African oil palm is also making a push in some parts of Mindanao in Southern Philippines. Large areas are leased for a certain number of years whose rentals are usually paid in advance, often 5 years. The same investment arrangements for pineapple, papaya, and banana are being offered to forest occupants or claimants. It is the vigilance of the DENR in the regions that has curbed this threat.

In Northern Luzon, there is also a move to establish coconut plantations to supply the raw materials needed for the production of coconut-methyl ester (bio-diesel). The targeted areas are those that have been awarded to CBFM communities and ISF families as well as those awarded to indigenous communities under the CADC/CALC. Coconut plantations at least allow for inter-planting with forest trees or perennial agricultural crops such as coffee or cacao and fruit trees.

The energy crisis which is expected to worsen if no significant discoveries of oil sources are made in the near future will have its impact in the use of forestlands. Already, the DENR has an agreement with its subsidiary, the Philippine Forest Corporation (PFC) to provide about 2

million ha of land for jatropha plantation development. It has so far turned over to the corporation about 375,000 ha of open grasslands and brush lands. Areas covered by jatropha will have additional plant cover because the environmental benefits that would accrue from forest trees would not be realized with jatropha.

Housing and settlement development as well as the establishment of economic zones in prime agricultural land have helped pushed agricultural development in forest lands. Prime rice fields in provinces close to Metro Manila such as Cavite, Laguna, Batangas, and Bulacan have been converted into export processing zones and economic zones and agricultural production is increasingly moving up the mountain slopes.

The interest in grazing and pasture activities in forest lands is again gaining ground. There has been an increase lately in applications for forestland grazing lease agreements (FLGLAs).

### **Future energy demand and its implications on forests**

#### ***Forests as a source of traditional biomass energy***

Biomass like wood or coconut wood or coconut shell or fronds and even bamboo has been the traditional fuelwood for cooking, ironing and for drying in rural areas. Nearby forest or brush lands and agricultural lands are the common sources of fuelwood. The collection of fuelwood for domestic purposes and for conversion to charcoal has been from nearby natural forests. This has put pressure on forests. The degree of this pressure depends on how large the population close to the forest areas is. The rate of increase in the population dictates the level of increase of the pressure on the forest. The continuous migration into the forest is expected to have negative impacts on the forest.

The economic condition of rural households close to forest areas also affects the extent of fuelwood collection. Poorer families cannot afford to use alternative fuels such as LPG or kerosene or electricity. In many cases, even if some households can afford to buy alternative fuels these are not usually available in rural areas. In the end these households will turn to fuelwood as an energy source. The absence of livelihood opportunities in rural areas drives families to grab any livelihood activity that is available. Fuelwood collection and charcoal making for commercial purposes is thus practiced by many households near forest areas. This had been one of the reasons for the destruction of forests.

The continuing rise in the price of fossil fuel including LPG will further increase the demand for fuelwood and charcoal. Many power generating units in the country still use coal as fuel. Coal is highly polluting and emits GHGs contributing to global warming. Many power generating units are planned to be converted from coal to wood pellets or briquettes. This would further put pressure on the forest. It could also initiate the establishment of fuelwood plantations.

#### ***Emerging trends in the production of fuel and their potential implications on the forestry sector***

When the price of LPG and electricity for cooking purposes rises beyond the capacity of the common families to buy they will turn to other sources of energy for cooking and in most likelihood it will be fuelwood and charcoal. However, the supply of these two commodities is becoming more and more limited as the forests are receding and becoming more inaccessible. At present, there are no plantations purposely developed to raise wood for fuel. However as the price of fuelwood and charcoal rises to a certain level it will become commercially viable to raise fuelwood in plantations. The DENR does not have at present any program for the establishment of fuelwood plantations. However, DENR Region III is planning to launch a program on fuelwood plantations in all the provinces in the Region. This concept could be the

basis for a “fuelwood plantation development program” (FWPDP). The DENR could identify open land and grasslands where it can have production sharing agreements with corporations, communities, families or individuals for fuelwood production.

This program could extend to private lands. With a proper policy environment similar to tree plantations in private lands where no permit is required for harvesting and transporting of logs, except for certification from the LGUs or professional foresters, fuelwood plantation could be the major source of this commodity in the future. An additional incentive that could be provided to investors is the exemption of plantation areas from the comprehensive agrarian reform law which requires some agricultural areas to be subdivided and shared with tenants.

### **Impact of globalization and regional and sub-regional integration**

International commitments have affected the use of forestlands and resources in the Philippines. In pursuit of the goals of the UN Convention on Biological Diversity (UNCBD) the Philippines has enacted into law the National Integrated Protected Area System (RA No. 7586, 1992). As a result, the country has proclaimed as of July 2007, 107 Protected Areas 77 of which are located in terrestrial areas covering 1.85 million ha. More areas are in line for proclamation. Utilization in these areas is prohibited except in designated multiple use areas and in buffer zones.

The Philippines also enacted into law the Wildlife Conservation and Protection Act of 2001 (RA No. 9147, 2001). Under this Act the DENR has issued DAO No. 2004-15 (DAO No. 15, 2004) which lists threatened terrestrial animal species and their categories. DAO No. 2007-01 lists threatened plant species and their categories.

Under these Orders, the species listed including their by-products and derivatives cannot be collected or harvested except for research and propagation purposes. DAO No. 2007-01 has been amended to allow harvesting of plant species in the list including by-products and derivatives by existing license holders at the time the Order was promulgated. New permits have to be approved by the Secretary. The impact of the Order is that upland communities that have been collecting by-products and derivatives of plants in their private lands now have to seek permission from the Secretary.

Globalization will have mixed impacts on forestry in the Philippines. The ASEAN Free Trade Agreement (AFTA) which will lead to zero tariff on forest products would immediately be seen as advantageous because the Philippines is importing about 60% of its wood needs. With zero tariff it is expected that the price of wood will decline. Household furniture from Malaysia, Indonesia or Thailand is cheaper than furniture made in the Philippines of the same quality. This situation could force the wood processors in the Philippines to become more efficient in their operations if they want to be competitive even in the local market.

However, the wood industry of the Philippine will not become efficient and competitive in the initial stage of implementation of reduced tariff because it is weighed down by old and inefficient processing equipment. In the end, the local industries could lose out to cheaper and better quality imported wood products. The industry needs a level playing field to adjust to competition and this level playing field can only be achieved locally through supportive policies such as tax-free importation of machineries and allowing the wood industry to export products from imported logs.

The Kyoto Protocol provides the CDM for developing countries to contribute to achieving sustainable development by allowing industrialized countries to finance projects that mitigate climate change such as reduced GHG emission and in turn receive credit for the reduction in emission. In the forestry sector, only afforestation and reforestation are eligible under the CDM. Furthermore, afforestation and reforestation are eligible only if they are established in

areas “that were not forests prior to 1990” and are not under forest cover at the time the project is established. Under the CDM certified carbon emission reduction (CERs) can be purchased by developed countries in fulfillment of their commitments to reduce their emission levels.

Already there is one reforestation project in the Philippines that has applied for registration under the CDM. One constraint in getting more projects registered under the CDM is the long and costly procedure for registration.

The Philippines has been a producer-country member of the International Tropical Timber Organization (ITTO) since its inception in 1983. The objectives of ITTO are to “promote the expansion and diversification of international trade in legally harvested tropical timber from sustainably managed forests and to promote the sustainable management of tropical timber producing forests” (ITTA, 2007).

In line with the strategies of ITTO for promoting and supporting research and development, it has been providing research and training grants to research and academic institutions in the Philippines as well as NGOs for the conduct of forest production and forest utilization research since 1990. The research grants have been in the area of expansion of the resource base through utilization of tree tops, branches, small diameter logs such as lesser-used species, plantation grown logs and coconut wood utilization. It has also supported research on NWFPs and on the development of sustainable forest management protocols within the context of watersheds. The results of these researches will contribute to the sustainable management of Philippine forests.

### **Technological changes within and outside the forest sector**

Technologies are drivers of change and positive changes in the forestry sector could well be initiated and sustained by the application of production and utilization technologies. This section reviews technologies that when applied or pursued further in the field could trigger much awaited positive changes in the sector. Some technologies developed outside of the sector could also have tremendous impacts when applied in the forestry sector.

The success of plantation development often lies in the quality of seedlings or planting materials. Even seeds that are produced from seed orchards are no guarantee that the seedlings have the same characteristics as the mother trees. Two methods of producing planting materials assure that the seedlings would have the qualities of the source; tissue culture and cloning. These techniques are very suitable for the production of planting materials of species that are difficult to propagate from seeds or species that do not profusely produce viable seeds. They also allow for the growing of trees whose characteristics and properties are similar to those of the mother trees.

Fertilization is a very important component in successful plantation development. However, the use of inorganic fertilizer aside from being expensive could also deteriorate the soil and pollute water systems. A fertilizer system called Bio-N has been developed for agricultural crops particularly rice, corn and vegetables. It increases the growth of the root system of the plant by increasing its ability to absorb soil nutrients and water *resulting* in faster growth. Bio-N has possibilities for use in the nursery during seedling production and during plantation establishment thus reducing the cost of plantation development and faster increase in forest cover. One kilogram of Bio-N is enough to fertilize a hectare of rice field otherwise needing 4 sacks of inorganic fertilizer for the same area. One kilogram of Bio-N costs PhP300 (US\$6) while 4 sacks of complete fertilizer (14-14-14) cost about PhP 6,000 (US\$120).

An indigenous endomycorrhizal inoculant for seedlings has been developed for reforestation and similar activities.

Another technology that has been developed for plantation establishment is computer software that assists would-be plantation developers to identify the species suitable for various sites in the country. This has the effect of better plantations and increased forest cover.

Technologies that expand the resource base promote sustainable forest management. The use of species that have not been considered commercial before has reduced pressure on the few species that have been traditionally used. Processing technologies have been developed for lesser-used species as well as small diameter logs, tree tops and branches. Non-conventional raw materials such as climbing bamboos and forest vines have been studied and technologies developed for their use in the manufacture of handicrafts. Similarly, the use of these raw materials will ease pressure on the conventional materials. In addition to expanding the raw material base they also provide new opportunities for livelihoods for upland communities through collection and sale of these raw materials.

These technologies have moved Philippine forestry several steps toward the goal of sustainable forest management.

### **Environmental issues and policies and their impacts on the forestry sector**

The following are environmental issues and policies that may have immediate and lasting impacts on the forestry sector.

#### ***Priority of mining over forestry***

The Mining Act of 1995 (RA No. 7942, 1995) defines where mining exploration can be carried out. Timberlands and forestlands as defined by laws are open to mineral agreements or financial or technical assistance agreements. The Act also allows the mining contractor to cut trees for use in the mining operations provided that the area is covered by an existing timber concession; the volume, manner of cutting and removal of timber shall be determined by the Mines and Geo-science Regional Director in consultation with the timber concessionaire, the contractor and the Director of the Forest Management Bureau.

The Mining Act however, identified areas closed to mining operations. These include all areas expressly prohibited by the NIPAS Act or RA No. 7586) and its implementing rules and regulations (DAO No. 25 Series of 1992) and other laws. These areas closed to mining include old growth forests, proclaimed watersheds, wilderness areas, mangrove forests, mossy forests, national parks, provincial and municipal forest, green belts, game refuges and bird sanctuaries, among others.

All other areas are open to mining operations such as open access forestlands and those areas covered by various agreements (TLA, IFMA, SIFMA, CBFMA, etc.). Mining has priority over forest use. This puts at risk second growth forests and plantations found in mining areas.

The Act requires the mining contractors to use appropriate technologies to protect the environment and to restore or rehabilitate mined out areas and other areas affected by mine tailings and other forms of pollution and destruction. In view of this, the work plan of the contractor in developing the mining claim should include plans for rehabilitation, regeneration, and re-vegetation of mineralized areas. Despite efforts to rehabilitate mined out second growth forests or forest plantations it is doubtful if such efforts could bring back the original state of the affected forest resources.

***Commercial timber species listed as threatened plant species (Wildlife Conservation and Protection Act (RA No. 9147)***

Among the objectives of the Wildlife Conservation and Protection Act (RA No. 9147, 2001) as mentioned earlier, is to conserve and protect wildlife species and their habitats to promote ecological balance and enhance biological diversity.

Pursuant to the provision of RA No. 9147 and Implementing Rules and Regulations (Joint DENR-DA-PCSD AO No. 01, Series of 2004), the DENR issued a list of threatened Philippine animal and plant species and their categories. Many of the plants in the list are commercial species found in the second growth forests.

