

Chapter



Flora

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INTRODUCTION

Flora is a term taken from the name of the Roman *goddess of flowers*. It is defined to be *the plant life that is present in a particular region or habitat or at a particular time*. It refers to plants in general including *ferns, lycopods, lichens, fungi, and mosses (based on Webster's Dictionary)*.

Flora is a vital component of *symbiotic life*. Flora lives on the other components as much as it exists for the other components in a natural cycle of mutual dependence called symbiosis.

While flora refers to plants in general, flora as discussed in this chapter covers only the existing plant wildlife in the Philippines and is primarily focused on the forest – its cover or vegetation – and to a limited extent, on marine plant resources.

Flora is often associated with the forest although the latter is far more complex than being a mere assemblage of trees, bushes, flowers, and rare plant species. A forest provides the main watersheds of rivers. It is home to a great variety of fauna and witness to many of nature's phenomena. It is a major source of food and other commodities of social and economic significance to human life. From an ecological perspective, life may indeed have come from the forest.

The importance of flora emanates not from its own unique attributes but from its role in the collective cycle of life, its role as a vital component of life magnified through the forest.

Because of these inherent characteristics, issues and concerns on flora are typically found integrated in general environmental concerns. This however, does not prevent discussion and resolution to focus on issues specific to flora but rather provides a more dimensional study of flora and its relationships with the other components.

Among the most critical issues on the state of flora in the Philippines and its impact are as follows:

- Continued degradation of natural forests or whatever is left of these resources;
- Soil erosion that often leads to disasters on human and economy;
- Low productivity or diminishing returns from forest resources and products;
- Access to natural resources and security of tenure;
- Appropriate environmental legislation and policy reforms; and
- Awareness and advocacy.

Efforts have been initiated to address these issues with the goals of arresting the rapid degradation of the environment, reviving depleted resources, and promoting the

propagation of certain resources. The Protected Areas and Wildlife Bureau (PAWB) of the Department of Environment and Natural Resources (DENR) spearheads the formulation and implementation of policies and programs for the salvation and propagation of depleted and endangered wildlife species and the management and protection of existing stocks of wildlife resources. Among the key programs that PAWB has pursued are the National Integrated Protected Areas System (NIPAS) and the National Biodiversity Strategy and Action Plan (NBSAP) which have been established for the efficient management, monitoring, protection and revival of natural habitats for the maintenance, growth, and proliferation of wildlife resources, including flora species.

The private sector and non-government organizations academic/scientific institutions both in the local and international communities likewise contribute in the monitoring of biological resources and in elevating issues and concerns to stakeholders. The Philippines also implements and is signatory to the Convention on International Trade in Endangered Species (CITES) of wild flora and fauna which aims to curb the exploitation of wildlife resources through regulation and restrictions on trade of selected species in 51 countries. Despite these efforts though, the battle to keep whatever is left of the forests and its wildlife inhabitants intact and to bring them back to its original luscious state continues.

1 Framework

1.1 Conceptual Framework

The conceptual framework on the development of flora statistics (Table A), as with other components discussed in this document, follows the basic classification of the United Nations Framework for the Development of Environment Statistics (UNFDES). This classification identifies major information categories under which activities, issues, and solutions and their inter-relationships are presented.

Through this classification, the Philippine framework on the development of flora statistics describes the general scope and content of the Philippine flora setting ranging from the social and economic activities that affect its existence – proliferation, extinction and survival, to the impacts that these activities place on existing stocks, to the remedial and preventive measures, to the existing stocks and inventories.

The framework is a product of research based on existing literature and discussion among key informants from selected institutions that are engaged in the monitoring, protection, and conservation of flora and other wildlife.

Table A: Conceptual Framework on FLORA

Social and economic activities and natural events	Environmental impacts of activities and events	Responses to environmental impacts	Stocks and inventories
<ul style="list-style-type: none"> 1 Agriculture <ul style="list-style-type: none"> 1.1 Upland farming 2 Forestry and logging <ul style="list-style-type: none"> 2.1 Logging <ul style="list-style-type: none"> (a) Roundwood production (b) Non-timber production 2.2 Wood production for paper manufacturing 2.3 Deforestation 3 Informal hunting, trapping, and gathering 4 Naturally-growing flora <ul style="list-style-type: none"> 4.1 Non-marine <ul style="list-style-type: none"> (a) Roundwood production (b) Non-timber production 4.2 Marine 5 Natural events <ul style="list-style-type: none"> 5.1 Weather and climatic hazards 5.2 Geological hazards 5.3 Biological hazards 6 Land use 	<ul style="list-style-type: none"> 1 Proliferation, depletion, and extinction of species 2 Depletion/growth of forest resources 3 Changes of habitat/ecosystem 	<ul style="list-style-type: none"> 1 Management, protection, and conservation <ul style="list-style-type: none"> 1.1 Regulation <ul style="list-style-type: none"> (a) issuance of policies and administrative orders (b) issuance of licenses, permits, certificates, agreements, and leases (c) confiscation of banned and protected flora 1.2 Protection of degraded habitat/ecosystem 2 Rehabilitation of degraded habitat/ecosystem 	<ul style="list-style-type: none"> 1 Forestry stocks <ul style="list-style-type: none"> 1.1 Forest inventories <ul style="list-style-type: none"> (a) timber inventory (a) non-timber inventory 1.2 Genetic resources 1.3 Manmade capital stocks 2 Other flora inventory

1.1.1 Social and Economic Activities and Natural Events

The activities identified in the framework on the development of flora statistics are those of human activities and natural events that have impact on flora and its environment. Human activities primarily include the production and utilization of flora and its environment for economic gains while natural events refer to environmental phenomena that occur beyond human control that affect flora and other resources.

The framework focuses on six (6) human activities and natural events as follows: (1) agriculture; (2) forestry and logging; (3) informal hunting, trapping, and gathering; (4) naturally-growing flora; (5) natural events; and (6) land use.

Agriculture, forestry, and fishery are major economic activities in the Philippines. Together, these activities comprise more than twenty percent of the country's gross domestic product and more often influence the direction of economic growth. With renewed government thrust on food production amidst the increasing population demand and industrial development, the production and consumption of goods and services through these activities are expected to intensify in the future. This poses a potential environmental concern especially in the wake of continued expansion of industries and the demands of human settlements that necessitate the transformation of the agricultural and forest lands and fish habitat for such purposes. For instance, to improve agricultural and livestock production at the level required for long-term sustainable yields, the area of cultivation is continuously being expanded to cover the rich soil of forest land in lieu of improving agricultural yield per unit area. Forest industries on the other hand, stimulate other attendant activities that further lead to the conversion of forest lands into communities that depend mostly on harnessing trees for forest products manufacturing and fuelwood and charcoal production. These not only deplete a potential resource for wood and habitat but also threaten the capacity of the biosphere to regulate atmospheric and hydrospheric cycles.

Another major aspect of forest activities is hunting, trapping and gathering of flora and fauna wildlife. Hunting is considered to be the very first economic activity of mankind. Wildlife hunting which necessitates trapping and gathering of wildlife directly contributes to the decline in population and reduction of habitat when it exceeds the extent of the potential for natural growth and replenishment. Excessive gathering or overharvesting of wild plants for commercial purposes threatens the continued existence of rare and endangered species.

Fishery is progressively becoming a major factor in the degradation of the environment. This consists mainly of fishing and seaweed harvesting. The use of illegal means such as dynamite fishing directly affects undersea plant life as it destroys fish habitat consisting of corals and seaweeds. Seaweed farming on pristine sites greatly contributes to changes in the biota of such areas. Seaweed farms may cause disruption in the regeneration/recolonization of hard corals and/or destruction of the seagrass beds that

serve as nursing ground for fishes and crustaceans. Seaweed farming can result in damage or loss of irreplaceable and limited critical areas.

Commercial and leisure activities such as deepsea/scuba diving, snorkeling, proliferation of beach resorts, and unabated eco-tourism activities may have also contributed to the depletion of undersea flora species.

These activities can result to unregulated human settlements on fragile island ecosystem that could wreck havoc on both the terrestrial and marine areas due to the generation of garbage and sewage.

The natural growth of certain flora affects the environment in two ways. It can be an addition to the stock of flora or a stimulus that can reduce the stock of other flora. Some of the plants can grow naturally in the forest and propagate themselves or with the help of other media such as insects. There are however, certain flora species that feed on other plant life naturally impeding growth and propagation or threatening extinction such as dominant wildlife or parasitic plants.

Natural events, as defined in the framework, identify the variables associated with non-human stresses on human production, consumption, and well-being, and on the environment. Wild fauna and flora have usually adapted to normal ranges of natural events but extreme conditions present risks to their survival. While human activities may have inadvertently weakened the resilience of natural systems to natural events, the factors identified in the framework are primarily considered naturally-occurring. These consist of weather and climatic factors, geological changes, and hazardous biological phenomena.

1.1.2 Environmental Impacts of Activities and Events

The topics under this information category represent the impacts of relevant social and economic activities and natural events which may either be harmful or beneficial and are classified according to the following: (1) proliferation, depletion, and extinction of species; (2) depletion/growth of forest resources; and (3) changes of habitat/ecosystem.

Proliferation and growth of previously declared rare and/or endangered species or new species as well as flora resources are generally good for the environment as they provide for sustainability of natural forest and marine flora resources. Economic prospects likewise increase with the continuous propagation of species and preservation or expansion of natural resources that can become important economic commodities. Taken in another context, proliferation and growth may also be harmful as these may result to overpopulation and/or domination of inferior/destructive plant species.

Depletion and extinction of species and diminishing of resources draw the more immediate and current environmental concerns. These refer to the continuous reduction

of important plant species to the point of extinction and degradation of vital flora resources due to unabashed extraction or overharvesting for economic gains, irresponsible land use, and unfortunate natural calamities and disasters.

Changes in habitat or ecosystem pose the greater risks to flora development. The loss of seagrass bed for instance, does not constitute mere depletion or extinction of natural marine resources but depicts far greater effects on the life and existence of both flora and fauna species and on the symbiotic undersea environment. Similar outcomes result in the restructuring of the forest due to other impacts such as loss of forest cover/vegetation.

1.1.3 Responses to Environmental Impacts

This information category incorporates the responses to environmental impacts brought about by the aforementioned socio-economic activities and natural events. Responses to environmental impacts are always geared towards generating beneficial effects. The topics under this category are classified into: (1) management, protection, and conservation; and (2) rehabilitation of degraded habitat/ecosystem.

These consist mostly of strategies and approaches to combat, arrest, control, reverse or avoid the harmful effects and to generate, promote and reinforce the positive impacts on the flora environment. Responses are typically in the form of policies, programs and projects designed to implement and support the management, protection, and conservation of flora resources or rehabilitation of degraded habitat/ecosystems. Individuals, government and non-government institutions, and social groups assume important roles and responsibilities in generating such responses.

1.1.4 Stocks and Inventories

The topics under this category provide ‘benchmark’ and background information as well as illustrate links with other information categories to further analyze their relationships. These topics are classified as: (1) forestry stocks; and (2) other flora inventory. Information on forest resource stocks is of critical importance in the analysis of sustainable development. As concern over the continuing destruction of forest ecosystem grows both at the global and local levels, the ecological significance of forests and their role in the overall ecosystem are given more attention. Forests, among others, serve as habitat for diverse flora and fauna species as well as regulate water flows to prevent soil erosion and siltation of water bodies.

Forestry resource stocks describe the current *in-place* inventory of flora resources. To enable assessment of the current resource stocks, information on forest inventories to include timber and non-timber is necessary. Supplemental information on genetic resources as well as manmade capital stocks are also important to describe and

monitor the changes in infrastructure capacity to exploit the natural flora resources and the technology employed.

Careful protection of the diminishing genetic flora resources is also important. A genetic resource data base will track the level of the ever-narrowing *gene pool* and provide information on the rate of diffusion of new and/or adopted flora varieties - as well as record the loss of genetic materials due to disappearance of traditional plants and breeds.

As a key variable in the measurement of the technological transformation of agriculture, man-made capital stock is also one of the most important factors in making changes in the state of the environment.

The status of non-cultivated plant life is provided by flora inventories. The most natural habitat is usually described by the species composition of the rare and endangered plants. In response to the accelerating rate of extinction of rare, endangered, extinct and exotic species, the government has increased its monitoring activities. There is a need to identify and list these species to aid in the protection and conservation as well as serve as early warning indicator of the state of ecosystems. The extinction of these species would indicate a depletion of the genetic stocks/resources. Severe degradation may result from overhunting or overharvesting of species. An example is the selective felling of high-value trees that results to the removal of high quality genetic stocks thus leaving only the inferior species to regenerate.

1.2 Statistical Framework

This section presents the topics/items covered in each of the information categories through statistical indicators and variables and their attributes, (refer to Table B).

Specifically, human activities and natural events are measured in terms of the extent of agriculture, forestry, and land use activities, wildlife gathering, changes in the naturally-growing terrestrial and marine flora, and characteristics and patterns of naturally-occurring events. Environmental impacts are basically measured by the changes in the stock of plant species and their habitat while responses to such impacts include the policies and programs implemented, financial resources poured into environmental efforts, and other interventions from local and international entities concerned with the management and of flora and other resources. Information on stocks and inventories consist of existing forestry resources and other flora.

