



Ross School of Business at the University of Michigan

Independent Study Project Report

TERM : Winter 2002

COURSE : CSIB 750

PROFESSOR : Linda Lim

STUDENT : Jon Blumenauer

TITLE : Deforestation in Indonesia: The Role of Business

MBA
Blumenauer

Deforestation in Indonesia: The Role of Business

Jon Blumenauer
Master's Thesis Final Draft
April 14, 2002

**KRESGE
BUSINESS
ADMINISTRATION
LIBRARY**

Table of Contents

1. Introduction: The Issue of Deforestation	3
2. Indonesia's Forests	6
3. The Threat to the Global Community	9
4. The Threat to Indonesia	15
5. The Origins of Deforestation	20
Timber Concessions	20
Overcapacity in Processing Facilities	26
The Role of the Crisis	29
Estate Plantations	36
6. Why the Problem Persists and Impediments to Reform	40
Illegal Logging	40
Corruption and the Entrenched Interests of the Government and Military	48
Forest Fires	52
7. The Current State of Affairs	55
Third-Party Involvement	55
Government Action	57
8. The Role of Business	64
Current Business Activity	68
The Role of Business Globally	72
The Role of Business Locally	78
9. Conclusion	81

APR 04 2003

KRESGE
BUS. ADM.
LIBRARY

Faculty Comments

(Evaluative comment in which the faculty supervisor should briefly describe the nature of the research project and add an evaluating comment)

This paper discusses the serious environmental problem posed by deforestation in Indonesia, including its causes and impacts, and why the problem is so difficult to solve, which lies in Indonesia's political and economic circumstances. It particularly focuses on business' contribution to the problem and its potential role in ameliorating the problem.

The paper provides a great deal of information and some thoughtful analysis, is well-written, organized and documented. It does not, however, consider the very considerable roles and impacts of Japan and China in Indonesia's timber trade, and needs more discussion of Kyoto and other multilateral policies.

Overall, the paper deserves a grade of Good.

Cinda Lim

Signature of Faculty Supervisor

PROFESSOR OF CSIR

Title

The Issue of Deforestation

Indonesia is home to the third largest area of tropical forest area in the world, but it is being deforested at an alarming rate. The rapid rate of forest loss is of concern not only to Indonesians, but to the global community as well. Indonesia's forests are home to vast numbers of flora and fauna, including several endangered species that are found nowhere else in the world. The country lost one-sixth of its forests in the period from 1985-1997 alone, and the rate of deforestation is increasing. The forest loss increases the concentration of greenhouse gasses in the atmosphere, leading to global warming and shifts in global weather patterns. At a local level, deforestation leads to loss of topsoil, which decreases crop productivity, and causes increased flooding and other environmental problems.

Forestry was an important source of government revenue during the rule of former President Suharto, who was in power from 1966-1998. Suharto's forestry policy was also used to reward cronies through the issue of logging concessions. During the Suharto era, business interests as well as the military were systematically exploiting forests. Timber is a valuable commodity that grew in importance to the Indonesian economy under Suharto's forestry policy. The value of annual forest product exports increased from about \$200 million in the early 1980's to about \$20 billion – roughly 10

percent of Indonesia's GDP – just before the economic crisis struck in 1997.¹

Approximately 800,000 people were employed in the formal timber sector at that time, and the government realized over \$1.1 billion in annual revenues from timber related operations.²

The economic crisis that hit Indonesia in 1997 and eventually led to Suharto's removal from office changed the dynamics of deforestation. Illegal logging, which occurred on a small scale under Suharto, became a major factor in the rapid destruction of forests, many of which were protected national parks.

After the crisis, timber became an even more valuable source of foreign currency. As the value of the Indonesian currency, the rupiah, fell dramatically, Indonesian exports became cheaper on world markets. Sawmills proliferated throughout the country to process the timber that was cut. Pulp and paper mills have also been established and grown dramatically. This huge buildup of processing facilities fed demand for timber, such that there is now far more processing capacity than sustainable supply. This gap between supply and demand has led to the expansion of illegal logging activities, to the point that illegal logging now accounts for most of the supply of Indonesian timber.

The development of agricultural estates to grow export crops has also encouraged deforestation. Fires that have ravaged the country frequently over the past 20 years,

¹ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*. 2001, p. 6.

² World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*. 2001, p. 6.

destroying millions of hectares of forest and choking the region in haze for weeks at a time, were often intentionally set by these estates to clear land.

Local businesses play a prominent role in Indonesia's deforestation. Government policy has been unable to slow the problem, largely because of corruption, weak rule of law and entrenched interests. The military and police are also negligent in enforcing the laws on the books because they profit from the logging themselves. It is unlikely that circumstances will change enough in the short term to make the government more effective in implementing a successful forest protection policy and, with the help of law enforcement organizations, mitigating the illegal logging problem.

While business interests have significantly contributed to Indonesia's deforestation, business remains an important short-term hope to alleviate the problem. Companies can significantly impact deforestation by addressing demand for forest products. Most Indonesian timber products are exported, often to western countries, in the form of plywood, lumber, furniture or paper. By taking steps to reduce demand and shift it to sustainable sources, the average American firm can help to reduce the impact of deforestation. Taking these steps is also good business, as they help to reduce costs and increase efficiency, which in turn increases profitability and can help attract customers. Businesses operating in Indonesia, and dealing with forest related products such as pharmaceuticals or ecotourism, also have a big stake in protecting forests. These firms can contribute to forest preservation through investment and educational efforts that can ultimately be profitable to shareholders as well as the environment.

Indonesia's Forests³

Tropical forests support the greatest diversity of living organisms in the world. Although they cover less than two percent of the Earth's surface, tropical forests are home to 50 percent of all life on the planet.⁴ An estimated 5-50 million creatures inhabit rainforests; such a wide variation shows how limited human knowledge of tropical forests really is.⁵

Indonesia is a sprawling archipelago made up of more than 13,000 islands with a total land area of about 733,000 square miles. Its tropical forests are the third largest in the world, after Brazil and the Democratic Republic of Congo, but it is being deforested at a much faster rate. The former two countries' forests declined at an average rate of 0.4 percent throughout the 1990's, while Indonesia's forest lost 1.2-1.7 percent of their area annually during that time.⁶ The forests, which once covered nearly all of Indonesia, are home to extraordinary biodiversity. Indonesia has the third greatest range of biodiversity in the world, after Brazil and Colombia.⁷ Although the country contains only 1.3 percent of the world's total land area, it is home to 11 percent of the world's plant

³ Forest area in this report is discussed in terms of hectares. One hectare equals 10,000 square meters, approximately 2.47 acres or 0.0035 square miles.

⁴ "Rainforest Diversity – Origins and Implications," *Tropical Rainforests*. Accessed online at www.mongabay.com.

⁵ "Rainforest Diversity – Origins and Implications," *Tropical Rainforests*. Accessed online at www.mongabay.com.

⁶ Global Forest Watch: *Indonesia Overview*. Accessed online at www.globalforestwatch.com.

⁷ "Rainforest Diversity – Origins and Implications," *Tropical Rainforests*. Accessed online at www.mongabay.com.

species, ten percent of the world's mammals and 16 percent of the world's bird species, most of which are found in the forests.⁸

Table 1
Tropical Forest Area and Deforestation, 1985-1997

Island	1985			1997		1985-97	
	Land Area (HA)	Forest Cover (HA)	Forested Area	Forest Cover (HA)	Forest % of Total	Change in Forest Cover (HA)	Forest Change (%)
Sumatra	47,581,650	22,938,825	48%	16,430,300	35%	(6,508,525)	-28%
Java	13,319,975	1,274,600	10%	1,869,675	14%	595,075	47%
Kalimantan	53,721,675	39,644,025	74%	29,637,475	55%	(10,006,550)	-25%
Sulawesi	18,757,575	11,192,950	60%	7,950,900	42%	(3,242,050)	-29%
Irian Jaya	41,405,500	35,192,725	85%	33,382,475	81%	(1,810,250)	-5%
Others	16,556,050	6,948,425	42%	6,357,975	38%	(590,450)	-8%
Total	191,342,425	117,191,550	61%	95,628,800	50%	(21,562,750)	-18%

Source: Global Forest Watch/Forest Watch Indonesia

Virtually all of the deforestation in Indonesia has taken place in the last 50 years,⁹ with forests dwindling from 162 million hectares to approximately 100 million in that time.¹⁰ It is estimated that approximately 72 percent of Indonesia's original forests are now gone, and, alarmingly, that the rate of deforestation is increasing. During the 1980's, the annual rate of deforestation was estimated at one million hectares.¹¹ During the first half of the 1990's, this rate increased to 1.7 million hectares, and since 1996 to approximately two million hectares.¹² At the current rate, Indonesia, a country a bit larger than the state of Alaska, is losing forest area equal to the size of Connecticut and

⁸ Global Forest Watch, *Indonesia Overview*. Accessed online at www.globalforestwatch.com.

⁹ There is some variation in estimates of current and past areas of forest coverage and rates of deforestation in Indonesia. Sources quoted most frequently in this paper are from Global Forest Watch, Global Resources Institute and Forest Watch: Indonesia. While variation exists, these sources reflect similar trends. Attempting to evaluate the validity of each source of data is beyond the scope of this paper; however, the difficulties in determining exact forest coverage are discussed in *The State of the Forest: Indonesia*.

¹⁰ Global Forest Watch, *Indonesia's Forests*. Accessed online at www.globalforestwatch.com.

¹¹ Global Forest Watch, *Indonesia's Forests*. Accessed online at www.globalforestwatch.com.

¹² Global Forest Watch, *Indonesia's Forests*. Accessed online at www.globalforestwatch.com.

Rhode Island combined *each year*. Illegal logging is responsible for approximately ten million hectares of the total loss.¹³ Most logging has taken place on the islands of Sumatra, Kalimantan and Sulawesi (see Table 1). If current rates of deforestation continue, lowland forests in Sumatra will be virtually entirely gone by 2005; those in Kalimantan by 2010.¹⁴

¹³ Global Forest Watch, *Indonesia's Forests*. Accessed online at www.globalforestwatch.com.

¹⁴ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*. p. 7.

The Threat to the Global Community

The rapid deforestation in Indonesia is of concern to the global community. One of the most significant implications is that of global climate change. The buildup up greenhouse gases in the earth's atmosphere has led to global warming. The concentration of these gases, including carbon dioxide, ozone, sulfur dioxide and nitrous oxide, has been steadily rising over the last century. Since the industrial revolution, the concentration of these gasses has increased 28.6 percent and continues to raise a half a percent per year.¹⁵ Global temperatures have risen dramatically as a result. The decade of the 1990's was the hottest since global record keeping began in 1860, with seven of the ten hottest years on record (the other three occurred after 1983).¹⁶

A warmer earth probably also means more volatile weather with more and worse extreme events of all kinds... In 1998 [at the time of the book's printing, the hottest year on record], at least 56 countries suffered severe floods while 45 baked in droughts... Many people's intuition that weather is shifting and becoming more volatile is confirmed by meteorological measurements.¹⁷

¹⁵ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter, *Natural Capitalism*, p. 235-6.

¹⁶ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter, *Natural Capitalism*, p. 237.

¹⁷ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter, *Natural Capitalism*, p. 237.

The biggest contributor to greenhouse gas buildup is carbon dioxide emissions, up to 25 percent of which are attributed to deforestation.¹⁸ Tropical forests act as “sinks” that sequester huge amounts of carbon, effectively mitigating some greenhouse gas emissions. Indonesia’s forests contain more than 14 billion tons of biomass – more than any other country in Asia and about one-fifth the total biomass of all of Africa’s forests.¹⁹ This amount of biomass is able to store approximately 3.5 billion tons of carbon.²⁰ At current emission rates, Indonesia’s forests store an amount equal to the total world carbon emissions for more than 150 years.²¹ The soil and vegetation of the earth’s forest contain about 125 percent of the carbon found in the atmosphere; when forests are cleared, this carbon is released into the atmosphere.²² Reduction in the tropical forest area of Indonesia reduces the amount of biomass that sequesters carbon, which means that greenhouse gases will escape into the atmosphere and contribute to the global warming problem. Conversely, increasing tropical forests will help mitigate the buildup of greenhouse gases. Tropical forests have the best potential because they have the greatest capacity to store carbon as they grow,²³ and growth is more rapid in tropical climates.

Large-scale cutting of tropical forests impacts weather patterns and climate on a global scale. It changes the reflectivity of the earth’s surface, alters wind and ocean currents, and changes rainfall distribution.²⁴ There is serious concern that changing global

¹⁸ “Atmospheric Role of Forests,” *Tropical Rainforests*. Accessed online at www.mongabay.com; Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter, *Natural Capitalism*, p. 243.

¹⁹ Global Forest Watch and Forest Watch Indonesia, *The State of the Forest: Indonesia*, p. 3. [Hereafter referenced as “*The State of the Forest: Indonesia*.”]

²⁰ *The State of the Forest: Indonesia*, p. 4.

²¹ Environmental Protection Agency, accessed online at www.epa.gov/globalwarming.

²² “Atmospheric Role of Forests,” *Tropical Rainforests*. Accessed online at www.mongabay.com.

²³ “Atmospheric Role of Forests,” *Tropical Rainforests*. Accessed online at www.mongabay.com.

²⁴ “Global Consequences,” *Tropical Rainforests*. Accessed online at www.mongabay.com.

weather patterns brought about by global warming will affect the distribution of tropical diseases, bringing them to areas where they have never before been experienced.

Richard L. Wittenberg, President and CEO of the American Association for World Health, comments:

With the recent appearance of the West Nile Virus in New York, the outbreak of the hantavirus in the Southwest, and the reporting of several cases of endemic malaria in the U.S., we are finding that diseases we once thought were found only in distant reaches of the globe are now present near our own neighborhoods.²⁵

Deforestation can bring about increased incidence of tropical diseases; mosquito-borne diseases such as malaria and dengue fever, and water-borne diseases like cholera are examples. Deforestation is linked to an increase in these diseases as logged over areas create artificial pools of standing water where the pathogens breed.²⁶ Malaria is a particular problem, frightening because of its drug resistant forms. There are now strains in Southeast Asia reputed to be resistant to over 20 anti-malarial drugs. This is a frightening prospect for a disease that currently infects roughly 270 million people worldwide and kills one to two million people per year.²⁷

Deforestation affects biodiversity and threatens many species with extinction. Due to the vast number of species in tropical forests, many of the threatened species are likely not even known, and their importance not understood. One of the most valuable species of tree logged is ramin. This tree is found in swamps in Malaysia and Indonesia,

²⁵ "Reminder/Local Impact of Global Infections Focus of World Health Seminar," Business Wire, 12/3/99. Accessed online at Dow Jones Interactive.

²⁶ "Increase of Tropical Diseases," *Tropical Rainforests*. Accessed online at www.mongabay.com.

although it has been nearly logged out in Malaysia. As a result of rapidly diminishing ramin population, it is classified by the World Conservation Union as a “vulnerable tree,” meaning that there is a high risk of extinction in the medium term.²⁸

Animal species are also threatened. The Sumatran and Javan rhinoceros are on the World Conservation Union’s Red List of critically endangered species.²⁹ The Sumatran orangutan and Javan gibbon are listed among the top 25 most endangered primates.³⁰ Only an estimated 400-500 Sumatran tigers remain.³¹ Sun bears, proboscis monkeys, gibbons and clouded leopards are also under threat.

Illegal logging, which will subsequently be explored in greater detail, is responsible for much deforestation. The illegal logging targets lowland forests, which are the source of high-value timber and provide easier access to loggers. Lowland forests are also home to vital areas of biodiversity. The 180,000-hectare Tesso Nilo forest in Sumatra has been found to harbor the highest level of plant biodiversity known to science, but could be completely destroyed in less than four years if the current rate of illegal logging there continues.³² The forest is home to a wide range of wildlife including elephants, tigers, gibbons and tapirs. The number of plant species found there is much higher than that found in similar studies in tropical, lowland forests elsewhere in Indonesia and 19 other countries.³³ Biodiversity loss has important implications for the pharmaceutical and

²⁷ “Increase of Tropical Diseases,” *Tropical Rainforests*. Accessed online at www.mongabay.com.