Placing them under the list and categorizing them as critically endangered, endangered, vulnerable and threatened virtually stops timber harvesting in production forest areas.

Other species in the list include those related to the livelihood activities of upland communities such as almaciga (*Agathis philippinensis*), pili (*Canarium ovatum*) and piling liitan (*Canarium luzonicum*). The Administrative Order prohibits the collection of resins and fruits of these species even in private lands (for pili and piling liitan). Although the Order was amended to allow harvesting of these products through a permit from the Secretary of DENR there is the threat that similar orders could be issued in the future.

The Joint DENR-DA-PCSD AO No. 01 (JDDP AO No. 1, 2004) further mandates the DENR Secretary to designate within two years following the promulgation of RA No. 9147 critical habitats outside the protected areas under RA No. 7586 where threatened species are found. All designated critical habitats are to be protected, in coordination with LGUs and other stakeholders, from exploitation or destruction. The 206 conservation priority areas identified under the Philippine Biodiversity Conservation Priorities in 2004 and the Key Biodiversity Areas in 2006 (PBCP, 2006) are currently being considered for designation as critical habitats if they do not qualify as protected areas based on the requirements of the NIPAS Act.

The establishment of the critical habitats will go a long way in the protection and conservation of threatened species. It will, however, diminish the effective area where commercial harvesting can be carried out.

***Insecurity of government permits and licenses***

After a few days of heavy rains flash floods and landslides occurred in General Nakar, Infanta and Real, Quezon in the southern part of the Southern Tagalog region in December 2004. The flash floods and landslides uprooted many trees and also washed down logs. Quezon Province does not have any logging operation. Because of this incident logging was suspended nationwide even in areas far away from Quezon Province (Memo from the Secretary, 2004). It was restored eventually for some regions on a case to case basis (Memo from Office of Secretary, 2005).

In 1998, illegally cut logs from the natural forest by an organized community with a CBFMA were confiscated in Quirino Province. Because of this incident, the RUPs to cut dead and fallen trees from the natural forest granted to CBFMA holders were suspended nationwide.

The two incidents, among many, illustrate how the government reacts to natural calamities that strike forest areas as well as isolated incidents of abuse by People's Organizations. In the case of the cut logs that rolled down the mountains during the flash flood that occurred in Quezon Province, the government should have investigated and those found guilty should have been punished. By suspending logging nationwide even the law abiding licensees were punished. This is true also in the case of the erring PO. Only the RUP of the erring PO should

have been suspended pending investigation and not the RUP of the entire CBFMA holders.

This action of government shows the insecurity of government permits and licenses. It discourages the flow of investments into the forestry sector both at the licensee level and at the community level. It does not portend a better future for the sector unless this practice is changed.

### ***Logging ban***

The rainy season in the island of Luzon in the Philippines was delayed in 2007 while it rained heavily in the southern part of the country. The water level of the dams supplying domestic water to households in Metro Manila and rice fields in nearby provinces reached critical levels that it was necessary for the government to undertake cloud seeding to induce rain. While many realized that this climate phenomenon was brought about by climate change there is still clamor from many quarters to revive the bill calling for a logging ban in the natural forest for 25 to 30 years. If the bill becomes a law there would be dire consequences. It would leave many of the licensed areas open access because it is uncertain if the present license holders would provide protection to the natural forest if they cannot conduct harvesting in these areas. The government would also be unable to provide protection to these areas. Open access forests would be prone to illegal logging and hasten their destruction and demise.

### ***Inadequate management of protected areas***

Of the 107 proclaimed protected areas, 19 do not have a constituted PAMB. Most of these 19 protected areas are newly established, two are under the direct supervision of PAWB. Without the PAMB, the PA lacks supervision and management and is at risk of intrusion and illegal occupation as well as poaching of forest products and bio-diversity.

A trust fund called Integrated Protected Area Fund (IPAF) was established under RA 7586 to provide sustainable financing for NIPAS. Fees are collected for the use of the resources and facilities of the protected areas. All IPAF collections go to the National Treasury. The DENR could access the Fund by submitting to the Department of Budget and Management a Work and Financial Plan, among the many other requirements to support the budget request. The estimated total collection of the IPAF is about PhP120 million since 1994 with total disbursement of PhP80.5 million as of August 2007. About 20 PAs have already availed the use of the IPAF for the management of PAs despite the many requirements and long and tedious process of accessing the Fund. Very few of the PAs have an IPAF. Those without one rely on meager funds from the national government and have difficulty providing protection to the PA and in implementing their comprehensive PA management plans.

Depending on the initiatives and resourcefulness of the PASu and the active participation of the PAMB members, particularly the LGU representatives, some PAs are able to pursue their conservation objectives such as the case of the Mt. Kitanglad Natural Park in Bukidnon, Central Mindanao. In this PA, the Provincial Government of Bukidnon shares responsibilities over law enforcement and protection activities by providing funds for the salaries of Park Rangers and demarcation of boundaries of the Park. It is necessary that stakeholders within the PA take responsibility for some of activities/projects in the comprehensive management plan. This is ensured when the management and development plan is prepared in collaboration with the stakeholders.

In some PAs volunteerism is evident such as in the case of Mt. Isarog Natural Park in the Bicol Region.

### ***Inadequate safeguarding of some biodiversity conservation areas***

Biodiversity conservation efforts in the Philippines target three levels; species, sites, and landscape levels. Focusing conservation efforts on these three levels ensures that the species at greatest risk of extinction are paid attention to and so are the sites and landscapes most important for their protection.

Site level targets are the Key Biodiversity Areas (KBAs). They contain species that require site level conservation to prevent them from extinction. A total of 128 KBAs were identified for 209 globally threatened and 419 endemic species of birds, amphibians, reptiles, fresh water fish, mammals as well as for 62 congregatory bird species. Presently, only 50 of the 128 KBAs benefit from official safeguard status. The rest lack formal government protection (CI Philippines, 2006). Without formal support these KBAs and the species found therein are at great risk of destruction.

### **Summary of key factors that are likely to impact forestry in the next 20 years**

#### ***The economy***

The Philippine economy is improving and it is expected to continue to improve unless there are political events that will disrupt its growth. With increasing economic growth there has been an increase in income of the people that has translated into an increased demand for goods and services including wood products such as lumber for construction and furniture for homes and hotels. This has provided incentives for investors including small farmers to establish commercial tree plantations that have improved the forest cover.

Because of the increased demand for goods and services locally and abroad there has been an increase in the conversion of prime agricultural land, especially in urban areas, industrial and economic zones as well as settlements and housing areas. This has displaced landless farmers who have been tenants in these agricultural lands. Many of them have migrated into the uplands to eke out a living from the land and the forest. This has brought tremendous pressure on these resources resulting in the decline of forests. This phenomenon is likely to continue into the future.

#### ***The energy demand of the country***

The Congress of the Philippines passed the Biofuels Act of 2006 (RA No. 9367, 2006) to ease the impact of the rising cost of fossil fuel on the economy. The law calls for the gradual replacement of diesel fuel with bio-diesel and gasoline with bioethanol. The plan of the government to establish about 2 million ha of jatropha plantations in forestlands and the plan of the private sector to develop about 600,000 ha of coconut plantations, most of them also in forestlands is going to change the landscape of the forestlands. The price of fossil fuel will continue to increase with corresponding decrease in supply. This is expected to result in the expansion of plantations of jatropha and coconut in forestlands. In turn this will reduce the amount of forest area available for forest tree plantations since it is expected that plantations of jatropha and coconut will be confined to forest areas that are also suitable for plantation development. On the other hand the establishment of jatropha and coconut plantations will benefit upland farmers since most of the coconut plantations are planned to be located in CBFMA and ISF areas.

The demand for fuelwood has never been filled. The forest will continue to be the main source of fuelwood. Upland communities often are dependent for their livelihoods on production of charcoal and selling this at the roadside or in the nearest market. Charcoaling has exacted a toll on forests close to communities. There is a new government plan to establish a program on fuelwood plantation development. This will ease pressure on the

natural forests and at the same time expand forest cover.

### ***The population***

The population growth rate of the Philippines is 2.35% annually. It has been estimated that if the trend continues the country will double its population in 29 years. This means that by 2036 the population will have grown to more than 180 million. Such a huge population will put tremendous pressure on the country's resources, particularly the forest which will have to provide materials for housing, fuelwood, for furniture and others. It will put pressure on water resources both surface and sub-surface water, and on biodiversity which will become a source of food and livelihood. The environment will be at risk with increased pollution particularly from solid wastes. Even now the metropolitan areas like Metro Manila, Cebu and Davao have difficulty looking for dump sites for their solid wastes. A doubling of the population will generate more difficulty in looking for areas in which waste can be dumped and in more likelihood forest areas will be used for this purpose.

### ***Impact of globalization***

The Philippines has entered into agreements with neighboring countries in ASEAN and with world organizations such as the UN and the ITTO. Most of these agreements are either on trade or on the environment. The ASEAN Free Trade Agreement (AFTA) could have mixed impacts. Zero tariffs can spur forest industries to be more efficient in processing and producing quality products that can compete globally. On the other hand foreign products provide serious competition where local products can lose out.

Global agreements on the environment are basically in the direction of improving the local environment and in protecting and conserving forest and biodiversity. The Kyoto Protocol will encourage reforestation/afforestation and plantation development because of the additional revenues that investors could receive from trading carbon emission reduction. Support by ITTO for research organizations in the Philippines in conducting studies on the use of small diameter logs, tree tops and branches, on lesser-used species and rattan has the effect of reducing demand on traditional species and expanding the resource base.

The UN Convention on Biological Diversity (UNCBD) was ratified by the Philippines in 1994. Pursuant to this Treaty, the Philippines enacted the Wildlife Conservation and Protection Act of 2001 (RA No. 9147). Under this Act, a list of threatened terrestrial animals and a list of threatened plants and their categories were issued. In the case of the list of threatened plants, it included commercial dipterocarp species which comprise the bulk of timber harvested in the natural second growth forests.

The list also included species whose by-products and derivatives are the basis for livelihoods of upland communities. This issuance threatens the employment and livelihood of many Filipinos.

### ***Technological changes***

Some technologies generated in forestry improve the chances of successful plantation development. Tissue culture and cloning are procedures to produce seedlings that possess the qualities and characteristics of the parent materials such as fast growth, good form, and resistance to pests and diseases. Another technology that could support plantation development is the development of biological fertilizers such as Bio-N, a fertilizer from micro-organisms from the roots of a grass. It induces growth of the roots of plants, reduces the cost of plantation development, and induces faster growth of plantation trees. Computer software on species site compatibility has been prepared and this can result in higher timber yields of plantations.

In forest product utilization, technologies have been developed on improving efficiency in processing and in expanding the resource base. Use of alternative species and materials for handicrafts provides additional materials that ease pressure on the dwindling resources of traditional species. Processes that lengthen the service life of construction materials have the effect of expanding the resource base since replacement of these materials is reduced.

The above technologies improve success in forest plantation development and thus, the ability to increase forest cover. They also increase the efficiency of the utilization of forest products with the effect of expanding the resource base. The overall impact is the conservation of the forest leading to sustainable forest management.

### ***Changes in policy and institutions***

The government is giving positive signals to plantation developers. It is liberalizing the harvesting and transport of timber planted in private lands. Harvesting in private lands no longer requires a permit and transport of logs only requires certification from barangay officials or by a registered forester. This is going to encourage investors in developing forest plantations especially in private lands. The lifting of the moratorium on the establishment of new sawmills will also spur similar positive effects on plantation development. Private plantation owners will now be able to process their own logs and benefit from value added to the products.

Institutional arrangements for the management of forests have veered toward the participation of various stakeholders such as upland communities and it is expected that this direction will continue in the future. Devolution of management of some forestlands to LGUs will also continue considering the agreements that the DENR has entered into with the Department of Interior and Local Government (DILG) and LGUs, albeit at a slower pace considering that many of the LGUs are wary of taking on the responsibility of forest management. Other government organizations have also been given the privilege to manage watersheds. It is expected that these arrangements will provide better protection and management of forest resources.

The IPRA Law has provided for the titling of ancestral and domain lands to indigenous people. Many of these areas are forested and will now be under the jurisdiction of concerned IPs. In some instances some of the titled areas are overlapping with proclaimed protected areas. An agreement between the DENR and the NCIP for assistance to the IPs in the preparation of the comprehensive management plans and in the implementation of the plans will ensure sustainable management of the forest areas. There is however a need to build the capacities of IPs in forest management.

By necessity many of the power and energy corporations of the government as well as the military establishments and the national irrigation administration will continue to manage forestlands. The government continues to place more forest areas under protected area status. More areas are being awarded to organized communities for management under the CBFMA. These developments are in the direction of placing every square metre of forestland under sustainable management.

