

The Economic Contribution of Indonesia's Forest-Based Industries

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Executive Summary

Indonesia is currently one of the world's strongest emerging economies. Its growth in GDP over the past decade has averaged 5.5 percent over the last decade, rising to 6 to 7 percent.

It is the world's fifth most populous country with a population of more than 230 million. Its population has grown strongly – by 70 million people since 1980. It is expected to increase by 50 million people in the next 20 years.

The people of Indonesia are highly dependent on the agricultural sector for their livelihoods. Half of Indonesia's people live in rural areas and half of all Indonesian households are primarily depend upon agriculture – the cultivation of rice and other foods, estate crops (such as rubber, coconut, palm oil and coffee), livestock and poultry and fishing.

Formal income earning opportunities are limited. Of the nearly 100 million people working in Indonesia, just 37 million are estimated to be employees. Many more are self-employed and unpaid. Around 40 per cent of the labour force is unemployed or underemployed. Thirty-eight million are classified as living in poverty and two-thirds are classified as undernourished.

Despite high levels of poverty and unemployment, Indonesia has increased per capita GDP year on year. Its sustained growth has in part been due to its large natural resources base, including forests.

Indonesia is home to some of the most extensive forest land in the world. Forests and forestry have played a large part in Indonesia's broader economic development over the past five decades.

The industry has expanded from craft enterprises and local lumber businesses to an internationally competitive sector. The forestry sector has for the larger part moved from localised selective felling for to large-scale plantation development. The forest-based manufacturing industry has diversified from small manufactures to large-scale plywood production and most recently pulp and paper production.

The contribution these combined sectors – forestry, wood manufacturing and the pulp and paper industry – cannot be underestimated.

- Combined, the sectors contribute approximately USD 21 billion to Indonesia's GDP, or roughly 3.5 per cent of the national economy;
- Wood products and pulp and paper manufacturing represent around 8.3 per cent of manufacturing value-added;
- The sectors employ a combined total of 3.76 million people; around 4 per cent of the working population and roughly 1.5 per cent of the total population;
- If employment multipliers are taken into account, this figure is likely to be closer to or exceed 4 million people;

- If dependents are taken into account, this equates to more than 15 million people dependent upon the sector.

Forestry (harvesting and silviculture) contributes roughly USD 5.1 billion (approximately 1 per cent) to Indonesia's GDP. The contribution of forestry harvesting to employment is particularly significant. While estimates of employment within the formal forestry sector are around 241,000 according to recent estimates, informal sector employment is much higher. Plantation forestry alone is responsible for approximately 713,000 permanent jobs, and approximately 450,000 short-term jobs annually during plantation establishment. The authors estimate that forest harvesting contributes approximately 1.3 per cent of government taxation revenues.

The benefits of forestry are likely to be greatest for rural populations where alternative income earning opportunities are scarce. Forestry operations are directly responsible for increased employment opportunities as well as infrastructure developments in rural communities.

Wood and wood manufacturing contributed USD 9 billion (around 1.4 per cent) to Indonesia's GDP in 2009. Its share of manufacturing value added was around 2.3 per cent in the same year. According to one estimate the subsector directly employs more than 1.3 million people. The sector also makes up around 4 per cent of total non-mineral exports.

Pulp and paper manufacturing and its associated industrial forest plantations combined directly employ around 1.51 million people and contribute around 1.8 per cent of GDP.

The pulp and paper industry is a significant contributor to the Indonesian economy, contributing around 1.2 per cent of GDP, and around 6 per cent of manufacturing value-added.

Wood products and pulp and paper represent 6 per cent of total exports in 2010 and around 9 per cent of non-mineral exports.

The development of large-scale pulp and paper operations (including industrial forest plantations) provides significant benefits at the provincial level.

A case study of Asia Pulp and Paper and its fiber supplier demonstrates its contributions to the Indonesian economy. APP and Sinar Mas Forestry (SMF) contribute around 0.9 per cent of Indonesia's GDP. The two companies also directly employ approximately 399,000 people on a full-time basis; its forestry operations also provide for approximately 252,000 full-time equivalent jobs annually for plantation establishment. Its pulp and paper exports make up around 2 per cent of Indonesia's non-mineral exports.

In Riau in particular, the contributions of APP and Sinar Mas Forestry are more pronounced. According to one economic analysis, APP and SMF in Riau:

- Generate 11 per cent of all provincial economic output;
- Employ 5.6 per cent of the total workforce;

- Contribute 3 per cent of Riau's tax revenue;
- Generate 4.6 per cent of all household income in Riau.

Further, APP's operations in Riau alone make up around 1.3 per cent of all of Indonesia's non-mineral exports.

Despite the large economic benefits generated by the industry, it has been subject to much criticism, particularly from developed countries for its environmental impacts, particularly deforestation.

Much of this criticism is misguided.

Indonesia has some of the largest forest resources in the world. Indonesia has classified over 110 million hectares, or around 60 per cent, of its total land as permanent forest areas. Roughly half of that area has been conserved for environmental purposes (equivalent in size to the entire land area of France or Spain) and half for continuing forestry.

The Indonesian Government has undertaken numerous policy measures to bring down levels of illegal logging as well as place a moratorium on new forestry developments in primary forest areas as a means of reducing carbon emissions.

Poverty, agricultural expansion and land tenure issues are major causes of deforestation and unsustainable land use practices in Indonesia's forest areas. Commercial forestry and plantation development alleviates pressure on forest resources by:

- Providing stable, formal employment and economic growth, reducing the need for poor land-use practices associated with subsistence agriculture;
- Providing legal tenure for conservation and community land use;
- Providing environmental stewardship through detailed land use and water use management that would otherwise be absent, mitigating against fire outbreaks and uncontrolled peat drainage that accompany poor land-use practices.

It is often claimed that forestry resources can deliver comparable or even greater value to Indonesia if, instead of commercial development they are valued for carbon storage and trading of carbon credits and developed for non-timber forest products, small-scale eco-forestry or community forestry. While there is scope for community forestry in Java, these other activities cannot be demonstrated as delivering comparable economic returns to current industry arrangements. Recent research has revealed that estimates of emissions from deforestation in Indonesia have conventionally been over estimated by around three and a half times. Nor will these proposed alternatives provide stable tenure or end poor land-use practices associated with poverty.

Indonesia's forest resources are a valuable resource. The general case has been made that forestry and plantation development are "either/or" options for Indonesia – either develop an important economic resource or conserve Indonesia's forests. There is no basis for this argument. The large-scale operators in Indonesia's industry show sustainable forest management can be practised.

1. Introduction: Indonesia in Context

Indonesia is currently one of the world's strongest emerging economies. Its growth over the past decade has seen steady increases in GDP and per capita GDP. The country is also projected to increase its population significantly in the coming decades.

It is the world's fifth most populous country with a population of more than 230 million. Its population has grown strongly – by 70 million people since 1980. It is expected to increase by 50 million people in the next 20 years.

The people of Indonesia are highly dependent on the agricultural sector for their livelihoods. Half of Indonesia's people live in rural areas and half of all Indonesian households are primarily depend upon agriculture – the cultivation of rice and other foods, estate crops (such as rubber, coconut, palm oil and coffee), livestock and poultry and fishing.

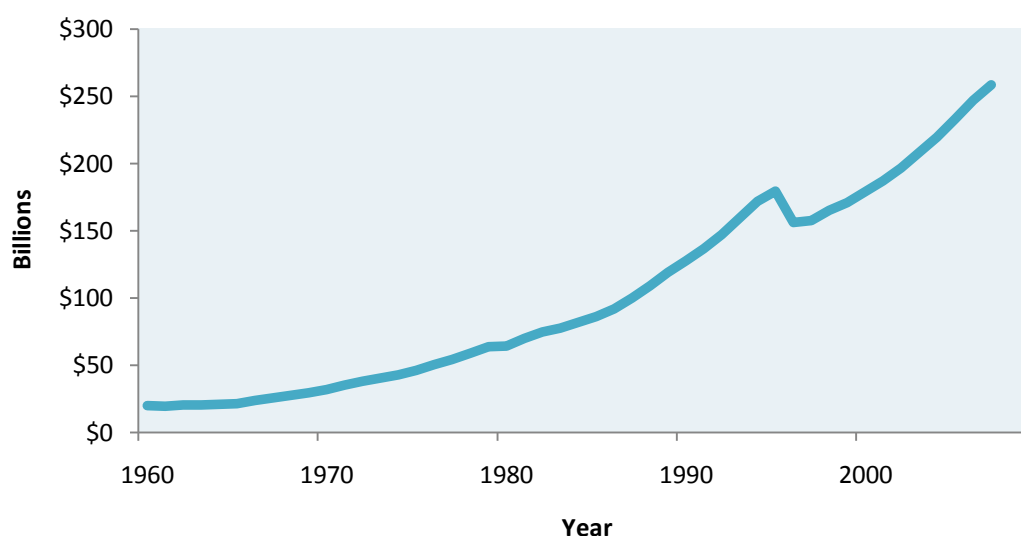
Formal income earning opportunities are limited. Of the nearly 100 million people working in Indonesia, just 37 million are estimated to be employees. Many more are self-employed and unpaid. Around 40 per cent of the labour force is unemployed or underemployed. Half of the population is classified as living in poverty (living on less than US\$2 per day) and two-thirds are classified as undernourished.

1.1 Background on Indonesia's Economy and Society

1.1.1 Indonesia's Economy

Indonesia is the world's 15th-largest economy and the largest in South-East Asia. After a period of robust growth in the 1990s, Indonesia was badly affected by the Asian financial crisis - experiencing a significant economic downturn in 1997-98. Since the crisis the Indonesian economy has grown steadily.

Chart 1.1: Indonesia: Gross domestic product: 1992 to 2009 (USD, constant prices 2000)

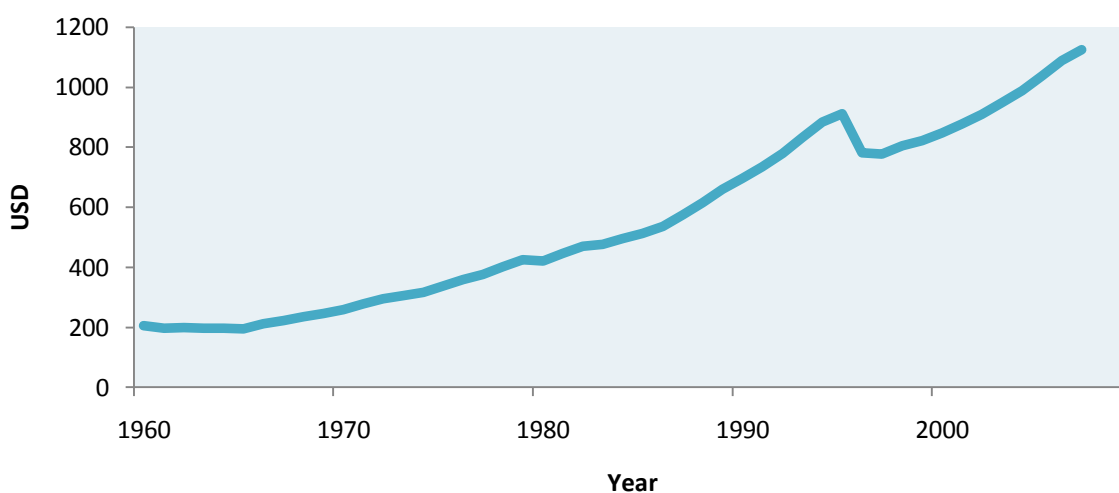


Source: World Bank World Development Indicators 2011

Chart 1.1 shows Indonesia's annual gross domestic product since 1992. It shows that Indonesia's economy grew in real terms between 6.5 and 8.2 per cent annually before the Asian financial crisis, but that growth fell to 4.7 per cent in 1997. The economy contracted by 13.1 per cent in 1998. Between 2000 and 2006 growth recovered, averaging almost 5 per cent annually. It recovered to pre-crisis levels around 2003.

From 2004 to 2009, Indonesia's GDP grew on average 5.5 per cent per annum, compared with roughly 3.8 per cent for South Asia, East Asia and the Pacific. This was largely due to Indonesia's strong performance during the Global Financial Crisis.¹

Chart 1.2: Indonesia: GDP per capita (USD, constant prices, 2000): 1992 to 2008



Source: World Bank World Development Indicators (2011)

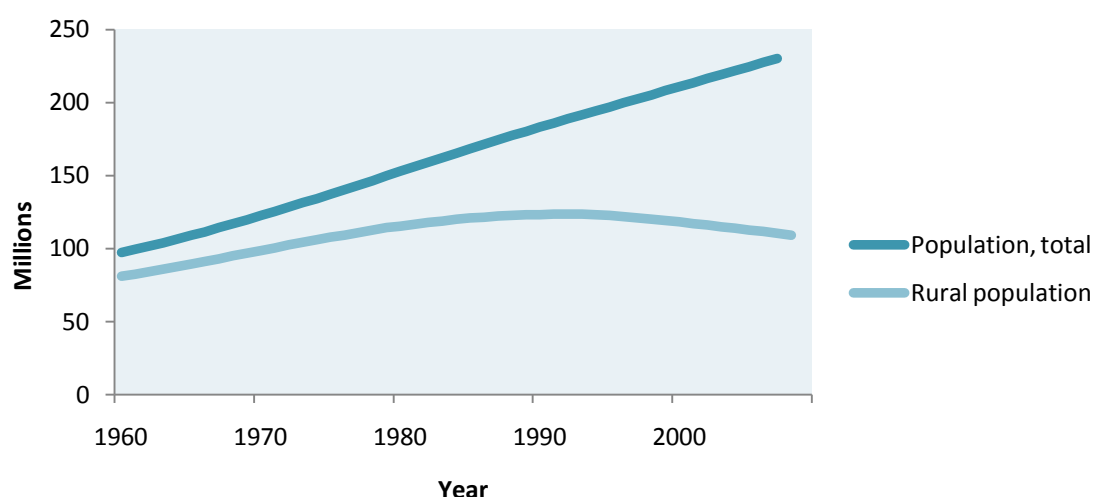
Chart 1.2 demonstrates that Indonesia's GDP per capita was USD 1,124 in 2008. It has risen by between 3 and 5 per cent annually since 2000 and is now significantly higher than its pre-crisis level of USD 911 in 1996 and its low of USD 776 in 1998. It is nevertheless low by international and regional standards.