²⁸ Environmental Investigation Agency and Telepak Indonesia, *Timber Trafficking: Illegal Logging in Indonesia, Southeast Asia and International Consumption of Illegally Sourced Timber*, p. 17. [Hereafter referenced as “*Timber Trafficking*.”]

²⁹ *The State of the Forest: Indonesia*, p. 2.

³⁰ *The State of the Forest: Indonesia*, p. 2.

³¹ *The State of the Forest: Indonesia*, p. 2.

³² “Record number of species found in threatened Indonesian forest,” Kyodo News online source, 2/4/02.

³³ “Record number of species found in threatened Indonesian forest,” Kyodo News online source, 2/4/02.

healthcare industries, as many tropical plant species are found to possess medicinal properties that are just beginning to be understood.

Indeed, deforestation threatens parts of the world's ecosystem, which as a whole provides the earth with vital products and services, such as climate control, freshwater, and waste treatment. It is an interdependent system of complex links that are just beginning to be understood. In a complex 1997 study, a group of scientists determined the value of the world's ecosystem to be \$33 trillion per year (in 1994 dollars) – nearly double world GNP at the time.³⁴ However, ecosystems and the services they provide are still poorly understood, current pricing mechanisms are distorted, and as the services provided by ecosystems are reduced, their value increases.³⁵ Due to these factors, the authors feel that their estimates are conservative. In the study, tropical forests were valued at \$2007 per hectare per year, and tidal marsh and mangroves – which are being destroyed even more rapidly than lowland forest – at \$9990 per hectare per year.³⁶ According to this study, the environmental services provided by Indonesia's forests is worth close to \$200 billion, and much of this benefit goes to the global community.

Dwindling forest resources will mean decreased economic earning potential from forest products. This increases economic problems in an already increasingly poor country. As earning opportunities worsen, Indonesians could be forced to look elsewhere for employment. Emigration on a large scale from the world's fourth most populous country

³⁴ Costanza, Robert, et al, "The value of the world's ecosystem services and natural capital." *Nature*, May 15, 1997, p. 253.

³⁵ Costanza, Robert, et al, "The value of the world's ecosystem services and natural capital." *Nature*, May 15, 1997, p. 253, 258.

³⁶ Costanza, Robert, et al, "The value of the world's ecosystem services and natural capital." *Nature*, May 15, 1997, p. 256.

could create significant pressure in neighboring countries, most of which are still dealing with economic problems of their own.

The Threat to Indonesia

Continued deforestation poses threats to Indonesians. There are immediate environmental issues resulting from deforestation, including flooding and soil erosion. Forest fires set to clear land for agricultural estates caused severe air quality problems (which will be discussed in more detail in the Estate Plantation section) costing millions of dollars in lost productivity, illness, death and medical expenses. Forest clearance has displaced indigenous populations. Establishment of agricultural estates has been followed by resettlement programs to bring in labor from other parts of the country, leading to ethnic tensions. The government loses revenue from illegal logging, estimated at over \$600 million per year. But the long-term loss may be more significant, after the forests are logged out and the revenues they generate end. As this happens, and poverty increases in an already poverty stricken nation, instability will increase as well. Indonesia is already facing several internal conflicts. East Timor recently approved a referendum to become an independent country. Separatist movements continue in the resource-rich areas of Aceh, in northern Sumatra, and Irian Jaya. Communal conflicts continue to rage in the Maluku, Sulawesi and Kalimantan. The republic is already threatened. Continued economic exploitation of the forests – much of it illegal – will only further destabilize the nation.

Forests play a vital role in local weather regulation. They act as a sponge, soaking up rainfall and holding valuable topsoil in place. When forest cover is lost, rainfall runoff that would have otherwise been absorbed by the trees flows rapidly into streams and rivers. Without the root systems of trees to hold it in place, nutrient-rich topsoil is carried off. The rate of soil loss increases dramatically with forest loss. One study estimated that annual topsoil loss on forested slopes is 0.03 tons per hectare; cultivated slopes lose 90 tons per hectare while bare slopes lose 138 tons per hectare.³⁷ In the late 1980's, Java lost 770 million tons of topsoil each year due to deforestation.³⁸

The loss of topsoil makes crops in the deforested area less productive, but also causes problems downstream. The rivers and streams carrying the erosion experience increased sedimentation, raising riverbed levels and making populated areas downstream more susceptible to flooding. The sediment smothers fish eggs, leading to reduced hatch rates.³⁹ As it is carried out to sea, the sediment causes the water to cloud, damaging coral reefs and fish population, affecting local fisheries.⁴⁰

Flooding on a massive scale hit Indonesia this year, which experts attribute to deforestation. Java experienced its worst flooding in decades, with floodwaters up to two meters deep in Jakarta killing at least 142 people.⁴¹ Over 380,000 people were made temporarily homeless.⁴² Shortly after these floodwaters receded in early

³⁷ "Erosion and Its Effects," *Tropical Rainforests*. Accessed online at www.mongabay.com.

³⁸ "Erosion and Its Effects," *Tropical Rainforests*. Accessed online at www.mongabay.com.

³⁹ "Erosion and Its Effects," *Tropical Rainforests*. Accessed online at www.mongabay.com.

⁴⁰ "Erosion and Its Effects," *Tropical Rainforests*. Accessed online at www.mongabay.com.

⁴¹ "Death toll 142," Associated Press News, 2/7/02.

⁴² Nurbianto, Bambang, "Government officials show disinterest in flood hearing," *The Jakarta Post*, 2/21/02.

February, heavy rains again caused rivers to overflow, bringing new flooding with waist deep water in parts of the city.⁴³

Eastern Java was also hit hard with flooding that killed 30 people and submerged houses.⁴⁴ The flooding impacts not only those whose lives or property are claimed by floodwaters, but entire communities. The flooding contaminated water supplies, leading to increases in waterborne diseases affecting thousands of people in the area, and relief efforts were hampered because the floodwaters and landslides blocked roads.⁴⁵ Bali and Sumatra were also struck by flooding. The floods hit local businesses hard. Aside from the 17 people were killed by flooding in North Sumatra, rice paddies, fishing ponds and irrigation systems that fed rubber and palm oil plantations were affected.⁴⁶

In Jakarta, the economic costs of flooding were felt deeply by average citizens, even those lucky enough to escape the floodwaters. Electricity was out for several days, traffic congestion increased as roads were blocked, and food and medicine were in short supply.⁴⁷ Prices of rice and other basic foodstuffs increased an average of twelve percent as a result of the shortage, and the Indonesian police deployed about 1000 officers to guard stores and shopping malls amid heightened fears of looting.⁴⁸ Despite the significant cost inflicted on Jakarta and clear indication of the causes behind the flooding, government leaders appeared indifferent. Several officials skipped a meeting

⁴³ "Heavy Rains Bring Fresh Flooding To Jakarta," Dow Jones Energy Service, 2/13/02.

⁴⁴ Brummitt, Chris, "Flood and Landslides Kill at Least 30," AP Online, 2/6/02.

⁴⁵ Brummitt, Chris, "Flood and Landslides Kill at Least 30," AP Online, 2/6/02.

⁴⁶ "Come Rain or Shine..." *The Independent – London*, 1/1/02.

⁴⁷ "Indonesian police on guard amid fear of looting after floods," Associated Press Newswires, 2/4/02.

⁴⁸ "Indonesian police on guard amid fear of looting after floods," Associated Press Newswires, 2/4/02.

between local and national government representatives to discuss the flooding, even after the meeting was delayed to accommodate those who arrived late.⁴⁹

The environmental problems caused by deforestation could have even more far-reaching long-term effects for Indonesians. Forests release water through the leaves of their trees in a process known as transpiration that adds humidity to the air, in turn leading to cloud formation and rainfall. Without the forest cover to effect the transpiration process, deforested regions experience decreased rainfall, which can cause drought affecting local communities and crops. Around the Malaysian capital Kuala Lumpur, excessive deforestation combined with dry El Nino conditions led to water rationing in 1998, when the city had to import water for the first time.⁵⁰

Agricultural crops were damaged by flooding in Indonesia, which could lead to decreased output in the key export crops – palm oil and rubber – that many forests were cleared to plant. But the environmental problems extend to all agricultural crops. The flooding caused increased volatility in global cocoa prices and traders expressed concern over the erratic weather in Indonesia.⁵¹ One trader commented, “If the weather worsens, the new harvest might be delayed, and there’s a possibility that we might see a lower output.”⁵²

⁴⁹ Nurbianto, Bambang, “Government officials show disinterest in flood hearing,” *Jakarta Post*, 2/21/02.

⁵⁰ “Loss of Local Climate Regulation,” *Tropical Rainforests*. Accessed online at www.mongabay.com.

⁵¹ “ODJ Asian Cocoa: Prices Higher Amid Volatile Intl Cocoa Futures,” Dow Jones Commodities Service, 2/6/02.

⁵² “ODJ Asian Cocoa: Prices Higher Amid Volatile Intl Cocoa Futures,” Dow Jones Commodities Service, 2/6/02.

The *Jakarta Post* called the flooding “an expression of nature’s wrath against man’s ill-treatment of the environment,” chastising the government while making a plea for improved environmental protection:

Considering the impact all this has made on the lives of millions of Indonesians... it seems no exaggeration to say that this is a tragedy of national dimensions... One lesson that the recent tragedy must have made us painfully aware of is what, in real and tangible terms, environmental preservation means to our own well-being as human beings.⁵³

⁵³ “Paying for past sins,” *Jakarta Post*, 2/20/02.

The Origins of Deforestation

Deforestation was brought about by several factors. The timber policy as a part of Suharto's larger economic development program began the process. Sawmills and the development of the pulp and paper industry encouraged investment in wood processing facilities to the point where capacity far outstrips sustainable supply of timber. The economic crisis reduced government stronghold over logging, focused it on other issues, and devolved authority. The crisis also encouraged increased reliance on export crops to provide much needed foreign exchange. The agricultural estates growing these crops were largely developed by clearing existing forestland.

Timber Concessions

Indonesia's forests were largely intact through 1950. What deforestation had taken place up to this point was for agriculture, especially rice cultivation. President Suharto officially took power in 1966 and targeted economic development as part of his "New Order." Like many developing countries, Indonesia focused on resource exploitation as a vehicle to improved wealth and standards of living. In the Forestry Act of 1967, the government provided the legal basis for exploiting Indonesia's forests through logging concessions it awarded. The concessions were permits to private businesses that allowed them to fell trees within the area of the concession, generally for a period of 20

years. Suharto awarded concessions – typically to those with close personal or family ties – on land area covering more than half of Indonesia’s forests for selective felling.⁵⁴

Logging increased dramatically as a result of the new policy, with most of the timber being exported in the form of raw lumber. In 1967, approximately four million cubic meters of logs were cut from Indonesian forests, mostly for domestic use; a decade later, the cut had jumped to 28 million cubic meters, approximately three-quarters of which was exported.⁵⁵ The timber industry brought in \$6 million in foreign exchange earnings in 1966; by 1974 earnings rose to \$564 million.⁵⁶ By 1979, Indonesia was the world’s largest supplier of tropical lumber, accounting for 41 percent of the global supply that provided \$2.1 billion in revenue.⁵⁷ At this time, Indonesia exported more tropical hardwood than all of Africa and Latin America combined.⁵⁸

In the 1980’s Indonesia instituted a ban on the export of raw logs, which gave rise to the lumber processing industry. The government also required companies seeking logging licenses to either own their own milling operation, or to have a corporate relationship with one, a stipulation that led to consolidation of the industry and, as will be explored later, enormous overcapacity in wood processing facilities. There were 21 plywood mills in Indonesia in 1979; by 1985 there were 101.⁵⁹ Plywood production rose

⁵⁴ “Selective felling” entails removal of a specific species, size, or other quality of tree. Depending on the intensity, even selective logging carried out properly can result in opening of forest canopy cover, which can threaten plant and animal species, or lead to forest degradation if trees are felled or removed carelessly. However, most timber concessionaires did not adhere strictly to selective felling requirements.

⁵⁵ Barber, Charles Victor; and Schweithelm, James. 2000. *Trial by Fire: Forest Fires and Forestry Policies in Indonesia’s Era of Crisis and Reform*, p. 29. [Hereafter referenced as “*Trial by Fire*.”]

⁵⁶ *The State of the Forest: Indonesia*, p. 24.

⁵⁷ *The State of the Forest: Indonesia*, p. 24.

⁵⁸ *The State of the Forest: Indonesia*, p. 26.

⁵⁹ *Trial by Fire*, p. 29.

from 624,000 cubic meters to 4.9 million cubic meters during this time, and to 10 million cubic meters in 1993 – nearly 90 percent of which was exported.⁶⁰

As the industry consolidated, it became increasingly connected to the government through personal connections, state-owned timber companies, and concessions awarded to the military. By 1994, the top ten timber companies controlled 28 million hectares, or 45 percent of the logging concessions.⁶¹ Suharto's family alone controlled over 4.1 million hectares,⁶² an area greater than the size of Maryland. By 1995, approximately 63 million hectares, or one-third of Indonesia's total land area, was awarded for logging concessions.⁶³

Forests were given various classifications. The most pertinent classifications for this study are production forest, conversion forest, conservation forest and protection forest.

Production forest – allocated to timber concessions to be used for timber production. Harvesting levels are intended to balance with replanting so that the forest will continue to produce timber indefinitely.

Conversion forest – Forest that is designated for clearance and permanent conversion to another type of land use, typically agricultural crops.

Conservation forest – that which is designated for wildlife or habitat protection, generally located within parks or other protected areas.

Protection forest – forest serving environmental functions, such as maintaining vegetation and soil stability, or protecting watersheds.

Source: Global Forest Watch/Forest Watch Indonesia

The World Resources Institute wrote about the problems with Suharto concessions:

⁶⁰ *Trial by Fire*, p. 29.

⁶¹ *The State of the Forest: Indonesia*, p. 26.

⁶² *The State of the Forest: Indonesia*, p. 26.

The most basic problem with the government's management of logging is that land was designated as production forest with little knowledge of the characteristics of the land, the traditional rights of communities already living there, or the conservation importance of forest ecosystems. The negative effects... were exacerbated when concessions were awarded to companies and individuals with no experience in timber harvesting, supervised by forestry officials who lacked the political support, incentives, and resources to provide meaningful oversight of harvesting operations.⁶⁴

As the twenty-year concessions expire, they are often renewed, transferred to one of five state-owned forestry corporations (known as Inhutani I-V), or reconstituted as joint ventures between the previous concession holder and an Inhutani company. By 1998, concessions totaling 39 million hectares were held by private firms; 14 million hectares were controlled solely by one of the Inhutani firms; eight million hectares were managed as part of an Inhutani-private company joint venture; and, 1.8 million hectares were controlled by the military.⁶⁵

The concessions system has not been effective in promoting sustainable harvesting of forests. The theory behind selective felling requirements of production forests is that they will be logged in such a manner that there will be a sustainable output of lumber, but in practice this has not occurred, leading to exploited and dilapidated forests.

According to a government survey, approximately 30 percent of logging concessions are

⁶³ *The State of the Forest: Indonesia*, p. 26.

⁶⁴ *Trial by Fire*, p. 30.

⁶⁵ *The State of the Forest: Indonesia*, p. 27.

in a “degraded condition.”⁶⁶ This classification results from a forest yield below a productivity threshold, resulting from mismanagement by the concessionaires. In 1998, approximately 10 million hectares (out of 60 million that was under concession then or at sometime in the past) was so degraded that rehabilitation was required.⁶⁷

Degraded forestland is seriously threatened. Concession owners can apply for a conversion license, which allows the forest to be converted to a different use from the original production forest classification. Generally, concessionaires will apply for conversion to agricultural uses, such as palm oil or rubber plantations. If granted, the concessionaires are then legally permitted to completely clear the remaining forest. Under this system, there is incentive for concession owners to over log their concessions and allow them to slip into degraded status. After being granted conversion licenses, however, concession owners routinely log the forests out, then abandon the land and move on without actually converting the land to other agricultural uses as required.⁶⁸ Government procedures subject each concession to up to 58 site visits or other control actions every year.⁶⁹ The government should detect violations committed by concessionaires, but oversight is lax.