Table B: Statistical Framework on FLORA

TOPIC/ITEM	VARIABLE/S	MEASUREMENT
1 Agriculture		
1.1 Upland Farming	Forest area cleared for agricultural production Area harvested/used in kaingin	hectare hectare
2 Forestry and logging		
2.1 Logging	Volume of log production Annual rate of change	cubic meter/year percent
(a) roundwood production	Rattan production	number of poles or linear meter
(b) non-timber production		
2.2 Wood production used for paper manufacturing	Volume of production Annual rate of change	cubic meter/year percent
2.3 Deforestation	Average annual deforested area	hectare
3 Informal hunting, trapping, and gathering	Number of confiscated wildlife flora	number
4 Naturally-growing flora		
4.1 Non-marine		
(a) roundwood production	Annual rate of change	percent
(b) non-timber production	Production of ornamentals Production of bamboo stumps	number number
4.2 Marine	Production of (a) seagrass (b) mangrove (c) seaweed	ton ton ton

Table B: Statistical Framework on FLORA (Continued...)

TOPIC/ITEM	VARIABLE/S	MEASUREMENT
5 Natural events		
5.1 Weather and climatic hazards	Precipitation, deviation from seasonal mean Temperature, deviation from seasonal mean Cloud cover, deviation from seasonal mean Wind Forest fire	mm, km ² °C, km ² h, km ² km/h days, km ²
5.2 Geological hazards	Earthquake and volcanic eruption Tidal wave Floods Landslides	Richter scale, km ² , h m, h, km ² m, h, km ² km ²
5.3 Biological hazards	Infestation Disease outbreak	km ² , days number, km ² , days
6 Land use	Area of land conversion Area of forestry and grazing land	hectare hectare

Table B: **Statistical Framework on FLORA**

Information Category: **Environmental Impacts of Activities and Events**

TOPIC/ITEM	VARIABLE/S	MEASUREMENT
1 Proliferation, depletion, extinction of species	Threatened, endangered, and extinct species	number, change
2 Depletion/growth of forest resources	Net change in forest resources (forest cover) Change in area reforested Naturally-reforested area	percent change percent change hectare
3 Changes of habitat/ecosystem	Loss of seagrass bed	hectare, km ² , pesos

Table B: Statistical Framework on FLORA

Information Category: Responses to Environmental Impacts		
TOPIC/ITEM	VARIABLE/S	MEASUREMENT
1 Management, protection and conservation 1.1 Regulation (a) issuance of policies and administrative orders (b) issuance of licenses, permits, certificates, agreements, and leases (c) confiscation of banned and protected flora	Policy and administrative order Licenses, permits, certificates, agreements, and leases Annual allowable cut Confiscated banned and protected flora	number/list number, hectare m ³ number
1.2 Protection and conservation	National protected areas (a) NIPAS sites (b) IUCN categories International protected areas (a) World Heritage Sites (b) Biosphere reserves Protected flora species Budget Expenditure Protected areas management boards	number (fully and partially protected areas), percentage to total forest area number, hectare number million pesos million pesos number of sites
2 Rehabilitation of degraded habitat 2.1 Rehabilitation of degraded flora habitat	Rehabilitation programs implemented Area afforested and reforested	number, hectare (area covered) hectare

Table B: Statistical Framework on FLORA

TOPIC/ITEM	VARIABLE/S	MEASUREMENT
1 Forestry stocks		
1.1 Forest inventories (a) timber and non-timber inventories	Stock of forest trees Known and endemic species by forest type	metric ton/year number
1.2 Genetic resources	Adopted varieties	number
1.3 Man-made capital stocks	Machinery and equipment, technology, etc. for forestry activities	number, pesos
	Capacity to produce seedlings for reforestation	
2 Other flora inventory	Area covered by aquatic plants	hectare
	Aquatic plants	number
	Threatened, endangered and extinct species	number

Table C: Data Assessment for the FLORA component

TOPIC/ITEM	VARIABLE/S	ASSESSMENT				
		Actual Variable/ Measurement	Disaggregation	Periodicity	Manner of Collection	Source
1 Agriculture 1.1 Upland Farming	Forest area cleared for agricultural production Area harvested/used in kaingin	Area of forest destruction	national	annual	admin-based	FMB
2 Forestry and logging 2.1 Logging (a) roundwood production	Volume of log production Volume of fuelwood Annual rate of change	Log production Fuelwood production Annual rate of change	regional regional	annual annual	admin-based admin-based	FMB FMB
(b) non-timber production	Volume of rattan production	Production of non-timber forest products	regional	annual	admin-based	FMB
2.2 Wood production used for paper manufacturing	Volume of wood production for paper manufacturing Annual rate of change	Production of paper and paperboard Annual rate of change	national	annual	admin-based	PICOP
2.3 Deforestation	Average annual deforested area Annual rate of change	Average annual deforested area Annual rate of change	regional	annual	admin-based	FMB
3 Informal hunting, trapping, and gathering	-	-	-	-	-	-
4 Naturally-growing flora 4.1 Non-marine (a) roundwood production	Volume of firewood and charcoal production Annual rate of change	Production of firewood and charcoal	regional	annual	admin-based	ERDB

Table C: Data Assessment for the FLORA component (Continued...)

TOPIC/ITEM	VARIABLE/S	ASSESSMENT				Source
		Actual Variable/ Measurement	Disaggregation	Periodicity	Manner of Collection	
(b) non-timber production	Production of ornamentals Production of bamboo stumps	Production of non-timber forest products	regional	annual	admin-based	FMB
4.2 Marine	Production of (a) seagrass (b) mangrove (c) seaweed	Seaweed culture production	regional	annual	admin-based	DENR, UP Diliman/Visayas, Siliman Univ, BAS
5 Natural events 5.1 Weather and climatic hazards	Precipitation, deviation from seasonal mean Temperature, deviation from seasonal mean Cloud cover, deviation from seasonal mean Wind Forest fire	Precipitation, deviation from seasonal mean Temperature, deviation from seasonal mean Cloud cover, deviation from seasonal mean Forest destruction - forest fires	regional	annual	admin-based	PAGASA FMB
5.2 Geological hazards	Earthquake and volcanic eruption Tidal wave Floods Landslides	Earthquake and volcanic eruption			admin-based	PHIVOLCS
5.3 Biological hazards	Insect infestations Disease outbreaks	Forest destruction - pests and diseases	national	annual	admin-based	BPI
6 Land use	Area of land conversion Area of forestry and grazing land		national national	annual annual	admin-based admin-based	FMB FMB

Statistics on land use are also indicative factors of the depletion of forest resources. The area of land conversion which can be due to forestry and industrial expansion is available at the FMB of the DENR.

Information on naturally-growing flora can be categorized into two major aspects: (1) non-marine; and (2) marine resources. The annual rate of change of firewood and charcoal production provides further indication of the harvesting and utilization of roundwood. Production of ornamentals and bamboo stumps are identified to describe the extent of non-timber harvesting. The production of seagrass, mangroves and seaweeds are the main interest in measuring marine plant life gathering. National and regional data on fuel production and bamboo stumps are available at the FMB while ornamentals production data are available at the Ecosystems Research and Development Bureau (ERDB) of the DENR. Statistics on marine resources are also available but on a limited scale through various studies of the University of the Philippines in Diliman and in the Visayas, Siliman University in Dumaguete City, FMB, and the Bureau of Agricultural Statistics (BAS) of the Department of Agriculture (DA).

Natural events refer to the natural or non-human occurring phenomena that affect flora and its environment. These are divided into three sub-topics as follows: weather and climate hazards, geological hazards, and biological hazards. Potential and actual environment hazards can be caused by weather and climatic hazards which are measured in magnitude and changes in the precipitation, temperature, cloud cover, wind, and forest fires. Earthquakes and volcanic eruptions, tidal waves, and landslides which destroy habitat for flora are also measured in terms of the number and intensity of occurrence as well as estimated area damaged and cost of such damages to environment. Weather and climatic data are available at the Philippine Atmospheric, Geophysical, and Astronomical, Service Administration (PAGASA), earthquakes and volcanic eruptions at the Philippine Volcanology and Seismology Institute (PHIVOLCS), landslides, tidal waves, and floods at the National and Regional Disaster Coordinating Councils (N/RDCCs), and forest fires at the FMB of the DENR.

Biological hazards on the other hand consist of infestations such as insect and rat infestation, red and green tide phenomena, and disease outbreaks which cause the depletion of flora resources and destruction of flora environment. Data are generated by the Bureau of Plant Industry (BPI).

1.3.2 Environmental Impacts of Activities and Events

This section identifies the variables or statistical indicators to describe the impacts of social and economic activities and natural events on the flora environment. There are three (3) categories of variables depicting quantity changes (expansion and reduction) in flora resources and changes in habitat/ecosystems.

Table C: Data Assessment for the FLORA component

TOPIC/ITEM	VARIABLE/S	ASSESSMENT				Source
		Actual Variable/ Measurement	Disaggregation	Periodicity	Manner of Collection	
1 Proliferation, depletion, extinction of species	Threatened, endangered, and extinct species	Number of threatened, endangered, and extinct species	regional		admin-based	PAWB, ERDB
2 Depletion/growth of forest resources	Net change in forest resources (forest cover) Change in area reforested Naturally-reforested area	Volume account of old growth dipterocarp forests -do- -do-	national	annual		PSEEA
3 Changes of habitat/ ecosystem	Loss of seagrass bed				special studies	DENR, UP Diliman/Visayas, Silliman Univ.

Proliferation, depletion and extinction of flora species are primarily gauged through the quantity changes in identified threatened, endangered, and extinct flora species (both terrestrial and marine). The size of the additional or remaining population of these species is sufficient to measure the impacts of socio-economic activities and natural events on flora wildlife resources.

The depletion and growth of natural forests and marine flora resources are generally indicated by the rates of change in the loss/gain of forest cover and extent of reforestation. Changes in habitat/ecosystems are more difficult to determine. At present, the degradation of forests and the succumb of sea grass to destructive interventions are measured only through the area and corresponding value of denuded (structural change) and defoliated seabed.

There is however, lack of indicators on the specific factors that contribute to the proliferation, depletion, growth, or extinction of flora species and resources. Another limitation of the data system is its inability to provide information on the replacement of superior with inferior species.

A list of threatened, endangered, rare, protected, and extinct species by region is released annually by the Protected Areas and Wildlife Bureau (PAWB) and ERDB of the DENR. The DENR also monitors the changes in the forest cover and area reforested. The loss of seagrass is measured through special studies periodically conducted by the DENR, University of the Philippines in Diliman and Visayas, and Siliman University.

1.3.3 Responses to Environmental Impacts

This section defines the variables or measures adopted to address the impacts of social and economic activities and natural events on the flora environment. This consists mainly of the number of interventions and extent of efforts to curb or to prevent further degradation of wildlife flora and to promote sustainability of the benefits of responses to environmental impacts.

Policies and other administrative issuances are largely and often dictated by needs as identified through environmental assessment of concerned institutions as well as the demand from individuals, sociocivic groups, and the public at large for preventive or defensive measures/reforms. The number of administrative issuances, licenses, permits, certificates, agreements and leases manifest government efforts to effectively regulate the utilization of the environment for socio-economic purposes. Furthermore, the prescription of quotas especially on the harvesting of forest resources such as annual allowable cut and confiscation of banned and protected flora such as wild orchids provide some control to regulate these activities.

Table C: Data Assessment for the FLORA component

TOPIC/ITEM	VARIABLE/S	ASSESSMENT				
		Actual Variable/ Measurement	Disaggregation	Periodicity	Manner of Collection	Source
1 Management, protection and conservation						
1.1 Regulation						
(a) issuance of policies and administrative orders	Policy and administrative orders				admin-based	DENR
(b) issuance of licenses, permits, certificates, agreements, and leases	Licenses, permits, certificates, agreements, and leases	Number of wildlife local transport permits, and forestry licenses, leases and permits issued	regional	annual	admin-based	FMB
(c) confiscation of banned and protected flora	Annual allowable cut					
	Confiscated banned and protected flora	Number of flora confiscated	national	annual	admin-based	PAWB
1.2 Protection and conservation						
	National protected areas					
	(a) NIPAS sites	Number and area of coverage	specific areas	annual	admin-based	PAWB, DENR, BFAR
	(b) IUCN categories					
	International protected areas					
	(a) World Heritage Sites	Number and area of coverage	specific areas	annual	admin-based	PAWB
	(b) Biosphere reserves					
	Protected flora species	Number of protected flora species	national	annual	admin-based	PAWB
	Budget	Appropriations	provincial	annual	admin-based	DEIM

Table C: Data Assessment for the FLORA component

TOPIC/ITEM	VARIABLE/S	ASSESSMENT				Source
		Actual Variable/ Measurement	Disaggregation	Periodicity	Manner of Collection	
2 Rehabilitation of degraded habitat	Expenditure	Expenditure	provincial	annual	admin-based	DBM, COA
	Protected areas management boards	Number of PAMBs	national	annual	admin-based	PAWB
2.1 Rehabilitation of degraded flora habitat	Rehabilitation programs implemented	Number of programs	national	annual	admin-based	DENR
	Area afforested and reforested	Area reforested	national	annual	admin-based	DENR

Protection and conservation are perhaps the more popular responses to environmental degradation. Through the number and span of protected areas, in both domestic and international perspectives, and its share of the total forest area, the extent of protection and conservation efforts is discerned. The expansion of identified/classified NIPAS sites, IUCN categories, world heritage sites, and biosphere reserves and the level of budget and expenditure on protection and conservation ensure sustainability of protected flora and increase chances of being classified/reclassified as mainstream flora species.