1.1.2 Demographics and employment

Indonesia is the world's fourth most populous country.² Its population continues to grow very strongly. Indonesia's population is now more than 237 million people: 87 million more than in 1980 and 57 million more than in 1990. The population is estimated to grow to more than 250 million by 2015.

¹ World Bank (2011), *World Development Indicators*, February 2011

² Fourth behind China, India, and United States. International Monetary Fund (2011) <http://www.imf.org/external/data.htm> February 2011

Chart 1.3: Indonesia's population 1960 to 2009, total and rural

Source: BPS Statistics Indonesia (2009), *Selected Socio-Economic Indicators of Indonesia*, October 2009

Half of Indonesia's people live in rural areas and many Indonesian households are farm households³ primarily involved in the cultivation of rice and other foods, estate crops (such as rubber, coconut, palm oil and coffee), livestock and poultry and fishing.

Table 1.4: Employment status of working population: August 2008

Employment status	People, millions	Share
Self Employed	42.7	41.7
Employer	3.0	2.9
Employee	28.2	27.5
Casual employee	11.2	10.9
Unpaid Worker	17.4	17.0
TOTAL	102.5	100.0

Source: BPS Statistics Indonesia, *National Labour Force Survey 2008*

http://www.bps.go.id/tab_sub/print.php?id_subyek=06%20¬ab=3 accessed February 2011

Table 1.4 shows the recent employment status of working Indonesians. It shows that the majority of Indonesians are not in formal employment. Of the more than 100 million people working in Indonesia, just 39 million are estimated to be employees. Almost 60 per cent of working Indonesians are either self-employed or unpaid workers. Nearly 40 per cent of the labour force is unemployed or underemployed.

Indonesia has a national unemployment rate of 8.1 per cent; more than 9.26 million people are classified as unemployed.⁴ A further 31 per cent of the labour force is classified as underemployed.⁵

There are high levels of poverty in Indonesia. According to national poverty measurements, 16.7 per cent of Indonesia's population, or 38 million people, live in

³ Of these 13 million are small landholders (gurem farm households) defined as those farm households with less than 0.5 hectares. BPS Statistics Indonesia (2007), *Selected Socio-Economic Indicators of Indonesia*, March 2007

⁴ BPS Statistics Indonesia (2009), *Selected Socio-Economic Indicators of Indonesia*, October 2009

⁵ BPS Statistics Indonesia (2009), *Selected Socio-Economic Indicators of Indonesia*, October 2009

poverty.⁶ Using the World Bank's poverty measure just over 50 per cent of the population is living on less than US\$2 a day.⁷

According to the World Bank, 13 per cent of the population is undernourished. The prevalence of underweight children under five years of age is around 18.4 per cent but decreasing.⁸ The infant mortality rate of 30 per 1000 births is higher than that for neighbouring countries including Malaysia (6), Vietnam (20) and the Philippines (26).⁹ Life expectancy at birth is 71 years, compared to 72 years for the Philippines and 74 years for Malaysia and Vietnam.¹⁰

1.1.3 Structure of the economy and trade

Table 1.5 shows Indonesia's gross domestic product by sector. Table 1.6 shows employment by sector.

Table 1.5: Gross Domestic Product by sector (percentage share)

Sector	1990	2000	2009
Agriculture	19	16	15
Manufacturing	21	28	26
Mining	12	12	11
Trade	17	16	13
Finance	8	8	7
Construction	6	6	10
Transport and communications	6	5	6
Public administration	7	5	6
Electricity, gas, and water	1	1	1
Others	4	4	5
TOTAL	100	100	100

Note: Finance includes ownership of dwellings. Source: Asian Development Bank (ADB), [Statistical Database System](#), February 2011, accessed at www.sdb.sdb.org/sdb/index.jsp

⁶ BPS Statistics Indonesia (2007), *Selected Socio-Economic Indicators of Indonesia*, March 2007

⁷ WDI

⁸ Government of Indonesia (2010), *Report on the Achievement of the Millenium Development Goals Indonesia 2010*, October 2010

⁹ World Bank (2011) *World Development Indicators*, accessed at <http://data.worldbank.org/indicator/SP.DYN.IMRT.IN> February 2011

¹⁰ World Bank (2011) *World Development Indicators*, accessed at <http://data.worldbank.org/indicator/SP.DYN.IMRT.IN> February 2011

Table 1.6: Indonesian Employment by sector ('000 people and percentage share)

Year	2006		2008		2010	
	Total	%	Total	%	Total	%
Agriculture, Forestry and Fishery	42,323	44.5	42,689	41.8	42,825	39.9
Mining and Quarrying	947	1.0	1,062	1.0	1,188	1.1
Manufacturing Industry	11,578	12.2	12,440	12.2	13,052	12.2
Electricity, Gas, Water	207	0.2	207	0.2	208	0.2
Construction	4,373	4.6	4,733	4.6	4,844	4.5
Wholesale, Retail, Hospitality	18,555	19.5	20,684	20.3	22,212	20.7
Transport, Comms	5,467	5.7	6,013	5.9	5,817	5.4
Business Services	1,153	1.2	1,440	1.4	1,639	1.5
Community Personal Services	10,571	11.1	12,778	12.5	15,615	14.5
TOTAL	95,177	100	102,049	100	107,405	100

Source: BPS Indonesia

The tables show that agriculture (including forestry) is a key sector in the Indonesian economy, employing around 40 per cent of the workforce. Its share in GDP is somewhat lower, reflecting the low productivity of the small and informal activities that dominate much of the sector.

One-third of Indonesia's GDP is exported.¹¹ Table 1.7 shows the structure of Indonesia's exports in 2009. Manufactured exports were the largest category of exports in 2006 – comprising 40 per cent of merchandise exports. Fuels and mining products were also significant, comprising 38 per cent of merchandise exports. Agricultural exports comprised 22 per cent of all exports.

Table 1.7: Merchandise and service exports by category: 2009 (percentage share)

Export category	Value (USD million, FOB)	Share (%)
Merchandise exports		
Agricultural products	26322	22
Fuels and mining products	45465	38
Manufactures	47858	40
<i>Sub-total</i>	119646	100
Service exports		
Transportation	2381	18
Travel	6351	48
Other commercial services	4499	34
<i>Sub-total service exports</i>	13233	100
All exports		
Merchandise exports	119646	90
Service exports	13233	10
TOTAL EXPORTS	132879	100

Source: WTO (2011) Statistics Database Time Series, accessed at

<http://stat.wto.org/StatisticalProgram/WSDViewData.aspx?Language=E> February 2011

¹¹ Goods and services. WTO (2007), *Trade Profile for Indonesia*, October 2007
<http://stat.wto.org/CountryProfile/WSDCountryPFView.aspx?Language=E&Country=ID>

1.2 Indonesia's forest-based industries

Indonesia is home to the eight-largest forest area in the world. It has the third-largest tropical forest area (after Brazil and the Democratic Republic of Congo) and has the largest forest area in South-East Asia. Approximately half (52 per cent) of Indonesia's land area is forested according to FAO data.

Indonesia's forests host a number of commercially valuable hardwood species, including *intsia* spp (traded as merbau), *gonystylus* spp (traded as ramin) and numerous species within the dipterocarpaceae family.

The tropical climate and relative accessibility of the forests to urban and coastal areas mean that Indonesia's forests have been easily exploitable within subsistence communities or for commercial use. Woodworking and wood crafts have a long history within Indonesia's myriad cultural groups.

According to some accounts, the pre-colonial kingdoms in Indonesia relied heavily upon the exploitation of teak forests.

The Dutch East India Company (Vereenigde Oostindische Compagnie or VOC) commenced exploiting timber in Java upon its annexation of Jakarta in 1619. The primary use for timber at that time was shipbuilding.

Formal attempts to manage forest resources on Java did not emerge until the early 1800s and the colonization of Indonesia by the Dutch republic. The Dutch established a Forest Board in 1808, which regulated harvesting, forest tenure and silvicultural practices.

There are two distinct forms of forest resource management in Indonesia. These are the plantation industry, which up until recently was dominated by teak plantations in Java, and the selective forestry, located mostly on outer islands.

Teak plantation forestry was first developed in Java during the Dutch colonial period. The plantation forests were eventually taken over by state-owned forest enterprises. Over the past two decades, plantation forestry for the pulp and paper industry has become a significant component of Indonesia's forest industry. Pulpwood plantations are dominated by acacia and eucalyptus species, which grow quickly in Indonesia's tropical climate.

Large-scale selective forestry only emerged in Indonesia in the 1970s. Prior to this, forestry was not considered a significant revenue stream. However, the opening up of selective concessions across the main islands, particularly Sumatra and Kalimantan, resulted in forestry becoming Indonesia's second-largest industry during the 1990s. During this period, approximately 3.5 million full-time equivalent jobs were created by the industry. According to the World Bank, forestry played a significant role in poverty reduction in the period.¹²

¹² World Bank (2006). *Strategic Options for Forest Assistance in Indonesia*. The International Bank for Reconstruction and Development, Washington.

Export bans were introduced in the 1980s and 1990s to increase economic value added in Indonesia, and to ensure a timber supply for the local industry. A log export ban was introduced in 1985; a rough sawnwood ban was introduced in 1992.¹³

Production capacity in the plywood industry grew sixfold from 2 million m³ annually in 1980 to 13 million m³ annually in 1995. At this time the plywood industry consumed fully half of Indonesia's forest output; 30 per cent was consumed by the pulp and paper industries; the remaining 20 per cent went to sawmills.¹⁴

With the exception of pulp and paper, demand for wood product industries has generally declined since then; pulp and paper demand now makes up 50 per cent of log output in Indonesia.

The decline has been in part due to by raw material supply constraints.¹⁵ Contributing factors here include revoking of timber licenses over concessions in production forests due to concerns about mismanagement and corruption, and a reduction in log supplies from convertible forest areas, a fall in international demand for plywood and greater competition from lower cost producers.

Plantation forestry for pulpwood production using fast-growing hardwood species such as eucalyptus and acacia has at the same time increased, as has the capacity of the pulp and paper industries. Indonesia's soil and climatic conditions have resulted in achievement of plantation growth rates higher than most other parts of the world. Access to financing, human resources and land have also given the Indonesian pulp and paper industry an enviable comparative advantage.

¹³ Brown, Simangunsong, Sukadri, Brown, Sumirta, Dermanwan and Rufi'ie (2005), *Restructuring and Revitalisation of Indonesia's Wood-Based Industry: Synthesis of Three Major Studies*, Ministry of Forestry, CIFOR and DFID-MFP, November 2005

¹⁴ Ibid.

¹⁵ Sunderlin, W. (1999), *The Effects of the Economic Crisis and Political Change on Indonesia's Forest Sector, 1997-1999*, CIFOR, November 1999, http://www.cifor.cgiar.org/publications/pdf_files/crisis.pdf

2. Economic and Social Contribution of Indonesia's Forest-based Industries

Forest-based industries – comprising forestry and logging, wood and wood product manufacturing, and pulp and paper production, make a significant contribution to Indonesia's economy.

- *Combined, the sectors contribute approximately USD 21 billion to Indonesia's GDP, or roughly 3.5 per cent of the national economy;*
- *The combined sectors directly employ a combined an estimated 3.76 million people, or approximately 1.5 per cent of the population;*
- *Pulp and paper manufacturing and forest plantations employ approximately 1.51 million people;*
- *Wood products and pulp and paper represent around 8.3 per cent of manufacturing value-added;*
- *Wood products and pulp and paper represent around 9 per cent of non-mineral exports;*
- *In addition, forestry provides significant social benefits to rural populations.*

Forestry, logging and related services such as silviculture make a significant economic and social contribution to Indonesia. Forestry contributes roughly USD 5.1 billion (approximately 1 per cent) to Indonesia's GDP.

The contribution of forestry harvesting to employment is particularly significant. While reported estimates of employment within the formal forestry sector are around 241,000 according to recent estimates, informal sector employment is much higher. Plantation forestry alone is responsible for approximately 713,000 permanent jobs, and approximately 549,000 full-time equivalent jobs for plantation establishment. It is also estimated that forestry harvesting contributes approximately 1.3 per cent of government taxation revenues.

The benefits of forestry are likely to be greatest for rural populations where alternative income earning opportunities are scarce. Forestry operations are directly responsible for increased employment opportunities as well as infrastructure developments in rural communities.

