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Can traditional forest management protect and conserve ironwood (ulin) stands? An option and approach in East Kalimantan

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6 Ironwood products: the chain of production to consumption

6.1. Introduction

Despite the fact that Indonesian law forbids the export of ironwood timber, and the Ministry of Agriculture has enacted a ministerial decree (*Surat Keputusan*) Nr. 54/Kpts/Um/2/1972 creating a ban on the cutting of ironwood trees with a diameter at breast height (DBH) of less than 60 cm, modern processed products continue to be heavily traded and illegally exported to many consuming countries and provinces in Indonesia. Indeed, ironwood has been included on the IUCN's Global Red List of vulnerable and threatened species since 1994. However, it has not yet been included in the CITES Appendix. As a result of deforestation and forest conversion, ironwood has now been logged in most of its home range. This high value tree species is threatened by international trade and is also a target species for selective illegal logging in many production, protection and conservation forests in Kalimantan.

Information about ironwood production can be obtained from the Provincial Forest Service (*Dinas Kehutanan Tingkat I*), however this does not reflect all cases of ironwood cutting and ironwood timber production is often not reported. Therefore, the information available on the cutting volume of ironwood is far from complete. Because of this, the identification of a proper policy intervention to support the sustainable management of ironwood is not easy. Although the study presented in this chapter is about East Kalimantan, ironwood trade information is also available for other regions, such as South Kalimantan and South Sulawesi. The implications of this study may be two fold. First, from a methodological perspective, where government data are poor and inconsistent, these data can still be useful for assessing the severity of the illegal exploitation of ironwood. Second, a study such as this can generate useful information for local policy initiatives, because good qualitative information is absolutely essential to back up the use of unreliable government statistics. This chapter is designed to fill existing information gaps with regard to ironwood logging, production, distribution and

consumption. This chapter also describes ironwood business and trade as a side-effect of illegal cutting in the province of East Kalimantan. It focuses on what we can learn about current markets for ironwood by analysing available ironwood trade documentation and examining whether the current Forest Law Enforcement (FLE) policies are appropriate for curbing illegal trading and cutting of ironwood.

6.2. Methods, research area and objectives

6.2.1. Methods

This study uses a multidisciplinary approach comprising socio-economics and politics to analyse the linkages between local, regional and international scales of intervention. The methods of collecting data and information for this objective have been discussed in Chapter 2. I have made field observations, and held semi-structured meetings with various stakeholders (government and administrative representatives; local and customary authorities; companies associated with timber extraction, processing and commercialisation; and members of civil society), as well as collected and analysed data on forests and taxes.

6.2.2. Research area

Research for this chapter was largely conducted between 2005 and 2007 in the cities of Balikpapan and Samarinda, and the districts of Kutai Kertanegara, East Kutai, Penajam North Paser, and Paser, where sawmills and industries were visited during this period. The flow of ironwood raw material, which comes from diverse areas, districts and municipalities, is complex.

6.2.3. Research objectives and questions

The main objective of this chapter is to provide information about the chain of production to consumption for ironwood. It also provides a trade analysis and an assessment of the extent of ironwood business, including those external factors that contribute to the degradation of ironwood stands. The study also addresses the following questions:

1. Where are the sources of ironwood raw material from different status forests?
2. What is the extent of ironwood business and trade in East Kalimantan province?
3. What are the specific factors that drive ironwood trade and which actors are involved?

4. To what extent is ironwood business, trade and the market chain a side-effect of illegal cutting and what we can learn about current ironwood markets by analysing available ironwood trade documentation
5. Are the current Forest Law Enforcement (FLE) policies appropriate for curbing the illegal cutting and trading of ironwood?

6.3. Identification of raw material sources

6.3.1. Clear-cutting of conversion forest¹¹ areas

Sources of ironwood timber originate from forest areas that have been converted to transmigration areas, oil palm and tree crop plantations or timber estates and mining areas. Within the conversion forest, clear-cutting or felling is allowed, and activities such as transmigration settlements are supposed to be located in contiguous blocks, after the area has been logged. Over the last two decades, much ironwood habitat in Kalimantan has been cleared to make way for transmigration settlements and timber and oil palm plantations. The timber estate plantation transmigration scheme (*Hutan Tanaman Industri Transmigrasi* – HTI-Trans), introduced in 1992, allows for clear-cutting in forest concessions (*Hak Pengusahaan Hutan* – HPH), provided that 10 per cent of the area is reserved for transmigration purposes. The rest of the arrangements are similar to other HTI contracts. In 1992, the Ministry of Forestry (MoF) took other measures to benefit the pulp and paper industry by introducing regulations. For example, it is now required that all production forests within a 100 km radius of a pulp mill must be used for pulpwood plantations. Ministerial Decision 442/1992 circumvents the original HTI regulations on converting productive natural forests and permits clear cutting of significant stands of commercially valuable timber (Triwibowo & Haryanto 2001).

