



## CHAPTER 1 INDONESIA'S FORESTS: WHAT IS AT STAKE?

### 1.1 100 Million Hectares of Tropical Forest

Indonesia is home to some of the most magnificent tropical forests in the world. In extent, they rank third behind Brazil and the Democratic Republic of Congo (formerly Zaire), and their biological richness is unique. The major forest types of Indonesia range from evergreen lowland dipterocarp forests in Sumatra and Kalimantan to seasonal monsoon forests and savanna grasslands in Nusa Tenggara and nondipterocarp lowland forests and alpine areas in Irian Jaya (sometimes referred to as Papua). Indonesia also contains the most extensive mangrove forests in the world, estimated at 4.25 million hectares in the early 1990s.

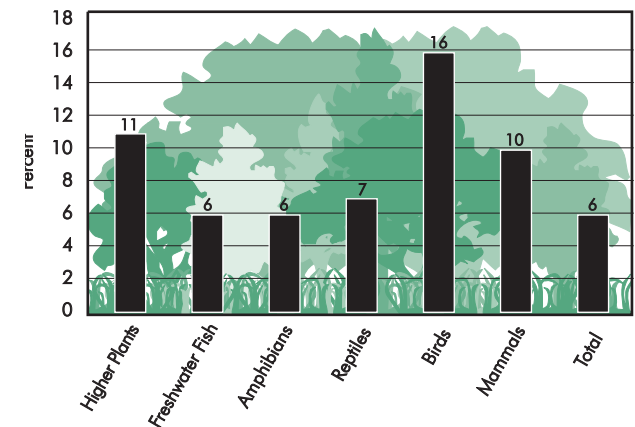
Most of these habitats are under serious threat. Indonesia today is losing nearly 2 million ha of forest *every year*. Deforestation on this scale, at this speed, is unprecedented. Environmental organiza-

tions are sometimes accused of hyperbole in their claims of imminent destruction. In the case of Indonesia, predictions of catastrophic habitat loss and species decline are not exaggerated. The most recent and authoritative survey of the country's forest cover predicts that lowland dipterocarp forests – the richest tropical habitat of all – will have vanished from Sumatra and Kalimantan by 2010 if current trends continue unchecked (Holmes, 2000).

### 1.2 A Rich Natural World Is Disappearing

Although Indonesia comprises only 1.3 percent of the earth's land surface, it harbors a disproportionately high share of its biodiversity, including 11 percent of the world's plant species, 10 percent of its mammal species, and 16 percent of its bird species. (See Figure 1.1.) The majority of these species are found in the country's forests.

Figure 1.1 Biotic Richness: Percent of World's Species Found in Indonesia



Source: World Resources 2000–2001. Washington DC: World Resources Institute: 246–248.

Indonesia's 17,000 islands span the Indomalayan and Australasian realms; the archipelago contains seven major biogeographic realms and an extraordinary diversity of habitat types. (See Box 1.1.) Many islands have been isolated for millennia, so levels of endemism are high. Of 429 locally endemic bird species, for example, 251 are unique to single islands. Most of Indonesia's insects are also found nowhere else, with many genera confined to individual mountaintops. The country's three main centers of species richness are Irian Jaya (high species richness and endemism), Kalimantan (high species richness, moderate endemism), and Sulawesi (moderate species richness, high endemism).

Indonesia provides the habitat for some of the world's most beloved mammals, including the orangutan, tiger, rhinoceros, and elephant. As recently as 1930, three subspecies of tiger, Balinese, Javan, and Sumatran, ranged across the country. Of these three, the Balinese tiger (*Panthera tigris balica*) became extinct in the late 1930s and the Javan tiger (*Panthera tigris sondaica*) in the 1970s. Today, only the Sumatran subspecies remains. Because of their solitary lifestyle and nocturnal habits, an accurate census of Sumatran tigers is nearly impossible. They are believed to number around 400-500, living mostly in five national parks on Sumatra. An informal census in 1978 estimated the number of tigers on the island at approximately 1,000. Despite tigers' ability to live in a wide range of habitats, forest fragmentation and agricultural development as well as the demand for tiger products have contributed to the decline of the population (Tiger Information Center, 2001).