Wood and wood manufacturing contributed USD 9 billion (around 1.4 per cent) to Indonesia's GDP in 2009. Its share of manufacturing value added was around 2.3 per cent in the same year. According to one estimate the subsector directly employs more than 1.3 million people. The sector also makes up around 4 per cent of total non-mineral exports.

Indonesia's pulp and paper industry is a significant contributor to the Indonesian economy, contributing around 1.2 per cent of GDP, and around 6 per cent of

manufacturing value-added. The industry employs around 248,000 people directly in manufacturing operations, and makes up more than 5 per cent of Indonesia's non-mineral exports.

2.1 Economic and Social Contribution of Forestry, Logging and Related Services

Forestry, logging and related services such as silviculture make a significant economic and social contribution to Indonesia. Forestry contributes roughly USD 5.1 billion (approximately 1 per cent) to Indonesia's GDP. The contribution of forestry harvesting to employment is particularly significant. While estimates of employment within the formal selective forestry sector are around 241,000 according to recent estimates, informal sector employment is much higher.

Plantation forestry alone is responsible for approximately 713,000 permanent jobs, and the equivalent of 549,000 full-time jobs for plantation establishment.

The authors estimate that forestry harvesting contributes approximately 1.3 per cent of government taxation revenues.

The social benefits of forestry are likely to be greatest for rural populations where alternative income earning opportunities are scarce. Forestry operations are directly responsible for increased employment opportunities as well as infrastructure developments in rural communities.

2.1.1 Contribution to GDP

The economic role of forestry in Indonesia is significant.¹⁶

Table 2.1: Gross domestic product of forestry (harvesting): 1985 to 2009

Year	Rp, billion	USD, billion	Share of GDP
1990	1,855		0.94
2000	16,343	1.9	1.18
2001	16,962	1.6	1.03
2002	17,602	1.9	0.97
2003	18,415	2.1	0.91
2004	20,290	2.3	0.88
2005	22,562	2.3	0.81
2006	30,017	3.3	0.90
2007	36,154	4.1	0.92
2008	40,375	4.5	0.82
2009	44,952	5.1	0.80

Source: BPS Statistics Indonesia, *GDP at Current Market prices by Industrial Origin, 2003-200; 2004-2009* <http://www.bps.go.id/sector/nra/gdp/table1.shtml>, accessed June 2008; February 2011. US\$ rate calculated by authors.

¹⁶ Based on preliminary GDP figures reported by the Indonesian National Statistics Agency, *Badan Pusat Statistik*

Table 2.1 shows the contribution of forestry to Indonesia's GDP since 1990. It shows that in 2009 forestry contributed USD 5.1 billion (Rp 44,952 billion) to the Indonesian economy, almost 1 per cent of Indonesia's GDP. Moreover it demonstrates that the value of forestry has been increasing over the past decade.

Indonesian national accounts do not disaggregate different types of forest production by volume. An approximation of this is to distinguish between types of forest production (selective forestry, plantation forestry, other) by volume. This measure will inevitably underestimate the illegal sector as well as non-reporting small-to-medium enterprises (SMEs) in the legal sector.

Table 2.2: Estimated GDP share of plantation forestry based on output (m³), 2005-2009

Concession type	2005	2006	2007	2008	2009
Large-scale selective	4,356,492.25	6,445,263.40	6,437,684.54	4,629,017.31	4,857,150.16
Small-scale selective	16,139,549.45	4,456,952.46	4,391,657.05	2,764,014.90	6,619,247.04
State-owned selective	21,539.73	28,565.65	48,033.60	97,480.29	87,827.81
Plantation	9,897,079.25	21,981,821.99	20,614,208.77	22,318,886.03	18,953,930.33
Other sources	1,551,064.48	1,179,880.94	705,462.15	2,191,387.09	3,802,380.78
Total	31,965,725.16	34,092,484.44	32,197,046.11	32,000,785.62	34,320,536.12
Share of production (plantations)	31	64.5	64	69.7	55.2
Share of GDP	0.25	0.58	0.59	0.57	0.44

The table demonstrates that although the GDP share of forestry has declined, the share of plantation forestry has been increased, reaching as much as an estimated 0.59 per cent in 2007.

Not included in national accounts are the flow on, or multiplier, effects that further boost the production in other industries and sectors of the economy to GDP. The multiplier effects are the additional demand for goods and services across all industries, and related increases in GDP, resulting from greater investment in forestry and related manufacturing.

Researchers estimate a conservative output multiplier of around 1.26 for the Indonesian forest sector.¹⁷ That is, for every one million Rupiah invested in forestry, GDP is estimated to increase by 1.26 million Rupiah.

2.1.2 Contribution to employment

The difficulty and variations in estimates of employment within the forestry sector, particularly in developing economies, have been well-documented by the FAO.¹⁸

¹⁷ Nur Arifatul Ulya and Syafrul Yunardy (2005). Analisis Peranan Sektor Kehutanan Dalam Perekonomian Indonesia: Sebuah Pendekatan Model Input-Output (Analysis of Forestry Sector Role in Indonesia Economy: an Input-Output Model Approach). See also Abeyasinghe, T. and Forbes, K (2005), *Trade Linkages and Output-Multiplier Effects: A structural VAR approach with a focus on Asia*, Review of International Economics, 13 (2) p 356-75

¹⁸ FAO (2009). Is There A Future Role For Forests And Forestry In Reducing Poverty? Working Paper No. APFSOS II/WP/2009/24 by The Regional Community Forestry Training Center, Bangkok

National labour statistics for Indonesia for the agriculture, fishing and forestry sectors do not disaggregate each of these subsectors. Subsequently, estimates on the number of people employed in forestry (plantations and harvesting) in Indonesia vary.

The most recent estimate of the number of people employed within the forestry industry is 241,000.¹⁹ This figure is likely to be an underestimate, as it excludes a large number of workers in the informal sector (particularly seasonal workers), small to medium-sized enterprises and the illegal sector. KAHUTINDO, a forestry sector estimates are significantly higher, estimating 576,521 workers in the forestry sector, excluding forest plantation workers.

The total number of people employed in the forestry plantation sector is likely to be much larger on account of the large, informal workforce used by the sector. The World Agroforestry Centre and the Indonesian Climate Change Council (DNPI) estimate labour requirements of 0.336 persons per hectare in pulpwood plantations during growing and harvesting phases.²⁰ During the establishment phase it estimates 3.1 persons per hectare.

Table 2.4 presents data on forest plantation development in Indonesia. It should be noted that while a plantation concession area can be allocated, the entire forest area is unlikely to be planted. Provision is made for environmental values and community needs. A further 30 per cent of all concession areas are set aside for community forestry operations.

Table 2.4: Forest plantation development: '000 ha

Year	Total plantation area ('000 ha, cumulative)	Business Units	Annual planted area ('000 ha)
2001	4,578	102	79,748
2002	3,523	91	66,972
2003	3,804	94	115,158
2004	5,910	112	124,691
2005	5,967	115	131,914
2006	6,467	133	163,125
2007	7,087	162	231,953
2008	7,154	165	334,838
2009	8,673	206	291,984
2010	9,393	233	NA
TOTAL			1,540,383

Source: Total HTI plantations: Ministry of Forestry (2006), *Forestry Statistics 2006*, Table IV.1.4 Development of Industrial Forest Plantation 1989 – 2006.

The table indicates that approximately 1.54 million ha of plantation forests have been developed over a nine-year period. In the three preceding years, approximately 584,000 ha of plantations were developed.

¹⁹ International Labour Organization (2010). *Labour Conditions in Forestry in Indonesia*, Jakarta Office; ILO, 2010

²⁰ Ekadinata A, Rahmanulloh A, Pambudhi F, Ibrahim I, van Noordwijk M, Sofiyuddin M, Sardjono MA, Rahayu S, Dewi S, Budidarsono S, Said Z. 2010. Carbon Emissions from Land Use, Land Use Change and Forestry (LULUCF) in Berau District East Kalimantan, Indonesia. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Office.

While precise planting areas are not recorded prior to this date, the numbers indicate that at the very least, a total of 2.1 million ha of plantation forests have been established over a 12-year period. Based on the World Agroforestry Centre's calculation for labour requirements this indicates an estimated 713,000 permanent jobs in plantation forestry, and the equivalent of an additional 549,000 full time jobs annually throughout establishment periods. This makes a total of approximately 1.26 million permanent jobs.

These estimates do not include indirect or flow-on employment multipliers. Researchers estimate an employment multiplier for the forestry sector of 41 jobs created for every Rp 1 billion invested in the industry.²¹

The number of people dependent on these incomes is much higher; the average family size in Indonesia among rural based families is around 5.5 people. It can be reasonably asserted that for every forest sector employee there are at least three dependent livelihoods. In the case of the 1.4 million people in the forest sector, this equates to approximately 5.6 million people dependent upon the forest sector.

2.1.3 Contribution to exports (roundwood harvesting)

Indonesia has instituted a number of policy measures to discourage or ban completely log exports. The purpose of this has been to encourage processing industries within Indonesia. Exports of roundwood have therefore been negligible to non-existent in recent years. The exception has been the period following the Soeharto era, or the reformasi period. During this time, what was essentially a policy vacuum permitted large-scale export of roundwood, with total value of roundwood exports exceeding USD 65 million.²²

The export contribution of forestry – i.e. unprocessed logs – can therefore be deemed to be negligible.

2.1.4 Contribution to Government revenue

The forestry industry contributes to government revenues through the forestry license fees, log royalty fees and a reforestation levy. In 2009 Government revenues from were around USD 190 million.

Table 2.5: Government forestry revenues, 1999 to 2009

Year	Rp (million)	USD (million)
1999	3,330,000	376
2000	3,020,000	341
2001	3,305,000	373
2002	2,929,000	331

²¹ Nur Arifatul Ulya and Syafrul Yunardy (2005). Analisis Peranan Sektor Kehutanan Dalam Perekonomian Indonesia: Sebuah Pendekatan Model Input-Output (Analysis of Forestry Sector Role in Indonesia Economy: an Input-Output Model Approach). See also Wulandari, Fitri. 2006. "Analisis Struktur dan Kinerja Industri Pulp dan Kertas di Indonesia Tahun 1994 dan Tahun 2001." Tesis tidak dipublikasikan. Fakultas Ekonomi Universitas Diponegoro. Semarang.

²² UN COMTRADE data

2003	2,723,000	308
2004	3,424,000	387
2005	3,249,000	367
2006	2,429,000	274
2007	2,115,000	239
2008	2,346,000	265
2009	1,681,000	190

Source: Statistik Kehutanan (2004) as cited in Ministry of Forestry (2006) *Indonesia's Forestry Long-Term Development Plan 2006-2025*; and Forestry Department (2009) *Data Strategies* table VIII.6 Lanjutan and BPS (2010) *Socio economic indicators October 2009* table 10.2

Table 2.5 shows Indonesian Ministry of Forestry estimates of government forestry revenue. Between 1999 and 2009 government revenue from forestry was between US\$190 million and US\$376 million annually.

Table 2.6: Government revenue from major forestry taxes and fees (million Rupiah)

Year	License fees and log royalties (IHPP + PSDH/IHH)	Reforestation levy (DR)	Total Rp (million)	Total US\$ (million)
1993/94	405,340	996,257	1,401,597	665.55
1994/95	511,660	1,069,703	1,581,363	724.12
1996/97	614,402	1,233,185	1,847,587	810.14
1997/98	642,835	1,253,783	1,896,618	800.88
1998/99	837,114	1,844,077	2,681,191	578.15
2001	1,772,800	3,066,010	4,838,810	471.35
2002	1,593,980	2,741,370	4,335,350	468.12
2003	731,850	1,331,730	2,063,580	240.75
2004	1,301,830	2,829,600	4,131,430	462.12

Source: Various sources as cite in Barr, Resosudarmo, Dermawan, McCarthy and Setiono (2006), *Decentralisation of Forest Administration in Indonesia: Implications for Forest Sustainability, Economic Development and Community Livelihoods*, Bogor, Indonesia, Centre for International Forestry Research, (CIFOR), 2006

Table 2.6 shows alternative estimates of government revenue from major forestry taxes and fees by Barr and others (2006). These estimates show slightly higher forestry revenue of around USD 450 million per annum in recent years.

It also demonstrates that the reforestation levy (DR), which finances government forest rehabilitation activities, is one of the industry's most significant contributors to government revenue. License fees paid for forest concessions are much smaller (and have been grouped with log royalties).

These revenues are shared by the three levels of government (national, provincial and district). License fees and log royalties are highly concentrated, mainly benefiting the timber producing regions in Sumatra and Kalimantan.²³ In 2004 forestry revenues of US\$71 billion was distributed to regional governments, including US\$23, 12 and 9

²³ Barr, Resosudarmo, Dermawan, McCarthy and Setiono (2006), *Decentralisation of Forest Administration in Indonesia: Implications for Forest Sustainability, Economic Development and Community Livelihoods*, Bogor, Indonesia, Centre for International Forestry Research (CIFOR)

billion in East and Central Kalimantan and Riau respectively.²⁴ Their value has fallen since 1997 when the plywood production was at its peak.

The reforestation levy is used to finance rehabilitation activities. It is shared by the central and provincial governments.