Ideally, the land allocation of tree crops and oil palm plantation areas is expected and designated to rehabilitate the unproductive (or degraded) forest. These types of land use are also expected to rehabilitate young secondary forest with a residual standing forest inventory of less than 20 m³ per hectare of commercial species with a minimum diameter of 30 cm DBH. Bush land or areas infested with *Imperata cylindrica* grassland, often considered to be useless wastelands and called *lahan tidur* (sleeping land) in local terms, must also be taken into consideration. In reality, most of the land allocations for plantation areas are natural forests with a high density of trees. The conversion process is implemented through the forest release permit (*Izin Pelepasan Kawasan Hutan*). The release of forest areas includes a permit to convert forest to agricultural land, tree crop plantation, cattle ranch or for mining. Among the economic considerations of

11 Forest that is designated (under an IPK licence) for clearance and permanent conversion to another form of land use; typically a timber or estate crop plantation. IPK (ijin pemanfaatan kayu) or legal conversions via timber use permit, specifically allowing clearing for plantations or transmigration settlements.

the companies that seek a permit to develop tree crop and oil palm plantations is an assumption that natural forests with highly valuable timber will give an early profit. Where credit is unavailable or expensive, it is cheaper to destroy natural capital and gain immediate income than to invest in its long-term production.

In Kalimantan, the development of tree crop and oil palm plantations have been developed using land preparation techniques such as clear cutting or felling system. These techniques are employed because timber or tree crop plantations comprise fast growing species such as *Acacia mangium* and oil palm *Elaeis guineensis*, which needs full light. These techniques involve cutting down all of the natural trees and ironwood trees are no exception. The clearing of the land in this way resulted in a considerable increase in the production and trade of timber, particularly ironwood (Obidzinski 2003).

For reasons that are not clear, during fieldwork I observed ironwood logs, which had not yet been removed, piled up at certain sites or left inside the forest. Ironwood has excellent physical characteristics; it is such highly durable and very strong and, even though the logs may be left for years, they are will not decay. When the demand for ironwood raw material increases, local people who live around timber plantations and transmigration areas dig up, pull up and sell the timber to small-scale sawmill industries. A survey of field locations of ironwood stems in conversion forest areas reveals stockpiles of logs in, among others the timber estate plantation area of PT. Surya Hutani Jaya, in the Sebulu sub-district, Kutai Kertanegara District, East Kalimantan. The majority of the ironwood sourced from forest conversion comes from districts in East Kalimantan such as Kutai Kertanegara, East Kutai, Penajam North Paser and Paser.

In terms of the process of land clearing, the fastest and cheapest method of clearing new land for plantation is burning. Fire has always been a useful instrument to get rid of all the leftovers in the forest after the valuable timber has been harvested. While ironwood stems cannot escape these events, it is one of the tree species that is resistant to fire. Indeed, fire cannot burn the ironwood stems at all; even hot fires rarely penetrate the dense wood and only scorch the surface of stems.

Most of the ironwood raw material destined for small sawmills, large-scale industries, and domestic uses is sawn in the form of square blocks. The square blocks, beams, posts and poles are sawn in the forest or on converted forest land, because the timber's density and weight make it difficult to transport round log. Typically, the extremely heavy logs are first split and cut into square blocks and beams in order to facilitate transportation. The woodcutters or chainsaw men and loaders (*tukang pikul*) call the square blocks *segitiga* (triangular), although they do not really look like triangles. Other forms of square blocks, which have a longer shape, are commonly are called *blambangan*. During field work, I observed that the forms and surface conditions of the square blocks could be distinguished and, consequently, the sources of ironwood raw material could be identified. Typically, the surface conditions of the square blocks (*segitigas*) are black after burning, which indicates that its sources are transmigration areas and timber estates

or tree crop plantation areas. By contrast, *blambangan* raw material has better surface conditions and it originates from fresh cutting, frequently from timber poaching in conservation areas. These areas, including Muara Kaman Sedulang Forest Reserve, Kutai National Park and other concession areas such as Menamang and Bengalon in Muara Bengkal sub-district, are close to the research villages (personal observation 2005; Anonymous 2000a). Square blocks of both *segitiga* and *blambangan* are supplied to many small sawmills located close to sources of raw materials.