To ease the pressure on logging in natural forests, industrial timber plantations have been promoted and subsidized by the government. Nearly nine million hectares have been set aside for this purpose, but much of this land was natural forest.⁷⁰ Setting aside natural forest for the development of timber estates perpetuates the same problem

⁶⁶ *The State of the Forest: Indonesia*, p. 23.

⁶⁷ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 19.

⁶⁸ *The State of the Forest: Indonesia*, p. 23-4.

⁶⁹ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p.19.

outlined above – that concessionaires will log out the natural forest, which is easy and lucrative in the short term, but not follow through in developing timber plantations. A wiser step would be to allocate land already degraded by logging. Much of the nine million hectares allocated has been cleared, but only two million hectares have been replanted as timber estate.⁷¹

So what should be “legal” logging in that a concession was approved by the government to cut timber is often not being conducted in accordance with government stipulations. A study in the early 1990’s estimated that only four percent of concessionaires followed logging regulations.⁷² In 1995, the head of East Kalimantan’s Forestry Service went further, saying that at least “80 percent [of concession holders] are liars” with respect to their logging practices.⁷³

The World Bank conducted a study on concessionaire environmental knowledge and behavior in 1999.

Most concession managers stated that their concessions engaged in environmental management practices: 81% stated that they followed the selective cutting system as stipulated in concession agreements, 84% stated that they engaged in low or reduced impact logging... Yet when asked to define these practices, few could...

This pattern suggests that the concessionaires fall into three groups. One group consists of those who know what is expected and claim they do it (about 25% of sample). A second is a group that claims not to know what is expected and

⁷⁰ *The State of the Forest: Indonesia*, p. 23.

⁷¹ *The State of the Forest: Indonesia*, p. 23.

⁷² *Trial by Fire*, p. 47.

consequently does not do it (about 20%). A third is a group that does not quite know what "it" is but does know, or is aware, that some form of environmental management is expected (about 55%). In other words, by their own admission, some 75% of concessionaires do not follow the law.⁷⁴

Overcapacity in Processing Facilities

The ban instituted by the government on exporting raw lumber sparked a tremendous buildup in lumber refining facilities, as noted earlier. This makes sense from a business standpoint, as Indonesian firms were able to control more of the value chain, capture more revenue and profit, and provide more employment. Later, Indonesia took over yet another part of the value chain by developing the pulp and paper industry. The requirement for concessionaires to have an affiliation with milling operations, however, predictably led to a dramatic increase in these facilities, many of which operate inefficiently. Pulp and paper operations also expanded greatly. Soon, sustainable logging yields were not sufficient to meet industry capacity.

As a result of the ban, Indonesian log exports have dropped significantly from 1985 until the ban was lifted in 1998 (according to official statistics; however, there is considerable evidence of illegal exports, which will be discussed subsequently). However, official exports of plywood have jumped during that time from virtually zero in 1980 to eight million cubic meters in 1999, after peaking at nearly ten million in the early 1990's.⁷⁵

⁷³ *Trial by Fire*, p. 47.

⁷⁴ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 20.

⁷⁵ *The State of the Forest: Indonesia*, p. 26.

While the plywood industry expanded during the 1980's and 90's, the pulp and paper industry expansion has been more recent and even more dramatic. The industry took hold in the late 1980's, and production capacity has increased from roughly one million tons per year in 1990 to roughly five million by the end of the decade and continues to grow, according to the World Resources Institute.⁷⁶ The World Bank figures are even greater, with 1999 estimate of 6.5 million tons of capacity.⁷⁷ Capacity of paper production facilities has increased from 1.2 million tons in 1990 to 8.3 million tons in 2000, leading Indonesia to become the world's ninth largest producer of pulp and eleventh largest paper producer.⁷⁸

The Ministry of Forestry estimated the total capacity of various wood processing operations (including sawmills, plymills, pulp mills, etc) in 1999 to be 76 million cubic meters annually.⁷⁹ Other estimates in the late 1990's range from 74-86.5 million cubic meters.⁸⁰ Legal supplies of timber or wood products are composed of logging from concessions, imports of wood pulp, and recycled domestic wastepaper. Various estimates of legal supply of domestic timber range from 30 million cubic meters in 1997 to 17 million in 2000.⁸¹ (Imports of pulp products augment timber harvested from legal concessions for the paper industry. Pulp imports were estimated at 20 million cubic meters in 1997, but fell to 3 million in 1999.⁸² Recycled paper is a negligible source.)

⁷⁶ *The State of the Forest: Indonesia*, p. 32.

⁷⁷ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 22.

⁷⁸ *The State of the Forest: Indonesia*, p. 32-33.

⁷⁹ *The State of the Forest: Indonesia*, p. 33.

⁸⁰ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 22; *The State of the Forest: Indonesia*, p. 32, 36.

⁸¹ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 22; *The State of the Forest: Indonesia*, p. 33, 36

⁸² *The State of the Forest: Indonesia*, p. 33, 36

These figures all point to a large gap between demand and legal supply of timber and timber products, which is costly for the processing industries. These industries are capital intensive, with initial investments ranging between \$600 million and \$1.3 billion.⁸³ With heavy up front investment, there is additional pressure on the companies to operate at high capacity. Pulp mills are illustrative of the problem. They accounted for approximately 30 percent of total demand for wood products in 2000 and operated at 84 percent capacity during that year.⁸⁴ One ton of pulp requires between 4.9-5.4 cubic meters of roundwood, so the production in 2000 required 23-25 million cubic meters of timber equivalent – more than the entire cut from legal concessions that year.⁸⁵

The Ministry of Forestry reported in mid 1998 that there were officially 1701 sawmills, 115 plywood mills and six pulp and paper mills.⁸⁶ Pulp and Paper International acknowledges the problem of illegal logging in Indonesia, but reports that the countries mills are currently running at “a high capacity of 80%-90% and making the most of export opportunities.”⁸⁷

Another factor in the dramatic growth in processing facilities is the high transportation cost of timber. It is desirable to locate processing facilities as near as possible to the forests where the timber is being logged in order to decrease transportation time and cost, which encourages increased investment. Rather than bringing timber to the mills, in many cases small illegal mills are set up near the source of the timber – in effect

⁸³ *The State of the Forest: Indonesia*, p. 38.

⁸⁴ *The State of the Forest: Indonesia*, p. 36.

⁸⁵ *The State of the Forest: Indonesia*, p. 39.

⁸⁶ *Trial by Fire*, p. 30.

⁸⁷ Pulp and Paper International, “Indonesia: Producers weather economic storm.” Accessed online at www.paperloop.com.

bringing the processing to the forest. It is estimated that the capacity of illegal sawmills is double that of licensed operations.⁸⁸

Four large Indonesian conglomerates accounted for nearly all of the growth in the paper industry over the past decade: Sinar Mas, Raja Garuda, Bob Hasan and Barito Pacific.⁸⁹ All four groups are holders of major logging concessions, and the Sinar Mas and Raja Garuda groups are also top holders of palm oil estates,⁹⁰ creating complex ties and conflicts of interest.

As capacity in pulp, paper and sawmills continues to increase, and the reported logging of legal concessions declines, the gap between legal supply and demand increases. If working properly, the market mechanism should adjust to bring supply and demand into equilibrium. Greater demand for timber products should increase prices. Unfortunately the market mechanism is being distorted. Instead of paying higher prices, forcing less efficient mills out of business, the gap between supply and demand is being largely filled by cheap sources of timber from illegal logging activities.

The Role of the Crisis

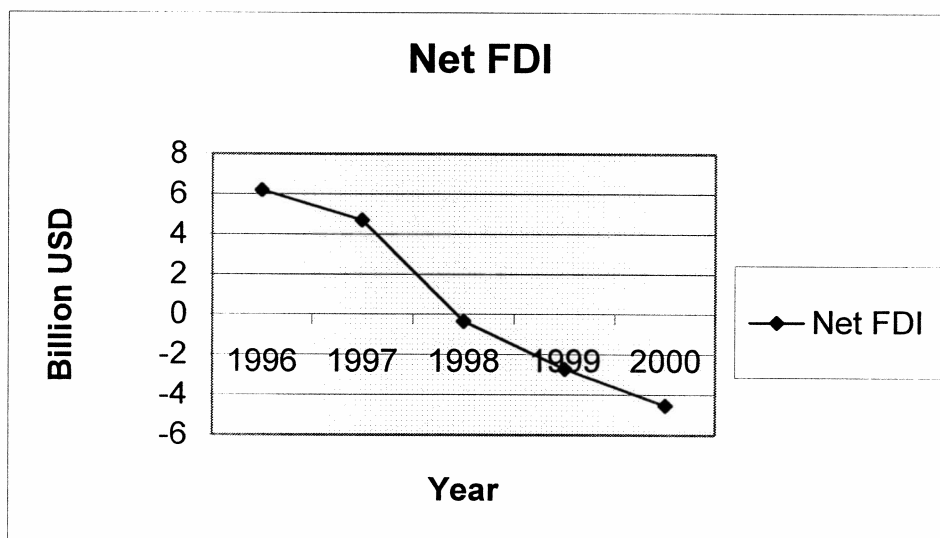
In July 1997, an economic crisis developed in Thailand that soon spread to Indonesia, sending the economy into a tailspin. Foreign investors became spooked by an uncertain political and investment climate. As a result, foreign direct investment (FDI) dropped dramatically (see Figure 1), contributing to increased unemployment, particularly in the

⁸⁸ *Timber Trafficking*, p. 11.

⁸⁹ *The State of the Forest: Indonesia*, p. 38.

manufacturing sector. This economic situation put more pressure on natural resource exports, such as petroleum products, minerals, timber products, rice, palm oil and other agricultural products. With the value of the rupiah tumbling versus international currencies (see Figure 2), Indonesian exports became cheaper on global markets. Agricultural products can be relatively easily exploited without foreign investment or technology. With FDI down, the Indonesian economy shifted away from high-growth areas of industry and services and leaned more heavily on natural resource exports to obtain badly needed foreign exchange (see Table 3).

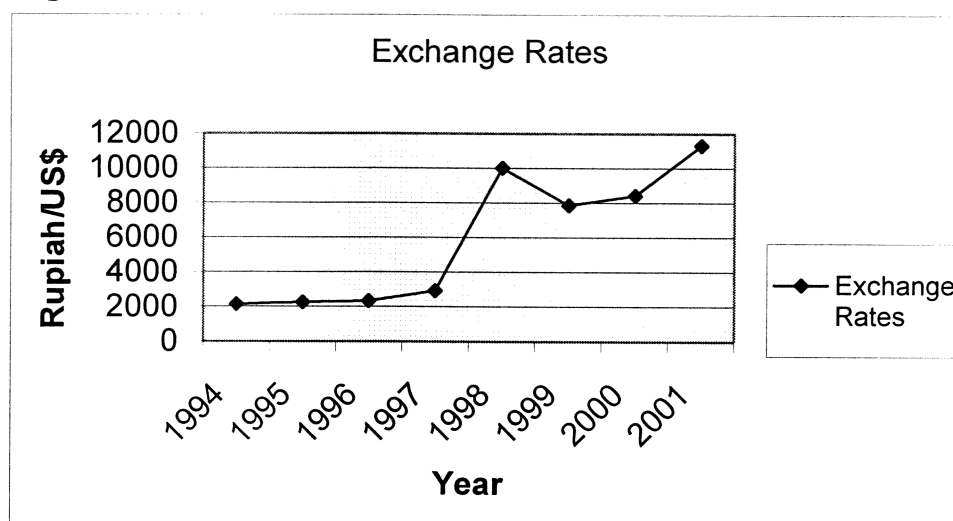
Figure 1



Sources: Asian Development Bank, World Bank

⁹⁰ *The State of the Forest: Indonesia*, p. 39.

Figure 2



Sources: Asian Development Bank, World Bank

While the dramatic devaluation of the rupiah was a boon to exporters, it led to high rates of inflation – up to nearly 60 percent in 1998 – that affected all Indonesians (see Table 2). The devalued rupiah made imports more expensive. It also raised the price of locally made goods, if any of the inputs – for example, raw materials or energy – were imported. Local companies with foreign debt were also significantly affected.

Meanwhile, the political environment was also in tatters. Indonesians were willing to tolerate corrupt government and military practices when the economy was growing, jobs were available and the standard of living of the average citizen was rising. But with the economic slowdown, the average citizen became much worse off. Per capita income dropped and unemployment increased (see Table 2). Inflation increased while the value of the rupiah plummeted.

The island of Java was particularly hard hit. Java is home to over 100 million people, about half the population of Indonesia, and where the country's capital city Jakarta is located. Not only were people out of work, they were increasingly unable to afford food and other necessities. More evidence of Suharto's nepotistic practices and cozy relations with the military emerged. "Reformasi" became a national slogan, spray-painted on buildings in cities all over the country. Riots broke out in several areas. Ethnic violence against Indonesians of Chinese decent was prevalent, as the Chinese minority controls most of the wealth in the country.

Table 2

	1997	1998	1999	2000
GNP (billions)	US\$ 222B	US\$ 131B	US\$ 125B	N/A
GNP per capita	US\$ 1110	\$640	\$600	N/A
Unemployment	4.70%	5.50%	6.40%	6.10%
Inflation	10%	58%	21%	4%

Sources: Asian Development Bank, World Bank

The unrest came to a head in May 1998, when approximately 1200 people were killed in Jakarta riots. Suharto, who had ruled Indonesia with a heavy hand from 1966, was finally forced to step down. The military, which had become so tightly linked with his rule and had often brutally suppressed conflicts in the past, now faced significant international and internal pressure to respect human rights.

Indonesia, after having two presidents in its first 50 years of post-Dutch independence, has had three in a three-year period since. B.J. Habibie succeeded Suharto in 1998. Habibie was the vice president under Suharto, and was considered a Suharto crony. He held office on a temporary basis until Indonesia's first free and fair election was held in

1999. Abdurrahman Wahid won coalition support and ruled until he finally stepped down in July 2001 after steady opposition to his erratic rule. Megawati Sukarnoputri, the daughter of Indonesia's first president Sukarno, took over as president from Wahid.

Table 3

Economic Sector Growth	1995	1996	1997	1998	1999	2000
Agriculture	4.4%	3.1%	1.0%	-1.3%	2.7%	1.7%
Industry	10.4%	10.7%	5.2%	-14.0%	1.9%	5.5%
Services	7.6%	6.8%	5.6%	-16.5%	-1.0%	5.3%

Source: Asian Development Bank

Under Suharto, there was resentment outside of Java of the strong control held by the central government. Indonesians in the outer islands wanted greater control over their economic affairs, particularly as they related to natural resources. To respond to this concern, the central government is giving more autonomy to regional governments. Jakarta still controls national policy relating to matters such as defense, foreign policy, and religious affairs, but has given local governments more say in management of, and revenue from, local resources. This has particular importance for areas such as Aceh, in northern Sumatra, and Irian Jaya, which have significant stores of oil, natural gas and minerals. But decentralization also has significant implications for the timber industry, as local governments and citizens now directly benefit from their forests. This could provide more incentive to conserve forest resources. "Regional autonomy raises hopes of better environmental management... but also means that natural resources are a source of regional income," said Nabel Makarim, the State Minister of the

Environment.⁹¹ Less oversight from law enforcement agencies combined with short-term profit motives raise fears that forests will be exploited in the short-term.