These figures demonstrate an internal underestimate of government forestry revenue by approximately 25 per cent. Further, they underestimate the total contribution as they do not include the company and other general taxes paid. Attempts to quantify the costs, taxes paid and profits in the forestry industry suggest that company taxes paid by the forestry industry could contribute an additional 1 per cent to government revenue.²⁵ A reasonable estimate would be that forestry harvesting contributes approximately 1.3 per cent of total government revenues.

2.1.5 Social contribution

Indonesia's forestry sector contributes significantly to the country's social development efforts.

Forestry operations contribute towards improving the economic livelihoods of some of the poorest regions in Indonesia, playing a central role in poverty alleviation and overall economic development. By the very nature of the work, forestry operations are located in remote and hard-to-reach areas, many of which have little or no access to infrastructure or social amenities, such as health or education services. The facilities provided by forestry operations therefore form the life-line of many communities.

Infrastructure

Improved access to infrastructure and roads has been found to be highly correlated to reduced levels of poverty. In 2005 only 61 percent of poor households in Indonesia had access to all-year passable roads,²⁶ and only 55 percent of the roads are considered to be in good condition.²⁷ Just 36 per cent of the rural population has access to improved sanitation, compared with 67 per cent in urban centres.²⁸

Tackling these issues require investment. A key component of forestry operations' contribution to the rural economy come in the form of investments in local infrastructure, including bridge and road construction, road maintenance, funding school facilities, operating on-site medical clinics as well as mobile clinics to serve people living in remote areas.

²⁴ Barr, Resosudarmo, Dermawan, McCarthy and Setiono (2006), *Decentralisation of Forest Administration in Indonesia: Implications for Forest Sustainability, Economic Development and Community Livelihoods*, Bogor, Indonesia, Centre for International Forestry Research (CIFOR)

²⁵ Rough estimates based on an assumption that company taxes are 50 to 100 per cent of the magnitude of forestry levies and fees as cited in Whiteman, A. (1996), *Economic Rent and the Appropriate Level of Forest Product Royalties in 1996*, Report No: SMAT/EC/96/1, Indonesia-UK Tropical Forest Management Project, Jakarta, Indonesia, <http://www.fao.org/forestry/11869/en/>

²⁶ World Bank (2006), *Making the New Indonesia Work for the Poor*, accessed at: http://siteresources.worldbank.org/INTINDONESIA/Resources/Publication/280016-1152870963030/2753486-1165385030085/Overview_standalone_en.pdf

²⁷ World Bank (2011) Data Statistics <http://data.worldbank.org/country/indonesia> February 2011

²⁸ World Bank (2011) Data Statistics <http://data.worldbank.org/country/indonesia> February 2011

Financial Benefits

Local communities obtain substantial benefits from forests resources through involvement with forestry operators. Under Indonesian law, forest operators are required to pay direct cash payments, develop infrastructure and fund agricultural projects under the umbrella of Community Development.²⁹

Cash payments from forestry companies are based on the volume of timber harvested in local operations and frequently range from Rp 20,000 to 50,000 per cubic meter.³⁰ In some Indonesian provinces, large-scale timber concession-holders are also required to pay a compensation fee to communities living in and around concession sites.

A study by undertaken by the Centre for International Forestry Research (CIFOR) surveyed the Community Development program of several major forestry companies operating in Sumatra.³¹ Four plantation companies were examined; together contributing approximately US\$4.5 million towards community development over five years. The contributions were allocated to a range of projects including infrastructure development, education, training, agricultural projects and the funding of cultural initiatives.

Additional benefits to local communities are derived from 'Company-Community Partnerships' in forestry operations. Under these partnerships arrangements companies share a proportion of revenue with local tree growers – often between 40 and 50 per cent of revenues. All four of the plantation companies in the aforementioned CIFOR study participated in such partnerships.

A survey across three Company-Community Partnerships found that 93 per cent of local tree growers received economic benefits from the partnership, while 61 per cent stated they were happy with the social benefits derived from the scheme.³² The study found a number of additional benefits to the local community:

- Employment opportunities for community members in plantations and nurseries;
- assistance to community members as a result of social funds and road infrastructure established by the company;
- practical experience on cultivation practices not previously available for local growers; and
- access to extension services such as technology and good quality seedlings for plantations.

The researchers also found local governments benefited from the development of under-utilised land through revenues, property taxes and providing income earning assistance.

²⁹ (Forest Management Act No. 5/1967; GR 7/1990; Basic Forest Law No. 41/1999; GR 34/2002)

³⁰ C. Barr, I Resosudarmo, A. Dermawan, J. McCarthy (2006) *Decentralization of forest administration in Indonesia: Implications for forest sustainability, economic development and community livelihoods* (Bogor Indonesia, CIFOR)

³¹ J., Maturana, N. Hosgood, A. Suhartanto (2005) *Moving towards Company Community Partnerships: Elements to take into account for fast-wood plantation companies in Indonesia* (Bogor Indonesia, CIFOR)

³² A. Nawir, L Santoso (2005) 'Mutually beneficial company-community partnerships in plantation development: emerging lessons from Indonesia', *International Forestry Review* Vol. 7 (3)

Commercial forestry in Indonesia – and their associated socio-economic benefits – does not deny local communities access to their forest resources. The terms of the IUPHHK-HTI concession licenses (plantation licences) obligate plantation companies to set aside 30 per cent towards local use, conservation and infrastructure.³³ Of that, they are required to leave 10 per cent of their concession area under the management of local people to provide plants that support livelihoods such as timber, fruit trees or food crops.

³³ R. Nasi, P. Koponen, J. Poulsen, M. Buitenzorgy, W. Rusmanto (2007), 'The impact of Landscape and corridor design on primates in large scale industrial tropical plantation landscape', *Biodiversity and Conservation*, Vol. 17(5)

2.2 Economic & Social Contribution by Manufacture of Wood and Wood products

Wood and wood manufacturing contributed USD 9 billion (around 1.4 per cent) to Indonesia's GDP in 2009. Its share of manufacturing value added was around 2.3 per cent in the same year. According to one estimate the subsector directly employs more than 1.3 million people. The sector also makes up around 4 per cent of total non-mineral exports.

2.2.1 Contribution to GDP (Value-added)

Table 2.7 shows the contribution of wood and wood products sectors to Indonesia's GDP since 2004. The left hand side shows the contribution to GDP. The right hand side shows value-added and only includes medium and large firms.

Table 2.7: GDP value of wood and wood products manufacturing sectors: 2004 to 2009

Year	GDP value of wood and wood products, all firms (Rp billion, USD billion)		Value-added, medium and large firms (Rp billion, USD billion)	
2004	31,226	3.5	17,491	2.0
2005	35,248	3.9	16,001	1.8
2006	44,603	5.0	14,627	1.6
2007	54,881	6.2	18,015	2.0
2008	73,196	8.2	17,041	1.9
2009	80,135	9.0	18,171	2.0
	Share of GDP (all firms)		Share of manufacturing value-added (medium and large firms)	
2004	1.4		4.9	
2005	1.3		4.0	
2006	1.3		2.8	
2007	1.4		3.0	
2008	1.5		2.4	
2009	1.4		2.3	

Notes: (a) Includes furniture; (c) Excludes furniture and plating material; Source: BPS Statistics Indonesia, *GDP at Current Market prices by Industrial Origin, 2004-2009* and *Value Added by Subsector, 2001-2009* http://dds.bps.go.id/eng/tab_sub/view.php?tabel=1&daftar=1&id_subyek=09¬ab=3, accessed February 2011. Calculated at current exchange rate of 1 IDR: 0.000112233 USD

Medium and large firms contributed the majority of value added in the wood and wood products manufacturing sectors.

Not included in national accounts are the flow on, or multiplier, effects that further boost the production in other industries and sectors of the economy to GDP. The multiplier effects are the additional demand for goods and services across all industries, and related increases in GDP, resulting from greater investment in forestry and related manufacturing. Researchers estimate multipliers of between 1.88 and 1.97 for timber processing in Indonesia, using plywood and sawnwood as examples.³⁴ That is, for every

³⁴ USAID (2000). Overview Of Commercial Forestry Sector: Analysis of BPS Survey of Manufacturing. June 2000. NRM Program Policy and Planning Group & Protected Areas and Forest Management Group. See also Abeysinghe, T. and Forbes, K (2005), *Trade Linkages and Output-Multiplier Effects: A structural VAR approach with a focus on Asia*, Review of International Economics, 13 (2) p 356-75

Rp 1 million invested in wood processing, GDP is estimated to increase by between Rp 1.88 and 1.97 million.

2.2.2 Contribution to employment

Estimates of the number of people employed in the manufacture of wood and other processed wood products vary significantly.

Table 2.8: Persons employed in the wood and wood products manufacturing sectors: 2004 to 2009

Subsector / Year	2004	2005	2006	2007	2008	2009
Wood and products of wood	347,962	312,193	299,278	279,622	241,226	269,604
Furniture and manufacturing	263,008	260,766	325,362	326,785	313,656	338,503

Source: BPS (2011)

These figures are likely to be a conservative estimate as they exclude informal and seasonal employment. ASMINDO, the Indonesian peak body for furniture manufacturing estimates that there are 4 million people directly and indirectly employed by the furniture industry in Indonesia. GTZ, Germany's aid agency estimates there are 3,500 furniture companies and even more small furniture enterprises.

The only other comprehensive set of figures that is publicly available has been published by KAHUTINDO (Indonesian Forestry and Allied Workers' Union). Its breakdown is as follows:

Table 2.7: Persons employed in the wood and wood products manufacturing sectors: 2009

Specialisation	Directly employed
Plywood manufacturing	492,500
Wood processing	370,000
Furniture manufacturing	472,000
Total	1,334,500

Source: KAHUTINDO (2009)

These estimates do not include indirect or flow-on employment multipliers. Researchers estimate an employment multiplier of 1.5 for the forestry sector. That is, for every new job created in the forest sector an additional 1.5 are created indirectly.³⁵

2.2.3 Contribution to exports

Processed wood and wood manufactures make an important contribution to Indonesia's exports. Wood and wood manufactures includes sawn wood, joinery and other finished products such as furniture. Total exports of wood and wood manufactures (including furniture) were valued at US\$3.9 billion in 2007, up from US\$4 billion in the early 1990s. In recent years this represented 10.6 per cent of Indonesia's non-mineral exports. Table 2.8 shows the value of exports of Indonesian forestry products and share of Indonesia's total exports.

³⁵ Contribution of the processing of forest products to development in tropical countries (English) In: Report ; Committee on Forest Development in the Tropics, Sess. 10, Rome (Italy), 10-13 Dec 1991 Rome (Italy) , 1991, p. 49-57

Table 2.8: Value and percentage share of wood product exports (USD, current prices)

Year	Wood and wood products ^(a)	Share of non-mineral exports
2006	4,316,406,482	6.4
2007	4,127,469,978	5.2
2008	3,918,343,587	4.2
2009	3,167,391,045	4.1
2010	3,892,963,401	3.8

Source: UN COMTRADE Note: (a) Includes furniture

The decline in exports over the past five years both in percentage share and value continues an ongoing trend since the late 1990s. Up to 1997, total forest, wood and paper sector export values were mainly generated from plywood, veneer sheets, and sawnwood exports. Export shares sharply declined after the Asian Currency Crisis and were gradually replaced by woodpulp, paper and paperboard exports.

2.3 Economic and Social Contribution of Pulp and Paper Products

Indonesia's pulp and paper industry is a significant contributor to the Indonesian economy, contributing around 1.2 per cent of GDP, and around 6 per cent of manufacturing value-added. The industry employs around 250,000 people directly in manufacturing operations, and makes up around 5.5 per cent of Indonesia's non-mineral exports.

2.3.1 Contribution to GDP (Value-added)

Over the past 5 years the pulp and paper industry contributed approximately 1.8 per cent to Indonesia's GDP – including a direct contribution from pulp and paper manufacturing of around 1.2 per cent and a further proportion of plantation forestry's contribution of around 0.6 per cent. In 2009 this amounted to over USD 6.9 billion from pulp and paper alone, and up to USD 8.3 billion including plantation forestry, or around Rp 81 trillion.

Table 2.9: Gross domestic product of paper sectors: 2004 to 2009

Year	GDP pulp and paper (all firms)		Value-added (medium and large firms)	
	Value, USD billion	Value, Rp billion	Value, USD billion	Value, Rp billion
2004	3.5	31,036	2.7	24,013
2005	3.8	33,899	2.7	24,129
2006	4.5	39,637	2.7	30,715
2007	5.1	45,403	3.7	32,579
2008	5.8	51,912	4.2	37,561
2009	6.9	61,110	5.2	46,170

Year	Share of GDP (all firms)	Share of manufacturing value-added (medium and large firms)
	2004	1.4
2005	1.2	6.1
2006	1.2	6.0
2007	1.2	5.4
2008	1.1	5.2
2009	1.1	5.8

Notes: (a) Includes furniture; (b) Includes printing; (c) Excludes furniture and plating material; (d) Excludes publishing and printing. Source: BPS Statistics Indonesia, *GDP at Current Market prices by Industrial Origin, 2004-2009* http://www.bps.go.id/tab_sub/view.php?tabel=1&daftar=1&id_subyek=11¬ab=1 and *Value Added by Subsector, 2001-2009* http://dds.bps.go.id/eng/tab_sub/view.php?tabel=1&daftar=1&id_subyek=09¬ab=3, accessed February 2011. Calculated at current exchange rate of 1 IDR: 0.000112233 USD

Table 2.9 shows the contribution of pulp and paper manufacturing sectors to Indonesia's GDP since 2004. The left hand side shows the contribution to GDP. The right hand side shows value-added and only includes medium and large firms. The share of manufacturing value added is around 6 per cent in the period. The value of pulp and paper has been increasing dramatically in recent years.