A far more complex problem that is being addressed by current programs is the deterioration of habitat/ecosystems. Rehabilitation programs that seek to revive or reinforce degraded natural habitat/ecosystems for flora species and resources offer some relief in the wake of the increasing rate of habitat/ecosystem destruction. Some of the typical modes adopted by the government and some concerned sectors are afforestation and reforestation. Afforestation refers to the rehabilitation of barren or non-forest lands while reforestation refers to the revival of degraded forest areas or seagrass beds to expand wildlife habitat.

Issuances and other regulatory measures are formulated, implemented, and monitored by the DENR and its constituent bureaus and attached agencies. Specifically, the number and list of banned and protected flora species are being generated and maintained by the FMB of the DENR. Protected areas are identified/classified by the DENR, PAWB, and Bureau of Forest Administration (BFA). Information on rehabilitation programs is available at the DENR.

1.3.4 Stocks and Inventories

In general, as shown in Table C, the natural resources stocks for flora are measured in physical terms, that is, either by weight, by volume, number or by area. These data are usually location-specific, e.g., by region. The assessment of forestry stocks and inventories involves the appraisal of the stock of forest trees by variables of species type and productivity and to the extent possible, the measurement in terms of high-value trees.

Ideally, a distinction should be made between actual conditions of forests and their potential capability for maintenance and growth based on soil quality, climate variables and topographic characteristics. A good forest inventory database also requires additional variables that characterize the service function of forests in terms of wildlife habitat, water catchment, recreational uses and local fuelwood sources.

Initially, base information on stock of forest resources was made available in the country through a *Philippine-German Forest Inventory Project in 1988*. This initial activity paved the way for the preparation of new forest maps for the whole country based on aerial photographs and satellite imagery, the inventory of standing volume,

Table C: Data Assessment for the FLORA component

TOPIC/ITEM	VARIABLE/S	ASSESSMENT			
		Actual Variable/ Measurement	Disaggregation	Periodicity	Manner of Collection
1 Forestry stocks					
1.1 Forest inventories (a) timber and non-timber inventories	Stock of forest trees Known and endemic species by forest type	Stock of forest trees Number of known and endemic species	regional regional	annual annual	admin-based admin-based FMB FMB
1.2 Genetic resources	Adopted varieties	Number of adopted varieties	regional	annual	admin-based BPI, FMB
1.3 Man-made capital stocks	Machinery and equipment, technology, etc. for forestry activities	Inventory of machinery and equipment	national	annual	admin-based DENR
2 Other flora inventory	Capacity to produce seedlings for reforestation		national	annual	admin-based BPI, FMB
	Area covered by aquatic plants	Inventory of aquatic plants	national	annual	admin-based BPI
	Threatened, endangered and extinct species	Inventory of threatened, endangered, and extinct species	national	annual	admin-based PAWB

regeneration, and minor forest products and the compilation of forest statistics by region and province. From the 1988 base information, the FMB extrapolates the value of forest resources stock for the succeeding years. Data on these are contained in the annual publication of the *Philippine Forestry Statistics* and are considered as the official data for stocks. For timber and non-timber inventories, area and volume statistics are compiled for dipterocarp and pine forests and only volume account for rattan. There is no forest area account for rattan since they thrive in the same area as the dipterocarp forest.

For its part, DENR has adopted a policy of community-based management of forest resources to provide upland dwellers access to forest resources. In this respect, utmost cooperation and active participation by the communities are encouraged to have effective control over forestland activities and realize equal access to forest resources.

A specific concern arises from the assessment of non-timber inventories covering the *kaam* and endemic species for rattan. An evaluation of past research on rattan in the country reveals that the current information is still inadequate to provide meaningful guidelines for the proper development and management of rattan plantations. The ERDB has identified among others, the following as recommended research and development strategies for rattan: (1) resource exploration and assessment; (2) selection of phenotypically-superior rattan strains and establishment of provenance trials; (3) improvement of cultivation methods for sustainable production; (4) *ex-situ* conservation; and (5) growth and yield studies.

Manmade capital stock is another variable that describes stocks and inventories for the flora sector measured in terms of the number of machinery and equipment utilized for felling and hauling of trees and/or technology applied/ utilized for forestry activities. This information can be sourced from the DENR. This information can be supplemented by appraising the capacity to produce seedlings for reforestation, for example, silviculture capacity of tree nurseries which can be sourced from the BPI and FMB. For known and endemic species, risk and uncertainties associated with a long gestation period as well as the limited production technology pose constraints to investment decisions for rattan plantation development. However, with the trend towards community-based development, the feasibility of incorporating rattan with agroforestry development schemes at the community level could be a promising approach.

“The distribution of genetic material is a function of evolutionary processes, natural selection and habitat conditions” (UN Concepts and Methods, 1991). Human activities influence the promotion of desirable and suppression of undesirable species and these affect the stock of resources. Depletion of genetic resources is caused by harvest, logging damage and illegal logging. While additions to stocks include natural growth and regenerations, genetic stocks *per se* are measured in terms of the number of tree species in natural forests or in terms of the number of rare species by type of species and forest communities. Statistics on tree species are available at the FMB while data on other plant species are generated by the BPI on an annual basis.

Flora inventories as discussed here refer to the popular notion of *wildlife*. Ideally, flora inventories should record the status of non-cultivated plant life. Flora inventories are affected by the impacts of forestry, hunting and trapping and fishing which results in its depletion. The conservation and protection of flora otherwise known as wildlife management is the primary aim of the PAWB. The establishment of inventories of flora for well-defined areas such as national parks is its responsibility. Lists of rare, threatened and endangered Philippine wildlife for flora are prepared by PAWB on an annual basis at the national level. This information is supplemented by a list of Philippine flora under the CITES of Flora and Fauna (I and II), the commercial export/trade of which is strictly regulated, as well as the list and number of confiscated wildlife and its by-products.

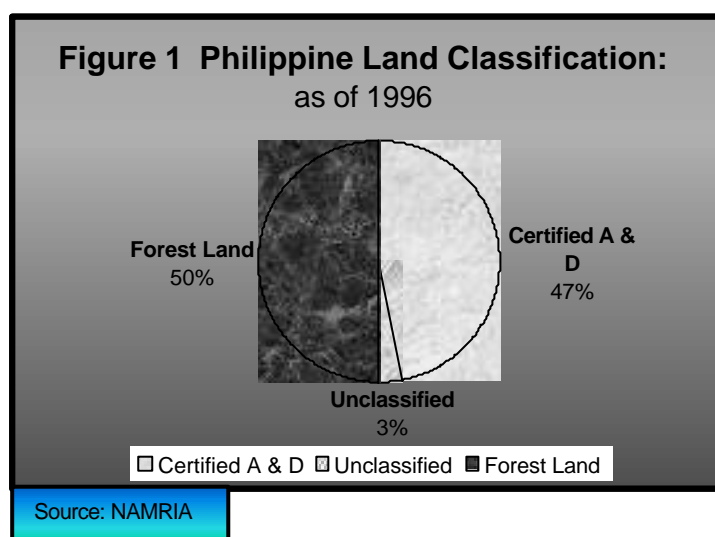
Other variables on flora inventory include area covered by aquatic plants which is measured in terms of hectare and the list of aquatic plants sourced from the BPI which are available at the national level.

2 Situational Analysis

2.1 Highlights of Results

Forest Resources

Forests refer to an ecosystem with a minimum of 10.0 percent crown cover of trees, shrubs, grasses generally associated with wild flora, fauna, and natural soil conditions and not subject to agricultural practices. Forest lands on the other hand, refers to public lands which have not been declared as alienable and disposable and presumed needed for forest uses. Fifty (50.0) percent of the Philippines' total land area of 30,000 hectares is characterized as forest land.



In 1996, only 5,493,148 hectares can be characterized as still stocked with forest trees. Conservation and protection of these areas have been placed under the NIPAS since 1992. Since then, logging activities in these areas have not been allowed.

Out of these total forest areas, 805,000 hectares remained as old growth or virgin forests as placed under the NIPAS. Areas planted to second growth forests decreased from 3,413 thousand hectares to 2,963 thousand hectares. Pine forest was estimated at 232 thousand hectares. The total estimated volume of timber in the commercial forest was 412,427 thousand cubic meters while dipterocarp pine forest was estimated to have 24,252 thousand cubic meters.

An analysis of forest resources reveals that for the period 1988 to 1994, the value of forest resources at current prices increased from P250M to P756M registering an annual growth rate of 6.4 percent. Depletion measured in terms of logging/harvest, waste and damage from logging, declined from P24,529M in 1988 to P271M in 1994

STATISTICAL TABLES

Table 1.1
LAND CLASSIFICATION
1976-1996
(In hectares)

Year	Total Area	Certified A & D	Total	Unclassified	Forest Land						
					Classified						
					Total	Established Forest Reserve	Established Timberland	National parks GRBS/WA	Military & naval reserv'n	Civil reserv'n	Fish- pond
1996	30,000,000	14,117,244	15,882,756	881,157	15,001,599	3,272,912	10,015,866	1,340,997	130,330	165,946	75,548
1995	30,000,000	14,117,244	15,882,756	881,157	15,001,599	3,272,912	10,015,866	1,340,997	130,330	165,946	75,548
1994	30,000,000	14,117,244	15,882,756	881,157	15,001,599	3,272,912	10,015,866	1,340,997	130,330	165,946	75,548
1993	30,000,000	14,117,244	15,882,756	881,157	15,001,599	3,272,912	10,015,866	1,340,997	130,330	165,946	75,548
1992	30,000,000	14,117,244	15,882,756	881,157	15,001,599	3,272,912	10,015,866	1,340,997	130,330	165,946	75,548
1991	30,000,000	14,117,729	15,882,271	881,157	15,001,114	3,272,912	10,015,381	1,340,997	130,330	165,946	75,548
1990	30,000,000	14,117,729	15,882,271	881,157	15,001,114	3,272,912	10,015,381	1,340,997	130,330	165,946	75,548
1989	30,000,000	14,117,729	15,882,271	881,157	15,001,114	3,272,912	10,015,402	1,340,997	130,330	165,946	75,527
1988	30,000,000	14,117,753	15,882,247	881,157	15,001,090	3,271,504	10,015,427	1,342,416	130,330	165,935	75,478
1987	30,000,000	14,108,087	15,891,913	881,297	15,010,616	1,494,844	11,801,970	1,342,919	130,330	165,935	74,618
1986	30,000,000	13,852,398	16,147,602	1,186,575	14,961,027	3,605,045	9,586,039	1,267,996	130,330	320,521	51,096
1985	30,000,000	14,659,760	15,340,240	1,319,794	14,020,446	3,472,252	8,805,144	1,264,364	129,911	306,291	42,484
1984	30,000,000	14,515,393	15,484,607	1,827,335	13,657,272	3,496,041	8,423,881	1,265,422	129,911	306,291	35,726
1983	30,000,000	14,467,592	15,532,408	5,060,139	10,472,269	3,496,041	4,959,417	1,571,403	129,911	306,291	9,206
1982	30,000,000	13,370,546	16,629,454	5,553,178	11,076,276	3,431,480	5,553,455	1,647,911	129,911	312,503	1,016
1981	30,000,000	13,327,630	16,672,370	5,846,639	10,825,731	3,256,421	5,535,869	1,591,027	129,911	312,503	-
1980	30,000,000	13,269,340	16,730,660	7,025,490	9,705,170	2,907,972	5,835,818	518,966	129,911	312,503	-
1979	30,000,000	13,093,263	16,906,737	7,578,178	9,328,559	8,630,007 a/	-	316,117 b/	129,911	252,524	-
1978	30,000,000	13,070,886	16,929,114	7,627,924	9,301,190	8,602,638 a/	-	316,117 b/	129,911	252,524	-
1977	30,000,000	12,990,866	17,009,134	7,738,919	9,270,215	8,571,688 a/	-	316,092 b/	129,911	252,524	-
1976	30,000,000	12,974,969	17,025,111	7,759,023	9,266,008	8,567,481 a/	-	316,092 b/	129,911	252,524	-

Source: National Mapping and Resource Information Authority; Forest Management Bureau.

a/ Forest reserve & timberland

b/ National parks only

Table 1.2
ROUNDWOOD PRODUCTION
1990 to 1995
(In cu.m.)

	1990	1991	1992	1993	1994	1995	1996	1997
Total	2,595,625	2,140,595	1,757,237	1,151,588	1,063,369	868,490	804,322	592,917
Log	2,502,625	1,921,595	1,438,237	1,021,588	957,369	758,490	771,322	555,917
Fuelwood/Firewood	93,000	219,000	319,000	130,000	106,000	110,000	33,000	37,000

Source: Forest Economic Division, FMB

Table 1.3
LOG PRODUCTION BY REGION
1990 to 1995
(In cu.m.)