These fears are being realized. The Jakarta Post calls the “early signs bleak,” as regions issue rulings to exploit forests in an effort to boost local government revenue.⁹² Local governments now are “just doing to Jakarta what Jakarta did to them. It’s going to kill the forest even faster, since more people are involved,” says Chris Barr of the Center for International Forestry Research.⁹³

“The tragedy of democracy is going to be the environment. It’s anarchy. People are trying to grab what they can,” says Jatna Supriatna, the country director of U.S. environmental group Conservation International.⁹⁴

Under Suharto there was government mismanagement of forest resources, which may increase under decentralization. Current instability has also affected the forest policy of the central government. There have been seven different Forestry Ministers since 1998, making it difficult to achieve consistency in forestry policies and make inroads to combat the problems. In addition, the post-crisis collapse has seen the dramatic rise of illegal logging, which will be discussed in greater detail below.

⁹¹ Wulandari, Fitri, “Autonomy raises hope and fear on environment.” *Jakarta Post*, 12/27/01.

⁹² Wulandari, Fitri, “Autonomy raises hope and fear on environment.” *Jakarta Post*, 12/27/01.

⁹³ Murphy, Dan, “The rise of the robber barons speeds forest decline – The 1998 fall of Suharto has set off an illegal logging boom in Indonesia’s national parks.” *Christian Science Monitor*, 8/24/01.

⁹⁴ Cochrane, Joe, “Raping Borneo; Indonesia’s democratic regime tolerates rampant logging and mining that are extinguishing wildlife.” *Newsweek International*, 9/10/01.

Reverse migration is also impacting forests. The urbanized population has grown greatly over the past two decades. The percentage of people living in urban areas increased from 22 percent in 1980 to 36 percent in 1995, with an estimate of 42 percent in 2000.⁹⁵ Workers have been drawn to urban areas in hope of finding jobs. With the economy in a slump and increased unemployment, fewer jobs are available in the cities. Some workers return to their rural homes, where they can engage in agricultural practices and rely on family networks for support.⁹⁶ This rural migration has put pressure on forests. Increased farming activities require more land to be cleared, and employment as an illegal logger provides income.

While the country's economic problems have meant increased pressure to exploit forest and other natural resources, they have also led to decreased enforcement of regulations already on the books. The costs of monitoring have gone up, while government expenditure allocated to environmental protection has fallen as a percentage of GDP since the crisis began.⁹⁷

In 1998, the government set up the Indonesian Bank Restructuring Agency (IBRA) to oversee the restructuring and disposal of banking assets affected by the crisis. As part of this move, \$4.1 billion in loans to the forestry industry was shifted to IBRA's control, \$2.7 billion of which were classified as non-performing.⁹⁸ Only if the companies became profitable could there be any hope of the loans being paid off, and the best way for

⁹⁵ Firman, Tommy. "Urban Development in Indonesia, 1990-2001: From the Boom to the Early Reform Era Through the Crisis." *Habitat International*, Vol. 26, Issue 2, June 2002.

⁹⁶ Linda Lim lecture, Fall 2001.

⁹⁷ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. i.

⁹⁸ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. ii.

these forestry companies to become profitable is access to cheap supplies of timber. Again, there is short-term incentive to increase deforestation.

Estate Plantations

The Indonesian government has encouraged the establishment of agricultural plantations, predominantly to grow commodity export crops. Land has been cleared, largely from virgin forest area, to set up agricultural estates growing timber, palm oil, rubber, tea, coffee, sugarcane and cocoa. While forest clearance for agricultural purposes has been a major cause of deforestation, the estate crops are not always planted. In these cases, the land is used for short-term profit from the cut timber, then abandoned.

In the 1980's the government established a plan for timber plantations to augment logging from natural forests in an effort to make the industry more sustainable.⁹⁹ To this end the government provided 40 percent of the investment, labor from specially established transmigration settlements, and interest-free loans from a "Reforestation Fund" collected from logging concessions.¹⁰⁰ Most timber estates provide timber to the pulp and paper industries. As of December 2000, 7.8 million hectares had been allocated to timber estates, but only 1.8 million hectares had been planted.¹⁰¹

⁹⁹ Timber estates are different from production forest. Whereas production forest is designed to keep the original forest intact and selectively log only trees of a particular species or quality, timber estates are monocultural and grown on land that has been completely cleared of existing forest cover.

¹⁰⁰ *Trial by Fire*, p. 31.

¹⁰¹ *The State of the Forest: Indonesia*, p. 39.

Palm oil plantations are another crop that is rapidly increasing (see Table 4). Palm oil is used as cooking oil and an ingredient in soap, margarine and other products, and output is expected to increase about seven percent annually for the foreseeable future.¹⁰² This crop is one unique in that much of the output is used domestically. Most other agricultural crops are grown for export, but 40 percent of palm oil is for domestic consumption.¹⁰³ Malaysia is the world's largest producer, but Indonesia is rapidly closing the gap. Malaysia produced about half of the world's output of palm oil in 1997, but by 2005 Indonesia is expected to produce over 40 percent of total output, or approximately 12 million tons.¹⁰⁴ Of the estimated 4.1 million hectares of forestland converted to agricultural purposes between 1982 and 1999, 1.8 million hectares is devoted to palm oil plantations.¹⁰⁵

Table 4

Leading Exports 1997 Category	Export Earnings (US\$ Billion)	Average Annual Growth 1992-97
Oil/Gas	11.7	2%
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%

Source: Tradeport Trade Directory

There is incentive to increase palm oil plantations because of strong domestic demand, forecasts of solid future growth in world consumption, and the productivity of palm oil

¹⁰² *Trial by Fire*, p. 32.

¹⁰³ *The State of the Forest: Indonesia*, p. 42.

¹⁰⁴ *Trial by Fire*, p. 32.

¹⁰⁵ *The State of the Forest: Indonesia*, p. 43.

plantations. Palm oil is cheap to produce, and crop yield is five times that of other oil sources.¹⁰⁶ Palm plantations have increased from about 843,000 hectares in the mid 1980's to nearly 3 million hectares in 1998,¹⁰⁷ and brought in more than \$1 billion in export revenue in 1999.¹⁰⁸ The government provided access to credit for estate development and processing facilities to help encourage the expansion.¹⁰⁹ There has been considerable foreign investment in the sector, but it still remains highly concentrated in the hands of private Indonesian companies. Four conglomerates in the top ten holders of palm oil estates – Sinar Mas, Salim, Raja Garuda and Surya Dumai – are also holders of major logging concessions.¹¹⁰

The situation in Indonesia favors continued increases in palm oil plantations. World demand is forecast to double 2000 output to over 40 million tons by 2020.¹¹¹ The industry is further encouraged by low interest rates, reduced export tax on palm oil and new government regulations that facilitate the establishment of palm plantations.¹¹² Because of the favorable conditions, there has been a surge in applications for conversion forest that is greater than the current land allocated to this purpose, putting pressure on the government to open up more forest land for clearing.

Indonesia is a significant producer of other agricultural exports. As well as being the world's second largest producer of palm oil, it is the second largest producer of rubber (also behind Malaysia), third largest producer of cocoa, and fourth largest producer of

¹⁰⁶ *The State of the Forest: Indonesia*, p. 42.

¹⁰⁷ *Trial by Fire*, p. 32.

¹⁰⁸ *The State of the Forest: Indonesia*, p. 42.

¹⁰⁹ *The State of the Forest: Indonesia*, p. 42.

¹¹⁰ *The State of the Forest: Indonesia*, p. 43.

¹¹¹ *The State of the Forest: Indonesia*, p. 46.

coffee.¹¹³ The country also grows copra, cinnamon, and black and white pepper for export. Outside of timber and palm, these crops are generally produced by small-scale farmers. Despite the devaluation of the rupiah, post-crisis volatility may have contributed to increased forest clearance by these small-scale farmers, as a study of over 1000 small farmers revealed:

Farmers did not benefit from windfall export profits as much as might be expected because the costs of living and agricultural production rose faster than gross income. As a result, farmers turned to the forests to compensate for lost earnings. Nearly 70 percent of the farmers said that they had cleared new land between 1996 and 1999, with the amount of land cleared each year rising sharply after the economic crisis.¹¹⁴

These factors all point to increased focus on agricultural estates, both large and small, and put greater pressure on existing forestlands.

¹¹² *The State of the Forest: Indonesia*, p. 46.

¹¹³ *The State of the Forest: Indonesia*, p. 48.

¹¹⁴ *The State of the Forest: Indonesia*, p. 51.

Why the Problem Persists and Impediments to Reform

Illegal Logging¹¹⁵

With significant overcapacity built up in the timber processing, pulp and paper mills, these industries must turn to sources outside legal harvests to provide needed supply of logs. So significant is the gap between capacity and legal supply that an industry has been built around illegal logging.¹¹⁶ Illegal logging takes many forms, but can basically be broken down into two categories: companies operating with legal concessions that fail to meet the requirements of their logging permits, versus individuals or syndicates that log forests with no right whatsoever.

As noted earlier, companies often violate the terms of their concessions by overcutting a selective cutting area. Concessionaires also break the law by logging outside of their areas, encroaching on the logging rights of others or, more often, by cutting protected forestland. (Logging practices can also be classified as illegal if the concessionaire fails to replant clear-cut area, or replants at low rates or with inferior species that do not allow forests to regenerate to support logging at sustainable rates.)

¹¹⁵ Illegal logging by nature is difficult to quantify. Studies attempt to determine its impact by quantifying the difference between capacity of processing facilities (after adjusting for reasonable capacity utilization rates) and legal supply of wood and wood products.

¹¹⁶ The World Bank, *The State of the Forest: Indonesia and Timber Trafficking* reports all cite studies made in the late 1990's to 2000 attempting to pinpoint the scope of illegal logging. Details of the studies will not be reviewed here, but their results are cited. There is some variation in the estimates for demand and

Rogue loggers range from a groups of a few individuals who cut a few trees per week to large, organized groups that run huge operations, often in collusion with government officials and protection by law enforcement agencies. Despite the ban on raw timber exports from Indonesia, illegal loggers have large-scale shipping networks in place that smuggle raw timber to Malaysia, Singapore and China.

Illegal logging has even more significant environmental impacts than “legal” deforestation. It targets the most commercially profitable species, often located in protected forests and national parks, which disproportionately threatens biodiversity.¹¹⁷ A study by the Laboratory of Tropical Forest Ecology at Harvard University reported that 61,000 hectares of the 90,000-hectare Gunung Palung National Park in Kalimantan had been destroyed by illegal loggers in the past decade, costing the Gunung Palung district \$345 million in lost revenue.¹¹⁸ In Central Kalimantan, the Tanjung Puting National Park is a protected area also designated by the United Nations as a “Biosphere Reserve” due to its exceptional plant and animal diversity. Still, it is being illegally logged for ramin – virtually all of which is exported – at a frenetic pace. Ramin is the most valuable commercial tree species in Indonesia, used in furniture, blinds, dowels, pool cues and picture frames. On the international markets finished ramin products can command prices of \$1000 per cubic meter, making it a prime target for legal and illegal loggers alike.¹¹⁹

supply, but the studies do have important commonalities: Supply of timber from legal sources is declining, industry capacity in processing timber industries is increasing, and the rate of illegal logging is increasing.

¹¹⁷ *Timber Trafficking*, p. 5.

¹¹⁸ “Illegal loggers destroy two-thirds of national park,” Agence France-Presse, 1/9/02.

Illegal loggers engage in high-impact logging, with no concern for sustainability. This undercuts legal timber, making it difficult for producers with environmentally sound practices to compete.¹²⁰ Illegal timber is estimated to cost less than half that from legal sources, helping inefficient milling operations to stay in business¹²¹ and encouraging new ones to be built. The practice also cheats the government out of revenue. The World Bank estimates that \$3 billion worth of timber is stolen annually.¹²² This is more than the revenue generated from the country's total plywood exports, which the Association of Indonesian Plywood Producers (known by the Indonesian acronym APKINDO) approximated at \$2.2 billion in 2001.¹²³ The World Bank believes that this level of illegal logging costs the Indonesian government a minimum of \$600 million per year in uncollected royalties and taxes.¹²⁴ By contrast, government officials estimate that 2002 revenue from the forestry sector will total approximately \$303 million.¹²⁵

Various sources calculate that illegal logging accounts for 50-70 percent of annual timber production in Indonesia, supplying a total of 35-60 million cubic meters of wood per year.¹²⁶ It not only supplies more than legal logging, but it far outstrips timber production in Malaysia, the world's largest official producer of tropical timber products, with a reported 30 million cubic meters per year.¹²⁷ A former Forestry Minister

¹¹⁹ *Timber Trafficking*, p. 16.

¹²⁰ *Timber Trafficking*, p. 5.

¹²¹ World Bank, *Indonesia: Natural Resources and Law Enforcement*, 12/20/01. p. 14.

¹²² Murphy, Dan, "The rise of robber barons speeds forest decline – The 1998 fall of Suharto has set off a logging boom in Indonesia's national parks." *Christian Science Monitor*, 8/24/01.

¹²³ "Plywood exports expected to decline by 12 percent." *Jakarta Post*, 5/9/01.

¹²⁴ Sizer, Nigel, "Cooperation makes a real difference." *Jakarta Post*, 9/18/01.

¹²⁵ "Indonesia Targets US\$303 Mln Earnings from Forestry Sector," ANTARA/Asia Pulse, 2/21/02.

¹²⁶ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 19; *The State of the Forest: Indonesia*, p. 36.

¹²⁷ *Timber Trafficking*, p. 12.

estimated that a total of about 10 million hectares of forest has been lost due to illegal logging¹²⁸ – an area approximately the size of Indiana.

A lumberyard owner in Java, where illegal logging has largely destroyed forests, comments on the situation:

It's true, we have no more forests here. They're all gone. So now, I have to get my logs elsewhere, from other places in Indonesia... When people bring logs here, we buy them. Why ask questions?¹²⁹

The rise of illegal logging can be traced to the downfall of Suharto. Although the central government raided forests during his time in power, his authoritarian regime did not tolerate others doing so. The absence of the rule of law since Suharto was forced from office provided an opportunity for a new class of entrepreneurs: timber barons.

In 2000, the Indonesian Ministry of Forestry commented on the problem:

Illegal logging has come to constitute a well-organized criminal enterprise with strong backing and a network that is so extensive, well established and strong that it is bold enough to resist, threaten, and in fact physically tyrannize forestry law enforcement authorities.¹³⁰

¹²⁸ *The State of the Forest: Indonesia*, p. 24.

¹²⁹ Gargan, Edward A., "Falling down: Teak poachers are killing off the great forests of Indonesia." *The Seattle Times*, 7/6/01.

¹³⁰ *The State of the Forest: Indonesia*, p. 30.

"Instead of one Suharto, you now have 300 Suhartos, and all they know is how to rape and pillage the forests," says Timothy Nolan, the director of a European-funded group supporting sustainable forestry in Indonesia.¹³¹

There are important international factors that contributed to the increase of illegal logging in Indonesia. Several Asian countries, for years logging their own forests at unsustainable rates, have recently enacted legislation to ban domestic logging. While this may be a commendable attempt to protect a country's own forests, this unilateral action – without an attempt to address demand – may unwittingly lead to increased illegal logging in Indonesia and other countries.

For example, China banned logging in its native forests in 1998 after major flooding in lowland areas along the Yellow and Yangtze rivers was tied to deforestation.¹³² As a result, domestic timber production fell 97 percent between 1997 and 2000; over that time official imports of raw logs jumped from five million cubic meters to 15 million cubic meters.¹³³ Total Chinese imports of illegal timber products are on the order of 120-140 million cubic meters per year.¹³⁴ Thailand banned all logging in 1998, after years of community protests against the practice, and devastating floods and landslides linked to deforestation.¹³⁵ Malaysia has basically logged out its forests, but tremendous capacity built up in its timber processing facilities – many of which are state-owned – requires importation of timber. In the early 1990's, Malaysia's forests annually produced 40

¹³¹ Montlake, Simon, "Indonesia battles illegal timber trade; Police blame politicians for collusion in trade." *Christian Science Monitor*, 2/27/02.