### ***Issues on the environment***

The Mining Act of 1995 (RA No. 7942) gives priority to mine development over timber and forest resources. However, mining is closed in all areas prohibited under the NIPAS Law; it is open in all other areas such as open access forestlands and those covered by various agreements (TLA, IFMA, SIFMA, CBFMA, etc.). This puts at risk second growth forests and plantations found in mining areas.

On the other extreme, the Wildlife Conservation and Protection Act of 2001 (RA No. 9147) virtually closed timber harvesting in natural forests since the List of Threatened Species promulgated under this Act included many commercial species particularly dipterocarp species. However, the List has been amended to allow timber harvesting with the approval of the Secretary.

Many proclaimed PAs still do not have PAMBs, thus these areas are left under the supervision of the DENR. This leaves the areas exposed to intrusion by migrants as well as illegal loggers and poachers, the same situation as when they were not proclaimed as protected areas.

## **4. PROBABLE SCENARIOS AND THEIR IMPLICATIONS**

### **Rationale for scenario definitions**

Definition of the future state of forests and forest resources serves as a guide in crafting and planning the strategies for attaining the goals in this sector. If the scenario drawn based on current conditions is bleak it motivates planners and implementers of forestry programs to adopt measures to prevent such a scenario to come about. It allows policy makers to adopt policies necessary to mitigate disastrous conditions and promote advantageous situations.

### **Elements (parameters) used in defining scenarios**

The outlook of forestry in the Philippines in the near to long term is going to be defined by the interplay of a number of factors. These include demography, economy (local and global economic changes), the political situation, the energy situation, and the emerging changes in response to climate change, and availability and price of substitute materials. Macroeconomic policies and those in forestry and related sectors affect the future of forestry and forest resources in the country.

### **The business as usual scenario**

One of the drivers of change that has deep impact on forest and forestry in the Philippines is population. The increase in population and the displacement of the landless into the forest has been one of the major causes of forest destruction. The population growth rate of the country is placed at 2.35%. The government's program on population management has not been effective. The growing population goes to large cities such as Metro Manila, Cebu City and Davao City where employment opportunities are found. When employment becomes a problem, they flock to the forestlands and practice shifting cultivation and gather fuelwood for sale or for conversion to charcoal which further degrades the forest.

The government launched a massive reforestation program in the late 1980s that continued in the early 1990s. It was reported that through these efforts almost 200,000 ha have been reforested. In the mid-1990s, however, the efforts of the government in reforestation were declining and during the last 10 years the average rate of reforestation was registered at 33,000 ha annually with about 10,000 ha planted by the private sector (Table 24). It is not also known how many of these planted trees survived. The government has been relying mostly on donors for reforestation projects with very minimal local funding. Foreign assistance on reforestation has been waning. The government continues to provide only meager financial support and private sector investment in plantation development is rather limited. Unless there are government funds provided for plantation development and policies are enacted that are conducive to business and thus, will promote private investments, it is expected that the requirement of about 650,000 ha of productive plantations to meet local wood demand will be difficult to achieve.

The rice crisis in the country should have generated the infusion of funds into the sector for the rehabilitation of the watersheds so that adequate supply of water for irrigation is made available. Unfortunately, no such flow of funds so far is forthcoming. The National Power Corporation (NPC) which has a number of watersheds under its control has provided funds for the preparation of development plans for its watersheds and presumably will provide funds for the implementation of development plans. Aside from this the watersheds remain largely unattended except for a few and sporadic watershed development projects.

**Table 24. Area reforested in the last 10 years**

Year	Grand total	Government			Non-government sector			
		Total	DENR	OGA	Total	TLAs	Other tenure holders	Others
2005	<b>16,498</b>	7,187	7187	-	9,311	341	6,337	2,633
2004	<b>20,338</b>	12,436	12,436	-	7,902	2,836	4,431	635
2003	<b>15,088</b>	13,195	6,565	6,630	1,893	842	1,034	17
2002	<b>25,620</b>	20,681	9,111	11,570	4,939	564	3,850	525
2001	<b>31,444</b>	26,524	26,484	40	4,920	1,410	2,721	789
2000	<b>27,632</b>	21,740	19,059	2,681	5,892	1,989	3,421	482
1999	<b>42,167</b>	31,184	30,831	353	10,983	6,904	-	4,079
1998	<b>42,368</b>	33,219	32,643	576	9,149	8,236	-	913
1997	<b>66,237</b>	49,301	48,490	811	16,936	14,357	-	2,579
1996	<b>46,096</b>	18,869	18,869	-	27,227	20,005	-	7,222
1995	<b>65,233</b>	21,841	7,840	14,001	43,392	30,380	-	13,012

Source: Philippine Forestry Statistics, 2005.

The community-based forest management program which is the national strategy for sustainable forest development remains underfunded and funds come largely from foreign assisted projects (FAPs). The Philippine Tropical Forest Conservation Foundation [PTFCF] and the recently concluded Small Grant Project of the United Nations Development Programme have provided minimal assistance to CBFM projects for forest conservation and livelihood development. Support for FAPs, however, is also waning and the communities do not have the financial capacity to develop their areas. Investments from the private sector for the development of CBFM areas are also not forthcoming.

In biodiversity conservation the government continues its efforts at proclaiming protected areas. In fact, several sites have been lined up for proclamation. However, most of these areas are yet to organize PAMBs, the managing body of PAs, designate capable PASus and prepare and implement effectively comprehensive development plans for these areas. Furthermore, these areas are not being delineated on the ground and provided with adequate financial support by the government and from other sources. Some PAs, however, have received financial support from FAPs through NGOs.

The wood-based processing industries have remained almost without infusion of additional investments owing largely to a diminishing wood supply and the unsupportive policies of the government. The situation is expected to continue unless these twin problems are solved.

#### **Probable shifts and alternative scenarios**

The outlook for forests and the forestry sector in the Philippines in the next decades depends basically on some drivers of change. These include the economy, the environment, social factors, technologies and political factors. These factors do not impact on the forest and forestry sector independently of each other but often in combination.

### *The economy*

**Land use:** The economy of the Philippines is basically agricultural with mangoes and bananas and other tropical fruits being export products. There have been attempts to industrialize. Several foreign manufacturing companies have established processing plants in the country such as electronics companies, car parts manufacturers and garments companies. In fact, the major exports of the country are electronic items. The influx of industries created a demand for more land such that prime agricultural lands have given way to industrial zones. Because of the improved economy of the country and increase in population, demand for housing has increased. In response, the government has established low-cost housing projects in addition to the private sector housing construction companies. This has driven further the conversion of prime agricultural land for settlement and residential areas.

Because agriculture has lost out to industrial parks and economic zones, food production has found its way into the uplands. Forests having been undervalued giving way to crop production thus further reducing the forest cover that has already been under stress from the onslaught of improper logging, illegal logging, and poaching. In addition, farmers who have been displaced in the lowlands because of the conversion of agricultural lands to other uses have also found their way into the uplands converting forest areas into shifting cultivation farms.

The policy of the country to convert agricultural lands into commercial, industrial and residential areas has left the country underresourced in its basic needs such as rice. In 2008, the President, to address the rice shortage, issued an Executive Order prohibiting the conversion of prime agricultural land into other uses. The Philippines has become the largest importer of rice. With rice supply becoming tight because of lower global production and increasing demand brought about by increasing population, the price has dramatically increased. Locally, a kilogram of rice which was about PhP20/kg at the start of the year has more than doubled to about PhP42/kg and is still rising. Because of this, the Department of Agrarian Reform (DAR) by virtue of the instruction of the President has suspended the conversion of agricultural lands to other land uses.

There are three options the country can take to meet the demand for food: first is to increase production per unit land area, second is to increase land area under cultivation, and third is to try both. However, there is a limit to increasing land productivity. Besides, fertilizers have become expensive and the use of hybrids has likewise proved to be expensive because of the high inputs needed to attain their production potential. Irrigation of paddy areas has not been able to keep up with the demand for water. In any case, the country will likely aim to improve production and expand the land area under cultivation, but efforts have moved slowly. Organic fertilizers which are much cheaper than inorganic fertilizers, but equally effective, have become available in the market.

With insufficient rice production and increasing demand from an increasing population the government has started looking at the forestlands as possible production areas for agricultural products. This certainly will further reduce the forest cover of the country.

On the other hand, the focus on the production of rice and other agricultural crops may have positive impacts on the forest. There will be greater demand for water and the attention of the government will eventually be turned towards the rehabilitation of the watersheds. As more irrigation water is needed by the agriculture sector, the government may allocate more funds to rehabilitate watersheds and develop more forest plantations. The Southern Philippines Irrigations Systems Project [SPISP] (Watershed Management Improvement Components) is basically geared toward this initiative. It is supporting certain irrigation systems in Southern Philippines such as the Cana-sujan Irrigation project in Carcar Cebu and Guibong Watershed

in Mindanao.

**Energy:** Another economic factor that is making deep impact on the Philippine economy and on the forest and forestry sector is the energy situation. The price of crude oil has dramatically increased to more than US\$135 a barrel and the pump price of gasoline has reached more than PhP50/litre compared to only about PhP40 at the start of 2008. During the past 5 years the country has been planning and implementing ways to find alternative fuel sources. Among those identified are biofuels to partly replace diesel and gasoline. For biodiesel the species that have been given priority are jatropha (*Jatropha curcas*) and coconut (*Cocus nucifera*). The Philippines has targeted to plant close to 2 million ha of jatropha in the uplands. The DENR which has been tasked to locate areas for jatropha plantations has identified so far about 375,000 ha of forestlands. While most of the areas identified are grasslands this certainly is going to change the vegetative cover of the forest areas and take away areas that could be reverted back to forest condition. There are also plans to establish coconut plantations of about 600,000 ha in CBFM and ISF areas for the production of raw materials for the manufacture of coco-methyl ester as biodiesel. To partly replace gasoline the country has looked at alcohol from sugar cane and from sweet sorghum. In Negros Province more areas are planted to sugar cane to supply the requirements of the country for bio-fuels.

If the energy situation continues or even worsens, there will be more forest areas that will be converted to jatropha, coconut and possibly oil palm plantations. Since focus will also be given to these commodities, there could be fewer funds for reforestation and watershed rehabilitation from the public sector. On the other hand, if the development of electric cars and solar powered vehicles succeeds to the point that they will be available to the general public in terms of prices, this will ease the demand on fossil fuel. This will also ease the demand for forest areas for the establishment of plantations for diesel and gasoline substitutes.

The other dimension of the energy situation is the demand for fuelwood/firewood including charcoal. The demand for fuelwood in the Philippines is estimated at about 29 million m<sup>3</sup>, much higher than the demand for timber for construction and for similar purposes. The energy situation has exacerbated the forest situation in the country since the price of electricity and LPG has increased. If the energy situation further deteriorates, there will be more demand for fuelwood and charcoal, which in turn will cause more illegal cutting and poaching in public forests. On the other hand, the increased demand for fuelwood and charcoal will drive the prices of these commodities higher. It may reach a point where it would be profitable to raise plantations dedicated to supply fuelwood in the market.

### ***Social factors***

**Population:** One of the social factors with deep impact on forest and forestry in the country is population. The Philippines has a growth rate of 2.35% and it has been predicted that if the growth rate does not decrease the population could double in 29 years. The increase in population will result in increased demand for space, food, water, shelter, clothing, health services, and education and subsequently will put more pressure on the resources of the country to provide these basic necessities. In the forestry sector, the demand for space will certainly result in the migration of more people into the uplands, clearing forest areas for residential and for agricultural purposes. Forestry, not being of paramount importance to the government because of its diminished monetary contributions to the economy, will likely be the first to be sacrificed, including the biodiversity it contains, in the quest for space, food and shelter.

There is, however, a possible change in the government's population program. A number of bills on reproductive health and population management have been submitted in both houses of Congress for consideration. If the bills become a law, a more effective population program

could be put in place and it will decelerate the growth of the population. It will, however, take time before the impact of the population program will be felt.

***Political and institutional changes***

**Policies:** The present national policies on forests and forestry are embodied in the 1975 Revised Forestry Code. It was issued when the country was still one of the biggest exporters of logs and other wood products. It contains regulatory policies on timber harvesting.

Community forestry was still a nascent idea that had yet to take root among policy and decision makers including those of the academe. Since then strategies have been towards promoting sustainable development and in the development of partnership and collaboration with all forest stakeholders particularly the communities within and around forest areas. Biodiversity conservation is an integral part of sustainable development.