Region	1990	1991	1992	1993	1994	1995
CAR	960	3,227	2,536	12,355	11,387	18,534
Region I	7	45				
Region II	497,537	274,931	40,845	51,728	21,661	28,482
Region III	5,238					
Region IVa	335,041	158,200	100,341	22,352	50,054	61,770
Region V		1,258		213	191	
Region VI	11	4,475				
Region VII						486
Region VIII	32,275	27,730				
Region IX	108,309	100,379	50,015	33,980	35,349	44,875
Region X	319,741	223,172	552,820	244,881	61,557	73,273
Region XI	922,212	791,186	586,279	496,983	644,542	426,726
Region XII	281,294	41,588	301	27,784	23,698	29,466
ARMM		295,404	105,100	131,312	108,930	74,878
<i>Philippines</i>	2,502,625	1,921,595	1,438,237	1,021,588	957,369	758,490

Source: Forest Economic Division, FMB

Table 1.4
LUMBER PRODUCTION
1990, 1992 to 1995
(In cubic meters)

Region/Province	1990	1992	1993	1994	1995
NCR					
Metro Manila	224,319	192,120	100,234	61,216	25,999
CAR					
Benguet	5,228	4,414	4,092	2,282	11,687
Kalinga-Apayao				8,027	
Region I					
Pangasinan	3,832	925		784	3,764
Region II					
Cagayan	9,755	11,609	5,066	4,654	
Isabela	88,797	36,831	28,649	7,810	21,820
Quirino	5,367	116	1,653		
Region III					
Bulacan	83,970	89,003	31,676	50,866	6,309
Nueva Ecija	2,918				
Zambales	3,263	1,508			
Region IV					
Aurora	30,204	17,599	30,676	23,942	23,059
Batangas	2,592	716	1,651	2,031	2,349
Palawan	6,840	6,596			
Quezon	34,859	16,529	12,849	12,882	13,296
Region VI					
Capiz		10			
Negros Occidental		319			
Region VII					
Cebu City	6,816	4,351	1,370	320	

Table 1.4 (continued)...

Region/Province	1990	1992	1993	1994	1995
Region VIII					
Leyte	4,762				
Region IX					
Zamboanga del Norte	15,274	76		256	1,982
Zamboanga del Sur	12,331	6,422	17,048	8,854	6,874
Region X					
Agusan del Norte	76,561	77,948	71,592	72,421	45,542
Agusan del Sur	2,128	7,659	6,961	13,583	
Bukidnon	6,657				
Misamis Occidental	391	73	3,735	127	16,918
Misamis Oriental	34,008	47,053		9,583	
Region XI					
Davao del Norte	18,378	9,429	19,576	22,287	9,311
Davao del Sur	38,271	14,540	18,301	33,741	32,370
Davao Oriental	22,621		360	411	
South Cotabato	12,609	2,755	3,425	1,492	889
Surigao del Sur	62,836	55,971	58,307	54,960	61,143
Region XII					
Lanao del Norte	21,054		12,678	3,441	2,724
ARRM					
Maguindanao	4,332	42,614	10,066	10,982	
Philippines	842,963	647,186	439,965	406,952	288,031

Source: Forest Economic Division, FMB

Table 1.5
VENEER PRODUCTION
1990, 1992 to 1995
(In cubic meter)

Region	1990	1992	1993	1994	1995
NCR	2,975	--		4,425	
Region II	1,603	102	1,917		1,260
Region IV	1,500	1,251			
Region VII	44	4,054	3,986		4,114
Region IX	12,506	3,889	322	1,842	2,873
Region X	16,956	50,562	54,264	5,179	5,868
Region XI	13,248	19,929	4,264	24,459	4,943
Region XII	35	--		2,860	
Philippines	48,867	79,787	64,753	38,765	19,058

Source: Forest Economic Division, FMB

Table 1.6
PLYWOOD PRODUCTION
1990, 1992 to 1995
(In cubic meter)

Region	1990	1992	1993	1994	1995
NCR	8,444	7,975	1,220	3,684	2,686
Region II	10,033	1,909	1,364		3,795
Region III				2,704	3,433
Region IV	2,830	3,975	3,684	5,565	5,686
Region IX	27,400	15,760	8,646	24,867	35,867
Region X	112,343	139,319	105,026	99,036	131,351
Region XI	208,832	161,642	130,047	119,522	105,137
Region XII	27,064		10,727	3,019	2,043
ARMM			12,480		
Philippines	396,946	330,580	260,714	258,397	289,998

Source: Forest Economic Division, FMB

Table 1.7
PRODUCTION OF PROCESSED WOOD PRODUCTS
1990 to 1995

Wood product	1990	1991	1992	1993	1994	1995
<i>In thousand cubic meters</i>						
Lumber	841	726	647	440	407	286
Veneer	49	54 ^{2/}	80 ^{2/}	65	39	19
Plywood	397	321	331 ^{2/}	273	258	290
<i>In thousand metric tons</i>						
Paper & Paperboard ^{4/}	175	392	--	--	--	--
Fiberboard	--	--	--	--	--	--
Particleboard	--	--	--	--	--	--
Blockboard	17	6	5	4	122	--

1/ Source: Pulpapel

2/ excluding data for ARMM

-- not available

TABLE 1.8
PAPER AND PAPERBOARD PRODUCTION OF PAPER INDUSTRIES
CORPORATION OF THE PHILIPPINES (PICOP)
1990 to 1995

Year	Production
1990	99,866
1991	130,947
1992	128,089
1993	123,544
1994	118,046
1995	139,893

Source: PICOP

Table 1.9
PRODUCTION OF NON-TIMBER FOREST PRODUCTS
1990 to 1997

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1990					
CAR	315,785				
Region I			219,570		
Region II	935,644				1,255,475
Region III	2,299	17,000			
Region IV	3,263,116	753,081	200		26,714
Region V	96,653		3,212	1,530	3,109,000
Region VI					3,091,624
Region VII			900		147,500
Region VIII	1,626,959	172,600			
Region IX	433,233				29,500
Region X	4,610,429		83,720		253,000
Region XI	7,646,862		333,120		110,500
Region XII	335,000				
Philippines	19,265,980	942,681	640,722	1,530	8,023,313

Table 1.9 (continued)...

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1991					
CAR	543,890		19,300		
Region I	31,380		390,899	29,000	5,582,134
Region II	4,360,817			1,585	1,700,704
Region III	180,962	25,000	115,080		
Region IV	6,073,496	688,617	12,074		139,808
Region V	132,468		13,231		2,149,000
Region VI				10,800	4,437,223
Region VII					
Region VIII	1,299,439	66,000			
Region IX	1,072,588				16,000
Region X	1,540,408				329,020
Region XI	9,834,242		341,400		364,862
Region XII	662,241				
Philippines	25,731,931	779,617	891,984	41,385	14,718,751

Table 1.9 (continued)...

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1992					
CAR	65,350				
Region I			244,934		
Region II	988,825			885	2,662,017
Region III	872,561		76,750		
Region IV	2,406,879	567,421	19,940		128,000
Region V	75,093		2,050	32,341	1,734,850
Region VI					7,117,589
Region VII					
Region VIII	1,003,514	66,500			
Region IX	1,097,802				116,480
Region X	3,133,995				384,500
Region XI	12,207,314		360,402		490,600
Region XII	841,746				
Philippines	22,693,079	633,921	704,076	33,226	12,634,036

Table 1.9 (continued)...

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1993					
CAR	602,300		8,000		
Region I	29,760		17,180		
Region II	647,264		9,000	10,000	2,701,647
Region III	587,287		79,960		
Region IV	4,488,029	509,095			69,762
Region V	89,044		31,897	31,500	1,771,700
Region VI					3,291,164
Region VII					
Region VIII	1,377,271	67,000			
Region IX	455,665				73,164
Region X	3,122,147				446,000
Region XI	11,446,868		329,278		664,200
Region XII	1,310,801				
ARMM	689,000				
Philippines	24,845,436	576,095	475,315	41,500	9,017,637

Table 1.9 (continued)...

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1994					
CAR					
Region I					
Region II	1,814,027				3,767,356
Region III			27,750		
Region IVa	55,000	79,690	130		1,000
Region IVb	2,007,603	1,087,827	33,885	10,581	5,700
Region V	24,734				510,250
Region VI					1,068,000
Region VII					171,500
Region VIII	1,355,442	63,500			
Region IX	678,742				
Region X	3,625,187				179,250
Region XI	8,049,216		326,416		579,700
Region XII	1,046,152				
ARMM	431,500				
Philippines	19,087,603	1,231,017	388,181	10,581	6,282,756

Table 1.9 (continued)...

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1995					
CAR	352,500				
Region I	29,800		24,515		
Region II	3,501,137				4,322,620
Region III	33,869				
Region IVa	226,281	70,866	750		
Region IVb	2,413,798	987,636			14,102
Region V	59,659		149,451	14,000	482,650
Region VI					3,157,750
Region VII			300		39,000
Region VIII	221,061				
Region IX	389,687				
Region X	3,159,635				295,200
Region XI	6,587,174		91,717		20,740
Region XII	482,844		40,000		
Philippines	17,457,445	1,058,502	306,733	14,000	8,332,062

Table 1.9 (continued)...

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1996					
CAR	273,480		29,474		
Region I	36,286		82,370	1,035	
Region II	4,281,842			3,881	4,667,500
Region III			1,500		
Region IVa	110,996		950		13,200
Region IVb	2,589,388	751,283			12,500
Region V	30,477		58,913		1,916,080
Region VI					1,215,126
Region VII					278,000
Region VIII	1,677,615	139,100			
Region IX	270,044				
Region X	354,650				
Region XI	5,003,786		453,682		13,090
Region XII	549,161				
Region XIII	8,399,391				313,500
ARMM	1,035,766				
Philippines	24,612,882	890,383	626,889	4,916	8,428,996

TABLE 1.9 (continued)...

Region	Unsplit Rattan (L.M.)	Almaciga Resin (Kilo)	Bamboo Poles (piece)	Palma Brava (piece)	Nipa Shingles (piece)
Yr. 1997					
CAR	124,497		11,736		
Region I					
Region II	2,447,260	12,000		1,140	3,226,750
Region III					
Region IVa			3,750		
Region IVb	1,761,417	200,974			13,842
Region V			14,640		293,360
Region VI					1,058,500
Region VII					
Region VIII	1,787,452	97,500			
Region IX					
Region X	528,293		10,140		
Region XI	3,498,064		123,227		
Region XII	797,358				
Region XIII	7,833,844				306,500
ARMM	741,000				
Philippines	19,519,185	310,474	163,493	1,140	4,898,952

Source: Forest Economic Division, FMB

Table 1.10
MARINE MUNICIPAL FISH PRODUCTION BY SPECIES
1992 to 1996

Species	1992	1993	1994	1995	1996
Seaweeds and Miscellaneous					
Aquatic Plants	1,049	1,144	1,062	919	884
Gozo (Eucheuma spp.)	670	533	730	359	363
Gulamang Dagat	188	164	42	40	40
Lato	191	447	112	326	321
Others			178	194	160

Source: Bureau of Agricultural Statistics.

Table 1.11
SEAWEEDS CULTURE PRODUCTION BY REGION
1992 to 1996
(In metric tons)

Region	1992	1993 R	1994 R	1995 R	1996
Region I	42	--	--	--	--
Region II	88	--	--	--	--
Region III					
Region IV	5,277	24,514	80,634	93,925	164,958
Region V	27	1,144	2,678	10,813	8,845
Region VI	--	2,152	1,683	1,279	1,311
Region VII	23,154	75,653	51,139	20,146	26,372
Region VIII	3,233	131	81	60	65
Region IX	316,938	24,037	53,707	87,402	93,845
Region X	183	276	155	42	43
Region XI	563	471	461	441	432
Region XII	--	147	134	22	16
CARAGA	*	272,395	290,330	343,749	335,060
ARMM	**	628	493	391	440
Philippines	349,505	401,548	481,495	558,270	631,387

Source: Bureau of Agricultural Statistics.

* included in Region IX and XII

** Included in Region X and XI

-- No sample indicator

R revised

TABLE 1.12
SEAWEEDS CULTURE PRODUCTION BY REGION
1992 to 1996
(In thousand pesos)

Region	1992	1993 R	1994 R	1995 R	1996
Region I	435	--	--	--	--
Region II	1,405	--	--	--	--
Region III					
Region IV	34,978	61,397	183,442	205,250	406,195
Region V	222	3,168	7,635	30,557	25,795
Region VI	--	10,704	8,815	6,832	7,384
Region VII	151,298	404,990	256,361	100,662	134,887
Region VIII	20,677	586	370	283	325
Region IX	1,313,604	77,025	155,728	231,800	263,520
Region X	1,253	1,324	818	240	257
Region XI	3,024	1,716	1,607	1,722	1,759
Region XII	--	731	670	122	94
CARAGA	*	633,375	614,914	747,998	780,112
ARMM	**	3,050	2,430	1,990	2,337
Philippines	1,526,896	1,198,066	1,232,790	1,327,456	1,622,665

Source: Bureau of Agricultural Statistics.