¹³² Dursin, Kanis, "Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban." *Environmental Bulletin*, 5/4/01.

¹³³ *Timber Trafficking*, p. 5.

¹³⁴ *Timber Trafficking*, p. 5.

million cubic meters of timber, but this fell nearly in half to 22 million cubic meters by 1999.¹³⁶ But with over 1000 domestic sawmills still operating, processing capacity has maintained at about 40 million cubic meters.¹³⁷ Korea and Japan also face timber shortages.¹³⁸ The drop in timber supply in these countries means that they will go elsewhere to fill their demand for timber and timber products.

Aside from filling capacity of its domestic saw, pulp and paper mills, illegal timber is smuggled out of Indonesia to meet needs in these other Asian countries. The island of Borneo is shared among Brunei, Malaysia and Indonesia, and provides one of only three land borders in Indonesia. The Indonesian territory of Kalimantan is also home to huge areas of forestlands, and across the border in Malaysia, many sawmills are operating among logged out forests. These conditions make Borneo a hotbed for timber smuggling.

The Malaysian government is complicit in, and benefiting from, illegal logging in Indonesia. In Malaysia, the Harwood Timber Company is a subsidiary of the state-owned Sarawak Timber Industry Development Corporation. Harwood has three sites in the East Malaysian state of Sarawak that process an estimated 500,000 cubic meters of illegal Indonesian timber each year.¹³⁹ One of these sites is located near the border in western Borneo. Malaysia does not allow the import of raw logs, so sawmills have been set up along the road near the border to produce rough sawn blocks of timber, which

¹³⁵ Dursin, Kanis, "Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban." *Environmental Bulletin*, 5/4/01.

¹³⁶ *Timber Trafficking*, p. 12.

¹³⁷ *Timber Trafficking*, p. 12.

¹³⁸ *Timber Trafficking*, p. 5.

¹³⁹ *Timber Trafficking*, p. 13.

customs officials then allow to enter for a fee of about \$6 per cubic meter.¹⁴⁰ The Environmental Investigation Agency reports that about 80 trucks a day carry illegal timber into Malaysia via this route.¹⁴¹ Another Harwood facility is located in the Sarawak coastal town of Sematan, which allows only small wooden Indonesian vessels to enter its port.¹⁴²

Sabah, the other province in Eastern Malaysia, receives even more stolen timber. Approximately one million cubic meters of Indonesian timber enter Sabah each year.¹⁴³ Timber smuggled from Kalimantan to East Malaysia is estimated to have cost the Indonesian government at least \$580 million over the last decade.¹⁴⁴ An official for the East Kalimantan Environmental Impact Management Board said that 6.5 million hectares of forests in East Kalimantan alone were damaged by illegal logging in 2001.¹⁴⁵ In addition, approximately one million cubic meters per year are smuggled from Sumatra to western peninsular Malaysia by vessel, with 100-200 metric tons are unloaded at Malaysian ports each day.¹⁴⁶

Singapore and China are also both involved in timber smuggling. Ships from both countries have recently been caught with shipments of illegal timber from Indonesia.¹⁴⁷

¹⁴⁰ *Timber Trafficking*, p. 13.

¹⁴¹ *Timber Trafficking*, p. 13.

¹⁴² *Timber Trafficking*, p. 13.

¹⁴³ *Timber Trafficking*, p. 14.

¹⁴⁴ *Timber Trafficking*, p. 14.

¹⁴⁵ "Illegal Logging Damaged 6.5 Million HA of E Kalimantan Forests," ANTARA – The Indonesian National News Agency, 1/2/02.

¹⁴⁶ *Timber Trafficking*, p. 14.

¹⁴⁷ "Govt Urged to Resist Chinese Pressure over Illegal Timber Carrying," ANTARA – The Indonesian National News Agency, 2/7/02.

Meanwhile, as Western countries decry the exploitation of tropical forests, they are the leading importers of products made from tropical timber. The U.S. is the largest importer of Indonesian wood, with \$450 million of timber products in 2000.¹⁴⁸ Assuming an illegal logging rate of 65 percent in Indonesia, this totals over \$290 million worth of illegal products. The European Union and Japan are also large importers of illegal Indonesian timber products.¹⁴⁹

Despite this huge appetite for tropical wood products and advocacy of sustainable forest management practices, Western countries have not instituted any mechanisms to stop the flow of illegal timber into their markets. The Environmental Investigation Agency notes:

...Even if you could track an illegally cut tree... to a port in a timber consuming country, and supply conclusive evidence that it was illegally cut, none of the consuming countries have legislation in place that would allow their enforcement authorities to seize the shipment.¹⁵⁰

By allowing illegal shipments into their markets, Western governments and consumers are culpable in the rapid deforestation of Indonesia and other countries growing tropical hardwood.

Environmental groups further blame western nations for the deforestation problem, citing the support of lending agencies based in industrialized countries that provided

¹⁴⁸ *Timber Trafficking*, p. 4.

¹⁴⁹ *Timber Trafficking*, p. 4.

¹⁵⁰ *Timber Trafficking*, p. 1.

loans in the 1990's that were used to support the pulp and paper industry.¹⁵¹ Loans totaling billions of dollars were made to Indonesia that were not contingent on even minimal environmental standards.¹⁵²

Corruption and the Entrenched Interests of the Government and Military

Government and law enforcement personnel are not leaping to defend against the forest plunder. In some cases, they are leading it. Government officials are implicated in illegal logging. Logging concessions have been awarded to cronies and relatives, and in some cases, illegal timber barons themselves are members of government.

In Central Kalimantan, one of the richest forest regions in the country, timber baron Abdul Rasyid was appointed to the People's Consultative Assembly, the upper house of Indonesia's parliament, in 1999. Rasyid and his brother Ruslan are reported to buy 60 percent of the stolen timber in the region, much of it from the protected Tanjung Puting National Park, from where an estimated \$8 million worth of timber is stolen annually.¹⁵³ Despite a dossier of evidence compiled by the Forest Ministry implicating the Rasyid brothers and their company, Tanjung Lingga, in illegal logging, no legal proceedings have been initiated.¹⁵⁴

¹⁵¹ Knight, Danielle, "Environment: Rich Nations Helped Deforest Indonesia, Says Report." *Environmental Bulletin*, 2/21/01.

¹⁵² Knight, Danielle, "Environment: Rich Nations Helped Deforest Indonesia, Says Report." *Environmental Bulletin*, 2/21/01.

¹⁵³ *Timber Trafficking*, p. 20.

¹⁵⁴ *Timber Trafficking*, p. 20.

Forest Watch Indonesia director Togo Manurung explained, "You have to understand that people like Rasyid are like Robin Hood in their localities. They put a lot of money into their communities, and they have a lot of support from local people."¹⁵⁵ Indeed, when a group of central government officials arrived at one of Tanjung Lingga's mills that processes illegal logs in an attempt to close it in February 2000, they were turned away by an angry mob of Rasyid's workers waiting with axes and machetes.¹⁵⁶ The officials left, and no Tanjung Lingga facilities have been threatened by Jakarta since.¹⁵⁷

The Department of Forestry, which manages the timber industry and national parks, also contributes to the problem. It is subject to political interference, and a survey of civil servants, businesspeople and citizens rated it as "highly corrupt."¹⁵⁸ Amnesty International ranks Indonesia third in its list of the world's most corrupt countries.¹⁵⁹ In a country that is already noted for corruption, the Department of Forestry's indictment by Indonesian citizens is telling. "There is no political will in Indonesia to stop illegal logging. The people who are supposed to be protecting the forests are often the ones logging them," commented Julian Newman, a researcher with the Environmental Investigation Agency.¹⁶⁰

The sheer bureaucracy of the Indonesian government contributes to the illegal logging problem, even if intentions are honorable. One report states that for each of its

¹⁵⁵ Gargan, Edward A. "Falling down: Teak poachers are killing off the great forests of Indonesia." *The Seattle Times*, 7/6/01.

¹⁵⁶ Murphy, Dan, "The rise of the robber barons speeds forest decline – The 1998 fall of Suharto has set off a logging boom in Indonesia's national parks." *Christian Science Monitor*, 8/24/01.

¹⁵⁷ Murphy, Dan, "The rise of the robber barons speeds forest decline – The 1998 fall of Suharto has set off a logging boom in Indonesia's national parks." *Christian Science Monitor*, 8/24/01.

¹⁵⁸ International Crisis Group, *Indonesia: Natural Resources and Law Enforcement*, 12/20/01, p. 8.

¹⁵⁹ Amnesty International, accessed online at www.amnesty.org.

concessions, a timber company must present 1599 documents plus other data to sixteen different state agencies in Jakarta, as well as eight regional agencies.¹⁶¹ Complying with regulations is thus a difficult, time-consuming process. The bureaucracy may be deliberately burdensome in order to facilitate graft on the part of poorly paid civil servants.

Lack of coordination between the Ministry of Forestry and other state agencies also pose problems. For example, the Ministry of Trade and Industry can grant licenses for wood-processing facilities, which raise the demand for timber, without consultation with the Ministry of Forestry. New roads built in forested areas can open up access for illegal loggers. Even within the Ministry of Forestry, policies can lead to wasteful practices. Timber companies are taxed for their exports, not based on the amount of timber cut.¹⁶² The World Bank reported that for every cubic meter of timber cut, at least another cubic meter of usable wood was destroyed and left behind to rot in what is left of the forest.¹⁶³

The military is involved in deforestation on a number of levels. The military budget is not entirely financed by the central government; it is responsible for raising a significant portion of its own operating costs.¹⁶⁴ This means that the military is both more likely to be involved in illegal or questionable practices, and its activities more difficult for the central government to control. The military is a major holder of logging concessions,

¹⁶⁰ Richardson, Michael, "Surge in Illegal Logging Puts Indonesia's Economy in Peril." *International Herald Tribune*, 4/24/01.

¹⁶¹ International Crisis Group, *Indonesia: Natural Resources and Law Enforcement*, 12/20/01, p. 8.

¹⁶² *Trial by Fire*, p. 50.

¹⁶³ *Trial by Fire*, p. 30.

¹⁶⁴ Michael Ross lecture 1/30/01.

which gives it a vested interest in maintaining the status quo regarding logging practices. The military is also said to be deeply involved in illegal logging, with a reported half of its operational costs financed by illicit activities.¹⁶⁵ The local police may be similarly involved.¹⁶⁶

Illegal loggers also pay the military and police for protection against prosecution.¹⁶⁷ When illegal shipments are seized, they are often auctioned back to the original loggers and the authorities then keep the proceeds from the sale.¹⁶⁸ Observers have noted timber being loaded onto barges by the illegal sawmill operators before the auctions have even taken place.¹⁶⁹ In other cases, enforcement agencies may conduct raids on illegal logging camps, but warn the loggers in advance; after the sweeps end, the loggers return.¹⁷⁰

In theory many of the illegal logging activities should be easy to stop. Logs are transported on waterways or roads in remote areas, so patrolling just a small area would make it clear whether illegal logging activities were taking place. But even if individual officers or law enforcement units are not involved in illegal logging, and want to step in and enforce laws against the practice, it is difficult to do so. The government and military are involved in such a large scale that there is tremendous inertia that keeps the process going.

¹⁶⁵ International Crisis Group, *Indonesia: Natural Resources and Law Enforcement*, 12/20/01, p. 10.

¹⁶⁶ International Crisis Group, *Indonesia: Natural Resources and Law Enforcement*, 12/20/01, p. 10.

¹⁶⁷ International Crisis Group, *Indonesia: Natural Resources and Law Enforcement*, 12/20/01, p. 10.

¹⁶⁸ International Crisis Group, *Indonesia: Natural Resources and Law Enforcement*, 12/20/01, p. 10.

¹⁶⁹ *Timber Trafficking*, p. 21.

¹⁷⁰ *Timber Trafficking*, p. 21.

Forest Fires

Several episodes of forest fires have contributed significantly to deforestation in Indonesia over the past two decades. The fires have in some cases been set deliberately to aid in logging and plantation businesses, and have had a huge toll on local economies, as well as the health and welfare of citizens not only in Indonesia, but in neighboring countries that were blanketed by smog from the fires for long periods of time.

In some cases, fires have resulted from deforestation. Typically, tropical forest is highly fire resistant due to high humidity, water stored in the vegetation and frequent rainfall. However, logged over and degraded forests and scrub on deforested land are much more prone to fire, especially during El Nino years, which have reduced rainfall. The first of the major fires to have occurred in Indonesia over the past twenty years happened in 1982-3, when approximately 80,000 square miles in East Kalimantan was destroyed, costing an estimated \$9 billion.¹⁷¹ Fire struck in 1991, burning approximately 500,000 hectares of land, and again in 1994, destroying an estimated five million hectares.¹⁷² The 1994 fires had regional implications, blanketing Singapore and parts of Malaysia in smog for several weeks and raising air pollution levels in those areas to unhealthy levels.

¹⁷¹ *The State of the Forest: Indonesia*, p. 53.

¹⁷² *The State of the Forest: Indonesia*, p. 54.

The most serious of the fires took place in 1997-8, an El Nino year, when an estimated 9.7 million hectares was destroyed, approximately half of this forestland.¹⁷³ Thousands of fires began in the spring and eventually took place in 23 of Indonesia's 27 provinces, but the most heavily affected islands areas were Kalimantan (6.5 million hectares), Sumatra (1.75 million hectares) and Irian Jaya (one million hectares).¹⁷⁴ The economic cost was estimated between \$8.9-9.3 billion.¹⁷⁵ The fires destroyed forests and agricultural crops, and caused environmental problems both in Indonesia and neighboring countries. Again, the fires caused a regional haze problem. By September it covered an area of nearly 400,000 square miles over Singapore and parts of Malaysia and the Philippines.¹⁷⁶ Nearly 70 million people were affected by the haze, which caused health problems, closed airports and affected tourism.¹⁷⁷

About one-third of the approximate \$9 billion cost of the fires was due to lost environmental services that the destroyed forests had provided. Lost vegetation providing flood protection is estimated to have cost about \$400 million, and protection from erosion and siltation control nearly \$1.6 billion.¹⁷⁸ An estimated 758 million metric tons of carbon was released during the fires, costing an estimated \$1.45 billion.¹⁷⁹

The government initially blamed the 1997-8 fires on shifting cultivators, but later admitted that the most of the fires were deliberately set, many in connection with palm

¹⁷³ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 17.

¹⁷⁴ *The State of the Forest: Indonesia*, p. 54-5.

¹⁷⁵ World Bank, *Indonesia: Environment and Natural Resource Management in a Time of Transition*, p. 17.

¹⁷⁶ *The State of the Forest: Indonesia*, p. 55.

¹⁷⁷ *The State of the Forest: Indonesia*, p. 55.

¹⁷⁸ *Trial by Fire*, p. 62.

¹⁷⁹ *Trial by Fire*, p. 62. The cost is based on an average price of \$7 per ton of carbon sequestered that companies are willing to pay for afforestation projects.

oil estates. As the World Resources Institute (WRI) reports, fires are set for several reasons:

- Fire degrades the quality of forestlands, and thus supports efforts to have areas of permanent forest estate... reclassified as forest areas available for conversion to plantation agriculture... [and thus] fire becomes a useful tool for increasing the stock of available land.
- In areas already allocated for palm oil development, fire is a cost-effective way of clearing the land.
- ...Oil palm firms hire outsiders to set fires to the lands of local people they want to take over. The fires reduce the value of the land by degrading it, then the companies can more easily take over, paying only token compensation to the original inhabitants.
- In some cases, local inhabitants also set fires to protest the takeover of their lands by oil palm firms.¹⁸⁰

Under the drought conditions, the fires burned out of control despite international assistance from Malaysia, the United States and Australia. The government instituted a belated ban on fire as a method of land clearance, but new fires were set and the regulations rarely enforced, despite clear evidence of who was responsible.¹⁸¹

¹⁸⁰ *The State of the Forest: Indonesia*, p. 56.

¹⁸¹ *The State of the Forest: Indonesia*, p. 58.