The Sustainable Forest Management bill was submitted to Congress for enactment as early as 1989 or almost 20 years ago but it has not been passed. The main issue is the varying understanding on what sustainable forestry is. Some members of the Congress are advocating for a total logging ban while there are those who are open to the idea of selective logging. In the absence of a legislated forestry law, forestry policies continue to be promulgated by the executive branch [DENR and Office of the President] through administrative fiats such as Executive Orders, Administrative Order, Memorandum Circulars, and other issuances. Administrative issuances can be easily revoked, amended, or repealed by the Secretary of the DENR. And as the Secretary of the DENR changes so do the policies. The frequent changes in forest policies have created confusion among the different stakeholders including the field offices of the DENR as to which policies are in effect. This has led to ineffective implementation of these policies.

If the Sustainable Forest Management bill is not enacted into law the forest resources of the country will be under constant threat because of unstable policies resulting in ineffective implementation. Under this situation it is also expected that the country will not be able to generate sufficient funds from the government to rehabilitate watersheds. The private sector will likewise be hesitant to invest in plantation development because of the uncertainty of their tenure and the lack of assurance that they will be able to harvest the plantations that they will develop. A similar situation will likely happen in the wood processing sector because of uncertainty of policies regarding wood utilization.

**Community participation:** Executive Order No. 263 established community-based forest management as the national strategy for sustainable management of forest resources. It awarded tenure to organized communities of certain areas of public forestlands to manage and benefit from. More than 3 million ha (only about 1.6 million ha are tenured) of forestlands (often containing natural forest cover) have been awarded to communities to manage. Unfortunately, only a small portion of that area has been developed properly. This is because the government has not been able to provide enough resources for their development. Most of these developments have taken place under foreign funded projects. When the foreign funded projects terminate, development of the areas also terminates. Development assistance for the communities from regular allocation has been very limited.

Similarly, private investments in CBFM areas have been very limited. For projects that are turned over to LGUs after completion, development activities have dwindled because of limited funding support provided by LGUs.

If no development assistance is provided to the CBFM communities no development will take place in these areas. In the absence of livelihood opportunities, these areas will continue to suffer from repeated illegal harvesting and poaching resulting in the decline of forest cover.

Also no or very limited plantations will be developed in these areas.

**Devolution of forest management:** The Local Government Code (RA 7160) transferred some functions of the DENR to LGUs such as the management of small watersheds, community forestry and the implementation of some forestry laws. The devolution of these functions to LGUs will not only allow the LGUs greater participation in the management of natural resources but also make forest management more relevant, meaningful and beneficial to the lives of people in the communities since local concerns would be integrated in the management of forest resources. To implement these devolved functions LGUs are encouraged to establish a Provincial/Municipal Environment and Natural Resources Office, as the case may be.

Until now, only very few LGUs have done this because of limited financial capabilities to establish these offices. Forest management functions transferred to the LGUs are either performed by the Municipal Agriculture Office or as added functions of other units. As regards allocation of resources, the LGUs have limited funds to support the implementation of the ISF. Thus, most ISF participants have filed applications with the DENR for the issuance of CBFMAs in their ISF areas.

If the devolution of the management of some forest resources to LGUs is stalled because of the inability of LGUs to set up institutions to manage these resources well, the forest resources in the local communities will continue to be under threat from illegal occupation and from illegal harvesting and poaching of forest products.

Another dimension in the devolution of forest management through institutional change is the transfer of authority over forestlands from the DENR to indigenous peoples. RA No. 8371 (Indigenous Peoples Rights Act) provided to IPs the right of ownership of their ancestral lands and domains and they can have these titled. It also created the NCIP to assist the IPs in managing their lands and affairs. However, authority over forest products contained therein still rests with the DENR. This has caused some friction between the IPs and the DENR because the IPs would like to have full control and authority over these resources. Unfortunately, the Constitution of the Philippines provides that all natural resources belong to the State. The DENR and the NCIP have entered into an agreement whereby the DENR will assist the NCIP and the IPs to prepare and implement comprehensive resource management plans for ancestral lands and domains.

Currently, the issuance of tenure instruments by the DENR requires free and prior informed consent (FPIC) of the IPs including areas that do not have IPs. This has slowed down the issuance of tenure instruments. The procedure for the issuance of FPIC by the NICP/IP is a long process. On May 23, 2008, however, the President issued Executive Order No. 726 transferring the NCIP to the DENR which hopefully will iron out the differences between these two agencies and facilitate the issuance of FPIC. The Implementing Rules and Regulations, however, are yet to be formulated and approved.

If the DENR and the NCIP/IPs do not come to full agreement on the disposition of forest resources within ancestral lands/domains or that the comprehensive resource management plans are not properly implemented, the forest resources in these areas will be under constant threat of being mismanaged and misused. The DENR and NCIP/IP should also come to an agreement on how to accelerate the issuance of FPIC.

### ***Environmental changes***

**Climate change:** The impacts of climate change such as stronger and more frequent typhoons, cyclones, floods, drought, landslides, soil erosion, the destruction of crops, destruction of lives and properties and many other calamities have brought to the fore the

need to mitigate these impacts and to adapt to climate change. Several efforts have been made in the Philippines to adapt to climate change such as mapping of flood prone areas and the establishment of community-based flood monitoring systems as an early warning mechanism to inform people of impending floods. In the energy sector many waste reduction mechanisms in energy projects have been instituted to reduce the emission into the atmosphere of GHGs such as methane and carbon dioxide.

The forestry sector presents one opportunity to mitigate climate change by serving as sink for carbon dioxide and by reducing soil erosion that also cause emission of GHGs. There are several efforts underway to establish forest plantations for registration as CDMs under the Kyoto Protocol. These could lead to an increase in forest cover in addition to the financial benefits realized in the trading of certified emission (of carbon dioxide) reductions (CERs). To increase plantation development under the CDM, the DENR must create a favorable environment for investments in the sector.

If the efforts of both the government and the private sector remain limited as far as plantation development is concerned, mitigation of climate change will remain limited and there will not be much improvement in the forest cover of the country.

### ***Technological changes***

**Biotechnology:** Several advances in biotechnology in the forestry sector could help the sector achieve its goals of increased forest cover and self-sufficiency in wood and other forest products. These are in tissue culture, cloning and organic fertilizers. Protocols for tissue culture of bamboo, rattan and a number of plantation tree species have been developed and field trials of tissue cultured seedlings have been made. Cloning is already a well developed technology for the production of high quality planting materials in the forestry sector. In fact commercial plantations have used cloned seedlings. A company has been set up in North Central Mindanao to produce cloned Gmelina for sale to plantation developers. The Ecosystems Research and Development Service (ERDS) of DENR Region X particularly the research center in Bukidnon is now selling cloned Mahogany seedlings. Likewise, organic fertilizers have been developed such as the “Mykovam” which is based on mycorrhiza, a fungus obtained from roots of plants. Another organic fertilizer, BioN, based on bacteria found in the roots of talahib has been developed and is now widely used as fertilizer for rice, corn and vegetables.

The challenge in this area is the wider use of these biotechnologies for the establishment of forest plantations which will reduce development cost and increase productivity. This depends on information campaigns by the government on the use of these technologies by small farmers and large plantation developers and on further research in these areas.

If the government embarks on a nationwide campaign based on the use of cloned seedlings and biofertilizers or the use of these technologies in government reforestation projects there will be higher survival rates and better quality of plantations. Furthermore, if the government provides more funds for further research on biotechnology there will be greater chances of improving the forest cover of the country.

**Remote sensing:** One of the reasons the Philippines has failed in its forest protection efforts is its inability to monitor its forest resources at the site level. Monitoring has been limited to surveillance of the movement of forest products through check points and recently through a computer based monitoring system. The use of satellite images and/or aerial photographs to monitor the changes in forest cover of tenure holders especially the TLAs and IFMAs as well as CBFMAs and those of the military and civil reservations and other forest managers like the NPC, the PNOC and the NIA has not been widely and regularly undertaken. NAMRIA regularly acquires satellite images that can be used to monitor changes in forest cover. The

large tenure-holders such as the TLAs and IFMAs are required to submit to the DENR aerial photographs of their areas. These should be used to monitor forest areas and make the tenure-holders accountable for whatever unauthorized operations that result in negative impacts in their areas. The DENR should be able to institute a corresponding system of disincentives, sanctions, and penalties for those who do not protect their forest or those who abuse the use of their tenure. Failure to do this will result in further degradation of the country's forest resources.

### **The most likely situation**

The most likely situation is that the economy will continue to grow as indicated by the growth rate of 7.3% in 2007. However the rate of growth will be greatly hampered by the rice situation and the energy crisis. Government attention and finances will be directed to alleviating the situation brought about by these two factors. As regards the rice crisis, the government will soon realize that to increase productivity will not only require expanding the rice areas but also taking care of the water supply to irrigate the rice fields and produce out-of-season rice. Consequently, this will compel the government to allocate more funds for the rehabilitation and better management of watersheds. However, some forest areas will give way to food production.

In the case of the energy crisis it is expected that more forestlands will be utilized for the production of sources of biofuels such as jatropha, coconut and possibly oil palm. This will change the structure of the vegetative cover of the forest areas. If oil palms are planted, large areas of forestlands will be converted and forest cover will be reduced including biodiversity therein. Hydroelectric power plants provide cleaner power at less cost than power generated with the use of coal since the latter emits GHGs. In the rehabilitation of watersheds for the continued supply of irrigation water, watersheds of hydroelectric dams will also be provided funds for their rehabilitation. Already the NPC is in the process of obtaining consultancy services for the preparation of watershed management and development plans for watersheds under its jurisdiction. The increased recognition of watersheds in sustaining these infrastructures will motivate the government to institute water users' fees or payments for environmental services.

On the other hand, the increased demand for fuelwood/firewood and charcoal will see the establishment of fuelwood plantations, thus increasing forest cover. The added benefit in fuelwood plantations is that there is no need to conduct replanting of the areas if species that coppice such as Gmelina, giant ipil-ipil, kakawate and auri (*Acacia auriculiformis*) are used.

The spectre of 180 million Filipinos in less than 30 years will bring to the fore the need for the government to adopt a more effective population program. This will greatly slow down population growth rate and ease the demand for space, water, food and other resources and services. The impact of a population program, however, even if it is effective will be felt much later. In the meantime some of the people displaced in the lowlands will spill over to forest areas. It is only hoped that the adoption of an effective population program will be implemented soon.

The increasing awareness of the contribution of forest to mitigate climate change will prompt Congress to adopt the sustainable forest management system in the country and pass the SFM Act. This will stabilize policies, improve the effectiveness of their implementation, and gain the confidence of the private sector. This will lead to higher investments in forest development and forest product processing thereby increasing forest plantations, and greater production of forest products. It will also improve the confidence of the government regarding its ability to govern the sector and revise policies such as banning the export of lumber from imported logs. This would benefit industry and provide more employment.

Some of the investments from the private sector will find their way into organizing upland communities. This will help realize the potential of communities to take the lead in the sustainable management of forest resources.

The devolution of management of forest resources to LGUs will be impeded by their limited capacity to do so. First, is the lack of resources to establish local ENR offices and secondly, the limited technical capability of the LGU personnel. There is a need to enhance the LGUs. Presently, the DENR through a foreign assisted project has been assisting LGUs in preparing their forest land-use plans. The assistance, however, is extended only to selected LGUs. Given the limited resources of LGUs, the devolution of management of forest resources will be limited. This will still threaten local forests with continued illegal logging and poaching and with little or no forest development from the LGU side.

The DENR and the NCIP/IP will be able to work out an acceptable working relationship that will promote the sustainable management of the resources found in their forests following comprehensive resource management plans. This will allow better management of the forests on a sustainable basis and possibly increase forest cover through the development of forest plantations by the IPs. The biodiversity of the area will also be protected as this will be incorporated in the resource management plans for the forest areas. Recently, Executive Order No. 726 issued on May 23, 2008 transferred to the DENR administrative supervision over NCIP (EO No. 726, 2008). This will facilitate collaboration between the DENR and the NCIP on forestry issues.

An approved SFM Act will spur forest rehabilitation and increase investment from the private sector in plantation development. These plantations will be registered under the CDM as project activities or they will become carbon sinks and help mitigate emission of carbon dioxide. It is expected that there will be increased plantation development in the near and medium term. It is also expected that more funds will be allocated to the forestry sector to rehabilitate the forests, especially watersheds.

With respect to biotechnology it is expected that the government will promote more vigorously the use of cloned seedlings and biofertilizers. As a result more private and government plantations will make use of these two biotechnology products resulting in improved growth and better quality of plantations.