* included in Region IX and XII

** Included in Region X and XI

-- No sample indicator

R revised

Table 1.13
STATISTICS ON FOREST DESTRUCTION
1992 to 1997
(In Hectares)

Year	Forest Destruction
1992	12,806.23
1993	17,862.09
1994	10,341.85
1995	24,102.48
1996	5,185.59
1997	22,362.22

Source: Regional Accomplishment Reports, FMB

Table 1.14
FOREST DESTRUCTION
1969-70, 1987
(In hectares)

Year	Kaingin	Illegal Logging	Pest & Diseases	Forest Fire	Others
1987	570	676	2	5,386	512
1986	1,991	90	1,344	4,257	
1985	941	1,918	30	11,743	
1984	1,137	478	6	3,177	97
1983	2,241	1,015	119	117,951	
1982	3,286	4,934	351	8,063	
1981	5,826	6,108	200	12,471	
1980	6,302	7,348	112	18,324	
1979					
1978					
1977					
1976					
	Total				
FY 1974-75	100,000				
1973-74	140,000				
1972-73	170,000				
1971-72	170,000				
1970-71	170,000				
1969-70	170,000				

Table 1.14a
FOREST DESTRUCTION BY REGION
1987
(In hectares)

Region	Kaingin	Illegal Logging	Pest & Diseases	Forest Fire	Others
Region I					
Region II	103	400		357	74
Region III				876	
Region IV					
Region V					
Region VI	35			3,409	
Region VII	123	6	1	481	
Region VIII				2	70
Region IX	194			184	
Region X					
Region XI	59	16		7	368
Region XII	56	254	1	70	
Philippines	570	676	2	5,386	512

Table 1.14b
FOREST DESTRUCTION BY REGION
1991
(In hectares)

Region	Kaingin	Illegal Logging	Typhoon	Forest Fire
CAR				605
Region I	45		458	398
Region II				303
Region III	270	3		2,707
Region IV	87			1,694
Region V	12	27		
Region VI	81		72	78
Region VII	5	22		45
Region VIII				
Region IX	72			36
Region X				
Region XI	187	20		6
Region XII				
Philippines	759	72	530	5,872

Table 1.14c
FOREST DESTRUCTION BY REGION
1996
(In hectares)

Region	Kaingin	Illegal Logging	Typhoon	Forest Fire
CAR	2		322	20
Region I				958
Region II			172	80
Region III			25	2,325
Region IV	37			82
Region V	0			2
Region VI				167
Region VII				196
Region VIII		10		
Region IX	53			
Region X			5	5
Region XI	2			204
Region XII				
Region XIII				519
Philippines	94	10	524	4,558

Table 1.14d
FOREST DESTRUCTION BY REGION
1997
(In hectares)

Region	Kaingin	Illegal Logging	Typhoon	Forest Fire
CAR			228	342
Region I				719
Region II			699	691
Region III			1,141	1,306
Region IV	4,453			162
Region V				
Region VI				99
Region VII		90		62
Region VIII				
Region IX	154	3		38
Region X	86			75
Region XI				
Region XII				27
Region XIII			14,500	17
Philippines	4,693	93	16,567	3,539

Source: Regional Accomplishment Reports, FMB

Table 1.15
NUMBER OF WILDLIFE LOCAL TRANSPORT PERMITS ISSUED
1990 to 1997

Region	Orchids								Plants								Derivatives							
	1990	1991	1992	1993	1994	1995	1996	1997	1990	1991	1992	1993	1994	1995	1996	1997	1990	1991	1992	1993	1994	1995	1996	1997
CAR		1	3	18	20		114	19					10							50				
Region I																								
Region II																								
Region III																								
Region IV																								
Region V			2		25	2	780	7,765					601	1	1,075									
Region VI	2		5	51	41	41	456	169					3	65	20									
Region VII	15	18	29	5,171	1,980	1,479	4,634	9,903	6				29	521	140	35					6			
Region VIII		1	1	367	507	27	233	173													55			
Region IX		3	15	150	171	517	421	331						7		3						40		
Region X	16	55	48	957	1,138	699	588	1,134					4	22	8	8				689				
Region XI	26	28	26	342	1,083	1,124	1,299	5,383																
Region XII	8	7	18	498	252	163	722						3											
Region XIII							70	244																

Source: PAWB, DENR

Table 1.16

FORESTRY LICENCES, LEASES AND PERMITS

1990 to 1997

(Area in hectares, AAC in cubic meters, linear meter)

Region	TLA			ITPLA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
(Yr. 1990)														
CAR	2	123,760	115,544	2	10,400	7	6,178,912	96,480	1	294	6	274	91	30,153
Region 1	-	-	-	7	8,532	6	899,256	19,082	11	3,595	25	1,926	63	15,656
Region 2	23	680,476	901,448	5	16,203	33	8,792,636	215,000	9	3,606	7	306	250	74,186
Region 3				9	9,711	1	6,897	1,169	16	6,329	16	1,204	83	36,261
Region 4	7	315,968	409,440	13	26,696	69	22,704,276	455,614	16	14,577	7	2,753	218	80,892
Region 5	-	-	-	2	3,030	4	414,000	13,939	3	6,301	6	836	103	36,759
Region 6	-	-	-	5	5,559	1	423,912	5,000	-	-	15	517	28	8,303
REgion 7	-	-	-	4	2,244	-	-	-	-	-	-	-	13	7,051
Region 8	1	26,600	80,000	3	2,275	42	13,919,240	256,750	2	4,210	-	-	4	3,201
Region 9	11	300,178	321,925	8	18,401	33	5,227,452	188,300	2	590	2	604	2	2,796
Region 10	18	749,755	1,095,293	14	83,667	21	7,572,609	106,618	15	45,263	11	1,463	90	30,479
Region 11	21	808,050	1,511,823	7	105,428	56	40,785,193	354,999	13	22,278	5	2,496	108	62,446
Region 12	10	588,115	570,239	2	11,935	14	33,345,841	143,010	6	3,219	1	960	24	25,369
Region 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Philippines	93	3,592,902	5,005,712	81	304,081	287	140,270,224	1,855,961	94	110,262	101	13,339	1,077	413,552

Table 1.16 (continued)...

Region	TLA			ITPLA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
(Yr. 1991)														
CAR	1	69,000	25,000	2	10,400	8	106,480	6,388,318	3	606	7	278	81	24,754
Region 1	-	-	-	5	6,906	6	19,082	899,256	7	2,459	21	1,764	59	14,127
Region 2	20	635,670	845,522	5	16,203	34	245,000	9,235,036	9	3,642	6	274	187	62,804
Region 3	-	-	-	12	15,055	3	10,000	3,147,808	14	5,297	24	1,524	76	29,321
Region 4	9	383,973	522,743	11	32,379	81	584,756	29,244,408	16	14,577	7	2,753	200	74,352
Region 5	-	-	-	3	3,630	3	9,464	323,017	3	6,301	6	836	109	36,341
Region 6	-	-	-	4	5,111	1	5,000	423,912	-	-	15	517	27	7,410
REgion 7	-	-	-	5	2,510	-	-	-	-	-	-	-	13	7,057
Region 8	1	26,600	80,000	3	2,275	44	288,750	14,791,019	2	4,210	-	-	2	840
Region 9	6	154,375	255,485	16	26,495	36	219,413	5,885,955	2	590	2	604	2	2,796
Region 10	13	661,437	1,293,874	15	104,524	21	106,618	7,572,609	15	46,084	10	1,446	91	30,375
Region 11	15	578,218	1,306,347	11	106,234	70	535,456	60,664,977	13	22,278	6	3,836	83	47,828
Region 12	4	116,215	271,659	3	23,797	16	153,010	34,439,263	6	3,219	1	960	23	24,270
Region 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Philippines	69	2,625,488	4,600,630	95	355,519	323	2,283,029	173,015,578	90	109,263	105	14,792	953	362,275

Table 1.16 (continued)...

Region	TLA			ITPLA/IFMA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
Yr. 1992														
CAR	1	69,000	25,000	2	10,400	8	106,480	6,388,318	3	606	7	278	85	25,255
Region 1	-	-	-	8	8,641	6	19,082	899,256	7	2,459	21	1,764	52	12,151
Region 2	18	569,660	238,779	6	17,198	34	245,000	9,235,036	9	3,642	6	274	195	64,392
Region 3	-	-	-	12	15,055	3	15,000	3,147,808	14	5,297	25	1,555	62	25,125
Region 4	7	333,153	120,527	11	28,700	85	602,206	30,070,066	15	7,189	7	2,753	202	75,195
Region 5	-	-	-	3	3,630	3	9,464	323,017	3	6,301	6	836	111	38,442
Region 6	-	-	-	4	5,111	1	5,000	423,912	-	-	15	517	29	7,612
REgion 7	-	-	-	5	2,510	-	-	-	-	-	-	-	13	7,057
Region 8	-	-	-	4	3,095	44	293,262	14,791,019	2	4,210	-	-	2	840
Region 9	5	134,050	68,462	22	28,807	41	256,234	6,752,685	2	590	3	622	2	2,796
Region 10	12	542,577	524,318	18	147,864	38	222,960	18,069,541	15	46,084	10	1,446	99	32,035
Region 11	11	458,428	450,719	44	148,514	79	637,508	68,889,490	12	20,587	6	3,836	87	49,516
Region 12	1	14,080	21,996	3	23,797	6	30,000	2,758,871	6	3,219	1	960	23	24,270
Region 13	5	138,865	257,455	-	-	8	115,845	27,828,008	-	-	-	-	-	-
Philippines	60	2,259,813	1,707,256	142	443,322	356	2,558,041	189,577,027	88	100,184	107	14,841	962	364,686

Table 1.16 (continued)...

Region	TLA			ITPLA/IFMA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
Yr. 1993														
CAR	1	74,500	60,000	2	10,400	9	106,480	6,388,318	3	606	7	278	79	24,076
Region 1	-	-	-	9	8,981	6	19,082	899,256	7	2,459	21	1,764	49	11,259
Region 2	9	324,935	151,604	17	27,754	35	255,000	9,805,692	9	3,642	6	274	172	54,980
Region 3	-	-	-	10	14,451	3	15,000	3,147,808	13	4,033	26	1,655	60	23,865
Region 4	4	152,455	48,881	12	29,600	85	602,206	30,070,066	14	7,044	7	2,753	177	61,859
Region 5	-	-	-	3	3,630	3	9,464	323,017	3	6,301	6	836	108	37,483
Region 6	-	-	-	4	1,042	1	5,000	423,912	-	-	15	517	27	6,834
REgion 7	-	-	-	4	2,244	-	-	-	-	-	1	234	13	7,057
Region 8	-	-	-	4	3,095	44	293,262	14,791,019	2	4,210	-	-	2	840
Region 9	5	131,695	52,226	36	38,858	41	256,234	6,752,685	2	590	4	632	2	2,796
Region 10	7	417,247	222,467	24	154,856	39	231,535	18,717,370	15	46,084	10	1,446	93	29,055
Region 11	10	445,998	478,748	59	161,031	90	1,073,080	87,188,235	12	20,587	6	3,836	80	44,168
Region 12	1	54,170	33,422	3	24,685	6	30,000	2,758,871	6	3,219	1	960	21	21,050
Region 13	4	64,037	123,070	-	-	8	115,845	27,828,008	-	-	-	-	-	-
Philippines	41	1,665,037	1,170,418	187	480,627	370	3,012,188	209,094,257	86	98,775	110	15,185	883	325,322

Table 1.16 (continued)...

Region	TLA			ITPLA/IFMA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
Yr. 1994														
CAR	1	74,500	27,782	2	10,400	11	174,780	7,719,759	3	606	9	681	76	22,496
Region 1	-	-	-	10	9,971	6	18,513	899,256	7	2,459	24	1,835	50	10,067
Region 2	4	145,965	36,306	17	27,754	29	223,370	10,493,102	9	3,642	8	698	154	48,553
Region 3	-	-	-	14	16,654	2	10,000	1,200,114	13	4,033	29	2,087	69	23,826
Region 4-A	5	203,806	53,888	12	17,186	13	122,789	6,557,767	14	7,044	7	2,753	4	414
Region 4-B	-	-	-	5	15,392	69	519,991	23,076,675	6	4,122	4	2,350	143	50,937
Region 5	-	-	-	3	3,630	3	9,464	323,567	3	6,301	6	836	98	31,717
Region 6	-	-	-	5	1,583	1	5,000	423,912	-	-	15	517	17	3,165
REgion 7	-	-	-	5	3,522	44	293,262	14,791,119	-	-	1	234	8	4,718
Region 8	-	-	-	6	3,367	34	222,295	6,413,280	2	4,210			2	840
Region 9	5	131,695	52,226	45	47,696	39	247,417	18,900,493	2	590	4	632	2	3,020
Region 10	7	409,642	223,871	31	163,928	93	1,030,187	85,232,974	15	46,084	10	1,446	77	24,071
Region 11	9	479,730	389,142	65	167,111	7	37,200	3,562,781	12	20,587	6	3,836	74	39,129
Region 12	2	66,020	38,750	7	28,220	13	154,270	31,426,954	6	3,219	1	960	18	19,191
Region 13	4	64,037	123,070	-	-	-	-	-	-	-	-	-	-	-
Philippines	37	1,575,395	945,035	227	516,414	364	3,068,538	211,021,753	92	102,897	124	18,865	792	282,144

Table 1.16 (continued)...