The Current State of Affairs

Leadership on the deforestation issue should be coming from the government. But because of entrenched government interests in continuing current logging practices, government instability and lack of commitment in addressing the problem, the government has been ineffective as an agent of change. Because the government has been ineffective, other groups are stepping in to try to address the issue.

Third-party involvement

Indonesia's international donors consist of the World Bank, International Monetary Fund (IMF), Asian Development Bank and donor countries, including the U.S., Japan, Australia and the Netherlands. The Consultative Group of Indonesia (CGI), a consortium chaired by the World Bank, coordinates Indonesia's aid donors. The CGI meets regularly with Indonesian government officials, and raised the matter of deforestation in 1999. As a part of its \$4.8 billion aid package in 2001, the CGI and Indonesian government agreed on a set of twelve forestry measures.¹⁸² The measures included commitments to act against illegal logging, place a moratorium on conversion of natural forests, and prevent forest fires.¹⁸³ The government also set up the Inter-Departmental Committee on Forestry to help implement the initiatives, but over a year later, "no progress on the

¹⁸² Dursin, Kanis, "Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban." *Environmental Bulletin*, 5/4/01.

commitments can be seen,” according to Longgena Ginting, the head of the policy advocacy division of the Indonesian Forum for the Environment, known by its Indonesian acronym WAHLI.¹⁸⁴ The government agreed with the assessment. Former Forestry Minister Marzuki Usman commented, “We have fulfilled none of the commitments. I just don’t know why we were so daring in giving promises. That is our fault.”¹⁸⁵

Several local and international environmental groups are active in the country promoting forest conservation. With the government not responding, the activists are targeting international donors, asking for a moratorium on logging.¹⁸⁶ The activists want a moratorium on industrial logging as a prerequisite condition on any future international aid, pointing to Southeast Asian neighbors that have implemented similar bans. “We have to pressure the Indonesian government to accept the idea that logging moratorium makes sense and is workable,” says WAHLI’s Ginting.¹⁸⁷

Many groups support community involvement as a way to promote forest conservation. The Center for International Forestry Research (CIFOR), based in Indonesia, and the U.S.-based Forest Trends issued a report advocating community management of forestlands. Only by including those who live in and around the forests in commercially

¹⁸³ *The State of the Forest: Indonesia*, p. 67.

¹⁸⁴ Dursin, Kanis, “Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban.” *Environmental Bulletin*, 5/4/01.

¹⁸⁵ Dursin, Kanis, “Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban.” *Environmental Bulletin*, 5/4/01.

¹⁸⁶ Dursin, Kanis, “Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban.” *Environmental Bulletin*, 5/4/01.

¹⁸⁷ Dursin, Kanis, “Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban.” *Environmental Bulletin*, 5/4/01.

viable, sustainable harvesting, the authors believe, will forests be managed in a way consistent with the best long-term interests of the community.¹⁸⁸

However, the World Resources Institute warns against local control of forests as a panacea for environmental problems:

Gaining control over long-term management of a resource may lead local people, especially if they have had the past experience of booms and busts in particular forest products, not to conservation-oriented management but rather to their own intensive exploitation of the resource as long as it fetches a high price and remains fairly readily available.¹⁸⁹

Community projects have not always proven effective. A \$30 million World Bank project in Sumatra supports community development in return for commitments to forestry conservation in an adjacent national park. A supervision mission visited the project in December 2001, and all components of the project were evaluated as unsatisfactory.¹⁹⁰ Illegal timber moved freely through the park, and the staff found 183 sawmills operating around the park perimeter, 111 of them without a license.¹⁹¹

Government action

¹⁸⁸ "Report Finds that Conserving the World's Forests Depends in Support for Community-Based Forest Enterprises; Indigenous and Local Groups Now Control 25 Percent of Developing World's Forests," Associated Press Newswires, 3/6/02.

¹⁸⁹ *Trial by Fire*, p. 45.

¹⁹⁰ Richardson, Michael, "Surge in Illegal Logging Puts Indonesia's Economy in Peril." *International Herald Tribune*, 4/24/01.

The first significant government step toward protecting the forests was taken by the Wahid administration in April 2001 by Minister of Forests Marzuki Uzman when he issued a moratorium on the logging and trading of ramin. To support this initiative abroad, he notified the secretariat of the Convention on International Trade in Endangered Species (CITES) that Indonesia was placing ramin on Appendix III of CITES with zero quota. This listing makes importation of ramin illegal, and thus puts some responsibility to address the problem on consuming countries. This is potentially a very effective step, because virtually all ramin is exported. Traders claim that demand for ramin has fallen as a result of the ban, but that the logging has simply shifted to other tree species.¹⁹²

The Wahid government made little progress in tackling the larger problem of deforestation. The CGI commented in April 2001:

In terms of results in the forests... there have been no tangible improvements. The rate of forest loss has not abated. The situation in the forests remains grave by any measure, and the donors remain seriously concerned.¹⁹³

Some groups are excited about the prospects for the future, and that the new administration would bring about reform in forestry practices. President Megawati, who took office in July 2001, seems to understand that illegal logging is a serious problem and showed her support for forest reform in her remarks opening a forestry conference in October 2001.

¹⁹¹ Richardson, Michael, "Surge in Illegal Logging Puts Indonesia's Economy in Peril." *International Herald Tribune*, 4/24/01.

¹⁹² Murphy, Dan, "The rise of robber barons speeds forest decline – The 1998 fall of Suharto has set off a logging boom in Indonesia's national parks." *Christian Science Monitor*, 8/24/01.

¹⁹³ *The State of the Forest: Indonesia*, p. 66.

To atone for our past mistakes, we will have to show our responsibility to the future generation by greatly improving forest management... The result (of mismanagement and corruption) is that we now face immense losses to the state budget and a great number of people have been deprived of their livelihood.¹⁹⁴

The international Forest Law Enforcement and Governance Conference held in Indonesia in September 2001 was hailed as a “breakthrough on the issue of illegal logging and destruction of the forests.”¹⁹⁵ Over one hundred participants from countries around the world attended the conference, including nine from East Asia, and agreed to a declaration supporting a crackdown on illegal logging and other reforms.¹⁹⁶ Many stakeholders were represented, including government and NGO leaders. The *Jakarta Post* saluted the conference as possibly “a turning point in the struggle to combat illegal logging in Indonesia and beyond.”¹⁹⁷

Despite the enthusiasm around these events, there is little evidence that Indonesia and other nations are serious in their commitment to combat illegal logging. Just two months after signing the declaration, the Chinese government was given a chance to demonstrate the seriousness of its pledge when Chinese vessels carrying 25,000 cubic meters of illegal timber were seized in Indonesian waters.¹⁹⁸ But instead of using the opportunity to build credibility by living up to the international agreement it signed, China did the opposite. The Chinese Embassy in Jakarta pressed for the vessels to be

¹⁹⁴ “President asks for reform on forest management,” *Jakarta Post*, 10/26/01.

¹⁹⁵ “Benn welcomes Forestry Conference as ‘breakthrough,’” M2 Presswire, 9/14/01.

¹⁹⁶ “Benn welcomes Forestry Conference as ‘breakthrough,’” M2 Presswire, 9/14/01.

¹⁹⁷ Sizer, Nigel, “Cooperation makes a real difference.” *Jakarta Post*, 9/18/01.

released with their cargo because they had the required documentation and “shouldn’t be punished” for carrying the timber – despite evidence that the logs were illegally cut from the protected Tanjung Puting forest in Kalimantan.¹⁹⁹

Malaysia and Singapore, two nations linked closest with Indonesian timber smuggling, were conspicuously absent from the conference. About the same time as China was pressuring Indonesia to release its ships carrying illegal timber, three Singaporean ships were seized, with several thousand cubic meters of illegal timber aboard.²⁰⁰

Forestry Minister Dr. Muhammad Prakosa pledged that Indonesia would take action against illegal loggers: “Indonesia will not tolerate illegal logging in national parks and will take strong measures to control it.”²⁰¹ Prakosa promised to impose stiff penalties on those convicted of forest crimes in what the *Jakarta Post* said “could herald a sharp crackdown on the bosses of timber smuggling syndicates.”²⁰²

The recent statements by the Indonesian government indicate an understanding of the issues and willingness to tackle them. But its actions indicate otherwise. The central government has not been willing to take serious action against those accused of timber crimes. In a high-profile case decided in February 2001, Muhammad “Bob” Hasan was convicted and sentenced to two years in jail for stealing \$75 million of funds belonging to the Ministry of Forestry. Hasan was a golfing buddy of Suharto, who awarded him

¹⁹⁸ “Govt Urged to Resist Chinese Pressure over Illegal Timber Carrying,” ANTARA – The Indonesian National News Agency, 2/7/02.

¹⁹⁹ Montlake, Simon, “Indonesia battles illegal timber trade; Police blame politicians for collusion in trade.” *Christian Science Monitor*, 2/27/02.

²⁰⁰ “Govt Urged to Resist Chinese Pressure over Illegal Timber Carrying,” ANTARA – The Indonesian National News Agency, 2/7/02.

vast logging concessions. While the sentence may seem a victory against corruption, Hasan was exonerated on charges of fraudulent use of \$168 million of state funds for an aerial forestry mapping project to be carried out by his company, PT Mapindo Parama. The charges carried a maximum life sentence, although the prosecution sought an eight-year term and \$244 million in damages, equal to the amount of state losses. Instead, the court handed down the two-year sentence and ordered \$1.48 million to be paid in compensation. In determining the sentence, the court considered mitigating factors that Hasan was “polite, elderly, and dedicated to national sports.”²⁰³ (The sentence was later increased to six years, although it is currently under appeal by Hasan.)

No state action has been initiated against Abdul Rasyid, the timber baron and central government official from Kalimantan, despite clear evidence of involvement in illegal activity. This case has received international attention because Rasyid’s employees allegedly kidnapped, beat and threatened the lives of two NGO workers investigating the case, which was subsequently widely publicized. “If ever the law was going to be enforced, this was a perfect case,” said Faith Doherty, a British citizen who was kidnapped while investigating illegal activities of Rasyid’s company for the Environmental Investigation Agency.²⁰⁴

The central government has been ineffective in enforcing its declarations on timber policy. Jakarta issued a moratorium on log exports in October 2001 to help curb illegal

²⁰¹ Sizer, Nigel, “Cooperation makes a real difference.” *Jakarta Post*, 9/18/01.

²⁰² Sizer, Nigel, “Cooperation makes a real difference.” *Jakarta Post*, 9/18/01.

²⁰³ “‘Bob’ Hasan gets 2 years in jail,” *Jakarta Post*, 2/3/01.

logging, and is set to renew the regulation when it expires.²⁰⁵ The exports of raw logs were banned in 1984, but lifted on recommendation of the IMF in 1998. There is little guarantee that this measure will be effective, though. Local and district authorities have openly defied the ban, saying that they need the revenue generated by the exports.²⁰⁶

Some local governments are taking steps on their own. The province of West Java implemented a three-year ban on industrial logging in November 2001, the first province to carry out such a policy.²⁰⁷ Even if this turns out to be effective, most local governments are not taking similar steps to address the deforestation problem.

The central government also called into question its motives when it dissolved the Environmental Impact Control Agency (BAPEDAL), a state environmental watchdog group, by merging it with the office of State Minister for Environment. However, the Presidential decrees mandating the dissolution did not confer law enforcement abilities (which BAPEDAL possessed), so it is unclear which agency will become responsible.²⁰⁸ Environmental groups protested the move. Longgena Ginting of WAHLI commented:

This is not a merger, it is the elimination of an agency altogether. We are extremely worried that its functions of monitoring environmental violations and enforcing

²⁰⁴ Murphy, Dan, "The rise of robber barons speeds forest decline – The 1998 fall of Suharto has set off a logging boom in Indonesia's national parks." *Christian Science Monitor*, 8/24/01.

²⁰⁵ "Indonesia to Issue New Regulation to Control Log Exports," ANTARA/Asia Pulse online source, 2/19/02.

²⁰⁶ "Indonesian Ban on Log Exports Defied by Regional Govts," ANTARA/Asia Pulse online source, 1/28/02.

²⁰⁷ Simanjuntak, Teretiani ZB, "West Java administration suspends industrial logging," *Jakarta Post*, 2/23/02.

²⁰⁸ Simanjuntak, Tertiani ZB, "Bapedal gone, fears of environment abuse up," *Jakarta Post*, 1/28/02.

environmental law will disappear. There will no longer be any state institution making or enforcing the law and protecting the environment.²⁰⁹

The Megawati administration has demonstrated an understanding of the problems caused by deforestation and paid lip service to making improvements, but to date the pledge has been purely rhetorical. This administration, like others before it, has demonstrated no tangible commitment to addressing the serious issues of illegal logging and deforestation that are before it.

²⁰⁹ “Illegal loggers destroy two-thirds of Indonesia national park,” Agence-France Presse, 1/9/02.

The Role of Business

Prospects for abatement in the rate of deforestation in Indonesia are slim in the short term. The country is mired in crises on several levels. Government instability, economic volatility and separatist movements threatening the sovereignty of the nation have taken away any focus that might otherwise be on forestry issues. Even without these distractions, corrupt interests of politicians and their cronies often act to increase the rate of deforestation, frequently by illegal means. The military and local law enforcement agencies also benefit from the plunder, so their interest is not in forest protection. In short, there is no real prospect of the Indonesian government taking the lead to effectively deal with the deforestation issue.

Much has been written about the loss of Indonesia's forests, resulting in many recommendations to help solve the problem. Some commonly cited solutions include stepping up enforcement against illegal logging and prosecuting those found guilty, stripping violating companies of their logging concessions, working with the international community to address illegal timber smuggling, recognizing the rights of forests dwellers and instituting sustainable, community harvesting plans, protecting forest lands and combating illegal forest clearing, especially by forest fires.²¹⁰ The Indonesian government has agreed many of these remedies, yet few have been implemented, and no tangible results have been achieved. In introducing a report by the International

Tropical Timber Organization, C. Chandrasekharan called the Indonesian forest sector “a graveyard of discarded recommendations.”²¹¹

The problem with these prescriptions is that they are dependent on a complete overhaul of the traditional *modus operandi* of government institutions. While in theory these solutions are possible, in reality they are not plausible. The Indonesian government for the most part has always operated in a way that enriches those in power at the ultimate expense of the general population. Some of the players may have changed since the economic crisis struck, but the standard operating procedure has not. In fact, corruption and mismanagement may have accelerated as a result, at least as far as forestry policy is concerned. The reformists among the existing government institutions, including the judiciary and military, are too weak to reverse this trend, particularly in difficult economic times. Community forestry and education programs are commendable and in some areas may be successful at protecting forests; however, they are not a viable short-term solution to the country’s problems. The bottom line is that as long as the existing political and economic structures continue to undervalue forest resources, making deforestation profitable, it will continue to happen, regardless of whether most of the country loses from this behavior.

Business clearly plays a major role in the deforestation of Indonesia. Within the country, forests are being exploited for short-term gain by both legal and illegal means. Abroad, wealthy nations consume most of the products from Indonesia’s forests, usually oblivious to the origin of the product or damage its consumption causes. Yet business –

²¹⁰ See *Trial by Fire, Timber Trafficking*, World Bank reports and CIFOR website for more details.

²¹¹ “A strategy for Indonesian forest management,” CIFOR Newsletter, February 2002.

both within Indonesia and abroad – may provide the best hope to help the address the problem.

Why should an average American company that is not involved in timber products or with direct business ties to Indonesia be concerned? In short, because virtually all businesses can have an impact in reducing deforestation pressure, and because doing so is good business. While much direction on environmental issues comes from the government, business can make more of an impact, and has a strong incentive to do so. Matthew J. Kiernan writes:

The private sector, by contrast [to the government], offers considerably more hope and much greater leverage. Increasingly, leading edge financial analysts are recognizing that there is a strong, positive and *growing* correlation between... companies' "eco-efficiencies" and their competitiveness and financial performance.²¹²

Studies show that the investment return on companies employing environmentally friendly business practices can be expected to outperform less-efficient competitors 2.3 percent or more per year.²¹³ In business sectors with more environmental risk, such as forestry products, the "out-performance premium" can exceed five percent.²¹⁴ The performance differentials are likely to increase in the future, as international regulations

²¹² Kiernan, Matthew J., "Translating Environmental Performance Into Profits." *Corporate Environmental Strategy*, Autumn 1998, Vol. 5, No. 5, p. 52.