Not included in national accounts are the flow on, or multiplier, effects that further boost the production in other industries and sectors of the economy to GDP. The multiplier effects are the additional demand for goods and services across all industries, and related increases in GDP, resulting from greater investment in forestry and related

manufacturing. Multiplier effects not only boost Indonesia's GDP, but also employment opportunities and incomes in others sectors of the economy.

Researchers estimate multipliers of around 1.61 in Indonesia.³⁶ That is, for every one million Rupiah invested in pulp and paper, GDP is estimated to increase by 1.61 million Rupiah.

2.3.2 Contribution to employment

As with other labor statistics in Indonesia, estimates of employment in the pulp and paper sector vary. However, the most comprehensive and methodologically sound survey of employment within the subsector was undertaken by the Indonesian Department of Industry in 2009. It states that pulp and paper industries in Indonesia directly employed 247,722 people. This was comprised of 79,923 people in pulp manufacturing and a further 167,799 people in paper manufacturing. It should be noted that this does not include employment figures for pulpwood harvesting.

This figure is more than double official data, which estimates that 112,909 people were employed by the subsector in 2009. As with most labour statistics in Indonesia, figures are limited to reporting firms, which generally excludes small and medium enterprises.

Notwithstanding this discrepancy, the BPS statistics serve as a useful indicator of the growth of the pulp and paper sector, which has provided increased employment for Indonesia. Between 1980 and 2005, annual jobs growth has averaged just under 8 per cent over the 25-year period.

Table 2.10: Number of employees in the pulp and paper sector

Year	1980	1985	1990	2000	2005	2008
Employees	18,000	30,000	80,000	97,000	119,469	126,883

Source: BPS Indonesia

These estimates do not include indirect or flow-on employment multipliers. A conservative employment multiplier for the Indonesian pulp and paper sector is 2.0. That is, for every new job created in the pulp and paper sector an additional 2 are created indirectly.³⁷

2.3.3 Contribution to exports

Exports of pulp and paper products alone were valued at around US\$5.6 billion in 2007. They have increased steadily in value since the 1990s. In recent years, exports of pulp products comprised between 3 and 4 per cent of Indonesia's total exports and represented around 5.5 per cent of Indonesia's non-mineral exports.³⁸

³⁶ Komisi Pengawas Persaingan Usaha Republik Indonesia (2007). Laporan Tahun 2007 Reformasi Regulasi Persaingan Usaha

³⁷ Hayter, M. 2003, Review of studies of the socio-economic impact of forest industries in Australia, Forest and Wood Products Research and Development Corporation, Melbourne

³⁸ Minerals dominate Indonesia's exports. They comprise over 30 per cent of Indonesia's total exports.

Table 2.11: Pulp and paper exports, value (current prices) and percentage share

Year	Pulp exports (USD)	Paper exports (USD)	Percentage of total exports	Percentage of non-mineral exports
2006	1,126,425,285	2,805,338,575	3.9	5.8
2007	1,068,126,235	3,328,017,193	3.9	5.6
2008	1,425,342,539	3,737,544,172	3.8	5.6
2009	868,791,719	3,357,340,346	3.6	5.5
2010	1,468,866,043	4,186,226,630	3.6	5.5

Source: UN COMTRADE data

2.3.3 Social contribution of pulp and paper production

The broader social contribution of pulp and paper production is explored more full in the next chapter, which examines the social and economic impact of the operations of Asia Pulp and Paper, and examines regional-level impacts.

3. Case Study on APP and Sinar Mas Forestry

Asia Pulp and Paper and its fiber supplier are a significant contributor to the Indonesian economy. APP and Sinar Mas Forestry contribute around 0.9 per cent of Indonesia's GDP. The two companies also employ approximately 399,000 people full time and a further 251,000 people annually in plantation establishment. Its pulp and paper exports make up around 2 per cent of Indonesia's non-mineral exports.

In Riau in particular, the contributions of APP and Sinar Mas Forestry are more pronounced. According to one economic analysis, APP and Sinar Mas in Riau:

- *Generate 11 per cent of all provincial economic output;*
- *Employ 5.6 per cent of the total workforce;*
- *Contribute 3 per cent of Riau's tax revenue;*
- *Generate 4.6 per cent of all household income in Riau.*

Further, APP's operations in Riau alone make up around 1.3 per cent of all of Indonesia's non-mineral exports.

3.1 APP/SMF operations

Asia Pulp and Paper is a large, vertically integrated pulp and paper producer with operations primarily in Indonesia. It is affiliated with the larger Sinar Mas Group, which has interests in agriculture, construction and banking. Sinar Mas pulp and paper operations extend to China, North America and Western Europe, where it has interests in forestry and pulp and paper operations.

APP is the largest producer of pulp and paper in Indonesia. It is also the largest in Asia, outside Japan.³⁹ Jaakko Pöyry Consulting (2005) cites Asia Pulp and Paper as being amongst the 10 leading paper companies in the world.⁴⁰

3.1.1 Indonesian operations

Sinar Mas Forestry (SMF) is APP's exclusive fibre supplier. It is also a manager of partner and associated plantation forest concession areas.⁴¹ It manages and operates forestry plantations on Sumatra and Kalimantan.

Of this total area, Sinar Mas and its suppliers are responsible for 2,309,511 ha of plantations across 35 licenses, or approximately 24.5 per cent of all industrial plantations by area and 15 per cent by units.

APP operates seven paper mills located in Java and Sumatra. The five mills on Java are paper mills only. The two mills on Sumatra are both vertically integrated pulp and paper mills.

³⁹ APP Press Release, 2 November 2009, *APP tops Indonesian Exporters*

⁴⁰ Jaakko Pöyry Consulting (2005), *World Paper Markets 2020*, as cited in Jaakko Pöyry Magazine Know How Wire, January 2006, <http://www.forestindustry.poyry.com/linked/en/news/KnowhowWireJanuary2006.pdf>

⁴¹ References to Sinar Mas Forestry (SMF) include associated and partner companies.

The pulp mills have a combined capacity of 2.7 million ADT (air dried tonnes) per year.

Paper production capacity (including tissue and stationery) is approximately 3.1 million ADT per year; packaging production capacity is approximately 1.3 million ADT per year.

Table 6.19 shows total production at APP's mills in 2007. APP produced around 7 million metric tons of products, including 2.5 million metric tons of pulp and 4.5 million metric tons of paper products (including paper, tissue and paperboard and stationery).

Table 3.1: APP mill production: 2007 (metric tons)

Pulp	Paper	Tissue	Stationery	Paperboard
2,516,836	2,843,882	113,337	217,000	1,322,447

Source: APP (2007), 2008 Corporate Social Responsibility Report

3.1.2 Operations in Riau Province

In Riau, APP's key operation is the Indah Kiat Perawang mill (IKPP). It is a large, integrated pulp and paper mill with a capacity of 2 million ADT per year for pulp and approximately 700,000 ADT per year for paper.

The key fibre supplier for IKPP is PT Arara Abadi (AA). AA and Sinar Mas affiliated suppliers control approximately 711,567 ha of forest plantations in Riau. These plantations are primarily Acacia mangium and Eucalyptus ptiela, both of which are fast-growing hardwood species.

3.2 Contributions to Indonesia

3.2.1 GDP contribution

GDP contribution -- forestry

APP's fiber suppliers are Indonesia's largest holders of industrial forest concessions in Indonesia, holding approximately one-quarter of all plantation areas in Indonesia. On this basis and the contribution of plantation forestry to GDP, APP's fiber suppliers alone contribute approximately 0.15 per cent to total Indonesia GDP.

This does not account for multiplier effects, which researchers have estimated at 1.39.

GDP contribution – Pulp and paper

APP is the major manufacturer of pulp and paper products in Indonesia. Table 6.20 demonstrates that in 2007 APP contributed around 40 per cent of Indonesia's total pulp production.

Table 3.2: Pulp production in Indonesia: 2007 (millions metric tons)

Mills	Pulp production (M ADT)	Production share
<i>APP mills</i>		
PT. Lontar Papyrus	0.67	10
PT. Indah Kiat	1.8	30
<i>Other mills</i>		
PT. Riau Andalan	2.20	33
PT. Ketas Kraft	0.17	3
PT. Kiana Kerta	0.53	8
PT. Toba Pulp Lestari	0.24	4
PT. Tanjung Enim Lestari	0.50	7
PT. lainnya	0.44	7
Total	6.55	100

Source: Warta Ekonomi (2007), as cited in Bogor Agricultural Univeerrity (2008), Peran dan Kontribusi Industri Pulp & Kertas PT. Indah Kiat dan Hutan Tanaman Sinar Mas dalam Pembangunan Sosial - Ekonomi Riau 2006, Report commissioned by APP, unpublished; APP (2008) *Our Mills*

The value of pulp production for 2007 was 18.03 trillion Rp according to the department of industry; APP's share of this value was Rp 7.2 trillion.

In 2007 its paper product manufacturing operations produced 4.495 million ADT of paper, tissue, stationery and packaging. Total production of paper products for Indonesia for 2007 was 8,608,804 ADT according to the Indonesian Department of Industry, with a value of Rp 28.6 trillion. APP was responsible for approximately 52 per cent of Indonesia's total paper output for 2007 and Rp 14.8 trillion of paper production.

The estimated combined value of APP's pulp and paper production was therefore Rp 26 trillion in 2007, or approximately 59.9 per cent of the sub sector's total value. This represents approximately 0.72 per cent of Indonesia's GDP for 2007.

Using 2007 figures for the contribution of plantation forestry to GDP, the authors estimate that the combined contribution of APP's fiber suppliers and pulp and paper operations in 2007 was approximately 0.87 per cent.

To put into perspective, this is roughly equal to the contribution of Indonesia's entire utilities sector (electricity, gas and water) for the same year.

APP's contribution is likely to be close to double that when the flow on, or multiplier, effects are taken into account for pulp and paper. As noted, this is roughly 1.782 for the pulp and paper sector.

3.2.2 Contribution to Employment

Table 3.3 shows the number of APP mill employees, indirect jobs and fibre supplier jobs in Indonesia. In total APP supported more than 70,000 Indonesian jobs in 2007.⁴² APP directly employed 37,589 people. It created 25,542 indirect jobs for contractors and

⁴² APP 2008 Corporate Social Responsibility Report Indonesia

suppliers. Its exclusive fibre supplier, Sinar Mas Forestry (SMF), also provided employment for an additional 8,553 workers.

Table 3.3: Number of APP mill employees, indirect jobs and fibre supplier jobs: 2007

Mill employees	Mill indirect jobs	Sinar Mas Forestry (direct and indirect)	Total
37,589	25,542	8,553	71,684

Source: APP 2008 Corporate Social Responsibility Report

APP's employment contribution people represents around 28 per cent of all those working in the pulp and paper industry; 20 per cent of those working in forestry and related manufacturing industries and almost 0.5 per cent of all Indonesian manufacturing workers. Reflecting recent growth in output, it is highly likely that APP's workforce has continued to grow since 2007.

However, APP's employment figures exclude additional informal plantation sector jobs. This can be calculated using DNPI/IUFRO figures for estimates of labour required for plantations, a 0.336 persons per hectare. At the beginning of 2009, APP's fiber suppliers had a total planted area of 974,879 ha. This represents approximately 327,500 permanent jobs. Establishment phase jobs over the past 12 years are roughly equal to 251,843 full-time equivalent jobs annually.

3.2.3 Export contribution

Over 60 per cent of APP's paper production, approximately 2.8 million metric tons, is exported.⁴³ This generated around US\$1.5 billion in foreign exchange earnings in 2007.⁴⁴

APP exports represent just over 60 per cent of Indonesia's total pulp exports⁴⁵ and 2 per cent of its total non-mineral exports.⁴⁶

Arguably more importantly, APP is also a major supplier of paper domestically. 40 per cent of APP's pulp product production, approximately 1 million metric tons, is supplied the Indonesian market – including as an important input for many industries and therefore a vital component for economic growth.

3.2.4 Social contribution

In addition to jobs and income, APP and Sinar Mas Forestry contribute to Indonesian development through the provision of infrastructure, health and education services for the communities in which they operate. APP and Sinar Mas Forestry further contribute

⁴³ APP Website <http://www.asiapulppaper.com/> Accessed February 2011

⁴⁴ APP (2007) Corporate Social Responsibility Report 2007

⁴⁵ Total paper exports: 2.615 m (Ministry of Forestry (2009) *Data Strategies*, Table V.1.) and APP exports 1.71m metric tonnes (APP website <http://www.asiapulppaper.com/> February 2011

⁴⁶ Total Indonesian Non-Mineral exports: \$79,494 (million USD) (www.sdbs.adb.org) and APP paper exports: \$1,586 (million USD) (From 65% of total sales – APP (2007) Corporate Social Responsibility Report) February 2011

by providing government with revenue - through the payment of forestry fees and taxes – which underpinned Indonesian government socio-economic spending and services.