The use of remote sensing to monitor the state of forest resources is long overdue. The use of aerial photographs and satellite images to monitor the state of forest resources will allow the DENR to make the tenure holders accountable for the protection and management of their forest areas. This will greatly reduce illegal logging and poaching thereby improving the state of forest cover as well as biodiversity of the country.

## 5. WHAT WE MAY SEE IN 2020

### Forest resources in the next two decades

#### *Forest cover situation in the context of alternative scenarios*

On the basis of the situation that will likely occur in the next two decades the following will take place regarding the forest cover situation:

1. Policies supportive of forest plantation development will be adopted and will be beneficial to smallholder plantations including those in private lands.
2. Incentives for forest plantation development are expected to be formulated and put in place including possibly micro-financing for smallholder plantation farmers.
3. More confidence is generated from investors to invest in forest plantation development including joint ventures with community-based forest management and people's organizations providing options for development of CBFMA areas.
4. More funds will be provided by the government to rehabilitate and better manage watersheds.
5. It will take some time before an effective population program will take effect, meantime migration into the forestlands will continue in the near term and destroy part of the natural forest cover.
6. More watersheds will be rehabilitated as a result of more funds allocated as a result of the rice and energy crises.
7. Part of the forest cover will give way to plantation development of biofuels.
8. Better monitoring of forestlands and resources will result in better protection of these resources.
9. Policies on payment for environmental services in forestlands will be implemented.

On the whole, the outcome will be a decrease in the natural forest brought about by continued poaching for fuelwood, illegal logging and conversion to crop production and production of biofuels but there will be a total net increase in forest cover due mainly to plantation development by smallholder farmers with contributions by corporate plantation development as well as through the rehabilitation of watersheds by large tenure holders such as the NPC, PNOC and NIA.

#### *Change in the area under production and protection*

There are presently 77 terrestrial protected areas covering an area of 1.85 million ha. There are more being planned for proclamation. The passage of the Sustainable Forest Management Act will also provide impetus to providing better attention in establishing, managing and funding PAs. It is expected that the procedures for the release of Integrated Protected Area Funds will be streamlined and faster release of funds will ensue. This, in turn, will see better managed and protected PAs. The production forest from the natural forest will definitely decrease because some of it will form part of the PAs but the production forest will also increase because of the increase in plantation forest in public lands and in private lands.

#### *Extent of area under sustainable forest management*

Thus far, only one forest area has been certified as sustainably managed forest in the Philippines. It is a CBFM forest in Mindanao. The ITTO project in Surigao Province in east-central Mindanao attempts to establish the area under sustainable forest management. All essential stakeholders in the area which include the IPs, LGUs, NGOs, members of people's organizations, civil society and investors have participated in the development of a management and development plan for the area. An organization made up of all the stakeholders was registered to implement the development plan.

The process followed in Surigao is probably the right way for establishing sustainable forest management units but it is very intensive and costly. It may not be easy to replicate. The government will encourage the establishment of sustainably managed forests especially those under tenure as mandated by an approved SFM Act. However, given the cost of doing so it is unlikely that more areas will be placed under sustainable forest management in the near future.

### ***Growing stock, increment and annual harvest of wood***

The change in growing stock will follow changes in forest cover. As stated above it is foreseen that there will be a slight increase in forest cover brought about by an increase in areas under forest plantations and because of the rehabilitation of watersheds which exceeds losses from continued illegal logging, poaching and fuelwood gathering as well as the conversion of some forestlands into biofuel plantations. As a result there will be a slight increase in the growing stock of the country.

The annual harvest is foreseen to increase. Most of the log production will come from forest plantations and it is expected that before the next decade the log production from plantations will account for more than 90 percent of log production. Eventually, log production from the natural forest will further decline as more natural forest areas become part of protected areas.

### **Wood and wood products**

#### ***Production, consumption and trade***

In 2005, the total timber production of the country amounted to 841,000 m<sup>3</sup> of which only 96,000 m<sup>3</sup> came from the natural forest with the balance coming from tree plantations. In the same year the country imported 165,000 m<sup>3</sup> of logs while exporting less than 1,000 m<sup>3</sup> of timber. With the projected increase in commercial tree plantations it is expected that local log production will surpass 1 million m<sup>3</sup> while at the same time increasing export of plantation logs.

As far as lumber is concerned, production was reported in 2005 to be 288,000 m<sup>3</sup> while the quantity imported was 363,000 m<sup>3</sup> or a total of 651,000 m<sup>3</sup>. Of this, 130,000 m<sup>3</sup> was exported, the remainder of 521,000 m<sup>3</sup> representing apparent consumption. In the light of climate change more and more people especially those with higher income and environmental advocates are opting for green construction utilizing wood as construction materials instead of steel and concrete because of the higher energy required to produce the two latter materials. It is expected that in the next decade, there will be higher consumption of wood as construction material. With higher log production coming from tree plantations, it is also expected that exports of lumber will continue to increase.

In terms of veneer and plywood, the Philippines will continue to import veneer logs and veneer for the production of plywood. Some plantation species, however, such as falcata and Gmelina (utilizing the lower portion of the trunk for core veneer) are utilized mostly for core veneer. There will be less production of veneer logs from the natural forest in the years to come. The Philippines will continue to export plywood but the increase will be minimal.

#### ***State of forest industries***

The forest industries of the country have been described as sunset industries particularly the wood based industries. This means that the industries are in a decline and this is characterized by low or no fresh investments at all. There has been a decline in the number of active sawmills with only 30 operating in 2005 compared to 209 in 1980. Consequently the daily

rated capacity declined from 11,000 m<sup>3</sup> in 1980 to only 1,000 m<sup>3</sup> in 2005.

The number of veneer and plywood mills from 1980 to 2005 paints a slightly different picture. The production of veneer and plywood over the 25 year period has not changed very much; likewise the number of active veneer and plywood mills has not varied much over 25 years. This could be due to plywood being able to compete with panel and ceiling materials while lumber has not been able to compete with steel and concrete for columns and for trusses. However, very few plywood mills have modernized their equipment by installing veneer lathes that can cut to smaller core logs. Most of the equipment of the veneer and plywood mills is over 25 years old and needs to be upgraded. This situation results in lower quality veneer and plywood.

The concentration of veneer and plywood mills is in Region 11 (Davao area) and Region 13 (Caraga area) where 15 veneer mills and 17 plywood mills are located. The raw materials for plywood have shifted from dipterocarp species coming from the natural forests to plantation grown species such as *Falcata* and *Gmelina*. It is likely that veneer and plywood production will continue to be located in these two regions because of the presence of plantations of *Falcata* and *Gmelina*. It is also expected that future plantation development in these regions will continue to increase because of the presence of veneer and plywood mills, the markets of these two species. It is not likely that there will be a large expansion of the veneer and plywood industries in the Philippines but the country will continue to produce its local requirements and maybe continue to export plywood, albeit in limited quantities.

#### ***Forest product industries in the global context***

The forest industries of the country have not been as competitive in the global market as they used to be 20 to 25 years ago when the Philippines was one of the dominant suppliers of wood and wood products in the world. While the country continues to produce lumber, veneer and plywood these are generally for the local market. Very little is exported and importation has been more or less steady.

However, in the forest-based industries there are some emerging industries that have shown vigorous competitiveness in the world markets. These are the furniture industry, handicraft industry, and the NWFP industry.

The total global furniture export market is estimated to be US\$52 billion. The export performance of selected forest-based furniture has been increasing steadily since 2001 from US\$206.49 to 232.49 million or an increase of 12.6%. However, the 2005 export value of Philippine furniture is a mere 0.44% compared to the global market. Given the wide opportunity for the furniture industry to expand in the global market especially in the high-end type of furniture, it has to be more aggressive. In 1999 it only ranked 4<sup>th</sup> in ASEAN after Malaysia (US\$1.3 billion), Indonesia (US\$1.2 billion) and Thailand (US\$0.85 billion). China exported close to US\$3.7 billion in 1999. The area where Philippine furniture has been competitive is in design.

The domestic market of furniture is difficult to assess because of the absence of records of sales unlike the export of furniture for which the Bureau of Customs has the relevant data. It is estimated that the domestic market for furniture and home furnishings is about PhP19 billion a year (TAPI, 2001). At the dollar exchange rate in 2000, this would be about US\$380 million or equivalent to the export value of furniture, thus, the local market also presents good opportunities for expansion of the furniture industry.

The furniture industry is expected to continue to grow close to if not more than 10% a year owing to the improving supply of local wood mainly from plantations and because of continued superiority of design which often combines different materials such as wood,

rattan/bamboo, metal/plastics and even stone in one furniture piece and is attractive in the foreign markets. More growth can be expected from the furniture and handicraft industries. There is little promotion, however, of these products from the government sector.

Another industry group that has been making much progress is herbal, body care and health products from forest-based sources. The export of this industry in 2002 was US\$43 million and is expected to further expand every year because of the increasing awareness of people about health and body care. What will hamper the industry is the limited development of plantations of plants from which these products are produced.

### ***Country's share in the global trade***

The share of the country in the global trade of wood and wood products in the next decade will most likely remain to be more or less the same as it is now. This is because it will take time for new plantations to mature. The harvests from the present plantations will only be used to fill up local demand with very little export of logs, lumber, veneer and plywood. When the plantations that are expected to be established in the next several years become harvestable after 10-12 years, there will be an increase in the global trade of the country in wood products.

### **Wood as a source of energy**

#### ***Emerging energy scenarios***

In the immediate future it is likely that more forestlands will be allocated for the growing of jatropha, coconut or oil palm for bio-diesel. The DENR has already allocated about 375,000 ha of forestlands for jatropha plantations. This will take away areas that could have been used for forest plantations. It is also likely that jatropha investors will contract POs for the growing of jatropha in their CBFM areas. To that extent it would provide the communities with sources of income over a period of time and if the funds are managed well, these could be used to develop other portions of their CBFM areas for forest plantations or for agro-forest crop production.

It is therefore expected that biofuels (biodiesel and alcohol) will be used to replace part of fossil fuel.

#### ***Potentials and constraints in the increased use of wood as a source of energy***

Wood has many applications for the generation of energy from simple firewood to the generation of electricity. With increasing prices of fossil fuel it will become increasingly economical to transform wood energy to electrical energy. These are the biomass to energy systems such as dendro-thermal plants, gasifiers and pyrolyzers, and the fluidized bed combustion system. There is also the potential for the use of wood pellets as replacements for coal in power generation. In the 1970s, the country tried to establish dendrothermal plants but failed because the tree plantations which would have served as raw materials did not succeed. Gasifiers and pyrolyzers did not move beyond the research stage because of the difficulty of cleaning the gases of particulate matter and tar and the fluidized bed combustion system suffered from economies of scale. They should be large systems to be economical.

With the continued increase in the price of fossil fuel there is great potential for wood-to-energy-systems. It is likely that more wood will be used for cooking and for conversion to power/electricity. However, the use of more wood will be constrained by supply. On the other hand, the low supply of fuelwood will increase further its price to a level that it will become highly profitable to raise fuelwood in plantations. Further, use of wood for electricity generation will require overcoming technological problems such as designing filter systems

that can effectively remove tar and particulate matter from gases from the burning of wood to run internal combustion engines, which in turn, will run turbines to generate electricity.

### ***Policies relating to energy use and their likely impacts***

To ease the effect of rising prices on fossil fuel and to reduce the emission of GHGs to the atmosphere, the Philippine Congress passed the Biofuels Act of 2006 (RA No. 9367, 2006). The law calls for the gradual replacement of diesel fuel with biodiesel and gasoline with bioethanol. Within 2 years from the promulgation of this Act at least 5% (by volume) of bioethanol would have replaced gasoline and about the same amount of biodiesel would have replaced diesel fuel. Within 4 years the replacement would be at least 10% for both gasoline and diesel. There are already gasoline stations in Metro Manila that sell diesel fuel mixed with 1% biodiesel.

In the forestry sector, what is likely to take place is the allocation of more areas for biofuel production. The existing area of 375,000 ha allocated for jatropha plantation will be likely to expand in support of the initiative of the government to use biofuels. As regards fuelwood, it is also expected that the government will issue policies supportive of the establishment of fuelwood plantations. The government will allocate forestlands for the development of such plantations. The government will also establish/enhance nurseries to provide planting materials at cost. Technical support will also be provided by the government. The Regional Office of DENR Region III is already preparing a project on fuelwood plantation development, initially targeting about 5 ha per province. While this may not be sufficient for some provinces what is more important is the advocacy that accompanies such projects. The likely impact would be the increased area of fuelwood plantation and the development of this endeavor as a supplemental source of income for households, especially in the uplands. This will also see private lands converted to fuelwood plantations or at least more intensified boundary or perimeter planting of fuelwood species.