Region	TLA			ITPLA/IFMA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
Yr. 1995														
CAR	1	74,500	27,782	2	10,400	11	174,780	7,719,759	3	606	9	681	75	21,735
Region 1	-	-	-	10	9,971	6	18,513	899,256	7	2,459	24	1,835	39	7,778
Region 2	5	160,315	48,842	18	25,450	29	223,370	10,493,102	7	1,418	11	1,251	142	43,639
Region 3	-	-	-	19	21,206	2	10,000	1,200,114	13	4,033	33	2,601	49	19,128
Region 4-A	5	163,451	75,315	12	17,186	13	122,789	6,557,767	8	2,922	3	403	4	414
Region 4-B	-	-	-	5	15,392	69	519,991	23,076,675	6	4,122	3	2,194	133	47,056
Region 5	-	-	-	2	1,630	3	9,464	323,567	3	6,301	6	836	87	27,447
Region 6	-	-	-	5	1,583	1	5,000	423,912	-	-	15	517	14	2,232
REgion 7	-	-	-	6	4,154	44	293,262	14,791,119	-	-	3	366	8	4,718
Region 8	-	-	-	7	4,295	30	165,376	4,320,436	2	4,210			2	840
Region 9	5	131,695	52,226	48	55,165	44	298,214	12,916,511	2	590	4	632	1	1,720
Region 10	9	487,607	265,165	34	168,044	100	1,125,492	95,890,630	15	46,084	10	1,446	79	24,457
Region 11	7	340,783	335,530	72	174,807	10	68,460	7,284,037	12	20,587	6	3,836	71	37,019
Region 12	2	72,270	38,750	8	28,944	8	115,845	27,858,751	6	3,219	1	960	18	19,191
Region 13	3	66,495	218,735	-	-	-	-	-	-	-	-	-	-	-
Philippines	37	1,497,116	1,062,345	248	538,227	370	3,150,556	213,755,636	84	96,551	128	17,558	722	257,374

Table 1.16 (continued)...

Region	TLA			ITPLA/IFMA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
Yr. 1996														
CAR	1	74,500	20,611	2	10,400	11	174,780	7,719,759	3	606	9	681	73	18,509
Region 1	-	-	-	11	10,966	5	15,115	674,982	7	2,459	24	1,835	42	8,155
Region 2	5	160,315	45,488	18	25,450	46	393,170	15,451,437	7	1,418	32	2,867	164	41,732
Region 3	-	-	-	19	21,206	2	10,000	1,200,114	13	4,033	32	2,561	46	15,727
Region 4-A	5	163,451	75,315	12	17,186	13	122,791	6,550,764	8	2,922	3	403	3	334
Region 4-B	-	-	-	5	15,392	68	441,367	23,284,605	6	4,122	3	2,194	111	39,079
Region 5	-	-	-	2	1,630	3	9,404	323,567	3	6,301	6	836	82	26,490
Region 6	-	-	-	5	1,583	1	5,260	423,912	-	-	20	1,057	13	2,102
Region 7	-	-	-	6	4,154	-	-	-	-	-	3	366	5	1,990
Region 8	-	-	-	7	4,295	44	293,262	14,791,119	2	4,210	-	-	1	560
Region 9	4	114,865	36,433	43	48,372	16	125,704	3,767,108	2	590	4	632	1	1,720
Region 10	2	96,055	42,471	10	51,240	15	79,005	5,320,186	4	4,189	3	404	76	23,067
Region 11	2	72,575	26,055	60	109,444	74	1,039,990	85,080,210	12	20,587	6	3,836	65	32,333
Region 12	1	54,170	33,422	8	28,944	10	63,851	5,020,872	6	3,219	1	960	17	15,191
Region 13	12	659,760	489,888	25	174,414	38	318,528	24,992,002	11	41,895	7	1,042	1	460
ARMM	3	66,495	218,735	-	-	9	115,645	29,352,966	-	-	-	-	-	-
Philippines	35	1,462,186	988,418	233	524,676	355	3,207,872	223,953,603	84	96,551	153	19,674	700	227,449

Table 1.16 (continued)...

Region	TLA			ITPLA/IFMA		Rattan Cutting Contracts			AFFLA		TFA		Grazing Leases and Permits	
	No.	Area	AAC	No.	Area	No.	Area	AAC(lm)	No.	Area	No.	Area	No.	Area
Yr. 1997														
CAR	1	74,500	27,782	1	10,080	3	82,840	820,979	3	606	9	681	67	17,190
Region 1	-	-	-	11	10,966	5	15,115	675,032	7	2,459	24	1,835	30	6,055
Region 2	5	160,465	42,984	18	25,450	24	260,670	11,575,261	7	1,418	30	2,767	148	37,819
Region 3	-	-	-	18	16,980	-	-	-	12	3,533	31	2,455	39	12,494
Region 4-A	3	120,870	24,930	11	17,006	14	100,330	6,480,364	8	2,922	3	403	4	444
Region 4-B	-	-	-	5	15,392	41	296,041	14,024,846	5	2,347	2	2,146	77	25,940
Region 5	-	-	-	2	1,630	2	5,619	278,550	3	6,301	5	236	70	21,648
Region 6	-	-	-	5	1,583	-	-	-	-	-	20	1,057	12	1,944
REgion 7	-	-	-	6	4,154	-	-	-	-	-	3	366	5	1,990
Region 8	-	-	-	7	4,295	18	-	4,555,455	2	4,210	0	0	1	580
Region 9	3	84,535	40,960	42	48,265	39	205,878	6,045,310	2	590	4	632	1	1,720
Region 10	2	96,055	42,471	6	42,302	13	67,320	4,237,313	4	4,189	3	404	64	20,971
Region 11	-	-	-	43	71,518	78	685,598	77,584,116	12	20,587	6	3,836	58	27,121
Region 12	1	54,170	33,422	8	28,944	10	63,851	5,020,872	6	3,219	1	960	12	11,332
Region 13	8	574,390	473,257	23	173,334	45	284,561	28,102,135	11	41,895	7	1,042	-	-
ARMM	2	42,915	136,026	-	-	3	-	13,038,015	-	-	-	-	-	-
Philippines	25	1,207,900	821,832	206	471,899	295	2,067,823	172,438,248	82	94,276	148	18,820	588	187,248

Source: Forest Economic Division, FMB

Note:

TLA - Timber License Agreement

IFMA - Industrial Forest Plantation Management Agreement

AFF - Agro Forestry Farm Leases

TF - Tree Farm Leases

Table 1.17
NUMBER OF PLANTS CONFISCATED
1991 to 1997
(In piece)

Wildlife	Unit of Measure	Annual Total						
		1991	1992	1993	1994	1995	1996	1997
Assorted Orchids	Piece	1,447	339	4,847		124	96	39
Assorted Orchids	Pots			7		5	35	10
Assorted Orchids	Flask			2		15		
Compots Orchids	Pots					7		
Birds' Nest	Piece			1			7	
Cactus	Piece			2			2	
Cycas or Pitogo	Piece	25		17		5		
Fern	Piece		1	10				
Orchids	Flask							
Pitogo	Piece		5					
Sabila or Aloe Vera	Piece	10	2	5		14	1	11
Sabila	Flask					8		

Source: Report of NAI A Wildlife Monitoring Team, PAWB.

Table 1.18
AREA REFORESTED BY THE GOVERNMENT AND PRIVATE SECTORS
FY 1960-61 TO CY 1996
(In hectares)

Year	Grand Total	Government			Non-Government Sector				
		Total	DENR	Other Government Agencies	Total	Timber <u>1/</u>	ITP/TP/AFF	PD 1153	Others
Licensees									
CY 1996	46,096	18,869	18,869	-	27,227	20,005 <u>3/</u>	-	-	7,222 <u>2/</u>
1995	65,233	21,841	7,840	14,001	43,392	30,380 <u>3/</u>	-	-	13,012 <u>2/</u>
1994	49,551	18,032	18,032	-	31,519	9,468	18,729	-	3,322 <u>2/</u>
1993	19,211	6,347	6,347	-	12,864	12,692	172	-	-
1992	40,593	24,304	24,304	-	16,289	11,683	4,606	-	-
1991	93,039	73,602	72,238	1,364	19,437	18,089	1,348	-	-
1990	191,663	153,949	146,718	7,231	37,714	33,443	3,749	-	522
1989	131,404	89,452	82,966	6,486	41,952	32,087	6,526	-	3,339
1988	64,183	31,226	30,890	336	32,957	23,126	9,831	-	-
1987	39,811	28,843	27,558	1,285	10,968	7,956	1,118	1,296	598
1986	32,998	24,426	22,495	1,931	8,572	6,572	1,625	368	7
1985	24,231	12,684	12,201	483	11,547	8,148	1,500	1,228	671
1984	38,935	16,088	15,520	568	22,847	14,186	7,011	1,650	-
1983	78,538	42,239	27,155	15,084	36,299	31,703	3,554	1,042	-
1982	63,262	35,201	31,202	3,999	28,061	21,588	972	5,501	-
1981	64,541	33,296	30,707	1,589	31,245	20,096	6,482	4,667	-
1980	60,516	39,881	32,956	6,925	20,635	15,579	1,162	3,894	-
1979	79,397	51,858	35,305	16,553	27,539	20,132	545	6,017	845
1978	78,425	44,686	34,343	10,343	33,739	22,006	5,001	6,523	209
1977	53,263	33,365	23,677	9,688	19,898	17,276	1,088	500	1,034
1976	31,733	23,228	20,977	2,251	8,505	8,275	-	-	230

Table 1.18 (continued)...

Year	Grand Total	Government			Non-Government Sector				
		Total	DENR	Other Government Agencies	Total	Timber <u>1/</u>	ITP/TP/AFF	PD 1153	Others
Licensees									
FY 1974-75	15,280	15,280	15,280	-	-	-	-	-	-
1973-74	4,994	4,994	4,994	-	-	-	-	-	-
1972-73	5,787	5,787	5,787	-	-	-	-	-	-
1971-72	4,831	4,831	4,831	-	-	-	-	-	-
1970-71	6,458	6,458	6,458	-	-	-	-	-	-
1969-70	11,801	11,801	11,801	-	-	-	-	-	-
1968-69	7,511	7,511	7,511	-	-	-	-	-	-
1967-68	6,869	6,869	6,869	-	-	-	-	-	-
1966-67	5,327	5,327	5,327	-	-	-	-	-	-
1965-66	7,396	7,396	7,396	-	-	-	-	-	-
1964-65	11,709	11,709	11,709	-	-	-	-	-	-
1963-64	16,822	16,822	16,822	-	-	-	-	-	-
1962-63	11,543	11,543	11,543	-	-	-	-	-	-
1961-62	7,474	7,474	7,474	-	-	-	-	-	-
1960-61	11,543	11,543	11,543	-	-	-	-	-	-
as of 1960	54,531	54,531	54,531	-	-	-	-	-	-

Source: 1996 Philippine Forestry Statistics.

1/ 1990 -1994 Including Enrichment Planting of Timber Licensees

2/ Including accomplishment of ITPLA and IFMA holders

3/ Private Lands and other organizations

Table 1.19
LIST OF PAS WITH APPROVED INTERIM PAMB's*
1994 to 1996

Region / Protected Area	Date Approved
CAR	
1. Cassamata Hill National Park	11/08/94
2. Mt. Pulog National Park	01/16/95
3. Mt. Data national Park	01/16/95
4. Busol WFR	12/09/95
5. Marcos Hi-way WFR	12/09/95
6. Balbalasang-Balbatan NP	12/09/95
Region 1	
1. Manleluag Spring National Park	10/15/94
2. Agoon-Damortis National Park	10/18/94
3. Paoay Lake National Park	02/07/95
4. Bessang Pass National Park	04/18/95
5. Northern Luzon Heroes Hills National Park	05/15/95
6. Tirad Pass NP	07/23/96
7. Hundred Island	02/28/97
Region 2	
1. Peñablanca Protected Landscape	02/21/94
2. Salinas Deer Refuge	02/21/95
3. Fuyot Spring National Park	02/21/94
4. Magapit Game Refuge and Bird Sanctuary	02/02/94
5. * Palanan Wilderness	02/21/94
6. * Batanes Protected Landscape	02/09/94
7. Palau Island Protected Landscape/Seascape	06/02/95
Region 3	
1. Masinloc and Oyon Bays Protected Landscape/Seascape	12/27/93
2. Mt. Arayat National Park	11/04/94

Region / Protected Area	Date Approved
3. Bataan National Park	01/16/95
4. Minalungao National Park	06/29/95
5. Roosevelt National Park	08/04/95
6. Lake Malimanga BFS	12/09/95
7. Biak na Bato NP	12/09/95
8. Palanas Watershed	06/11/96
Region 4-A	
1. Mt. Palay-Palay Mataas na Gulod National Park	02/02/94
2. Taal Volcano National Park	06/27/95
3. Quezon National Park	06/27/95
4. Alibijaban Wilderness Area (PD 2131)	08/04/95
5. PD 1636 (Rizal side)	08/04/95
6. Aurora Memorial National Park	08/04/95
7. Mt. Banahaw-San Cristobal National Park	08/04/95
Region 4-B	
1. * Apo Reef Marine Reserve	10/94
2. Ursula Island Game Refuge and Bird Sanctuary	02/07/95
3. Naujan Lake National Park	05/15/95
4. Mts. Iglit-Baco National Parks	05/25/95
5. Tubbataha Reefs National Park	06/29/95
Region 5	
1. Bicol National Park	04/21/94
2. Libmanan Caves National Park	07/20/94
3. Bulusan Volcano National Park	06/28/94
4. Mt. Isaraog National Park	06/24/94
5. Caramoan National Park	09/13/94

Table 1.19 (continued)...