²¹³ Kiernan, Matthew J., "Translating Environmental Performance Into Profits." *Corporate Environmental Strategy*, Autumn 1998, Vol. 5, No. 5, p. 52.

²¹⁴ Kiernan, Matthew J., "Translating Environmental Performance Into Profits." *Corporate Environmental Strategy*, Autumn 1998, Vol. 5, No. 5, p. 57.

and competitive pressures increase.²¹⁵ Environmental policies are increasingly used as criteria to evaluate investment decisions. According to the Social Investment Forum's 1999 report, \$2.16 trillion of the \$16.3 trillion under professional management in the U.S. was invested in a socially responsible manner – an increase of 82% in just two years.²¹⁶

Kiernan writes that superior environmental performance can create a competitive advantage for companies in several areas, including lower operating costs resulting from waste reduction, and stakeholder satisfaction from acting as an environmental steward.²¹⁷ Cost reduction benefits are greatest for companies that pollute the most, but the marginal costs of reducing waste seldom exceed the marginal benefits.²¹⁸

It behooves companies not only to incorporate environmental strategy into their core business strategy, but to do so sooner rather than later. Steve W. Percy writes about the decision firms make to be a "first-mover" versus a "fast-follower" in environmental policy:

²¹⁵ Kiernan, Matthew J., "Translating Environmental Performance Into Profits." *Corporate Environmental Strategy*, Autumn 1998, Vol. 5, No. 5, p. 53.

²¹⁶ www.calvert.com online source.

²¹⁷ Kiernan, Matthew J., "Translating Environmental Performance Into Profits." *Corporate Environmental Strategy*, Autumn 1998, Vol. 5, No. 5, p. 54.

²¹⁸ Hart, Stuart L.; and Ahuja, Gautam, "Does It Pay To Be Green? An Empirical Examination Of The Relationship Between Emission Reduction And Firm Performance." *Business Strategy and the Environment*, Vol. 5 1996, p. 7.

Increasingly, the benefits of establishing a reputation for leadership as well as taking the opportunity to participate in the 'writing the rules of the game' are tipping the scales in favor of being the first mover.²¹⁹

Current Business Activity

Some companies dealing extensively in forest products have already taken action.

Lowe's is the world's second-largest home improvement retailer. Revenues of about \$16 billion made the company the 15th largest retailer in the U.S., and 34th largest in the world in 1999.²²⁰ Lowe's has pledged to phase out the purchase of wood products from endangered sources, and purchase forest products certified by the Forestry Stewardship Council (FSC) as coming from legal, sustainable sources.²²¹ One important result from this policy is a ban on purchasing dowels made from Indonesian ramin. Aside from shifting demand to more sustainable sources, Lowe's has committed to increase efficiency of wood products and to use more recycled content in its products.²²² Lowe's also pledged to work closely with environmental groups including the FSC, WRI and Certified Forest Products Council, which gives these organizations more clout. Dr. Nigel Sizer, the WRI's director of forest policy, comments on the trends in the U.S. marketplace.

²¹⁹ Percy, Steve W., "Environmental Sustainability and Corporate Strategy: Why a Firm's "Chief Environmental Officer" Should Be Its CEO." *Corporate Environmental Strategy*, Vol. 7, No. 2, 2000, p. 196.

²²⁰ "Lowe's Unveils Unprecedented Business Initiative to Help Protect the World's Forests," *Lowe's Environmental Policy*, 12/5/00. Accessed online at www.lowes.com.

²²¹ "Lowe's Unveils Unprecedented Business Initiative to Help Protect the World's Forests," *Lowe's Environmental Policy*, 12/5/00. Accessed online at www.lowes.com.

²²² "Lowe's Unveils Unprecedented Business Initiative to Help Protect the World's Forests," *Lowe's Environmental Policy*, 12/5/00. Accessed online at www.lowes.com.

It is conceivable that up to 50 percent of the U.S. retail market could be covered by similar policies in the next couple of years – Lowe’s and the other early adopters deserve much credit for leading this change.²²³

Comments like this giving credit to first movers is a benefit and incentive for companies to lead in environmentally-friendly business practices.

B&Q, a U.K. based home improvement and garden products company, is another global retailer implementing sound forestry purchasing tactics. The company has 300 stores in the U.K. and 50 in other countries, with revenues of approximately \$4 billion in 2000. B&Q’s timber buying policy says that the company will only purchase wood products that are certified by the FSC or equivalent to come from sustainable sources.²²⁴ This policy has caused the company largely to turn away from tropical timber because of the lack of certified sources.²²⁵

Ikea, a home furnishing company with 2001 revenues of \$9.6 billion, has implemented similar policies. Its forestry policy states that wood products must come from forests certified by the FSC, or equivalent.²²⁶

Global retailers that implement strong environmental policies can have an effect beyond the borders of their home countries. B&Q has four stores in China, including its largest branch in the world, located in Shanghai. China is Ikea’s largest source country,

²²³ “WRI applauds forest protection moves by Lowe’s,” 8/8/00. Accessed online at www.wri.org.

²²⁴ “B&Q Timber Buying Policy – Revised August 2000,” p. 2. Accessed online at www.diy.com.

²²⁵ “B&Q Timber Buying Policy – Revised August 2000,” p. 10. Accessed online at www.diy.com.

²²⁶ Ikea Environment-Forestry policy, accessed online April 2002 at www.ikea.com.

supplying 14 percent of the company's purchases.²²⁷ Employing sound business practices can have a contagious effect, as others seek to adopt best practices or risk being left behind. By implementing their corporate policies in Chinese operations, these companies can raise the bar and force other firms operating there to follow suit. This is especially important in a country like China, which was demonstrated to use much illegal timber from Indonesia. The ultimate result could be an impact far greater than the companies' own demand for timber products.

Meanwhile, pulp and paper conglomerates in Indonesia are struggling to achieve a sustainable supply of timber to feed their operations, much to the consternation of their business investors. Asia Pulp and Paper (APP) obtained huge loans to finance rapid expansion that made it the tenth largest pulp and paper producer in the world. It relies heavily on its Indonesian mills – and the cheap supply of materials provided by Indonesia's forests – to produce competitively. In order to keep the mills running profitably, they must run at near capacity. But APP failed to develop sustainable sources of timber, raising questions about the company's long-term viability. In response to concerns from various stakeholders including the investment community, the company has taken steps to ensure that its timber supply comes from sustainable sources. APP has promised that it would establish a sustainable supply by 2007, an "extremely optimistic" target, according to a CIFOR official.²²⁸ But it may be too late. The company is now at risk of defaulting on its \$13.4 billion debt, which it stopped repaying last year.²²⁹

²²⁷ www.ikea.com

²²⁸ McBeth, John, "Missing the Wood for the Trees." *Far East Economic Review*, 4/11/02.

Sinar Mas and Raja Garuda Mas, two more of Indonesia's largest pulp producers (who are also top holders of logging concessions), also rely heavily on natural forest supplies. Although both firms claim that their operations will be fed by sustainable sources of timber by 2008, CIFOR estimates that their plantations will provide at best 50 percent of demand by that time.²³⁰

Indonesian companies would do well to look at Weyerhaeuser, one of the largest pulp and paper companies in the world, with sales over \$16 billion in 2000. The company has been progressive in its approach to mitigating the environmental impacts of its operations. It is implementing environmental management systems in each of its facilities in the 17 countries where it operates, many of which are in place and have been certified by third party auditors.²³¹ However, this, and other measures such as guaranteeing a sustainable supply of timber and pledging to not log old growth forests,²³² is the minimum acceptable standard for forestry products companies. Weyerhaeuser seeks to go beyond what is required by vowing to address greenhouse gas emissions by increasing forest growth rates and improving timber utilization. The company is also diversifying its business operations into collecting and recycling paper products in order to reduce demand for virgin timber.²³² Due to these and other efforts, *Fortune* magazine has named Weyerhaeuser the most socially responsible company in the forestry products industry for seven years.²³³

²²⁹ "Predictions of a CIFOR researcher come true," CIFOR Newsletter, February 2002.

²³⁰ "Pulp mills put heavy pressure on forests – study," *Jakarta Post*, 2/9/02.

²³¹ www.weyerhaeuser.com.

²³² www.weyerhaeuser.com.

²³³ www.weyerhaeuser.com.

Other pulp and paper operations understand the value of environmentally sound forestry practices. Singapore-based Poh Lian Holdings is looking to become one of the top ten pulp producers in the world by forging an alliance with Swedish pulp trader Cellmark Holding AB. Poh Lian proposed purchasing the concession rights in Kalimantan, and the rights to build a pulp mill there. Its pulp will be sourced from plantations, not natural forests. "This will be environmentally friendly, which matters to many consumers in the world," said Poh Lian Chairman Chia Quee Hock.²³⁴ As part of the deal, Cellmark will buy 90% of the pulp produced for the next ten years at prevailing market prices.²³⁵

The Role of Business Globally

The global business community can play an important role in mitigating the damage of deforestation in Indonesia, even if most businesses have no direct business ties to the country. Simply by addressing company purchase decisions, a firm can make a significant impact – often while lowering its own operating costs. Products whose global demand play a significant role in deforestation include paper, furniture and fixtures, all of which are used extensively by businesses. Companies should take an informed view of where its business purchases originate from, and not purchase products that cannot be verified to come from sustainable and legal sources.²³⁶ These sources are just beginning to develop in Indonesia, so the support of sustainable products by U.S. companies and other consumers abroad sends a powerful message. This is especially

²³⁴ Chia, Adeline, "Poh Lian unveils plan to become top 10 pulp producer." *Singapore Business Times*, 2/25/02.

²³⁵ Chia, Adeline, "Poh Lian unveils plan to become top 10 pulp producer." *Singapore Business Times*, 2/25/02.

true because most Indonesian forestry products are exported – \$472 million worth to the U.S. alone in 1999.²³⁷

American companies of all sizes can have an impact on the deforestation problem by addressing their paper consumption habits. Paper usage is growing in the U.S., where we consume \$132 billion worth of paper a year, and much of the growth is driven by businesses.²³⁸ Paper accounts for two percent of global trade and 2.5 percent of industrial production, yet most paper products are used for a short time and then either discarded, or placed in long-term storage.²³⁹ Paul Hawken writes in *Natural Capitalism*:

The average American officeworker is estimated to use a sheet [of paper] every 12 minutes... and to dispose of 100-200 pounds of paper per person every year. This paper accounts for as much as 70 percent of typical office waste. During the years 1972-87, America's discarded office printing and writing paper grew almost five times as fast as the human population, miscellaneous office paper grew over five times, and copier paper almost ten times – a 150 percent absolute increase.²⁴⁰

U.S. imports of Indonesian paper products totaled \$107 million in 1999.²⁴¹

Companies can drastically reduce paper consumption by moving more data storage to electronic sources and decrease unnecessary printing and copying. Hawken gives

²³⁶ Supply of sustainable forestry products is a concern, especially in the short term. A large-scale shift in demand to sustainable sources would overwhelm supply. Still, sustainable products do exist and supply will only increase if driven by growing demand.

²³⁷ Food and Agriculture Organization of the United Nations. Accessed online at www.apps.fao.org.

²³⁸ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 173.

²³⁹ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 173-4.

²⁴⁰ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 174.

²⁴¹ Food and Agriculture Organization of the United Nations. Accessed online at www.apps.fao.org.

examples of companies that made up-front investments in computer systems that not only decreased paper consumption, but more than paid for themselves with increased efficiency.²⁴² What paper does need to be purchased can even come from non-tree sources. In 1998, non-tree paper made up 11% of the world's supply – less than one percent of U.S. usage, but nearly 80 percent of China's.²⁴³

Companies that produce and ship products can also significantly impact timber product usage by examining product packaging. Much packaging is superfluous and can be disposed of without notice of the customer. Wooden pallets account for about 11 percent of total lumber use, and are often discarded after a single use.²⁴⁴ Minor packaging alterations can significantly cut both packaging materials used and reduce requirements for wooden pallets,²⁴⁵ which saves materials and costs for the company, and reduces environmental damage. Addressing design and material choice for office buildings and fit-outs can yield similar results of lowering costs and saving materials. Hawken writes:

At the heart... is the thesis that 90 to 95 percent reductions in material and energy are possible in developed nations without diminishing the quantity or quality of the services that people want.²⁴⁶

Another significant impact large businesses can have is in pollution offsets. As greenhouse gas emissions continue to rise, companies are looking not just to cut

²⁴² Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 174-5.

²⁴³ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 188.

²⁴⁴ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 184.

²⁴⁵ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 184.

²⁴⁶ Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*, p. 176.

emissions, but, given that company activities will continue to emit carbon into the atmosphere, to offset emissions by planting trees to sequester carbon. Several U.S. companies are already investing in carbon offsets. Firms in energy intensive industries are more likely to participate in such programs, but companies as diverse as Stonyfield Farms (yogurt), Nike (athletic wear) and PacifiCorp (energy) currently invest in carbon offsets. At present, American companies generally invest in U.S. forests. Pursuing the carbon offsets in Indonesia, however, could offer substantial benefits. Tropical forests have the greatest capacity to store carbon in their tissues as they grow, and growth rates are rapid in the tropics,²⁴⁷ so forests there sequester more carbon in a shorter period of time. Given the difference in costs and standard of living between the two countries, it is also likely that investing in Indonesian forests would be significantly cheaper than those in the U.S.

One way to pursue a carbon-offset scheme in Indonesia is to partner with an internationally recognized forestry NGO to manage the program. The company would determine the area of offsets, then pay a fee to the NGO to acquire the land, do the planting, and maintain the forest area. An important responsibility is to make sure the forest remains intact, which will require cooperation from government and law enforcement agencies to monitor and, if necessary, to apprehend and punish offenders. Given the current situation in Indonesia, this will require a shift in government attitudes and strengthening of the rule of law. However, companies pursuing pollution offsets are generally large and economically powerful. If several companies pursue this strategy, as well as the purchase strategies outlined above, it sends a powerful message that it pays, literally, for the government to protect its forests.

²⁴⁷ "Atmospheric Role of Forests," *Tropical Rainforests*. Accessed online at www.mongabay.com.

may result in higher costs and lower profit. A reputation of this sort can help attract customers and increase sales and profits.

This is not to say that a company will be considered “environmental” and increase customers, profits and shareholder return simply by using less paper. But the measures laid out above are important, easy steps for firms to take as part of a larger environmental plan that can have positive returns.

The Role of Business Locally

Businesses operating in Indonesia also have the ability to make a positive impact. Aside from the measures listed above, local firms can play a direct role in educating local communities about what is at stake with deforestation, how it takes place and how to put a stop to it. Indonesians are just beginning to understand that they can effect change after decades of living in a repressed political climate under Suharto.

Particularly important are communities affected by illegal logging and deforestation. Education needs to take place here to help citizens understand what is being lost, and even if they are profiting from deforestation, what the short-term versus long-term tradeoff means.

Forests provide other business opportunities for companies with more direct business ties to Indonesia specifically or tropical countries in general. Pharmaceutical companies have a significant stake in protecting the biodiversity found in tropical forests, which are the potential source of untold drug remedies. At least half of pharmaceutical products

contain substances derived from plants,²⁵³ many of which are found in tropical forests. Botanists estimate that two-thirds of the world's plant species could disappear in the next decade;²⁵⁴ much of this plant loss is due to tropical deforestation. Consumers in the U.S. alone spend \$6 billion a year on medicines derived from tropical plants,²⁵⁵ so pharmaceutical companies have a strong business interest in protecting tropical forests – particularly those in countries like Indonesia, with disproportionately high levels of biodiversity.