### Box 1.1 The Wallace Line

The Indonesian archipelago is split almost in half by an invisible line. The English biologist Alfred Russel Wallace first described this line in the 1850s (Wallace, 1859). Wallace observed that birds present on one island were not present on another island only 40 km away. He later found that this startling pattern was true when applied to countless other animal and plant species. For example, the famous dipterocarp trees that make up the bulk of lowland forests in Indonesia show a remarkable divide across the Wallace line. Over 287 species are found on Borneo, whereas only 7 are found 80 km eastward on Sulawesi, at the same latitude. The line, which now bears Alfred Wallace's name, is created by a deep-sea shelf that cuts between Bali and Lombok, and north between the islands of Borneo and Sulawesi. Few species found on one side of Wallace's line are found on the other. Wallace speculated that west of Bali,

species were Asian in origin, whereas east of Bali they seemed to have come from Australia. This stunning separation of species is one of the primary sources of Indonesia's incredible biodiversity. In fact, the isolation of Indonesia's wide archipelago, which spans over 4,800 km, is what has created such a diverse range of species. Indonesia ranks among the top five countries in the world in its diversity of plants, mammals, birds, and reptiles (CI, 2001).

#### References

Conservation International. 2001. Online at: <http://www.conservation.org> (January 9, 2001).

Wallace, Alfred Russel. 1859. "On the Zoological Geography of the Malay Archipelago" (S53, 1859). Paper presented to the Linnean Society on 3 November and published in their *Zoological Proceedings* in 1860.

Other mammal species are not faring much better. The Sumatran and Javan rhinoceros are both on the World Conservation Union's (IUCN) Red List of critically endangered species. The Javan rhinoceros (*Rhinoceros sondaicus*) is the rarest large mammal species in the world, with an estimated 54-60 individuals in 1995, most of them in a single protected area, Ujung Kulon National Park. The Sumatran rhinoceros (*Dicerorhinus sumatrensis*) is known to exist on the Malay Peninsula, Sumatra, and Borneo. In all populations, rhino numbers have declined more than 50 percent over the past

decade. Only about 400 rhinos are known to exist in Indonesia.

Habitat fragmentation and conversion have also hit primate species particularly hard. The Primate Specialist Group of IUCN has recently designated 2 species, the Sumatran orangutan (*Pongo pygmaeus*) and the Javan gibbon (*Hylobates moloch*), among its top 25 most endangered primates. The Javan gibbon numbers between 300 and 400 in the scant remaining forest of Java. On Sumatra, orangutans are found only in the provinces of Aceh, North Sumatra, and

West Sumatra. As with most endangered mammals, habitat loss and fragmentation are the key causes of population decline. However, hunting for food and sport, the illegal pet trade, and management ineffectiveness in the national parks have also contributed to population declines (IUCN, 2001).

### 1.3 People Also Depend on the Forests

A large though undetermined number of communities live in or depend on Indonesia's forests. Estimates made over the past several decades have varied wildly on the precise number of people – from 1.5 million to 65 million – depending on definitions used and the policy agenda pursued (Zerner, 1992:4).

#### **Nontimber Forest Products**

In mid-2000, the Ministry of Forestry<sup>1</sup> reported that 30 million people “depend directly on the forestry sector for their livelihoods,” but did not define the degree of dependency (MOF, 2000). Many of these people live by traditional “portfolio” economic strategies that combine shifting cultivation of rice and other food crops with fishing, hunting, harvesting and selling of timber, and gathering nontimber forest products (NTFPs) such as rattan, honey, and resins for use and sale. The cultivation of coffee, rubber, and other tree crops is also an important source of income (De Beer and McDermott, 1996:74). One particularly valuable nontimber forest product is rattan cane. Indonesia dominates world rattan trade; its abundant supply of wild and

cultivated rattan accounts for 80-90 percent of global supply (FAO, 2001:4).

Millions of people use forest plants and herbs known for their medicinal properties. Medicinal plants and other nontimber forest products are poorly appreciated and difficult to document because many of them are not reflected in formal market transactions recorded in economic statistics. The total value of exports of “wildlife and plants” for the 1999-2000 fiscal year was more than \$1.5 billion, according to the Ministry of Forestry, but the components of this aggregated total are not specified (MOF, 2000). Nonmarket use values are also likely to be high: if each of the estimated 30 million forest-dependent people used forest products worth only \$100 each year, their total value would be \$3 billion.