Figure 6.1. A) *Segitiga* (triangular), with burning wood surface; (B) *Blambangan*

Procurement and origins of ironwood timber

Sawmills in Sebulu sub-district rely on three methods of procuring the necessary raw material of ironwood for processing: (1) they obtain ironwood square blocks as a result of land-clearing of timber plantation areas and of 'village forests', under the guise of establishing community plantations for village cooperatives or *Koperasi Unit Desa* (KUD) and village work groups or *Kelompok Tani* (KT); (2) they establish a network of cutting crews, who are charged with the task of seeking, cutting and loading ironwood square blocks and delivering it to sawmills; and (3) they buy ironwood square blocks from cutting crews working independently.

Gathering ironwood timber waste from transmigration areas in Sebulu is largely undertaken by migrants from Java who have been in the area since 1981. Gatherers are either part-time or full-time collectors. Some work under a head cutter, who takes care of the transactions with the owners of sawmills or his agents. Most ironwood raw material traders are unlicensed middlemen (illegal traders).

Sebulu sub-district is a centre for the timber processing industries and most of the transmigrants who work in ironwood sawmills come from a limited number of villages: Sumber Sari, Sebulu Modern, Manunggal Jaya, Giri Agung and Sebulu Ulu. During my interview with the village leader (*Kepala Desa*) of Sumber Sari, he explained that activities initially occurred because a number of timber entrepreneurs from Samarinda

saw the potential of ironwood waste. The timber entrepreneurs provide the capital and equipment, such as timber cutting machines, there is an incentive for migrants to gather and process ironwood waste. In Sumber Sari village, for example, there are 70 sawmills actively processing ironwood timber. Each sawmill has five ironwood seekers and loaders, four circle machine operators, a driver and a co-driver (*kernel*).

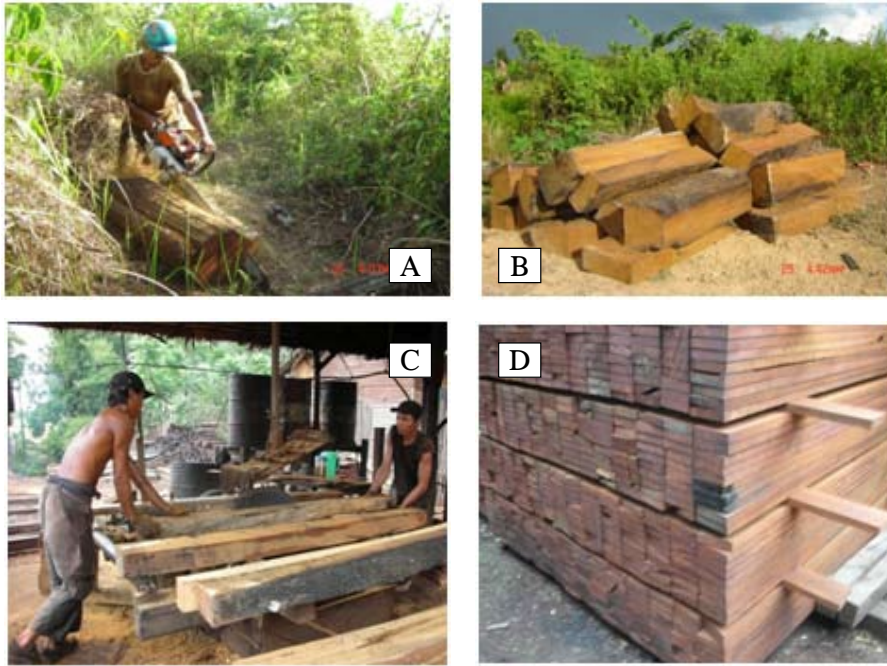


Figure 6.2. An ironwood scavenger saws and cuts stems and stumps of ironwood; (B) Ironwood square blocks as raw material; (C) Migrants in a primary processing sawmill; (D) Semi-finished flooring products

Interviews with migrants revealed that they are forced to become seekers and gatherers of ironwood waste because their farming activities in the transmigration settlements did not develop as planned. Cropping intensities and yields of annual crops were much lower than expected. Settlers have not been able to develop their land fully. Additional factors include shortages of family labour, low use of animal traction and the settlers' lack of experience, combined with the inefficiency of supporting services, the settlers' preference for off-farm employment, soil degradation, erosion and difficulties in marketing crops. Income from ironwood gathering is substantially higher than from agricultural yields. However, it is not a sustainable source of income. Unsustainable logging will ultimately affect the communities' livelihoods. The migrants interviewed

also realised that their work to gather and process ironwood timber did not have long-term prospect. They understood that they could not rely on this work as their main source of income. To keep these sawmills supplied with ironwood raw materials, woodcutters, loggers and gatherers went further and further into accessible remote areas, into logged-over forests or into protection forests to cut and salvage small-diameter ironwood trees. If they continue to cut down trees without any rehabilitation or regeneration efforts, there will be no valuable tree species left for the next generation.