### ***Changes in energy technology***

In the early 1970s when the energy crisis first emerged, the Philippines explored the use of dendro-thermal energy for power generation. The government established dendro-thermal plantations using ipil-ipil (*Leucaena leucocephala*). However, the program did not succeed for a number of reasons, one of which being the low survival rate of planted trees because of poor maintenance and protection activities.

In the 1980s, there was an attempt to popularize gasifiers. Gasifiers are internal combustion engines that utilize gases from the burning of charcoal. The gases from the burning charcoal are cleaned and filtered of suspended solids and tar and fed into an internal combustion engine. The engine in turn runs a generator to produce electricity. The main reason gasifiers did not prosper was the difficulty of cleaning the gas. If the gas is not cleaned properly the suspended solids and tar in the gas clog the cylinders of the internal combustion engine.

There was also research on the biomass pyrolyzer system undertaken in the 1980s. Several biomass materials such as wood chips, sawdust, coconut shells, rice hulls and others when burned yielded pyrolysis gases, charcoal and traces of pyrolysis oil. The gas was used to supplement diesel oil for running internal combustion engines which in turn ran a generator (Unciano and Briones, 1989). Like the gasifier the gas needs to be cleaned of particulate matter and tar. The gas cleaning system was not effective and the biomass pyrolyzer system did not prosper.

Another use of wood in power generation was fluidized bed combustion. Sawdust is burned in the fluidized bed to generate heat to produce steam which in turn is used to run a turbine to generate electricity. The steam could also be used to run dry kilns in drying wood and other

materials. The Australian Government implemented a project in Southeast Asia (ASEAN-Australia Economic Cooperation Program Phase I and II) involving a number of countries to develop the fluidized bed generator (Unciano et al Undated). The Forest Products Research and Development Institute (FPRDI) participated in the project and the fluidized bed generator it developed is now being used by Asia Rattan, a furniture factory in Central Luzon, in running a steam boiler to generate steam for its dry kilns. The use of the fluidized bed is claimed by Asia Rattan to have generated savings for the company. The company was using sawdust and wastes as fuel for the fluidized bed generator.

The price of fossil fuel will generate interest in energy technologies that have been tried in the past. Among these would be the dendro-thermal electricity plants, gasifiers, pyrolyzers, and fluidized bed combustion. It is expected that more funds will be allocated to develop further the above technologies. Interest will also be in the lower level technologies for using wood energy such as more efficient wood/charcoal stoves and briquetting technologies. It is likely that there will also be attempts to replace coal with charcoal briquettes or wood pellets in running power generating plants. If that happens, large areas of plantations would be needed to produce the briquettes or pellets.

#### ***Most likely situation as regards wood energy use***

The fossil fuel crisis will drive to new levels the demand for wood fuel. Right now the price of LPG has been escalating so more families are turning to the use of fuelwood. The use of gasifiers or pyrolyzers and even fluidized bed generators will become more economically viable compared to about two decades ago and more research efforts will be expended to further develop these technologies. The use of fossil fuel for electricity generation will decrease because of the escalating prices. Thus, there is a major opportunity for the use of wood for power generation. The most likely situation is that there will be widespread development of fuelwood plantations, increased use of efficient wood stoves and greater research funds to further develop the old technologies of gasifiers, pyrolyzers and fluidized bed generators.

#### **Future of non-wood forest products**

The two most important NWFPs in the Philippines are bamboo and rattan. They form the basis for a segment of the furniture industry. They are also important raw materials for the production of handicrafts. Bamboo is also a major raw material for construction either as the building material itself or as scaffolding during construction. Presently, there is no national program for the development of these two NWFPs. However, there has been a growing interest in bamboo both as construction material and as food (bamboo shoots). There have been a number of national conventions and workshops on bamboo and the Laguna Lake Development Authority (LLDA), an office attached to DENR, has been promoting the use of bamboo as reforestation material in watersheds around the lake. This interest will augur well towards promoting the plantation development of bamboo.

The sub-sector of the NWFP sector that will become more prominent in the next decade are herbal, medicinal, body and beauty care, as well as food supplement products. The industry is growing very fast. Prominent among these NWFPs are those that produce essential oils used as fragrance in soaps and body lotions. Some are trees while others are shrubs and herbs. They include ilang-ilang (*Cananga odorata*), citronella (*Cymbopogon nardus*), and lemongrass (*Cymbopogon citratus*). Cultivation of these plants has proved a viable livelihood and an enterprise for upland communities. A PO in Ilagan, Isabela has entered into a contract with an herbal soap and lotion manufacturer, the Herbakh Philippines, to supply essential oils. The PO has established plantations of citronella and lemon grass. It has also planted a 34-ha ilang-ilang plantation which is now more than 3 years old. It is expected that more private sector investors will establish plantations of these species in cooperation with organized

upland communities. Herbakh Philippines is also buying essential oils from an upland community in Quirino Province. It is expected that there will be more planting and growing of plants that provide raw materials for medicines, body and beauty care as well as food supplements and spices.

### **Service functions of forests**

#### ***Long term shift resulting in increased use of forest for their service functions***

Two major service functions of forests will emerge in the near future and will continue to impact the forestry sector in the long term. First is the function of forests in providing a sustainable supply of water. This will largely be a result of the rice crisis. As the rice crisis worsens decision-makers in the highest echelon of government will begin to value the importance of watersheds in supplying water for agricultural purposes and also for industrial as well as domestic needs. More support for watershed rehabilitation will ensue.

The second major service function of the forest that has gained prominence is the tourism function of forest, both in the uplands and in mangrove areas. The tourism function of forests is here defined as that function that caters to foreign visitors as contrasted with the recreational function of forest which generally caters to locals. Forests are major components of landscapes that have become major tourist attractions. This is particularly true in sites that have unique features such as caves, waterfalls, unique land formations, or underground rivers. These features are often found in forest areas. Bird watchers have also come to the Philippines to watch unique endemic bird species including migratory birds that rest in protected areas such as the Olango Island Wildlife Sanctuary and Agusan Marsh Wildlife Sanctuary in Cebu and Agusan, respectively. Since tourism has been providing employment in communities of tourist destinations the people and the local governments (tourism has also improved the income of LGUs) have started to protect the tourist areas which include forests and mangrove areas. It is likely that more forest areas will gain protection from the communities and local governments.

#### ***Recreational use of forests and the long term potentials (including economic viability)***

With the improving economic/financial condition of many families especially those who have relatives working overseas they have now more capacity to go to recreational areas. Thus more recreational facilities have been established especially in metropolitan and other urban areas. More people are also drawn to natural recreational areas including forest areas. One major recreational area has been developed close to Metro Manila and it is drawing crowds from nearby cities. The nature park in Mt. Makiling which is only about 60 km away from Metro Manila is also a favorite destination on week-ends not only for students who go on nature field trips but also the general public. Privately owned nature parks are also week-end destinations such as the Eden Garden in Davao City in Mindanao. It is foreseeable that more nature parks will be established not only by government but by private investors as well.

#### ***Wildlife management and managing forest for biodiversity***

Two major items of legislation were passed by the Philippine Congress for the protection and management of biodiversity, the NIPAS Law (RA No. 7586 of 1992) and the Wildlife Conservation and Protection Act (RA No. 9147 of 2001). These two Acts aim to ensure the conservation and sustainable management of Philippine biodiversity.

It is expected that in the near and medium term there will be more proclaimed protected areas for the conservation and preservation of biodiversity as well as their habitats. It is also expected that more intensive management of these protected areas and their biodiversity will be implemented including the establishment of functional PAMBs with operational

management plans in each of the protected areas. The one constraint in the protection and management of biodiversity will be insufficiency of funds allocated for protected area management unless innovative means of sourcing resources are developed by each of the PAMBs of the protected areas.

### *Urban forestry*

One of the consequences of urbanization is the removal of trees and other greenery to give way to infrastructure such as roads, buildings, sidewalks, parking lots, etc. Populations in urban areas are now demanding more space for trees and city parks and that sidewalks be planted with trees and other vegetation. In recognition of the importance of trees and parks in reducing air pollution and in ameliorating temperature as well as the recreational services they offer, urban LGUs are establishing more mini-forests and city parks. One example of a forest area that has been improved close to Metropolitan Manila is the La Mesa Watershed Reservation which the President recently proclaimed as a watershed reserve and was developed as a recreational area by an NGO. Furthermore, housing developers are required to allocate about 30% of the subdivision area for recreational areas including mini-forest parks.

Recognizing the importance of urban forestry as a function of the DENR in cooperation with the LGUs, the National Capital Region (NCR) of the DENR has established an Urban Forestry Division to provide assistance to developers and local governments within Metro Manila. Although this organizational set up is present only at the NCR, this service is being provided by another division in the other DENR regional offices.

It is expected that more forest parks will be established in urban areas in the near and medium term up to 2020. To help LGUs identify species for urban park development, the Ecosystems Research and Development Bureau (ERDB) of the DENR has published a list of species suitable for urban areas (ERDB, 2006).

### *Forests and water — the future*

Continuous increase of population leads to increase in demand for water for domestic, irrigation, industrial and commercial uses. Continuous supply of water for these purposes requires proper management of watersheds. It is expected that there will be a spill-over effect of the rice and energy crisis in the forestry sector. Decision makers will come to realize that rice and other food production efforts will be short sighted without a sustainable supply of water and that this can happen only by taking better care and management of the watersheds. As a result it is most likely that more budget allocation will be provided by the national government for the rehabilitation and proper management of important watersheds.

Several government-owned and controlled corporations have management jurisdiction over watershed areas such as the National Power Corporation (NPC), the Philippine National Oil Company (PNOC) and the National Irrigation Administration (NIA). They have already started to provide funds for the rehabilitation of their watersheds. The NPC is in the process of getting tenders from consultancy firms for the preparation of management and development plans for watersheds under its jurisdiction. In addition several LGUs have become more concerned with water supply in their communities and have begun to provide budgetary allocations for the improvement of their small watersheds.

It is expected that with the increasing consciousness of the national government, the LGUs and the government-owned and controlled corporations there will be better management of the country's watersheds in the near future.

### ***Forests as carbon sinks***

In the London financial district the fastest growing specialty is in managing carbon emissions. Companies are scrambling to get a slice of the estimated market of US\$30 billion and it is expected to grow to US\$1 trillion within a decade (NYT, 2007). Piggy-backed to the carbon trading are the investments in new projects in developing countries that will generate additional carbon credits.

The implementation of the CDM is quite new in the Philippines. The mechanisms for processing CDM projects are already institutionalized with the DENR as the Designated National Authority (DNA) and the procedures for processing applications for projects have been put in place. The LLDA, a corporation attached to the DENR has a project with the World Bank called Carbon Shed and the Authority is spearheading the development of CDM projects around Laguna Lake. The PNOC is also developing a project in its Pantabangan watershed for submission under the CDM and the Philippine Eagle Foundation (PEF) an NGO is assisting several communities in the Arakan Valley in North Cotabato in Mindanao to develop a CDM project. It is expected that with the LLDA leading the efforts, more private plantations will be developed as CDM projects.

### **Social functions of forests**

#### ***Forests and employment generation***

Employment in the forestry sector has decreased from the days when the forest cover of the country was bountiful and there were many logging companies. Employment then was in harvesting and wood processing. Now only 18 TLAs are operating and by 2011 the last one will have expired. However, there are other opportunities for employment that have opened in spite of or because of the decline of the traditional forestry sector. These are in the field of environment and forest conservation, in secondary and tertiary wood processing such as in furniture manufacture, handicrafts production, and in forest-related tourism.

Now, there are more companies involved in small scale plantation development where employment can be found. Many individual farmers and communities have started to raise seedlings in nurseries in response to the growing demand for seedlings. One company has started production of cloned seedlings to supply high quality seedlings for plantation development in Mindanao.

With the scenario of improved forestry governance that could be brought about by the passage of the SFM Act and the new confidence in the forestry sector that the SFM Act is expected to bring about, more forest plantations both in government and private lands will be developed. This will bring about opportunities for employment relative to plantation development and later on in the harvest, transport and primary and secondary processing of wood products. The new interest in bamboo plantation development will also bring about more employment opportunities for the production of bamboo planting materials. The expected increase in the supply of this raw material will further generate employment in the processing of bamboo products for construction and for handicraft and furniture.

The expanding tourism industry has encompassed forest areas as part of tourism destinations. This will expand as it has already expanded employment in the care and management of the tourist areas, as tourist guides, and in the production and sale of souvenir items.