#### **Environmental Services**

The range of benefits provided by Indonesia's forests extends far beyond forest products. More than 16 million people live in the country's 15 largest watersheds. Their forests help protect freshwater supplies by stabilizing soil on hillslopes and regulating the speed and timing of river flow. Yet these watersheds lost more than 20 percent of their forest cover between 1985 and 1997.

Indonesia's forests also store great quantities of carbon. According to the FAO, forest vegetation in Indonesia totals over 14 billion tons of biomass – more than any other country in Asia and equal to about 20 percent of the biomass in all of Africa's tropical forests. This quantity of biomass stores,



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theoretical economic value of biodiversity and carbon storage dwarfs the revenues currently obtained from roundwood production (Bogor Agricultural Institute, 1999).

While such studies are not robust enough to be taken too literally,<sup>3</sup> they provide a useful reminder that conventional appraisals of forest value, based on timber prices, are too narrow and they neglect the interests of local forest dependent people. They also neglect the interest and concern of people worldwide who care about the fate of Indonesia's forests. Many people respond to tropical forests with a sense of awe, excitement, and reverence. It may be argued that monetary valuation techniques are not always relevant and that the spiritual and aesthetic qualities of Indonesia's forests lie beyond the reach of both mainstream and ecological economics.

## 1.4 Timber Products Are a Major Source of National Revenue

Indonesia is a significant producer of tropical hardwood logs and sawnwood, plywood and other boards, and pulp for papermaking. More than half the country's forests, some 54 million hectares, are allocated for timber production (although not all are being actively logged), and a further 2 million ha of industrial wood plantations have been established, supplying mostly pulpwood. The volume and value of Indonesian wood production are hard to determine with precision: data provided by FAO, the International Tropical Timber Organization, and the Indonesian government are compiled differently and do not tally. The majority of Indonesian wood production is used domestically and domestic prices

are generally much lower than international market prices. Nevertheless, the importance of the forestry sector to the Indonesian economy is clear. In 1997, the forestry and wood processing sectors accounted for 3.9 percent of Gross Domestic Product (GDP), and exports of plywood, pulp, and paper were valued at \$5.5 billion. This amount was nearly half the value of oil and gas exports, and equal to nearly 10 percent of total export earnings. (See Table 1.1.)

The forestry sector shared in the tremendous growth and export drive of the economy in the 1980s and 1990s, but this expansion was achieved at the cost of wholly unsustainable forestry practices. The wood processing industries in Indonesia now require about 80 million m<sup>3</sup> of wood annually to feed sawmills, plywood manufacturing plants, pulp mills, and papermaking plants. This quantity of wood is far more than can be produced legally from the country's forests and timber plantations. As a result, more than half the country's wood supply is obtained from illegal logging.

## 1.5 Assessing the State of the Forest

Only a century ago, Indonesia was still densely forested, with trees covering an estimated 80-95 percent of the total land area, depending on the island being considered. Total forest cover at that time has been estimated at about 170 million ha. Today it is approximately 98 million hectares, at least half of which is believed to be degraded by human activity. The rate of deforestation is accelerating: Indonesia lost about 17 percent of its forests between 1985 and 1997 alone. On average, the

roughly, about 3.5 billion tons of carbon.<sup>2</sup> Given the extensive forest clearance in Indonesia and the relatively small area that has been replanted (see Chapter 3), it appears likely that land cover changes have created a net source of carbon in recent decades, thus contributing to global warming.