Region / Protected Area	Date Approved
6. Mt. Mayon Volcano National Park	12/14/94
7. Catanduanes WFR	10/11/96
8. Lagonoy WFR	10/11/96
9. Abasig-Matogdon-Manang	10/11/96
10. Mt. Masaraga WFR	10/11/96
Region 6	
1. Bulabog-Putian National Park	06/20/94
2. * Mt. Canlaon National Park	09/05/94
3. Taklong Island National MP	12/16/94
4. Sagay Protected Landscape/Seascape	06/01/96
Region 7	
1. Sudlon NP	11/01/95
2. Central Cebu NP	11/01/95
3. Rajan Sikatuna NP	11/01/95
4. Olango Island WS	11/01/95
5. Mangrove WA (Bantayan Island)	11/01/95
6. Mangrove Swamp Forest Reserve	11/01/95
7. Loboc WFR	11/01/95
8. Mananga River WFR	11/01/95
9. Alijawan-Cansuhay-Anibongan WF	11/01/95
10. Kotkot and Lusaran WFR	11/01/95
11. Apo Island	06/11/96
12. Albuquerque, Loay, Loboc MSFR	06/20/97
13. Sandigan Island MSFR	06/20/97
14. Panglao Island MSFR	06/20/97
15. Pangangan Island WA	06/20/97
16. Tubigon Group of Island	06/20/97
17. Clarin Group of Islets	06/20/97
Region 8	
1. McArthur Landing Memorial National Park	02/16/94
2. Sohotan Natural Bridge National Park	04/22/94

Region / Protected Area	Date Approved
Region 8	
1. McArthur Landing Memorial National Park	02/16/94
2. Sohotan Natural Bridge National Park	04/22/94
3. Mahagnao Volcano National Park	07/08/94
4. Lake Danao National Park	10/05/94
5. Kuapnit-Balinsasayao National Park	05/30/95
6. Pan-as Falls Hayiban WFR	08/04/95
7. Jicontol Watershed Forest Reserved	08/04/95
8. Palumpon Watershed Forest Reserve	07/05/96
9. Guiuan Protected Landscape/Seascape	12/09/95
10. Hinabian Watershed Forest Reserve	02/08/96
11. Bulosao Watershed Forest Reserve	02/08/96
Region 9	
1. Basialn National Park	09/09/94
2. Rizal (Dapitan) NP	01/26/96
3. Sta. Cruz Island	01/26/96
4. Pasonanca Watershed	01/26/96
5. Buug Watershed Forest Reserve	01/26/96
6. Slocon Watershed Forest Reserve	01/26/96
Region 10	
1. * Mt. Kitanglad National Park	09/09/94
2. Initao National Park	07/28/94
3. Mt. Malindang National Park	09/14/94
Region 11	
*1. Mt. Apo National Park	11/94
2. Mt. Matuntum Protected Landscape/Seascape	03/05/96
Region 13 (CARAGA)	
1. Siargao Wilderness	01/16/95
2. Agusan Wildlife Sanctuary	01/25/95

Source: PAWB, DENR

Note: * PAMBs were organized starting in 1994.
IPAS sites

Table 1.20
LIST OF POLICY ISSUANCES
1995 to 1997

PROCLAMATIONS	TITLE
No. 552 - March 20, 1995	Establishing as Mt. matutum Protected Lanscape the parcels of land of the public domain situated within the municipalities of Tupi, Tampakan, and Polomok, Province of South Cotobato, and the Municipality of Malungon, Province of Sarangani
No. 592 - June 1, 1995	Declaring the islands of Molocaboc, Diutay, Matabas, and surrounding reefs and the reefs of Carbin and Maca, situated in the municipality of Sagay, Province of Negros Occidental as Protected Lanscape/Seascape
No. 746 - February 20, 1996	Declaring as protected area a certain parcel of land of public domain to be known as the mount GUITING-GUITING Natural Park embraced and situated in the municipalities of Cajidiocan, Magdiwang and San Fernando, in the island of Sibuyan, Romblon
No. 756 - March 5, 1996	Establishing Sarangani Bay and a portion of the municipal waters of Maitum, Kiamba and Maasim Sarangani provice as protected sescape for the purpose of protecting and maintaining its coastal and marine resources for the benefit and enjoyment of the people of the Philippines
No. 868 - September 6, 1996	Amending Presidential Proclamation No. 1801, Series of 1980, by declaring certain parcels of land of public domain and reef areas covering Apo Reef situated in the municipality of Sablayan, Occidental Mindoro as protected area under the category of natural park
No. 882 - September 24, 1996	Amending Presidential Proclamation No. 59, dated May 9, 1936 by declaring certain parcels of land of the public domain covering Mt. Apo situated in Kidapawan, Makilala and Magpet in Cotobato, Bansalan, Digos, Sta. Cruz, Davao del Sur, Davao, Island Mindanao as protected area under the category of Natural Park

Table 1.20 (continued) ...

PROCLAMATIONS	TITLE
No. 896 - October 24, 1996	Amending Proclamation No. 677 dated December 14, 1990 by declaring certain parcels of land of the public domain covering Mt. Kitanglad range situated in Talakag, Baungon, Libona, Manolo Fortich, Sumilao, Impasug-ong, Malaybalay and Lantapan, all in the province of Bukidnon as protected area under the category of Natural Park and its peripheral areas as buffer
No. 901 - October 10, 1996	Declaring a certain parcel of land within the coverage of Proclamation Nos. 1636 and 1687 dated 18 April 1977, situated in the municipality of Rodriguez, Rizal, as Pamitinan protected landscape
No. 902 - October 10, 1996	Amending Proclamation No. 1801 dated August 30, 1979, Proclamation No. 2151 dated December 29, 1981, and Proclamation No. 2152 dated December 29, 1981 by declaring the terrestrial, wetland and marine areas of Siargao and its surrounding islets in northeastern part of Mindanao, province of Surigao del Norte as protected area under the category of protected landscape and seascape
No. 923 - November 19, 1996	Amending Proclamation No. 235, dated July 22, 1967, by declaring the Taal Volcano island national park, province of Batangas, Island of Luzon as protected area under the category of protected landscape
No. 978 - March 10, 1997	Amending Letter of Instruction 917-A dated September 7, 1979 by declaring certain parcels of land of the public domain and its coastal waters covering northern Sierra Madre situated in Palanan, Dunlacan, Maconacon and portions of San Pablo, Cabagan, Tumauni, Iligan, San Mariano and Dinapigue, all in the province of Isabela as protected area under the category of Natural Park.

Table 1.20 (continued) ...

PROCLAMATIONS	TITLE
No. 1005 - May 8, 1997	Amending Presidential Proclamation No. 721, dated August 08, 1934, by declaring certain parcels of land covering mount Kanlaon situated in the municipalities of Murcia and La Castellana and cities of Bago, La Carlota, Canlaon and San Carlos, all within the Negros island as protected area under the category of natural park.
No. 1030 - June 23, 1997	Declaring the Philippine Tarsier as a specially protected faunal species of the Philippines
No. 1037 - July 1, 1997	Establishing the 1,776 hills, more or less, popularly known as Chocolate hills and the areas within and surrounding them located in the municipalities of Carmen, Batuan and Sagbayan, Bilar, Valencia and Sierra Bullones, Province of Bohol as a natural monument to protect and maintain its natural beauty and to provide restraining mechanisms for inappropriate exploitation.
No. 1125 - November 4, 1997	Declaring an area of the public domain situated in the municipalities of Calbiga, Wright and Hinabangan, Province of Samar, as Calbiga caves protected landscape

Source: PAWB, DENR

Table 1.21
DENR ADMINISTRATIVE ORDERS
1995 to 1997

ORDERS	TITLE
No. 95-03 - January 13, 1995	Procedural and/or documentary requirements, guidelines and/or criteria to be observed and/or criteria to be observed and/or followed in the selection of representatives of Local Government units, Non-government Organizations and Peoples Organization to the Protected Management Board (PAMB)
No. 95-05 - February 2, 1995	Guidelines in the selection, Awards, monitoring and evaluation of Host Non-government Organization in the Conservation of Priority Protected Areas Project
No. 95-06 - March 03, 1995	Creation of a National Biodiversity Unit under the Office of the Director, Protected Areas and Wildlife Bureau
No. 95-10 - March 29, 1995	Amendment of DENR Administrative Order No. 42, series of 1994
No. 95-22 - June 30, 1995	Guidelines on the Accreditation and Registration of Zoos and Wildlife Facilities of Private Collector/s Including Wildlife Stocks thereat
No. 95-28 - November 17, 1995	Amendment to Section 22, 25 and 26 of DAO, 25, Series of 1992 RE: Composition and Authority of PAMB Executive Committee and the Role of PASu
No. 96-02 - January 23, 1996	Amendment to DENR Administrative Order No. 95-28 Re : Composition and Authority of PAMB Executive Committee and the Role of the PASu
No. 96-16 - April 15, 1996	Amending DENR Administrative Order No. 95-22 dated 30 June 1995 RE : Guidelines on the Accreditation and Registration of Zoos and Wildlife Facilities of Private Collector/s including Wildlife Stocks Threat
No. 96-17 - April 19, 1996	Creating the NIPAS Evaluation Committee (NEC) to Assess the Performance of the Protected Area Superintendents
No. 96-20 - June 21, 1996	Implementing Rules and Regulations on the Prospecting of Biological and Genetic Resources
No. 96-22 - June 21, 1996	Guidelines on the Establishment and Management of Integrated Protected Area Funds (IPAF)

Table 1.21 (continued)...

ORDERS	TITLE
No. 96-28 - September 19, 1996	Requirements for the Deputation of Barangay Volunteers and Members of Tribal Communities as Field Officers within Protected Areas
No. 96-31 - October 15, 1996	Amendment of Section 61 of Administrative Order No. 25, September 1992 RE: Implementing Rules and Regulations of RA 7586 (National Integrated Protected Areas Act of 1992)
No. 96-34 - November 12, 1996	Guidelines on the Management of Certified Ancestral Domain Claims
No. 97-12 - April 11, 1997	Amendment of DENR Administrative Order No. 56, Series of 1993
No. 97-14 - April 21, 1997	Amending DENR Administrative Order Nos 95-22 and 96-16 RE: Guidelines on the Accreditation and Registration of Zoos and Wildlife Facilities of Private Collector/s including Wildlife Stocks Threat
No. 97-16 - April 28, 1997	Addendum to the Guidelines on the Establishment and Management of the Integrated Protected Area Fund.
No. 97-17 - April 29, 1997	Establishing the Disposition Program for Confiscated and Donated Wildlife in the Custody of DENR Wildlife Rescue Centers and Similar DENR Facilities and Providing Guidelines Therefor
No. 97-27 - July 31, 1997	Amendment of Section 15, Transitory Provisions of Department Administrative Order No. 96-20 also known as the Implementing Rules and Regulations on the Prospecting of Biological and Genetic Resources
No. 97-33 - November 24, 1997	Guidelines on the Issuance of Permit for the Collection and Transport of Biological Specimens From Protected Areas for Use by DENR Biodiversity Conservation Programs/Projects
No. 97-36 - December 15, 1997	Institutionalizing the Dalaw-Turo of the Protected Areas and Wildlife Bureau (PAWB) as an Environmental Education Strategy for Nature Conservation and Environmental Awareness Projects and Activities
No. 97-42 - December 29, 1997	Transferring the Tamaraw Conservation Program (TCP) from the Protected Areas and Wildlife Bureau (PAWB) to DENR Region IV

Source: PAWB, DENR

Table 1.22
DENR MEMORANDUM CIRCULARS
1995 to 1997

MEMORANDUM CIRCULARS	TITLE
No. 95-19 - December 05, 1995	Supplementary guidelines on the granting of additional monkey breeders quota as provided for in DENR Administrative Order No. 29, Series of 1994
No. 96-02 - February 9, 1996	Interim Guidelines Governing the Issuance of "Muyong Resources Permit" in the Province of Ifugao
No. 96-09 - November 27, 1996	Clarification on who shall take lead in the Implementation of NIPAS Activities within Protected Areas under the Administrative Jurisdiction of Other Government Instrumentalities including the Organization of Individual Protected Area Management Boards.
No. 97-17 - September 11, 1997	Criteria for the Identification of Wetlands critical to Biodiversity Conservation
No. 97-18 - September 12, 1997	Fifty Percent (50%) Discount on all National Park Fees

Source: PAWB, DENR

Table 1.23
DENR MEMORANDUM ORDERS
1995 to 1996

MEMORANDUM ORDERS	TITLE
No. 95-08 - April 04, 1995	Clarification on the provision of the NIPAS law regarding the modification of boundary of the protected area and its buffer zone
No. 289 - July 5, 1995	Directing the integration of the Philippines strategy for biological diversity conservation in the sectoral plans, programs and project of the national government agencies and the operationalization of the objectives of sustainable biological diversity resource management and development as embodied in the strategy
No. 96-02 - January 23, 1996	Reiterating the Creation of Filed NIPAs Coordinating Office
No. 96-07 - March 20, 1996	Attention all Regional Executive Directors
No. 96-15 - September 11, 1996	PAMB Membership

Source: PAWB, DENR

Table 1.24
VOLUME ACCOUNTS OF OLD GROWTH DIPTEROCARP FORESTS
1988 to 1994
(In thousand cubic meters)

	1988	1989	1990	1991	1992	1993	1994
OPENING VOLUME 1/	318,739	243,105	227,123	212,416	198,792	198,792	198,792
Changes due to economic activity	(24,152)	(12,411)	(8,688)	(8,688)	0	0	0
Reforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Afforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Depletion (-)							
Logged 2/	24,152	12,411	8,688	8,688	0	0	0
Other Accumulation (+/-)							
Forest converted to non-forest use 3/	(3,475)	(2,482)	(2,433)	(2,408)	0	0	0
Other volume changes (+/-)	(48,007)	(1,089)	(3,587)	(2,529)	0	0	0
Natural growth 4/							
Natural mortality 4/							
Other changes (s.d.)	(48,007)	(1,089)	(3,587)	(2,529)	0	0	0
Net Change in Volume	(75,634)	(15,982)	(14,707)	(13,624)	0	0	0
CLOSING VOLUME	243,105	227,123	212,416	198,792	198,792	198,792	198,792

Source: Philippine System of Integrated Environmental and Economic Accounting (PSEEA), National Statistical Coordination Board (NSCB).