The rapidly emerging market for herbal, medicinal, body care products and food supplements will open new areas for employment. The export market for these products is large and still increasing. Employment will be in nursery and plantation development and in processing and marketing.

### ***Forests in the context of improving the rural economies***

Rural economies have been improving because of remittances from overseas workers. With these remittances families have built new houses or renovated their old houses. In addition they have established small enterprises. These families have, to a certain degree, been weaned away from total dependence on the forest and forest products. The efforts of many government agencies to bring development in rural areas have started to bear fruit such as improved agricultural productivity or improved capacity of communities to access credit or development assistance. Again to a certain degree this has reduced the dependence of the communities on forest.

While there may be a palpable improvement in the rural economy not all families are equally favorably affected by it. They continue to be impoverished and they continue to depend largely for their livelihood on the forest. It is expected that in the near and long term the forest will still loom large as a source of livelihood for many rural families.

In this context upland communities continue to need assistance especially from the DENR, the LGUs and other government development agencies in the identification of opportunities for enterprise development. The type of enterprises depends on the existing resources within or close to the communities. It could be tourism, seedling production where there is demand for it, fruit processing such as fruit jams and jellies, fruit juices, vinegar production where there is sustainable raw material available or even honey bee rearing. What is crucial is the support provided to these communities.

### **An overview of the future of forests and forestry in 2020**

Forests and forestry in the Philippines in 2020 will see an improvement in the forest cover. This will come mostly in the form of forest plantations. It is projected that an additional 220,000 ha of forest plantations will be established, most as industrial forest plantations. It is also projected that more forest lands will be devolved to LGUs and communities and as such will be better taken care of. By 2020 it is also projected that an additional 1 million ha will be proclaimed as protected areas.

It is projected that by 2020 the Philippines will be producing about 2 million m<sup>3</sup> of logs mostly coming from forest plantations. The Philippines will also become a net exporter of lumber, veneer and plywood. It is expected that the country will be exporting 300,000 m<sup>3</sup> of lumber, 10,000 m<sup>3</sup> of veneer and 50,000 m<sup>3</sup> of plywood. Furniture and handicrafts will continue to be foreign exchange earners. NWFPs especially herbal, body-care products and food supplements will increase in export value.

The increasing price of fossil fuel will spark some changes in the forest landscape. It is expected that more plantations for the production of raw materials for biodiesel such as jatropha and coconut will be established. There are plans to establish about 2 million ha of jatropha plantations and about 600,000 ha of coconut-based agro-forest plantations for the production of coco-methyl ester, about 200,000 ha of which could be located in ISF and CBFMA areas. The high price of LPG will raise demands for fuelwood and as a result will see an increase in fuelwood plantations. It is projected that by 2020 there will already be about 10,000 ha of fuelwood plantations.

All these changes will be brought about by the improving policy and institutional environment in forestry in the coming years. Policy in plantation development will be more liberal. The lifting of the moratorium on the establishment of mini-sawmills will be expanded to include other wood processing mills. It is also projected that lumber produced from imported logs will also be allowed to be exported.

The expansion of forest plantations and revitalized wood processing industries including NWFPs will generate an increase in employment in forestry.

Forest and forestry in the country will continue to be influenced by international commitments. This is particularly true in forest and biodiversity conservation and protection. This will be evidenced by the increase in the area proclaimed as protected areas. It is also expected that protected areas will be better managed and better funded.

## 6. HOW COULD WE CREATE A BETTER FUTURE?

**Responding to changing societal needs:** The needs of society with respect to forests and resources derived from them have been changing over the years. During the middle of the 20<sup>th</sup> century the needs of society were utilitarian, wood for construction and non-wood products to meet demands for furniture and handicrafts. As society became more aware that health and individual well-being are closely tied to a cleaner environment and land productivity in the forest there was demand for the conservation of forest resources. As the economy became stronger and financial capacities of families grew bigger, society began to demand more recreational facilities and tourism destinations.

The current demand for water has been made more acute because of increasing population coupled by the fact that water sources such as springs, rivers and other water bodies are drying up as a result of the destruction of the forest. Thus, there is more clamor for the conservation of forests especially watersheds. To create a more secure future for water it is indeed necessary to rehabilitate, protect and manage watersheds properly.

The energy crisis is ballooning and has started to change the services that are demanded of forestlands and the forestry sector. Forestlands are now expected to provide space for growing alternative fuels such as jatropha and coconut as well as oil palm. Forests have been the traditional sources of fuelwood and charcoal. It is expected that in the near term more investments will be made in fuelwood plantation development.

The impact of climate change has demanded the reduction of GHG emissions. In the field of construction, architects are designing buildings that save on the use of energy. Thus, preferences in building materials have shifted to those that require less energy to produce or those that are less polluting. Wood construction materials, in addition to sequestering carbon, require less energy to manufacture than steel and cement. Many owners are now designing their homes using wood construction materials. This is expected to increase the demand for wood. The Philippines can respond to increasing local demand by establishing more tree plantations and managing and protecting the natural production forests.

**Policy changes within and outside the forest sector:** One of the factors affecting the economic development of the country is its population. The rate of growth of the population is outstripping gains in productivity in agriculture and industry. Thus, to make real economic progress there is a need for the government to implement an effective population program.

The Mining Act (RA No. 7942) gives priority to mining over that of forests. This could lead to the destruction of part of the forest cover (natural or planted) outside of protected areas which are exempted from mining. The DENR should ensure that mining companies comply closely with the requirements that they rehabilitate mined areas.

One initiative the government must take, not only with the DENR but with other agencies of government that have anything to do with investments such as the Department of Trade and Industry (DTI), the Securities and Exchange Commission (SEC), the LGUs, the Police and the Military as well as the various agencies of the Department of Finance (DoF) such as the Bureau of Customs (BoC) and the Bureau of Internal Revenue (BIR) is to respond to the complaint of the private sector that it is difficult to do business in the Philippines because of high transactional costs. In the forestry sector, in particular investors lament the insecurity of their tenure because they are not sure whether they can harvest what they plant. To attract investments, the sector must make sure that policies are clear, stable, and effectively implemented. This returns to re-orientation of field officers from a regulatory mode to a development mode.

**Institutional changes:** One factor that has been affecting governance in the forestry sector in a negative way is the inability of the DENR field offices to shift from their regulatory orientation to a development attitude as required by the present governance framework and situation. When the management of forest resources was still conducted through TLAs there was a need to supervise the timber concessionaires closely. Now that the government has entered into partnerships with communities and LGUs as well as private investors in the management of forests and forest resources, DENR partners should embrace participatory development approaches (facilitators, catalysts, and network and linkage builders). This calls for a re-orientation of the field officers and a re-structuring of field offices especially the CENRO. The CENRO should be structured and should function as an extension and coordinating office providing assistance to investors in forestry and not as a regulator and fiscal body. The DENR, however, should still have its regulatory functions but the unit that conducts extension should be separate and distinct from the unit whose function is regulation so that field officers will not be confused as to what their functions are.

Another institutional change that needs to move forward is the gradual and phased devolution of the management of forests to the LGUs. At present, the limited implementation of the devolved functions is due to the lack of appreciation of both the DENR and LGUs on the concept. The DENR shall also transfer to LGUs the required competency in the management of forestland. The DENR must realize that the forestlands which constitute about half of the land area of the country cannot be effectively managed and developed without the partnership of other stakeholders, particularly the LGUs. It must accept that eventually it has to transfer management of these resources to LGUs who have proven capacity. While there are agreements signed between the two parties for more co-management of forest resources the DENR has yet to develop a concrete program with timelines for the devolution of the management of these resources. On the other hand, LGUs should also have a similar program to prepare themselves for the transfer of management of forest areas that are important to their economy such as watersheds and areas for forest development.

Concomitant to the changing role of the DENR field offices is the relationship with upland communities, particularly those that have been extended forest management agreements. Again, the CBFMA communities should be viewed as partners in the management of the natural resources within their communities and accordingly provided with development assistance. While funding support expected of the DENR is minimal, the agency has limited capability to provide other assistance such as technical support in plantation development or in accessing financial assistance from other sources. The DENR should also examine its policy of providing free seedlings and of paying the community for its labor in site preparation, out-planting, and plantation protection and maintenance during plantation development since this has been proven ineffective and has not engendered ownership of the plantation by the communities. Through this approach, communities view plantations as being owned by the government especially because they were paid laborers in the establishment of them. But what is crucial in the community-DENR relationship is the building of trust and confidence and this can start in a most significant way by the DENR field officers embracing their role as development partners and not as regulators.

The communities, on the other hand, must also accept that they have a role to play in forest development. They have to view the entire process not as a short-term opportunity for employment but as a long-term economic activity that is designed not only for their benefit but also for the entire country. What is needed is an extension program by the DENR.

One institutional change that needs to be incorporated in forest resource management is making the resource managers accountable for their forest areas and resources therein. To do so effectively, the DENR must institute an effective monitoring system. Remote sensing technology has become available at reduced cost so the government can afford to establish a system to monitor the forest resources in the country. Resource managers should be made

accountable for any unexplained reduction or destruction of resources within their area of responsibility.

**Technological changes:** Technological advances have been made in plantation development in the production of quality planting materials through cloning and in the development of organic fertilizers such as BioN and Mykovam. More new and effective technologies could be generated from the forestry sector that can provide benefits within and outside the sector. The forestry research and development sector can pick up where it left off during the 1980s and develop more efficient biomass for energy systems which are suitable for small scale energy applications. Energy-reducing processing systems can also be developed for the wood industry such as energy-saving sawing methods and the adoption of solar drying technology.

Technologies that expand the viability of the forestry sector are urgently needed. The use of cloning and organic fertilizers will expand the productivity of forest plantations per unit of area. What are needed are technologies that lengthen the service life of wood with low pollution effect or those that expand the utility of wood and reduce wastes. Government must provide more research and development funds to develop these technologies.

**Regional and global cooperation:** A number of concerns in the forestry sector often require cooperation among countries involved. One of these concerns is illegal logging. Often illegally cut logs find transboundary markets. Illegal logging can be minimized if not entirely eliminated if log-buying countries refuse to buy illegally cut logs. Agreements between countries have already been made to this effect. The Philippines must take the initiative to enter into agreement with trade-partner countries. Another area that requires cooperation is the trade of endangered flora and fauna. The Philippines should strengthen its cooperation with other countries not only with the signatories to CITES but also with non-signatory countries.

In the area of biodiversity conservation, ASEAN has a cooperative project with the European Union, the ASEAN Center for Biodiversity (ACB). The role of the Center should be strengthened to foster cooperation in the exchange of technologies and practices in biodiversity conservation and protected area management. One area where such cooperation can be established is in the capacity building of various agencies and institutions and officers and managers of protected areas. The ACB has already started by initiating consultations with officials of the DENR, the academe, and practitioners in protected area management. This dialogue should be carried out with ASEAN member countries to identify the capacity building requirements of various levels of protected area managers and practitioners in the region.

Research is also one area where cooperation should be established among countries not only within ASEAN but also in the Asia-Pacific Region and beyond. ITTO has been funding research activities that involve many ASEAN members such as the ongoing project on rattan. The project has been building capacity in nursery and rattan plantation development among cooperating countries in ASEAN that include Thailand, Indonesia, Vietnam, Myanmar, Cambodia, Lao PDR and the Philippines. One activity that the project is undertaking is the development of rattan grading rules which hopes to foster better marketing of rattan poles and semi-processed products. Similar cooperative research could be undertaken among ASEAN member countries with countries outside the region.

**Overall priorities and strategies:** In summary, the overall priorities of the forestry sector are to meet the demand for environmental services; foremost is that of water for various purposes that include domestic, agricultural, industrial and commercial uses. The other environmental services include conservation of biodiversity, provision of venues for recreation and facilities for ecotourism. Other priority objectives of the forestry sector are meeting the demand for wood and other forest products, contributing to food and energy security, improving the

economic well-being of forest occupants and upland communities, and contributing to the overall economic development of the country.

The strategy that the country has to adopt to achieve the overall priority objectives of the sector includes the following:

1. Effective governance in the forestry sector: Effective governance in the sector is predicated on a number of confluent actions, among them are:
  - Passage of the SFM Act — this would stabilize forest policies and improve their implementation
  - A paradigm shift in the perception of the role of DENR field officers, from a regulatory to a development function. Field officers must begin to view their role in the overall scheme of forest resource management as development facilitators. This must first be a political policy of DENR management and it should begin to inculcate this attitude among its field officers
  - This should be followed by a re-structuring of the field institutions particularly the CENRO. The DENR cannot altogether dissociate itself from regulatory functions. The CENRO should be structured in such a way that one unit should function as an extension and development office whose main function is to assist partners in forest management while a separate and distinct unit in the CENRO can carry out regulatory functions. There should not be any cross-over in these two functions among officers in the CENRO.
2. Improve the climate for investments in forestry and forest industries — unstable policies have created a situation where investors have become wary that if they invest in plantation development they may not be able to harvest their plantations. To encourage investors to develop plantations or enter into wood processing their investment should be secured and guaranteed that the rules of the game will not be changed. Furthermore, the cost of transactions should not be too high that they are not assured of reasonable returns to their investments. The playing field should be level for all players and the government should always ensure a fair and balanced decision.