Environmental services are hard to quantify. Much anecdotal evidence exists and many local studies confirm that ecological functions have declined with deforestation, but consistent information at the national scale is lacking. The importance of environmental services being lost is still harder to evaluate in dollar terms. Scholars have attempted to assign economic value to environmental goods and services that are not exchanged in recognized markets. Using a variety of assumptions and methodological approaches, researchers have ascribed values to tropical forests ranging from hundreds to thousands of dollars per ha. One such study by the Forestry Department of Bogor Agricultural Institute (IPB) in Java concluded that the

<b>Table 1.1 Indonesia's Leading Exports, 1997</b>		
<b>Category</b>	<b>Export Earnings</b>	<b>Average Annual Growth 1992–1997</b>
	(US\$ Billion)	%
Oil and Gas Exports	11.7	2
Non-Oil Exports		
Garments	4.2	5
Plywood	3.5	2
Textiles	3.4	7
Electrical Appliances	3.3	26
Pulp and Paper	2.0	37
Palm Oil	1.7	29
Copper	1.5	18
Rubber	1.5	8
Shrimp, Lobster, Tuna	1.1	6
Handicrafts	1.0	14
Other Non-Oil Exports	21.5	18
<b>TOTAL</b>	<b>56.3</b>	<b>11</b>
<b>Source:</b> Bank of Indonesia, reported by U.S. Department of Commerce - National Trade Data Bank, September 3, 1999. Online at: <a href="http://www.tradeport.org/ts/countries/indonesia/trends.html">http://www.tradeport.org/ts/countries/indonesia/trends.html</a>		

country lost approximately 1 million ha of forest each year in the 1980s and about 1.7 million ha per year in the 1990s. Since 1996, deforestation appears to have accelerated again to approximately 2 million ha per year. At this rate, virtually all of Indonesia's lowland forests – the most valuable for both biodiversity and timber resources – will be gone within the next decade (Holmes, 2000).

The threats to Indonesia's forest are numerous, ranging from large-scale logging operations to small-scale clearance by family farmers, from clear-cutting to make way for industrial agriculture to devastation by repeated fires. Illegal logging is undertaken at every level of society, by supposedly legitimate timber groups, the military, corrupt officials, and wildcat operators. Yet despite the importance of Indonesia's forests, and the speed at which they are disappearing, accurate, up-to-date information on forest extent and condition is either nonexistent or hard to obtain. No integrated record of forest area has been kept over the years, so information has to be pieced together from different sources. On top of the practical difficulties, access to Indonesian forestry data was hampered under the Suharto regime by government secrecy, industry intimidation, and bureaucratic obstruction. (*See Box 2.1 and Annex 1.*)

The *reformasi* era that followed the fall of Suharto in 1998 has encouraged a resurgence of interest and critical investigation into the management of the country's affairs. Nongovernmental organizations (NGOs) and other civil society groups have been prominent in pressing for the release of official information and publicizing the results. As information emerges, the extent to which Indonesia's

natural resources – forests above all – have been abused and wasted has become clear. The story is now beginning to be told.

This report was prepared by Forest Watch Indonesia (based in Bogor, Indonesia) and Global Forest Watch (based in Washington DC, United States). Its purpose is to provide a comprehensive information source on the state of Indonesia's forests that will serve as a baseline for future reporting. The report suffers from all the imperfections of the information sources: data are missing, often outdated, sometimes conflicting. The exact extent and distribution of Indonesia's forests still cannot be mapped, precise regional deforestation trends are not known, the biological condition of many forests is not well studied, and the operations of the country's forest industries remain secretive and are often illegal. Nonetheless, this report attempts to compile and harmonize the best of the official information that is available. It also includes information gathered in the field by FWI staff and their colleagues in other NGOs. We acknowledge the help and cooperation of some officials of the Ministry of Forestry who provided valuable new information on forest management issues. When data sources conflict, we attempt to provide an explanation. Where data are missing, we say so, and when we have conducted our own analyses of forestry data, especially relating to forest condition, we make this clear. It is our hope that as better information becomes available, future State of the Forest reports will provide an increasingly accurate and reliable resource for policymakers, environmental organizations, forest industries, and all those who believe that better information will lead to better decisionmaking.



FWI Papua

## 1.6 Structure of the Report

Chapter 2 provides a summary of what is known about the current extent and distribution of forest cover, trends in deforestation, and the condition of remaining forests. Chapter 3 examines the causes of deforestation through an analysis of the economic activities affecting forests: logging under the concession system, illegal logging, conversion of forests to industrial timber plantations or agricultural estates, and small-scale farming. Chapter 4 documents the causes, scale, and impacts of forest fires over the past 25 years. Chapter 5 provides a brief summary of the current policy and institutional environment, reviews the current national agenda for forest policy reform, and assesses the prospects for its implementation.