Note: 1/ Opening volume for a given year is based on the volume of old growth forest in the preceding year (PFS).

2/ Volume logged equals logged area multiplied by 248.22 cu.m./ha. (mean harvestable volume of old growth forest).

3/ Volume of forest converted equals converted forest area multiplied by 248.22 cu. m. / ha.

4/ Net stand growth is zero in old growth forest: tree growth equals tree mortality.

Table 1.25
VOLUME ACCOUNTS OF SECOND GROWTH DIPTEROCARP FORESTS
1988 to 1994
(In thousand cubic meters)

	1988	1989	1990	1991	1992	1993	1994
OPENING VOLUME 1/	588,753	475,991	467,125	458,137	449,161	435,695	423,480
Changes due to economic activity	(1,068)	(978)	(503)	(352)	(352)	0	0
Reforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Afforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Depletion (-)							
Damage from logging 2/	1,068	978	503	352	352	0	0
Other Accumulation (+/-)	2,704	2,191	(1,179)	(1,960)	(1,893)	(3,812)	(3,745)
Old growth converted to second growth 3/	6,054	5,541	2,848	1,993	1,993	0	0
Forest converted to non-forest use 4/	(3,350)	(3,350)	(4,027)	(3,953)	(3,886)	(3,812)	(3,745)
Other volume changes (+/-)	(114,397)	(10,079)	(7,306)	(6,665)	(11,222)	(8,403)	(7,308)
Net stand growth 5/	22,961	18,564	18,218	17,867	17,517	16,992	16,516
Other changes (s.d.)	(137,359)	(28,643)	(25,524)	(24,532)	(28,739)	(25,395)	(23,823)
Net Change in Volume	(112,762)	(8,866)	(8,988)	(8,976)	(13,466)	(12,215)	(11,053)
CLOSING VOLUME	475,991	467,125	458,137	449,161	435,695	423,480	412,427

Source: Philippine System of Integrated Environmental and Economic Accounting (PSEEA), National Statistical Coordination Board (NSCB).

Note: 1/ The Opening volume in a given year is based on the volume of old growth forest in the preceding year.

2/ Area damaged from logging multiplied by the harvestable volume of 67.0 cu.m./ha.

3/ Area logged in old growth forest in the previous year multiplied by density of 67.0 cu.m./ha.

4/ Area converted to other uses multiplied by the residual density of 67.0 cu. m./ha.

5/ Net stand growth equals opening volume multiplied by annual growth rate taken from the Revilla study (Yeal 10).

Table 1.26
AREA ACCOUNTS OF OLD GROWTH DIPTEROCAP FORESTS
1988 to 1994
(In thousand hectares)

	1988	1989	1990	1991	1992	1993	1994
OPENING AREA 1/	1,219.689	988.300	922.000	861.200	804.900	804.900	804.900
Changes due to economic activity	(97.300)	(50.000)	(35.000)	(35.000)	0.000	0.000	0.000
Reforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Afforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Depletion (-)							
Logged Area 2/	97.300	50.000	35.000	35.000	0.000	0.000	0.000
Other Accumulation (+/-)							
Forest area converted to non-forest use 3/	(14.000)	(10.000)	(9.800)	(9.700)	0.000	0.000	0.000
Other volume changes (+/-)	(120.089)	(6.300)	(16.000)	(11.600)	0.000	0.000	0.000
Additions 4/							
Other changes (s.d.)	(120.089)	(6.300)	(16.000)	(11.600)	0.000	0.000	0.000
Net Change in Area	(231.389)	(66.300)	(60.800)	(56.300)	0.000	0.000	0.000
CLOSING AREA	988.300	922.000	861.200	804.900	804.900	804.900	804.900

Source: Philippine System of Integrated Environmental and Economic Accounting (PSEEA), National Statistical Coordination Board (NSCB).

Note: 1/ Based on the RP-German Forest Inventory as indicated in the Philippine Forestry Statistics (PFS). The Opening area in a given year is based on the area of old growth forest in the preceding year (PFS).

2/ From Master Plan for Forestry Development (MPFD): Appendix 15

3/ 1988 and 1989, from Table 9 of Tonie Balangue's paper; 1990-1991 : from MPFD, Appendix 8 (Current trends scenario:total logging ban) 1992 onwards assumed to be zero.

4/ There is no additional area for old growth forest.

Table 1.27
AREA ACCOUNTS OF SECOND GROWTH DIPTEROCARP FORESTS
1988 to 1994
(In thousand hectares)

	1988	1989	1990	1991	1992	1993	1994
OPENING AREA 1/	3,618.919	3,412.800	3,350.900	3,287.600	3,224.300	3,131.900	3,041.758
Changes due to economic activity	(15.945)	(14.595)	(7.500)	(5.250)	(5.250)	0.000	0.000
Reforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Afforestation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Depletion (-)							
Damage from logging 2/	15.945	14.595	7.500	5.250	5.250	0.000	0.000
Other Accumulation (+/-)	40.355	32.705	(17.600)	(29.250)	(28.250)	(56.900)	(55.900)
Old growth area converted to second growth area 3/	90.355	82.705	42.500	29.750	29.750	0.000	0.000
Forest area converted to non-forest use 4/	(50.000)	(50.000)	(60.100)	(59.000)	(58.000)	(56.900)	(55.900)
Other volume changes (+/-)	(230.529)	(80.010)	(38.200)	(28.800)	(58.900)	(33.242)	0.000
Other changes (s.d.)	(230.529)	(80.010)	(38.200)	(28.800)	(58.900)	(33.242)	0.000
Net Change in Area	(206.119)	(61.900)	(63.300)	(63.300)	(92.400)	(90.142)	(55.900)
CLOSING AREA	3,412.800	3,350.900	3,287.600	3,224.300	3,131.900	3,041.758	2,962.655

Source: Philippine System of Integrated Environmental and Economic Accounting (PSEEA), National Statistical Coordination Board (NSCB).

Note: 1/ Based on the RP-German Forest Inventory as indicated in the Philippine Forestry Statistics (PFS). The Opening area is in a given year is based on the area of old growth forest in the preceding year (PFS).

2/ Equivalent to 15% of logged area in previous year, for logged landings, roads, skidding/yarding trails

3/ Area logged in old growth forest in previous year less 15% for log landings, roads, skidding/yarding trails

4/ 1990 onwards: from MPFD, Appendix 8 (Current trends scenario:total logging ban); 1988 and 1989, from Table 9 of Tonie Balangue's paper

Table 1.28
VOLUME ACCOUNTS OF PINE FORESTS
1988 to 1994
(In thousand cubic meters)

	1988	1989	1990	1991	1992	1993	1994
OPENING STOCK 1/	25,098	24,977	24,888	24,759	24,626	24,500	24,377
Closed	17,067	16,984	16,924	16,836	16,746	16,660	16,576
Open	8,031	7,993	7,964	7,923	7,880	7,840	7,801
Depletion (-)	28	23	0	0	0	0	0
Harvest 2/	28	23	0	0	0	0	0
Other Accumulation (+/-)	(123)	(118)	0	0	0	0	0
Forest Conversion	(123)	(118)	0	0	0	0	0
Other Volume Changes (+/-)	(26)	6	(129)	(133)	(126)	(123)	(125)
Additions 3/	717	711	706	700	695	689	684
Reductions	(618)	(617)	(609)	(605)	(600)	(596)	(591)
Stand Mortality 4/	(573)	(572)	(564)	(560)	(555)	(551)	(546)
Closed	(390)	(389)	(384)	(381)	(377)	(375)	(371)
Open	(183)	(183)	(180)	(179)	(178)	(176)	(175)
Forest Fires	(45)	(45)	(45)	(45)	(45)	(45)	(45)
Other Changes (S.D.)	(125)	(88)	(226)	(228)	(221)	(216)	(218)
Net Change in Stock	(121)	(89)	(129)	(133)	(126)	(123)	(125)
CLOSING STOCK 1/	24,977	24,888	24,759	24,626	24,500	24,377	24,252

Source: Philippine System of Integrated Environmental and Economic Accounting (PSEEA), National Statistical Coordination Board (NSCB).

Note: 1/ Based on PFS data

2/ Harvest: zero harvest from 1990 - 1994 due to log ban

3/ Addition: 3.40 cu.m./ha/year (based on RP-German Inventory Project)

4/ Stand Mortality: 1.75 cu.m./ha. for open forests

2.95 cu.m./ha. for closed forests

Table 1.29
VOLUME ACCOUNTS OF RATTAN
1988 to 1994
(In thousand lineal meters)

	1988	1989	1990	1991	1992	1993	1994
OPENING STOCK 1/	4,343,670	4,112,320	3,894,400	3,820,970	3,627,140	3,511,170	3,370,720
Depletion (-)	355,860	343,080	199,180	317,380	235,660	255,690	245,730
Harvest 2/	205,070	197,710	113,810	181,360	134,670	146,110	112,450
Waste 3/	150,790	145,370	85,370	136,020	100,990	109,580	133,280
Other Accumulation (+/-)	(69,630)	(65,450)	(61,270)	(59,870)	(59,190)	(57,790)	(57,100)
Forest conversion 4/	(69,630)	(65,450)	(61,270)	(59,870)	(59,190)	(57,790)	(57,100)
Other Volume Changes (+/-)	194,140	190,610	187,020	183,420	178,880	173,030	168,530
Addition due to growth (+) 5/	312,957	307,272	301,480	295,670	287,920	278,930	271,680
Reduction due to stand mortality	118,817	116,662	114,460	112,250	109,040	105,900	103,150
NET CHANGE IN STOCK 7/	(231,350)	(217,920)	(73,430)	(193,830)	(115,970)	(140,450)	(134,300)
CLOSING STOCK 8/	4,112,320	3,894,400	3,820,970	3,627,140	3,511,170	3,370,720	3,236,420

Source: Philippine System of Integrated Environmental and Economic Accounting (PSEEA), National Statistical Coordination Board (NSCB).

Note: 1/ closing stock of the previous year based on the RP-German FRIP (1988)

2/ split rattan harvest + unsplit rattan harvest * % of understatement * % of inventory per diameters
split & unsplit rattan harvest is based on PFS

% of inventory for large diameter rattan = 42% based on PFS

% of inventory for small diameter rattan = 58% based on PFS

% of understatement = 488% based on Silviconsult-ADB report

3/ % of waste * merchantable lengths felled

% of waste = 50% based on Virtucio & Sy (1987) Industry Representative

merchantable length = 150% of harvest

4/ forest area converted * rattan stock density in residual forest

forest conversion projection is based on MPFD

rattan stock density in residual forest is based on FRIP

5/ rattan stock density in residual forest * residual forest area * growth rate

residual forest area is based on PFS

growth rate is based on assumption of PCARRD (1988) which is 0.70 meter per year

6/ residual forest area * rattan stock density in residual forest * % of stand mortality

% of stand mortality = 5% of stand in residual forest based on Nur Supardi Md. Noor & Wan Razali Mohd. (1987)

7/ depletion +/- other accumulation +/- other volume changes

8/ opening stock - net change in stock

Table 1.30
AREA ACCOUNTS OF PINE FORESTS
1988 to 1994
(In thousand hectares)

	1988	1989	1990	1991	1992	1993	1994
OPENING AREA 1/	238.89	238.88	237.60	236.40	235.20	233.90	232.70
Closed	162.45	162.44	161.57	160.75	159.94	159.05	158.24
Open	76.44	76.44	76.03	75.65	75.26	74.85	74.46
Depletion (-)	0.90	0.16	0.00	0.00	0.00	0.00	0.00
Harvest 2/	0.90	0.16	0.00	0.00	0.00	0.00	0.00
Other Accumulation (+/-)	(1.20)	0.00	0.00	0.00	0.00	0.00	0.00
Forest Conversion	(1.20)	0.00	0.00	0.00	0.00	0.00	0.00
Other Volume Changes (+/-)	2.09	(1.13)	(1.20)	(1.20)	(1.30)	(1.20)	(1.20)
Additions	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reductions	(0.64)	(0.64)	(0.64)	(0.64)	(0.64)	(0.64)	(0.64)
Stand Mortality	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forest Fires 3/	(0.64)	(0.64)	(0.64)	(0.64)	(0.64)	(0.64)	(0.64)
Other Changes (S.D.)	2.73	(0.49)	(0.56)	(0.56)	(0.66)	(0.56)	(0.56)
Net Change in Area	(0.01)	(1.28)	(1.20)	(1.20)	(1.30)	(1.20)	(1.20)
CLOSING AREA 1/	238.88	237.60	236.40	235.20	233.90	232.70	231.50

Source: Philippine System of Integrated Environmental and Economic Accounting (PSEEA), National Statistical Coordination Board (NSCB).

Note: 1/ Based on PFS data

2/ Harvest: zero harvest from 1990 - 1994 due to log ban

3/ Forest Fires: 640 has./year