In addition to a favorable climate for investments in forestry, the government should develop a system whereby forest plantations could be traded, if not in the stock market, as a legitimate commodity. The system should be able to guarantee and certify as to the quantity and quality of the growing stock in a particular area of plantation to be traded. The system should also be able to guarantee protection from fire, illegal logging, and poaching. The system should include insurance against damage from natural causes. In short, the system should elicit confidence from buyers in order for this mechanism to work. The benefit of being able to trade plantations is that it can generate the needed capital for plantation maintenance and provide the opportunity for owners to recover their investments anytime when needed.

Incentives should also be provided for investments in the sector.

Small plantation development cannot move forward as fast as it could because of the paucity of funding. Small plantation developers should be provided with micro-financing that they can repay when they harvest their logs. Furthermore, small plantation development is subjected to the same requirements as large plantation development. They should be exempted from obtaining an ECC, because their activities are geared towards improving the environment.

3. Secure accountability by forest managers — forest managers whether they are Government Owned and Controlled Corporations (GOCCs) or upland communities or the private sector should be made responsible and accountable for the protection and management of the resources under their jurisdiction. The government should invest in technologies for monitoring of the forest resources such as remote sensing to obtain reliable data for decision-making. The government must impose punishment on those who are remiss in their duties of protecting and managing the forests.
4. Users' fees for environmental services — the government cannot always provide the funds to rehabilitate the watersheds to meet the demand for water from various stakeholders. A system of payment for environmental services should be developed to generate the funds for insuring that the forest will continue to provide the needed services. Similarly, users' fees should be established for the management of protected areas and for biodiversity conservation.

**Investment requirements:** The national government does not have sufficient financial capability to fund development in the forestry sector such as the rehabilitation of the watersheds and for the establishment of forest plantations. Innovative schemes should be pursued to develop the forestry sector. Private investments should be encouraged particularly in the establishment of forest plantations. Establishing the environment for investments therefore is a very important strategy for financing part of the development efforts.

For the rehabilitation of watersheds, the conservation of biodiversity and in the management of protected areas, payment for environmental services should be a mechanism that can be pursued. Rewarding the upland poor who practice soil and water conservation (RUPES) in their fields is worth pursuing. In addition, as part of their social responsibility large corporations should be encouraged to invest in the conservation of the environment. A power company in Quezon Province has provided a substantial amount for the development and conservation of mangroves in the province. An NGO has financially supported the development of a forest area close to Metro Manila as a recreational facility. The National Power Corporation (NPC) is authorized to collect a certain amount for every kilo-watt hour generated as an environmental fee. The DENR can assist the NPC to plan and implement watershed rehabilitation projects.

There are already established financing schemes for development in the sector such as the rattan deposit for which a certain amount is collected for every metre of rattan harvested and this is deposited in the national treasury. There is also the Integrated Protected Area Fund which is collected for financing the management and development activities for protected areas. Moreover, the benefit sharing scheme implemented for plantation developed with government funds in CBFM areas also provides for a 75-25 percent sharing in favor of the PO. Since the funds are deposited with the national treasury it is not easy to have them released for the purpose they are intended. The DENR, however, has to work out a mechanism with the Department of Budget and Management (DBM) for easier access to these funds.

The Mount Kitanglad Protected Area in Bukidnon Province in Mindanao is one of the better managed protected areas. This has been made possible through the assistance of the local governments in providing funds and additional personnel in manning the protection and management of the PA. This could serve as a model for other PAs for better management. Another mechanism is being developed by the LGU of a municipality famous as a tourist destination. It is preparing an ordinance that would impose a fee of PhP200 (US\$4) for each tourist and the funds will be used to maintain and protect the environment of the municipality.

## 7. SUMMARY AND CONCLUSIONS

### Findings and observations

**Condition and health of the forests** — there is a reported increase in the forest cover and this can be attributed to the following factors:

- The previous statistics which showed a decline in the forest cover were based only from projections using the results of the earlier studies conducted in 1969 and 1988. The forest cover from 1969 to 1988 was in a decline, hence, from 1988 to 1997 the projection on forest cover was also on a decline
- The increase can also be a result of the change in what is reported as forest. While earlier what was considered as forest was a minimum of one hectare, now it is 0.5 ha; before plantations were not included in the reported forest cover, now they are included, also included are forests in private lands

There is little attention at the moment to rehabilitating the important watersheds despite the current rice crisis. No one is connecting the need for water and the role of watersheds in providing the needed water not only for agriculture but also for domestic, industrial and commercial uses.

The forests are still besieged by illegal cutting and poaching and shifting cultivation. The forestlands are being regarded to provide space for the growing of sources of alternative fuel such as jatropha, coconut and oil palm. This takes away areas for possible expansion of plantation development. On the other hand, the oil crisis will trigger the establishment of fuelwood plantations.

**Condition of the forest-based industries** — log production has been on the decline and the country has become a net importer of logs. The country will continue to import part of its log requirements in the next decade. The bulk of logs produced now comes from plantations and these plantation logs are coming from smallholder farms. Fewer and fewer logs are coming from the natural forests.

Lumber production has been on the decline since 1990 and has remained more or less constant from 2000 onwards. The country has also become a net importer of lumber. Again, this is expected to continue into the next decade. Similarly, imports of veneer are much higher than veneer exports. The declining production of veneer logs from the natural forest will mean a continued importation of veneer. Although the export of plywood has declined since the early 1990s the country continues to have a positive balance in the plywood trade. This is also expected to continue as long as the prices of plywood in the international market remain favorable.

The country continues to have a positive outlook in the furniture and handicraft sub-sectors. Both areas continue to expand. One sub-sector that has shown great promise is in the health and body care, medicinal and food supplements sub-sector. The country is beginning to export these products.

The environment for investment in the forestry sector is not conducive. Policies are constantly changing such that investors are wary that the trees they plant will not be harvested by them and transaction costs will be very high. The returns on investments promise to be high but enthusiasm is dampened by high risks in the sector because of high instability of policies.

**Protected areas and biodiversity** — the country has proclaimed 107 protected areas covering 3.81 million ha; 77 of these protected areas are terrestrial covering 1.85 million ha while the rest are marine and coastal areas. The country continues to proclaim areas rich in

biodiversity as protected areas. Many of the PAs are not well managed because of the paucity of funds and of qualified personnel to manage these areas. The extent of production in second growth natural forests decreases as more areas are proclaimed as protected areas.

**Forest plantations** — the total area of forest plantations developed by government and non-government sectors has been declining since 1990. Annually, the area developed by the government sector has always exceeded that of the non-government sector except in 2005 when the area developed by the government sector was lower by 30 percent. About 28% of the area planted by the non-government sector was in private lands.

**Policies** — the SFM bill is still being discussed in Congress. The Revised Forestry Code of 1975 remains the main forest policy source but it has been overtaken by issuances from the DENR (administrative orders, memoranda and circulars) and from the Office of the President through executive orders. The issuances from the DENR change frequently. This has spawned instability in forest policies resulting in ineffective forest governance. This is one reason for low confidence of the private sector in forestry as an investment area.

**Forest institutions** — most of the DENR's field officers have not been able to shift from the regulatory frame of mind, spawned during the days when the country was a major producer and exporter of logs and manufactured wood products, to the development frame of mind. This has become a barrier in transforming field officers into agents of extension and development partners supposed to guide tenure holders and private investors in forest development.

Accountability of forest managers such as tenure holders (TLAs, IFMAs, SIFMAs, CBFMAs, etc), GOCCs (NPC, PNOC, NIA), the military (military reservations), the PAMBs and other government agencies has not been imposed effectively on them. This is because of the lack of an efficient and effective system for monitoring the changes in the status of forestlands and resources within their responsibilities.

The CBFMA remains the national strategy for sustainable development in the uplands. However, investments are being made to develop areas covered by CBFMAs.

**Devolution in forest management** — although mandated by the Local Government Code, devolution in forest management to LGUs has been slow, owing to 1) resistance of the DENR to share responsibilities in decision making in sensitive management functions such as resource utilization, and 2) inadequate institutional capacity on the part of the LGUs to undertake natural resource management. There are only a few LGUs who have established Provincial/Municipal Environment and Natural Resources Offices and there are very few qualified technical personnel in the LGUs.

**Drivers of change** — among the drivers of change in the forestry sector, population growth ranks as a driver with very critical impacts on forestry. The changes in land use and land management in the lowlands particularly prime agricultural lands are often an offshoot of the rapid increase in population. Population growth has also affected forest areas because of the continuing incursion of people who have no place else to go in the urban areas. This caused the destruction of forest through shifting cultivation and the gathering of forest products, particularly wood for fuel and charcoal production.

The energy crisis is affecting land use in forestlands. Already the DENR has assigned 375,000 ha of forest areas for possible production of jatropha. Similarly, forestlands including those of ISF and CBFMA areas are being contemplated for coconut production to produce raw materials for biodiesel. Fuelwood plantations are also being planned in the forest areas. Should there be a resurgence of biomass for energy systems, more fuelwood plantations would be developed.

The rice crisis is not generating the level of interest in watersheds that the forestry sector anticipated. This has been due to the lack of attention being given by decision-makers in the sector.

**Budget allocation** — given the potential of the forestry sector as an economic force in the country, budgetary allocations for development are very limited. The DENR therefore cannot provide needed funds for effective governance and in forest development especially plantation development and rehabilitation of watersheds.

## Conclusions

Based on the above findings and observations, the following are some of the key conclusions of the study:

1. The country will continue to be a log deficit country and it will rely on imports to meet its demands for timber in the next decade. As a result the country will continue to import lumber to augment local production as well as importing veneer. It will however, continue to be an exporter of plywood, furniture, handicrafts and NWFPs. There is a need to develop more commercial plantations to meet the local demand for timber and for export.
2. There is a need for Congress to pass the Sustainable Forest Management Act in order to have stable forestry policies and improved governance in the sector.
3. The investment environment in the sector has to improve in order to gain confidence of the private sector to invest in forest development and wood processing. This requires stable policies, secure tenure, reduced transactional costs and greater incentives.
4. Another requirement for improved governance in the sector is a paradigm shift in the policy direction of the DENR. More emphasis is needed on development functions rather than regulatory and control functions. This shift must take place among the personnel of the DENR, especially field officers. The structure of the DENR needs also to evolve in a manner that reflects the paradigm shift, with distinct units undertaking forest development functions separate from regulation functions.
5. More forestlands will be used in the growing of raw materials for biofuels. This will change the vegetative structure of the forests.
6. The government will continue to have biodiversity rich areas proclaimed as protected areas. The irony is that not all of the proclaimed protected areas can be given adequate management because of the dearth of qualified protected area superintendents and protected area personnel and lack of funds to manage protected areas properly. These areas will remain under threat of destruction from illegal logging, poaching and gathering of fuelwood and other NWFPs including endangered flora and fauna.
7. The population growth rate will continue in the next decade and it will also continue to be one of the major reasons for the destruction of forests. The government needs to implement a more effective family planning program soon but its effect will not be felt in the next 5 to 10 years.
8. Devolution will continue to take place but at a slow pace. This will be defined by how fast the DENR will have a shift from its perceived function of regulation and control to a development function. Furthermore, this will also be affected by how fast the LGUs can become capable of assuming their functions as resource managers.
9. An effective monitoring system using remote sensing technologies is required to monitor the state of forest resources of the country. It is also a mechanism for the government to impose accountability on forest managers. This will redound to better managed forest resources.

**Follow-up to the Outlook Study**

The future of the forestry sector as pictured in the Outlook Study will depend a great deal on the pursuance of the strategies mentioned and the developments within and outside of the sector. The strategies should be pursued as much as possible to effect positive changes in the forestry sector. It is upon the initiative of the DENR in general and of the FMB in particular to make positive changes irrespective of the hurdles it must overcome within and outside of the DENR.

The FMB will review the Outlook Study periodically and in particular the identified strategies and pursue implementing policies and projects to attain the desired forestry and forestry sector status in the near and medium term.

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