In 2007 APP allocated US \$30 million towards social and environmental programs.⁴⁷ Another US\$1.8 million was allocated towards social programs by APP's philanthropic arm, Eka Tjipta Foundation.

In the area of education, APP operates on-site schools, provides classroom and pre-school facilities and contributes to school funding in communities. In 2005 and 2006 APP provided US\$300 million for scholarships, stationary supplies, school uniforms, bags and books. It also funded teacher training and provided school buses for children living in remote regional areas. APP provides vocational school fellowships tied to paid internships at the company.

APP's health services include operating on-site medical clinics for employees; mobile clinics and funding for APP physicians to serve the local villages; providing pesticide fogging to control mosquitoes; making ambulances and fire crews available for local emergencies; providing finance for hospitals; and running HIV/AIDS awareness programs.

APP also contributes to the infrastructure improvement projects including bridge and road construction; schools and other buildings and providing equipment for fresh, clean water.

To improve the income earning opportunities of the community, APP provides skills training in agricultural areas and marketing. It supports local employment by contracting with small independent businesses, such as trucking contractors, and opening its sites to food vendors. Unused land is available to villages for agriculture. Sinar Mas Forestry also purchases plantation seedlings from a cooperative community nursery.

Sinar Mas Forestry funded approximately US\$870,000 of activities over the last two years through its Community Development Fund. In 2006-07 Sinar Mas Forestry funded US\$400,000 of infrastructure improvements (primarily roads) and US\$200,000 for religious activities. It provided almost US\$100,000 each for education (scholarships, teacher stipends and school facilities and skills training), cultural activities (including free medical treatment) and support for small-to-medium enterprises.

3.3 Case Study: Contributions to Riau Province

3.3.1 Background on Riau

In 2009 Riau's economy expanded at 6.44 per cent⁴⁸ –above the Indonesian average of 4.5 per cent.⁴⁹ This is due to its natural resources and expanding industrial base in the petroleum, oil palm, plantation and forest industries.

⁴⁷ APP 2007 Corporate Social Responsibility Report

⁴⁸ Riau BPS (2010) Press Release *Riau Growth without Oil in 2009*, accessed at Riau.bps.go.id

⁴⁹ Sabam Siagian (2008). "Catatan Pekanbaru: Riau, Provinsi Yang Maju Pesat" in *Suara Pembaruan Daily*, March 22, 2008 and IMF (2011) indicators www.imf.org/statistics

Riau's population is more than 5.5 million people⁵⁰; it has grown by over 4 per cent annually between 1980 and 2008. This rate of increase is forecast to continue for another decade.⁵¹

Riau's relatively wealthy status therefore attracts further migration. Net migration to Riau has grown significantly over the past two decades. In 2005, net migration to Riau was second only to Jakarta.⁵²

3.3.2 Forest resources, population and land use

In Riau, as elsewhere in Indonesia, many people depend on the land for their livelihoods. Agriculture, forestry and fisheries employ 44 per cent⁵³ of the working population in Riau and the sector contributes 20 per cent of the province's GDP.⁵⁴ Riau's total land area is 9.7 million hectares. Just 0.2 million hectares of this area is designated as non-forest area – this is proportionally small given the province's large population. Close to half of Riau's forested area (4.6 million hectares) is planned for economic development purposes.⁵⁵

Land-use change (conversion) in Riau provides benefits for its population, including land for housing, employment and other income earning opportunities, and government revenues to assist in poverty alleviation. Underlining this is the development of agriculture and plantations to feed and employ growing populations.

3.3.3 Contribution to Riau's economy

An APP-commissioned report⁵⁶ quantifies some of the benefits of the pulp and paper industry in Riau. The main findings are reported below.

Contribution to Riau's GDP

In 2006 the pulp and paper industry directly contributed around US\$7 billion – around 20 per cent – of Riau's total output (gross domestic product, GDP). Its contribution was second only to the oil and gas industry. The forest sector contributed a further US\$1.5 billion, or 4.57 per cent.

APP's mill (PT. IKPP) production contributed 51 per cent of the total output of the pulp and paper industry in Riau. Therefore it directly contributed over 10 per cent of Riau's

⁵⁰ BPS (2010) *Hasil Sensus Penduduk 2010* accessed at http://www.bps.go.id/65tahun/SP2010_agregat_data_perProvinsi.pdf

⁵¹ It is expected to continue to grow strongly by 4.1 and 3.8 per cent over 2005-2010 and 2010-2015 respectively. BPS Statistics Indonesia (2007), *Selected Socio-Economic Indicators of Indonesia*, March 2007

⁵² Badan Pusat Statistik (2007) Recent Migration 198 1980 – 2005 accessed at http://dds.bps.go.id/eng/aboutus.php?tabel=1&id_subyek=12 Accessed

⁵³ Riau BPS (2010) Press Release Employment Situation Riau Month February 2010, accessed at riau.bps.go.id

⁵⁴ BPS Riau, *Table 3: Riau GDP structure by sector 2010 per cent.* <http://riau.bps.go.id/>

⁵⁵ BPS Riau statistics differ from those of the Ministry of Forestry. BPS Riau reports 4.3 million hectares as non-forest areas rather than conversion land. BPS Riau, *Table 6.5.1 Forest Area by Function*, www.riau.bps.go.id

⁵⁶ Bogor Agricultural University (2008), *Peran dan Kontribusi Industri Pulp & Kertas PT. Indah Kiat dan Hutan Tanaman Sinar Mas dalam Pembangunan Sosial - Ekonomi Riau 2006*, Report commissioned by APP, unpublished

GDP, or USD 3.5 billion. Sinar Mas Forestry's associated pulpwood plantations contributed around 1.4 per cent of Riau's output, or USD 450 million.

The research also used government input-output tables to estimate the impact of the existence of pulp and paper industry on other industries in Riau (see Annex II).

It found that increased investment in the pulp and paper industry in Riau also increases economic activity in other sectors in the economy. Increased economic activity in the pulp and paper industry (excluding forestry) of US\$1 is estimated to increase Riau GDP by US\$3 (a multiplier of 3.0).

The multiplier for the forestry sector was estimated to be around 2.2.

The multiplier effects of the pulp and paper industry are second only in magnitude to those of the service industry (with a multiplier of 3.2).

Contribution to employment

Of the 1,907,946 people working in Riau, the pulp and paper industry provided direct employment for 17,720, or 0.86 per cent.

It is estimated that with investment of US\$3.5 billion that PT. IKPP employed around 8,360 people directly and a further 11,695 suppliers and contractors. Furthermore it is estimated that PT. IKPP supports as many as 118,000 people across all industries.

In addition Sinar Mas Forestry's investment of US\$4.75 billion resulted in around 89,663 direct jobs and a further 12,151 suppliers and contractors. It is also estimated that it supports a further 137,000 additional people across all industries.

In total this represents more than 6 per cent of Riau's total workforce.

Export contribution

PT IKPP's sales in 2006 totalled USD 1.58 billion. Export sales from IKPP totalled USD 837 million – approximately 53 per cent of IKPP's total sales. This represents 21 per cent of national pulp and paper exports, and approximately 1.3 per cent of all exports excluding oil and gas.

Contribution to government revenue

Indonesia's total government tax receipts in 2006 were USD 35 billion (Rp 315 trillion). Total tax receipts in Riau amounted to USD 350 million (3.2 trillion).

During 2006 it is estimated that PT. IKPP paid as much as USD 10 million (Rp 92.6 billion) in taxes, or 3 per cent, of Riau's total receipts.

Contribution to household income

Researchers also estimated the impact of the forestry, pulp and paper sectors on household incomes in Riau. (See Annex for data tables).

The forestry and pulp and paper industry contributed around USD 335 million, almost 12 per cent, of household income in Riau Province. This included the contribution of the pulp and paper sector of US\$165 million (5.7 per cent) and the forestry sector of US\$170 million (5.9 per cent).

APP contributed around USD 135 million, or 4.6 per cent of household income in Riau. This included the contributions of PT. IKPP of US\$86 million (2.9 per cent) and Sinar Mas Forestry of US\$50 million (1.7 per cent).

The pulp and paper industry and APP also provided significant contributions to household income in other sectors, such as the food and beverage sector.

3.3.4 Community impacts

The APP commissioned report also surveyed local communities in Riau across five districts⁵⁷ on the social, economic and environmental impact of APP's mill (PT. IKPP) and Sinar Mas Forestry's HTI plantation activities. A total of 650 respondents were surveyed.

They found that the communities in and around areas occupied by these companies⁵⁸ had higher household incomes compared to those outside the area. For example, the household income in the area around APP's mill (Tualang subdistrict, part of Siak Regency) was Rp 4.2 million per month, compared to Rp 3.1 million for the rest of Siak Regency. The income outside of Siak Regency was much lower at 2.4 million Rupiah a month

The survey indicated that the income of 68 per cent of the families around PT. IKPP (within Tualang) was directly and indirectly connected to the existence of the APP mill. This equates to around 40,000 of the 60,000 workers in this sub-district. Moreover, 55 per cent of households around the HTI plantations had generated income connected to the operations of Sinar Mas Forestry.

Many people reported that their employment was indirectly linked to these companies including building workers, transport services, and employees in food stalls. Village cooperatives and local contracts were also involved in plantation development.

Other benefits reported included assistance to small-to-medium enterprises (SME) and housing. 74 per cent of those surveyed reported receiving help from the companies for SME development. 19 per cent of the community was living in housing provided by the company.

⁵⁷ Included the regencies of Kab. Siak, Bengkalis, Kampar, Pelalawan and Indragiri Hilir.

⁵⁸ The report compared the incomes with those in the Siak Regency (excluding Tualang subdistrict), with those around IKPP (Tualang subdistrict) and Sinar Mas HTI plantations (five regencies).

The majority of those surveyed reported that Sinar Mas and APP has assisted in improving roads (55 per cent), health (63 per cent) and education (68 per cent) in their communities.

3.3.4 Community Development by Plantation Companies

A study involving several plantation companies in Sumatra showed that two of the biggest contributors were under the APP management group: Wira Karya Sakti in Jambi (associated with the Lontar Papyrus Pulp and Paper mill); and Arara Abadi in Riau (associated with the Indah Kiat Pulp and Paper mill). Combined, the two plantation companies contributed almost USD 3 million within five years towards local community development.

Arara Abadi made a significant contribution to local communities in close proximity to the concession area. It operated a Community Development program between 1995 and 2002 that contributed US\$1.2 million/year on average to diverse projects including infrastructure, education and training.⁵⁹

Table 3.4: Annual expenditure (USD) in Arara Abadi Community Development programme

Expenditure	1995	1996	1997	1998	1999	2000	2001	2002
Roads	10,673	5,182,329	1,669,084	74,569	333,448	697,336	2,862	259,794
Religious	3,031	33,479	16,880	4,306	7,810	27,323	17,288	61,502
Education	15,123	1,701	14,264	1,778	25,718	17,305	28,039	86,579
Agriculture	27,798	43,720	80,481	24,359	83,729	19,569	24,095	157,662
Ceremonies	0	0	0	0	2,835	11,434	390	0
Training	0	0	0	50	2,503	6,934	98	3,906
Infrastructure	3,626	10,033	3,967	60	5,309	9,444	6,870	29,611
Sports	0	11,723	412	2,575	4,011	4,586	5,280	113,977
Others	0	2,584	0	999	18,686	21,613	3,502	12,069
Total	60,251	5,285,576	1,785,088	108,695	484,048	815,543	88,424	725,099

Source: Maturana, et al., (2005)

Similarly the Wira Karya Sakti plantation company, through their 'Rural Forest Community Development' or PMDH (Pembinaan Masyarakat Desa Hutan) programme, invested significantly in local community development. PMDH expenditure between 1998 and 2003 represents an average contribution of approximately USD80 000 per year.⁶⁰

Table 3.5: Annual expenditure (USD) in Wira Karya Sakti Community Development (PMDH) programme

Expenditure	1998	1999	2000	2001	2002
Education, training, religious and social	16,936.4	36,849.2	39,599.6	41,617.6	50,695.8
Social and religious-related infrastructure	56,623.7	62,635.1	28,860.2	33,093.1	34,193.3
Agriculture, agroforestry and conservation	4.49	0	262.7	194.91	0
Total	73,564.6	99,484.3	68,722.5	74,905.61	84,889.1

Source: Maturana, et al., (2005)

Further contributions were made through partnerships with local communities, where the company shares the profits of the harvest with local tree growers. Surveys of local

⁵⁹ Maturana, et al., (2005);

⁶⁰ Maturana, et al., (2005);

populations show the significant achievements of APP's community forestry projects. Wira Karya Sakti, for example, offers the local community a scheme called 'Joint Venture Forest Plantations' or HTPK (Hutan Tanaman Pola Kemitraan). Through this, a 40% share of the profits made from acacia timber sold to the associated Lontar Papyrus mill is allocated to the community. A study undertaken by CIFOR researchers found the Wira Karya Sakti company received revenue of US\$211 per ha, while tree growers received US\$137 per ha.⁶¹ Revenue from tree planting resulted in an estimated annual household increase of US\$382 for local tree growers.

Community development funding by APP should be viewed in the context of Indonesian development: remote communities living in forestry concessions are often isolated from government infrastructure such as health, education and welfare facilities. The contribution from APP's forestry operations represents significant economic and social opportunities for local communities.