Several pharmaceutical and research firms are making investments in such countries. Merck & Co., one of the world's largest pharmaceutical companies, paid \$1.35 million to Costa Rica's National Biodiversity Institute in exchange for chemical extracts from protected areas.²⁵⁶ The deal also promised a percentage of royalties from any resulting products; seven more companies have since signed similar contracts.²⁵⁷ Andes Pharmaceuticals, in a joint venture with a Colombian partner, is building a \$5 million laboratory in Colombia to screen forest extracts for efficacy against cancer and other diseases.²⁵⁸ A village in Samoa will receive a percentage of profits from an AIDS drug developed from a compound discovered there.²⁵⁹

²⁵³ Allen, William, "Not All Endangered Species Are Animals, Botanists Say." *St. Louis Post-Dispatch*, 8/16/99.

²⁵⁴ Allen, William, "Not All Endangered Species Are Animals, Botanists Say." *St. Louis Post-Dispatch*, 8/16/99.

²⁵⁵ Parlange, Mary, "Biobucks: How to Love Mother Nature and Make Money." *Globe and Mail*, 3/6/99.

²⁵⁶ Tangle, Laura; Fine, Doug, "Rain forests for profit: Businesses sell nuts, tourism, and 'carbon storage.'" *U.S. News and World Report*, 4/20/98.

²⁵⁷ Tangle, Laura; Fine, Doug, "Rain forests for profit: Businesses sell nuts, tourism, and 'carbon storage.'" *U.S. News and World Report*, 4/20/98.

²⁵⁸ Tangle, Laura; Fine, Doug, "Rain forests for profit: Businesses sell nuts, tourism, and 'carbon storage.'" *U.S. News and World Report*, 4/20/98.

²⁵⁹ Griffith, Victoria, "Samoa to get percentage of Aids drug profits." *Financial Times*, 12/13/01.

Ecotourism and watershed services are two more business opportunities that help to preserve forests. Ecotourism is the top foreign exchange earner in Costa Rica, bringing in about \$700 million in 1998.²⁶⁰ Forest watersheds provide a natural filtration system that provides clean drinking water more cheaply than industrial filtration systems. Forests also yield products that can be harvested and sold by local communities without damaging the forests. In Guatemala, two forest products, xate and allspice, alone generate \$4-6 million in sales annually, more than clearing the forests and planting crops could.²⁶¹ Protecting forests for individual uses such as pharmaceutical research, watershed services, carbon offsets, ecotourism and harvesting forestry products has economic benefits. But the beauty of forest protection for these uses is that a country is not forced to choose between the uses – they can all take place simultaneously.

Businesses operating within Indonesia or with direct business ties there can have a significant impact in the battle against deforestation. These companies have the opportunity for direct contact with Indonesian communities, to educate them on the costs of deforestation, and how protecting forests is in the long-term interests of the community. Companies in specific industries, such as pharmaceuticals or ecotourism, also have the ability to invest in forest services in a way that protects both the forest and the companies' bottom line.

²⁶⁰ Tangle, Laura; Fine, Doug, "Rain forests for profit: Businesses sell nuts, tourism, and 'carbon storage.'" *U.S. News and World Report*, 4/20/98.

²⁶¹ Tangle, Laura; Fine, Doug, "Rain forests for profit: Businesses sell nuts, tourism, and 'carbon storage.'" *U.S. News and World Report*, 4/20/98.

Conclusion

Deforestation in Indonesia is a significant problem, both for Indonesian citizens and the global community. Locally, deforestation causes a myriad of environmental problems that far outweigh the profits from logging. Topsoil is washed away in deforested areas, leaving the land less productive for agricultural uses, and depositing hundreds of millions of tons of soil in rivers and streams each year. This raises riverbeds, leading to flooding on a massive scale, which was evidenced throughout Indonesia earlier this year. The flooding damages water supplies and harms crops whose planting, ironically, was often the cause of the deforestation in the first place. Eventually the loss of forest cover leads to decreased rainfall, potentially causing water shortages and higher temperatures in already hot, tropical climates. These consequences significantly affect the cost and quality of life of citizens in the fourth most populous country in the world.

The welfare of the global population is also threatened. The loss of tropical forests leads to increased buildup of greenhouse gasses in the atmosphere, which in turn causes global warming and more volatile – and often more destructive – weather patterns throughout the world. Warmer weather leads to diseases re-establishing themselves in areas where they had been eradicated, and spreading to new ones. The effect of ecosystem and biodiversity loss caused by deforestation is not well understood,

and comes with a price tag that is probably significantly undervalued because we simply do not understand their current and potential contributions to human welfare.

The government of Indonesia is largely responsible for deforestation. The concession system under Suharto set the stage for the plunder of the forests for the benefit of timber exporters, processing industries and agricultural estates. The corrupt interests of the government and military, and lack of political will to reform logging practices despite an understanding of the costs, allow the problem to continue.

Business interests caused deforestation to begin with, and continue to perpetuate and even increase it today. As long as forests are undervalued, signaling an apparent profit to be made from exploiting forest products, this activity – much of it illegal and occurring with the knowledge of the government – will continue unabated. However, business also represents the best hope to tackle the problem. By addressing consumption and purchasing decisions, virtually every company – regardless of its size or connection to Indonesian timber business – can have an impact by reducing demand for illegal and unsustainable forest products. Doing so not only helps the environment, it can also help reduce costs, increase profitability and enhance public standing of the firm. Larger companies can have a further impact by working with the NGO community to offset carbon emissions through afforestation projects. Many global companies are already doing this, but doing it in Indonesia helps reduce deforestation pressure there, while realizing the quickest benefit of carbon sequestration.

Firms operating in Indonesia or dealing more directly with forest products have an even greater ability to impact the situation through these means and by direct educational efforts with Indonesian communities. Industries such as pharmaceuticals and ecotourism that rely on healthy forests have a significant stake in forest preservation that can be addressed through investments in protection.

Deforestation is an issue of global scale that needs to be dealt with immediately. To date, the involvement of the Indonesian government, which should be leading the charge to protect its forests, has been limited to rhetoric against logging. Luckily, for most firms, doing what is “right” in the case of deforestation is also in their best business interests. By understanding the scope of the problem and opportunities involved, business can have the greatest impact in addressing the serious deforestation problem in Indonesia.

Exhibit 1 – Table of Acronyms

APKINDO	Indonesian acronym for Association of Indonesian Plywood Producers
APP	Asia Pulp and Paper
BAPEDAL	Indonesian acronym for Environmental Impact Control Agency
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species
CGI	Consultative Group of Indonesia – consortium of international donors chaired by the World Bank
FDI	Foreign Direct Investment
FSC	Forestry Stewardship Council
IBRA	Indonesian Bank Restructuring Agency – organization set up by the central government after the economic crisis to oversee restructuring and recapitalization of banking sector
IMF	International Monetary Fund
NGO	Non-governmental organization – in the context of this paper the term refers to an environmental watchdog group
WAHLI	Indonesian acronym for the Indonesian Forum for the Environment
WRI	World Resources Institute

Bibliography

Agence France-Presse, "Illegal loggers destroy two-thirds of national park," 1/9/02.
Accessed online at Dow Jones Interactive Newsstand.

Allen, Vicki, "Costa Rica Launches Plan to Save Forest." *Rocky Mountain News* (Reuters), 5/3/98.

Allen, William, "Not All Endangered Species Are Animals, Botanists Say." *St. Louis Post-Dispatch*, 8/16/99.

Amnesty International, accessed online at www.amnesty.org.

ANTARA/Asia Pulse – Accessed online at Dow Jones Interactive Newsstand:
"Govt Urged to Resist Chinese Pressure over Illegal Timber Carrying," 2/7/02.
"Illegal Logging Damaged 6.5 Million HA of E Kalimantan Forests," 1/2/02.
"Indonesia Targets US\$303 Mln Earnings from Forestry Sector," 2/21/02.
"Indonesia to Issue New Regulation to Control Log Exports," 2/19/02.

Associated Press – Accessed online at Dow Jones Interactive Newsstand:
"Death toll 142," 2/7/02.
"Indonesian police on guard amid fear of looting after floods," 2/4/02.
"Report Finds that Conserving the World's Forests Depends in Support for Community-Based Forest Enterprises; Indigenous and Local Groups Now Control 25 Percent of Developing World's Forests," 3/6/02.

B&Q. August 2000. "B&Q Timber Buying Policy – Revised August 2000." Accessed online at www.diy.com.

Barber, Charles Victor; and Schweithelm, James. 2000. *Trial by Fire: Forest Fires and Forestry Policies in Indonesia's Era of Crisis and Reform*. World Resources Institute. Available online at <http://www.wri.org/forests/pdf/trialbyfire.pdf>.
[Referenced throughout as "Trial by Fire"]

Brummit, Chris, "Floods and Landslides Kill at Least 30," 2/6/02. Associated Press.
Accessed online at Dow Jones Interactive Newsstand.

Business Wire, "Reminder/Local Impact of Global Infections Focus of World Health Seminar," 12/3/99.

Calvert Investments, accessed online at www.calvert.com.

Center for International Forestry Research (CIFOR). February Newsletter. No. 29, February 2002. Accessed online at www.cifor.org.

Chia, Adeline, "Poh Lian unveils plan to become top 10 pulp producer." *Singapore Business Times*, 2/25/02.

Cochrane, Joe, "Raping Borneo; Indonesia's democratic regime tolerates rampant logging and mining that are extinguishing wildlife." *Newsweek International*, 9/10/01.

Costanza, Robert; d'Arge, Ralph; de Groot, Rudolf; Farber, Stephen; Grasso, Monica; Hannon, Bruce; Limburg, Karin; Naeem, Shahid; O'Neill, Robert. O; Paruelo, Jose; Raskin, Robert G.; Sutton, Paul; and van den Belt, Marjan, "The value of the world's ecosystem services and natural capital." *Nature*, Vol. 387, 15 May 1997.

Dow Jones Commodities Service, "ODJ Asian Cocoa: Prices Higher Amid Volatile Intl Cocoa Futures," 2/6/02. Accessed online at Dow Jones Interactive Newsstand.

Dursin, Kanis, "Environment – Indonesia: Donors Urged to Tie Aid to Logging Ban." *Environmental Bulletin*, 5/4/01.

Environmental Investigation Agency and Telepak Indonesia. 2001. *Timber Trafficking: Illegal Logging in Indonesia, Southeast Asia and International Consumption of Illegally Sourced Timber*. Available online at <http://www.eia-international.org/Campaigns/Forests/Reports/timber/timber.pdf> [Referenced as "Timber Trafficking"]

Environmental Protection Agency. Accessed online April 2002 at www.epa.gov/globalwarming.

Firman, Tommy. "Urban Development in Indonesia, 1990-2001: From the Boom to the Early Reform Era Through the Crisis." *Habitat International*, Vol. 26, Issue 2, June 2002.

Food and Agriculture Organization of the United Nations. Accessed online April 2002 at www.fao.org, www.apps.fao.org.

Gargan, Edward A. "Falling down: Teak poachers are killing off the great forests of Indonesia." *The Seattle Times*, 7/6/01.

Global Forest Watch. www.globalforestwatch.com online resource, accessed January 2002.

Global Forest Watch and Forest Watch Indonesia. 2002. *The State of the Forest: Indonesia*. Bogor, Indonesia: Forest Watch Indonesia, and Washington, D.C.: Global Forest Watch. [Referenced as "The State of the Forest: Indonesia"]

Griffith, Victoria, "Samoa to get percentage of Aids drug profits." *Financial Times*, 12/13/01.

Hart, Stuart L.; and Ahuja, Gautam, "Does It Pay To Be Green? An Empirical Examination Of The Relationship Between Emission Reduction And Firm Performance." *Business Strategy and the Environment*, Vol. 5 1996, p. 7.

Hawken, Paul; Lovins, Amory; and Lovins, L. Hunter. *Natural Capitalism*. Boston: Little, Brown and Company, 1999.

Ikea Environment-Forestry policy, accessed online April 2002 at www.ikea.com.

The Independent – London. "Come Rain or Shine..." 1/1/02. Accessed online at Dow Jones Interactive Newsstand.

International Crisis Group. 2001. Indonesia: Natural Resources and Law Enforcement. ICG Asia Report No. 29. Jakarta/Brussels.

The Jakarta Post:

"Bob' Hasan gets 2 years in jail," *Jakarta Post*, 2/3/01.

"Paying for past sins," 2/20/02.

"Plywood exports expected to decline by 12 percent," 5/9/01.

"President asks for reform on forest management," 10/26/01.

"Pulp mills put heavy pressure on forests – study," 2/9/02.

Kiernan, Matthew J., "Translating Environmental Performance Into Profits." *Corporate Environmental Strategy*, Autumn 1998, Vol. 5, No. 5, p. 52.

Knight, Danielle, "Environment: Rich Nations Helped Deforest Indonesia, Says Report." *Environmental Bulletin*, 2/21/01.

Kyodo News. "Record number of species found in Indonesian forests," 2/4/02. Accessed online at Dow Jones Interactive Newsstand.

Lim, Linda. "Business in Southeast Asia" class lecture, Fall 2001.

Lowe's. "Lowe's Unveils Unprecedented Business Initiative to Help Protect World's Forests," *Lowe's Environmental Policy*, 12/5/00. Accessed online at www.lowes.com.

M2 Presswire, "Benn welcomes Forestry Conference as 'breakthrough,'" 9/14/01. accessed online at Dow Jones Interactive.

McBeth, John, "Missing the Wood for the Trees." *Far East Economic Review*, 4/11/02.

Montlake, Simon, "Indonesia battles illegal timber trade; Police blame politicians for collusion in trade." *Christian Science Monitor*, 2/27/02.

Murphy, Dan, "The rise of the robber barons speeds forest decline – The 1998 fall of Suharto has set off an illegal logging boom in Indonesia's national parks." *Christian Science Monitor*, 8/24/01.

Nurbianto, Bambang, "Government officials show disinterest in flood hearing." *Jakarta Post*, 2/21/02.

Parlange, Mary, "Biobucks: How to Love Mother Nature and Make Money." *Globe and Mail*, 3/6/99.

Percy, Steve W., "Environmental Sustainability and Corporate Strategy: Why a Firm's "Chief Environmental Officer" Should Be Its CEO." *Corporate Environmental Strategy*, Vol. 7, No. 2, 2000, p. 196.

Pulp and Paper International, "Indonesia: Producers weather the economic storm." Accessed online April 2002 at www.paperloop.com.

Richardson, Michael, "Surge in Illegal Logging Puts Indonesia's Economy in Peril." *International Herald Tribune*, 4/24/01.

Ross, Michael. "Government and Politics in Southeast Asia" lecture, 1/30/01.

Simanjuntak, Teretiani ZB, "West Java administration suspends industrial logging." *The Jakarta Post*, 2/23/02.

Simanjuntak, Tertiani ZB, "Bapedal gone, fears of environment abuse up," *Jakarta Post*, 1/28/02.

Sizer, Nigel, "Cooperation makes a real difference." *Jakarta Post*, 9/18/01.

Stonyfield Farms. Company information accessed online April 2002 at www.stonyfield.com.

Tangle, Laura; Fine, Doug, "Rain forests for profit: Businesses sell nuts, tourism, and 'carbon storage.'" *U.S. News and World Report*, 4/20/98.

Tradeport Trade Directory. Accessed online April 2002 at www.tradeport.org.

Tropical Rainforests. Accessed online March 2002 at mongabay.com.

Weyerhaeuser. Company information accessed online April 2002 at www.weyerhaeuser.com.

World Bank. 2001. *Indonesia: Environment and Natural Resource Management in a Time of Transition*. Washington, D.C: World Bank.

World Resources Institute. "WRI applauds forest protection moves by Lowe's," 8/8/00. Accessed online at www.wri.org.

Wulandari, Fitri, "Autonomy raises hope and fear on environment." *Jakarta Post*, 12/27/01.