⁶¹ Nawir & Santoso (2005)

4. Sustainability and Indonesia's Forest Industries

Global pulp and paper demand is forecast to increase in the medium term, particularly in the Asia-Pacific region. Indonesia is well-placed to meet this demand; it has extensive forest resources, low-labour costs and increasing levels of foreign direct investment. While management of forest resources has been poor in the past, deforestation – largely attributable to the agriculture sector – is declining. Moreover, areas of plantation forest have been increasing significantly. Indonesia has set aside significant areas of forest for conservation; the key to maintaining these is better governance and strong enforcement.

4.1 Global outlook for forest-based products

There is growing global demand for pulp and paper, with expectations for strong future prospects. Indonesian industry is well placed to supply the increasing global demand.

According to analysts' predictions, the global forest products market is forecast to have a value of USD 1,704.3 billion in 2014, an increase of 69.1% since 2009. It is also projected to increase in volume by 1.7 per cent to 4 billion cubic meters over the same period.

Paper demand is expected to increase by 2.1 per cent per annum in the long term, from 350 million tons in 2004 to 490 million tons by 2020.⁶² Much of the increase in demand will come from China, India and Russia.⁶³

Chinese demand for wood pulp, for example, has tripled over the last two decades.⁶⁴ In 2009 Chinese purchases represented more than 29 percent of global market pulp – a 44 percent increase on 2008.⁶⁵ EU and North American consumption of paper and paperboard fell after of the Global Financial Crisis of 2008, but Chinese year-on-year consumption continued to increase by 8.7 per cent in 2008.⁶⁶

Meanwhile, the past 20 years have seen a transition from 'traditional' pulp producers – Northern and Western Europe and North America – to emerging producers in Latin America and South-East Asia. New producers were responsible for less than 10 per cent of woodpulp production in 1990, but are projected to make up 30 per cent of the market in 2015. The share of traditional producers in industrialized global markets is projected to fall from almost 80 per cent to under 50 per cent by 2015.⁶⁷

Indonesia is an emerging producer that is particularly well placed to meet growing Chinese demand. Indonesian industry has already experienced growth - exports of pulp soared over the past five years, reaching 24.6 per cent growth year-on-year. The

⁶² Jaakko Pöyry Consulting (2005), *World Paper Markets 2020*, as cited in Jaakko Pöyry Magazine Know How Wire, January 2006, <http://www.forestindustry.poyry.com/linked/en/news/KnowhowWireJanuary2006.pdf>

⁶³ Jaakko Pöyry Consulting (2005), *World Paper Markets 2020*, as cited in Jaakko Pöyry Magazine Know How Wire, January 2006, <http://www.forestindustry.poyry.com/linked/en/news/KnowhowWireJanuary2006.pdf>

⁶⁴ American Forest & Paper Association (2007). *Wood for Paper: Fiber Sourcing in the Global Pulp and Paper Industry*, Prepared by Seneca Creek Associates, LLC

⁶⁵ Dave Hillman (2010) "China's Pulp Purchases Reach 13.68 Million Mt in 2009" Paperage, February 12

⁶⁶ United Nations Comtrade Database statistics

⁶⁷ Nils Grafstrom (2007), *Paper, Packaging and Forest Products*, Stora Enso Latin America

Indonesian pulp and paper industry is well positioned to capitalise on increasing global demand.⁶⁸ Comparative advantages include land coverage, surplus labour, raw material supply, the benefits of being closer to the Asian market, lower transportation costs and the appropriate climate for fast-growing trees.⁶⁹ These factors make Indonesia one of the most cost competitive producers in the world.

4.2 National outlook for forest resources

Overview of Indonesia's forestry resources

Indonesia has some of the largest forest resources in the world. Approximately 94 million hectares, or around 50 per cent of its total land mass, is forested.⁷⁰ Approximately 77 million ha is considered permanent forest estate.

Table 4.1 shows the size of Indonesia's designated forest areas. It shows that almost half of Indonesia's permanent forest area, or 37 million hectares, is designated as conservation forest area. This is approximately 20 per cent of Indonesia's land mass and is equivalent in size to the entire land mass of Germany or Japan.⁷¹

Table 4.1: Basic Statistics on Indonesia's forest area: 2010 (ha)

Forest classification	Area
Protection and Conservation forest area	37,772,000
Production forest area	50,048,000
Permanent forest estate	77,067,000
Total forest area	94,432,000

Source: FAO 2010

Approximately 50 million ha is designated as production forest – just under 25 per cent of Indonesia's land mass. A further 17 million hectares of forest area is classified as convertible forest area to be cleared for other uses such as agriculture.

The United Nations Food and Agricultural Organisation (FAO) estimates that Indonesia's forests are the eighth largest in the world, only behind those of the Russian Federation, Brazil, Canada, United States, China, Australia and the Democratic Republic of the Congo.⁷²

Deforestation

Indonesian forests have been subject to levels of deforestation that are considered high by Western standards.

⁶⁸ Hidayat, Dr H. (2007), *Pulp and Paper in Japan and Indonesia: for the Viewpoints of Political Ecology*, V.R. F. Series, No. 427, March 2007

⁶⁹ Hidayat, Dr H. (2007), *Pulp and Paper in Japan and Indonesia: for the Viewpoints of Political Ecology*, V.R. F. Series, No. 427, March 2007

⁷⁰ Ministry of Forestry (2008), *Forestry Statistics 2008*, Table I.1.1. Extent of Forest Area, Inland Water, Coastal and Marine Ecosystem Based on Forestry Ministerial Decree on the Designation of Provincial Forest Area, Inland Water, Coastal and Marine Ecosystem and Forest Land Use by Consensus

⁷¹ Using an estimate of forest area of 88 million hectares. FAO (2007), *State of the World's Forests 2007*

⁷² FAO (2010) Global Forest Resources Assessment 2010

Indonesia's deforestation contexts vary from island to island and between provinces. Consequently, the Indonesian Government has developed its own framework for assessing forest conversions, classifying them as either planned (e.g. urbanization, mining developments, agricultural developments) or unplanned (e.g. subsistence or slash and burn agriculture, removals for wood fuel).

The Indonesian Government notes that the greatest cause of forest loss in primary forests is unplanned deforestation – generally encroachment by smallholder farmers.

However, the deforestation rate has been reduced considerably over the past two decades, falling from 1.75 per cent per annum in the 1990s to 0.31 per cent in 2000-2005.

High rates of deforestation in the 1990s were caused by a combination of over-exploitation by the plywood industry, which was fuelled by poor national land-use policies during the Suharto era. Following the collapse of the Suharto regime, government reform that decentralised power to provincial governments effectively created a land-use policy vacuum. This resulted in a vast number of permits for forestry and agricultural developments with little regulatory oversight.

Land-use reform and increased government enforcement against unplanned deforestation has meant that deforestation rates have fallen considerably. This is likely to fall further with the implementation of the recent Indonesian Presidential Decree that places a prohibition on new forest licenses within primary forests.

Reforestation and plantation development

Indonesia has been using its forestry endowment to generate sustained growth. It is in its interests to ensure that forest resources are available for the future to continue to support economic growth, employment and incomes.

There are a number of government programs which are contributing to the future sustainability of Indonesia's forest resources. These include activities for reforestation such as the National Movement on Forest and Land Rehabilitation; the establishment of community forests; and activities to reduce the consumption of forest resources by forest fires. Importantly, the government is also emphasising the development of plantations to supply the wood products industries.

Plantation development

Plantations have a significant role to play in the development of sustainable forest industries. Despite comprising less than 7 per cent of the global forest area⁷³, the FAO estimates that planted forests continue to expand and they contribute close to 35 per

⁷³ FAO (2010) Global Forest Resources Assessment 2010 Main Report, accessed at <http://www.fao.org/docrep/013/i1757e/i1757e.pdf>

cent of global wood production.⁷⁴ Indonesia's use of plantation timber has kept up with global increases.

Indonesia's use of plantations in wood product manufacturing has increased significantly over the past two decades. In 1994 industrial plantation timber was almost non-existent; however, by 2006 plantations supplied more than half (18.9 million cubic meters) of all industrial logs.⁷⁵

Indonesian pulpwood plantations have developed at a rapid pace, aided by policy incentives (such as a Ministry of Forestry decree stating that plantation estates must be established on all pulp and paper plantation concession areas by the end of 2009).⁷⁶ CIFOR found that the Decree likely contributed to accelerated plantation development in APP's concession areas.⁷⁷

4.3 Protected forest areas

Indonesia's forest resources are significant, as noted above. Its total protected areas are also significant. As noted above, Indonesia has placed 40 per cent of its total forest area aside for conservation or biodiversity or protection of ecological functions.

The total area under protection or conservation covenants is greater than 37 million ha; this network comprises more than 530 conservation areas across the Indonesian archipelago.

There have, however, been significant problems with protected areas in Indonesia that have resulted in large-scale encroachment, particularly in populated areas. Gunung Merbabu National Park in Java, for example, has according to estimates lost 70 per cent of its forest cover due to encroachment. A similar case exists in Kutai National Park in Kalimantan.

Numerous studies have noted that the lack of effectiveness of existing national parks in Indonesia can be attributed to a lack of both resources and management.

Advocates for biodiversity protection have called for increases in the number and size of protected areas, despite clear evidence that the existing areas are not performing adequately and suffer from lack of clear tenure in many circumstances.

The recent Presidential Decree which places a two-year prohibition on new forestry, agricultural and mining developments within primary forests – which includes most protected forest areas in Indonesia – goes some way towards addressing the problems of land tenure.

⁷⁴ Ibid.

⁷⁵ Statistics Directorate General of Forestry (2009), *Statistics 2009*, Table V.2.7 Timber Production by source 2007-2009

⁷⁶ Minister of Forestry, Decree Number SK101 of 2004 *The Acceleration of Plantation Development and raw Material Supply for Pulp and Paper Industry*

⁷⁷ David Raitzer (2008), *Assessing the Impact of CIFOR's Influence on Policy and Practice in the Indonesian Pulp and Paper Sector*, CIFOR, Indonesia

National parks or protected areas provide a regulatory disincentive to forest clearing for local populations. However, they do not address the underlying economic incentives for local communities to clear forests in order to escape poverty.

4.4 Conversion of forest land for other uses

Agricultural expansion is the major proximate cause of deforestation in tropical countries, while economic concerns are the major underlying cause of deforestation.⁷⁸

In Indonesia, no proximate causes (i.e. agricultural expansion, increased urbanization or timber extraction) or underlying causes (economics, demographics, policy, politics/institutions and culture/socioeconomics) of deforestation can be excluded. All are present to varying degrees across different provinces.

Indonesia lacks national-level data to quantifiably identify the leading causes of deforestation. However, a report published by the European Commission noted that while proximate causes vary, agriculture was the leading cause of deforestation in Indonesia.

Further, there is a positive correlation between poverty and forest cover, and a negative correlation between poverty and agricultural suitability of land in Indonesia.⁷⁹ In other words, forests are cleared for agricultural production to escape poverty.⁸⁰

Poor economic conditions in Indonesia have historically prompted higher levels of land clearing for agricultural purposes.⁸¹ During the Asian financial crisis the number of households clearing forestland for agricultural purpose increased by as much as 40 per cent.⁸²

Planting of crops is also used by smallholders as a means of establishing land tenure in a country where land tenure is often ambiguous.⁸³

These factors exert significant pressure on existing forest resources. The result is a general disregard for land-use management and conservation policies. This pressure has even been documented by NGOs, which have noted that the Tesso Nilo National Park⁸⁴ is being encroached upon by trans-provincial immigrants. In Bukit Barisan Selatan National Park, the majority of the forest loss is due to forest areas being converted to coffee plantations and paddy fields,⁸⁵ not commercial forestry plantations.

⁷⁸ Geist, op.cit.

⁷⁹ Tacconi, L. and Kurniawan, I. (2006). Forests, agriculture, poverty and land reform: the case of the Indonesian Outer Islands. Occasional Paper No. 9. Australian National University, Asia Pacific School of Economics and Government, Canberra, Australia.

⁸⁰ Sunderlin, W.D. (2007). Poverty and forests: multi-country analysis of spatial association and proposed policy solutions. CIFOR. Bogor, Indonesia

⁸¹ Cf. William D. Sunderlin, Ida Aju Pradnja Resosudarmo, Edy Rianto, and Arild Angelsen (2000). The Effect of Indonesia's Economic Crisis on Small Farmers and Natural Forest Cover in the Outer Islands. CIFOR. Bogor, Indonesia.

⁸² Ibid.

⁸³ Chip Fay, Martua Sirait, Ahmad Kusworo (2000). Getting the Boundaries Right: Indonesia's Urgent Need to Redefine its Forest Estate. Southeast Asia Policy Research Working Paper, No. 25 and Deininger, K. (2003) Land Policies for Growth and Poverty Reduction. The World Bank, Oxford University Press, Washington DC.

⁸⁴ The Tesso Nilo forest in Riau Province is one of the largest forest tracts in Sumatra and an important habitat for the elephant population

⁸⁵ Ministry of People's Welfare (2003). *Submission for Nomination of Tropical Rainforest Heritage of Sumatra by the Government of the Republic of Indonesia*, The Coordinating Minister for People's Welfare, Jakarta, January 2003.

In this context, sustainable forest management and the development of plantations provides a mechanism by which environmental values can be safeguarded.

As demonstrated above, the pulp and paper sector contributes significantly to poverty reduction in Indonesia. Formal (and informal) employment alleviates the need for subsistence farming and swidden agriculture.

Similarly, community forestry programs implemented by forestry operators and the allocation of lands for community use as required by Indonesian law⁸⁶ within forestry concessions restrict small-scale forest encroachment to confines areas and provide security of land tenure.

In this context forestry plantations provide a level of environmental stewardship that would not be provided in the absence of large-scale commercial forestry. Plantations play a significant role in forest conservation and sustainable forest management, and plantations as a form of intervention that prevents further illegal and unsustainable encroachment on natural forests and maintains forest landscape integrity This is recognized by the Intergovernmental Forum on Forests (the precursor to the United Nations Forum on Forests).⁸⁷

Sound land management practices are not economically feasible for a great number of smallholders. For example, the establishment of agriculture and estate crops on peat lands requires careful irrigation, drainage and water management systems with a high level of planning and technical expertise. This is often outside the expertise of smallholders, who produce low yields and have poor management practices.⁸⁸ Similarly, a 'no-burn' land clearing by smallholders is not economically feasible,⁸⁹ resulting in broad, uncontrolled slash-and-burn clearing by smallholders.

However, in large-scale plantations, detailed planning must be undertaken. This includes AMDAL (environmental impact assessments) as well as macro- and micro-delineation for the existing landscapes. AMDAL reports and planning documentation must be submitted to the Ministry of Forests for approval before any plantation activity can be undertaken.

Large-scale forestry developments provide a direct economic benefit that bolsters land tenure security, sustainable land use and a level of landscape protection that would otherwise be absent. Moreover, it is a joint approach between corporations and smallholders that balances both economic and environmental concerns within the boundaries of Indonesia's existing legal framework.

⁸⁶ Ministry of Forestry Decree 70/Kpts-II/1995

⁸⁷ See Intergovernmental Forum on Forests (1999). 'The Role of Planted Forests in Sustainable Forest Management'. Report of the International Expert Consultation. April 6 to 10, 1999, Santiago, Chile.

⁸⁸ Government of Indonesia (2007). REDDI – Summary for Policymakers.

www.dephut.go.id/INFORMASI/LITBANG/IFCA/Summary%204%20policy%20makers_final.pdf

⁸⁹ V H.J. Sargeant (2001). Vegetation fires in Sumatra, Indonesia. Oil palm agriculture in the wetlands of Sumatra: destruction or development?. Government Of Indonesia, European Union and Natural Resources International Limited. Brussels.

4.5 Carbon sinks as alternatives to Forestry

A number of governments and multilateral aid organizations have proposed that developing countries implement systems to measure 'avoided deforestation', based on historical levels of deforestation. These measurements would be used as the basis for generating carbon credits, which could then be sold and/or traded and thus generate income for communities, businesses and individuals that would otherwise engage in agriculture or forestry. This would be the basis of a 'low carbon economy' in Indonesia.

These propositions rely on three assumptions.

The first is that Indonesia's emissions from deforestation and forest degradation are high.

These propositions have been based on assessments of the rates of emissions from Indonesia which recently have been shown to be significant over estimations. Research commissioned by the World Bank and the Norwegian Government has produced new, more technically-based estimates of carbon sinks in Indonesia which show Indonesia's emissions of carbon from forest activity in around 390 Gt (gigatonnes) CO₂e (carbon dioxide equivalent), not 1490 G tonnes CO₂e, which is the number conventionally cited as drawn from assessments used by the UN Intergovernmental Panel on Climate Change (IPCC).

The second is that there is a prospective international, government-backed system for the trading of carbon emissions. There is not. Current negotiations under the United Nations Framework Convention on Climate Change have agreed to address REDD (reduced emissions from deforestation and forest degradation), but there is no unilateral movement to generate carbon credits within this framework.

The third is that a carbon price – if ever determined -- will be high enough to compensate individuals, communities and businesses for any foregone income. As has been demonstrated elsewhere, the opportunity cost for replacing forestry or agriculture is particularly high. One analysis posits a conservative net present value (NPV) from palm oil, for example at USD3340, compared with USD2200 for carbon sequestration at a generous price of USD10/tC, excluding transaction costs. A generous estimate of a NPV for timber felling within tropical forests yields USD4400.

The proposition, then, that carbon 'farming' or payments for environmental services (such as carbon sequestration) could somehow offset or equate to the economic contribution of forestry is fanciful at best.

Sources

- Abeyasinghe, T. and Forbes, K (2005), Trade Linkages and Output-Multiplier Effects: A structural VAR approach with a focus on Asia, *Review of International Economics*, 13 (2) p 356-75
- Abeyasinghe, T. and Forbes, K (2005), Trade Linkages and Output-Multiplier Effects: A structural VAR approach with a focus on Asia, *Review of International Economics*, 13 (2) p 356-75
- American Forest & Paper Association (2007). Wood for Paper: Fiber Sourcing in the Global Pulp and Paper Industry, Prepared by Seneca Creek Associates, LLC
- Asia Pulp and Paper (2007). Corporate Social Responsibility Report 2007. Jakarta, Indonesia
- Asia Pulp and Paper (2008). Corporate Social Responsibility Report Indonesia. Jakarta, Indonesia
- Badan Pusat Statistik (2007). Recent Migration 198 1980 – 2005 accessed at http://dds.bps.go.id/eng/aboutus.php?tabel=1&id_subyek=12 Accessed
- Barr, Resosudarmo, Dermawan, McCarthy and Setiono (2006), Decentralisation of Forest Administration in Indonesia: Implications for Forest Sustainability, Economic Development and Community Livelihoods, Bogor, Indonesia, Centre for International Forestry Research (CIFOR)
- Bogor Agricultural University (2008), Peran dan Kontribusi Industri Pulp & Kertas PT. Indah Kiat dan Hutan Tanaman Sinar Mas dalam Pembangunan Sosial - Ekonomi Riau 2006, Report commissioned by APP, unpublished
- BPS (2010) Hasil Sensus Penduduk 2010 accessed at http://www.bps.go.id/65tahun/SP2010_agregat_data_perProvinsi.pdf
- BPS Riau (2010). Press Release Employment Situation Riau Month February 2010, accessed at riau.bps.go.id
- BPS Riau (2010). Press Release Riau Growth without Oil in 2009, accessed at [Riau.bps.go.id](http://riau.bps.go.id)
- BPS Statistics Indonesia (2007), Selected Socio-Economic Indicators of Indonesia, March 2007
- BPS Statistics Indonesia (2009), Selected Socio-Economic Indicators of Indonesia, October 2009
- Brown, Simangunsong, Sukadri, Brown, Sumirta, Dermanwan and Ruffie (2005), Restructuring and Revitalisation of Indonesia's Wood-Based Industry: Synthesis of Three Major Studies, Ministry of Forestry, CIFOR and DFID-MFP, November 2005
- Ekadinata A, Rahmanulloh A, Pambudhi F, Ibrahim I, van Noordwijk M, Sofiyuddin M, Sardjono MA, Rahayu S, Dewi S, Budidarsono S, Said Z. 2010. Carbon Emissions from Land Use, Land Use Change and Forestry (LULUCF) in Berau District East Kalimantan, Indonesia. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Office.
- FAO (2009). Is There A Future Role For Forests And Forestry In Reducing Poverty? Working Paper No. APFSOS II/WP/2009/24 by The Regional Community Forestry Training Center, Bangkok
- FAO (2010) Global Forest Resources Assessment 2010 Main Report. Food and Agriculture Organization of the United Nations, Rome, Italy.
- Fay, Chip, Martua Sirait, Ahmad Kusworo (2000). Getting the Boundaries Right: Indonesia's Urgent Need to Redefine its Forest Estate. Southeast Asia Policy Research Working Paper, No. 25 and Deininger, K. (2003) Land Policies for Growth and Poverty Reduction. The World Bank, Oxford University Press, Washington DC.
- Geist, H.J, Lambin, E.F. (2001). 'What Drives Tropical Deforestation?. LUCR Report Series 4, Louvain-la-Neuve, 2.

- Government of Indonesia (2007). REDDI – Summary for Policymakers. www.dephut.go.id/INFORMASI/LITBANG/IFCA/Summary%204%20policy%20makers_final.pdf
- Grafstrom, Nils (2007). Paper, Packaging and Forest Products. Stora Enso Latin America
- Hidayat, Dr H. (2007), Pulp and Paper in Japan and Indonesia: for the Viewpoints of Political Ecology, V.R. F. Series, No. 427, March 2007
- Hillman, Dave (2010). “China’s Pulp Purchases Reach 13.68 Million Mt in 2009” Paperage, February 12
- Intergovernmental Forum on Forests (1999). ‘The Role of Planted Forests in Sustainable Forest Management’. Report of the International Expert Consultation. April 6 to 10, 1999, Santiago, Chile.
- International Labour Organization (2010). Labour Conditions in Forestry in Indonesia, Jakarta Office; ILO, 2010
- International Monetary Fund (2011) <http://www.imf.org/external/data.htm> February 2011
- Jaakko Pöyry Consulting (2005). World Paper Markets 2020, as cited in Jaakko Pöyry Magazine Know How Wire, January 2006, <http://www.forestindustry.poyry.com/linked/en/news/KnowhowWireJanuary2006.pdf>
- Maturana, N. Hosgood, A. Suhartanto (2005) Moving towards Company Community Partnerships: Elements to take into account for fast-wood plantation companies in Indonesia (Bogor Indonesia, CIFOR)
- Minister of Forestry, Decree Number SK101 of 2004 The Acceleration of Plantation Development and raw Material Supply for Pulp and Paper Industry
- Ministry of Forestry (2008), Forestry Statistics 2008, Table I.1.1. Extent of Forest Area, Inland Water, Coastal and Marine Ecosystem Based on Forestry Ministerial Decree on the Designation of Provincial Forest Area, Inland Water, Coastal and Marine Ecosystem and Forest Land Use by Consensus
- Ministry of Forestry Decree 70/Kpts-II/1995
- Ministry of People’s Welfare (2003). Submission for Nomination of Tropical Rainforest Heritage of Sumatra by the Government of the Republic of Indonesia, The Coordinating Minister for People’s Welfare, Jakarta, January 2003.
- Nasi, P. Koponen, J. Poulsen, M. Buitenzorgy, W. Rusmantoro (2007). ‘The impact of Landscape and corridor design on primates in large scale industrial tropical plantation landscape’, Biodiversity and Conservation, Vol. 17(5)
- Nawir, L Santoso (2005) ‘Mutually beneficial company-community partnerships in plantation development: emerging lessons from Indonesia’, International Forestry Review Vol. 7 (3)
- Raitzer, David (2008). Assessing the Impact of CIFOR’s Influence on Policy and Practice in the Indonesian Pulp and Paper Sector, CIFOR, Indonesia
- Republic of Indonesia (2010). Report on the Achievement of the Millenium Development Goals Indonesia 2010, October 2010. Jakarta, Indonesia
- Republic of Indonesia. Forest Management Act No. 5/1967; GR 7/1990; Basic Forest Law No. 41/1999; GR 34/2002
- Sabam Siagian (2008). “Catatan Pekanbaru: Riau, Provinsi Yang Maju Pesat” in Suara Pembaruan Daily, March 22, 2008 and IMF (2011) indicators www.imf.org/statistics

Sargeant, V.H.J. (2001). Vegetation fires in Sumatra, Indonesia. Oil palm agriculture in the wetlands of Sumatra: destruction or development?. Government Of Indonesia, European Union and Natural Resources International Limited. Brussels.

Statistics Directorate General of Forestry (2009), Statistics 2009, Table V.2.7 Timber Production by source 2007-2009

Sunderlin, W. (1999), The Effects of the Economic Crisis and Political Change on Indonesia's Forest Sector, 1997-1999, CIFOR, November 1999, http://www.cifor.cgiar.org/publications/pdf_files/crisis.pdf

Sunderlin, W.D. (2007). Poverty and forests: multi-country analysis of spatial association and proposed policy solutions. CIFOR. Bogor, Indonesia

Tacconi, L. and Kurniawan, I. (2006). Forests, agriculture, poverty and land reform: the case of the Indonesian Outer Islands. Occasional Paper No. 9. Australian National University, Asia Pacific School of Economics and Government, Canberra, Australia.

Whiteman, A. (1996), Economic Rent and the Appropriate Level of Forest Product Royalties in 1996, Report No: SMAT/EC/96/1, Indonesia-UK Tropical Forest Management Project, Jakarta, Indonesia, <http://www.fao.org/forestry/11869/en/>

World Bank (2006). Making the New Indonesia Work for the Poor, accessed at: http://siteresources.worldbank.org/INTINDONESIA/Resources/Publication/280016-1152870963030/2753486-1165385030085/Overview_standalone_en.pdf

World Bank (2006). Strategic Options for Forest Assistance in Indonesia. The International Bank for Reconstruction and Development, Washington.

World Bank (2011), World Development Indicators, February 2011

World Trade Organization (2007). Trade Profile for Indonesia, October 2007 <http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?Language=E&Country=ID>

Wulandari, Fitri. 2006. "Analisis Struktur dan Kinerja Industri Pulp dan Kertas di Indonesia Tahun 1994 dan Tahun 2001." Tesis tidak dipublikasikan. Fakultas Ekonomi Universitas Diponegoro. Semarang.