Orang kerja kayu literally means ‘people working with timber’ to gather ironwood waste, which provides them with a quick income. They cut the remaining ironwood stumpages to produce raw material with a length of only 1-2 meters. This is why such raw material is called *waste* (*limbah*). Initially, in 1999, a number of independent timber producers in Sebulu made the decision to add value to ironwood ‘waste’ timber by producing quality-sawn timber. These operational mini-sawmills are powered by diesel are manually operated by at least two people during the slicing process (see fig 6.2 C). The mill is operated by a team of migrants who are paid according to the volume of lumber produced by the mill.

Using these mini-sawmills, they can carry out basic cutting for flooring. During the production of semi-finished flooring in primary processing sawmills, the remaining raw materials are processed as side- or secondary products, such as *siring* (thin planks), *siring modern or millennium*¹² (millennium planks), *sirap* (shingles), and *papan* (plank boards). The forms, size and price range of ironwood products obtained from primary processing in Sebulu are presented in the table below.

The ironwood secondary products from sawmills in Sebulu are transported by trucks or pick-up cars to buyers for reselling in timber kiosks in Samarinda or Balikpapan. These secondary products are sold for local uses. Meanwhile semi-finished flooring produced at these sawmills tend to be special orders for export, which go on to be processed further into finished products. These semi-finished floorings are processed at sawmills in Samarinda, at a distance of about 64 km from the location where the final processing takes place. In this way, all sawmills, whether small or large, can participate and have a role to play in ironwood production for export.

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Another plank of ironwood processed product or modern plank call locally millennium plank.

Table 6.1. Forms, size and price range of ironwood obtained from primary processing

Forms	Size	Price Range (Rp ¹³ /m ³ /packet)	Uses
<i>Siring</i> (Thin plank)	1 x 10 x 200 cm 1 x 10 x 100 cm	15,000/packet (10 pieces) 8,000/packet (10 pieces)	For wall and floor For fence
<i>Siring</i> (Plank) Millennium	1 x 12 x 200 cm 1 x 12 x 100 cm	20,000/packet (10 pieces) 10,000/packet (10 pieces)	For wall and floor For fence
<i>Sirap</i> (Roof Shingles)	0.2 x 11 x 30 cm	25,000/packet	For roof
<i>Papan</i> (Plank board)	1.3 x 14 x 200 cm	3,000/piece	For wall and floor
Flooring a. Jumbo b. Standard	2.5 x 14 x 100 cm 2.5 x 14 x 200 cm 2.5 x 10.7 x 100 cm 2.5 x 10.7 x 200 cm	5,000/piece 10,500/piece 2,500 /piece 5,000/piece	Export order (include NTFP)

Source: Interviews, August 2006

Because the ironwood products are very heavy, the transport to the secondary processing location is complicated. Each truck or pick-up car can load 1.5 m³ of semi-finished flooring. To facilitate the transportation of ironwood products, the timber owner regularly provides small payments (*pungutan liar-pungli*) through the driver to security and administration officials posted along the road. If they meet in at coffee shop, he treats them to a drink. During my field investigations, I observed that there were twelve stopping points along the route of transmigration settlements where small payments were made. These small payments were between Rp. 5,000 to Rp. 20,000 per truck. At one stopping point, the organised gangs (*oknum*) or a local term '*polisi cuk*' asked the wood owner for more, between Rp. 50,000 to Rp.150, 000 (US\$ 1 = Rp.10,000). The *oknums* commonly base of their operations at *ojek* (motorcycle hire) posts or guard posts. Along the route from Sebulu to Samarinda, the cumulative small payments can reach Rp. 45 million/per day (based on 300 pick-up trucks per day). These small payments are not the only source of such informal income, however. The police and the military also ask for additional small monetary contributions (*uang rokok*), or for donations in kind (i.e. timbers). All the sawmills in Sebulu were specialised in ironwood processing and the surrounding forest was also exploited without much state control. According to the head of the Provincial Forest Service in Samarinda, most of the ironwood raw

material that is processed by sawmills in Sebulu is illegal timber locally called '*Spanyol*' (abbreviation of *separo nyolong* means a part of raw material from timber poaching).

Legality

The physical form of timber and the island's zone (explained below) are used to determine the tropical wood group as a base of forest contribution at the Forestry Department in Indonesia (the ministerial decree of the Ministry of Forestry Nr.163/Kpts-II/2003) and the standard prices for the calculation of Forest Resource Rent Provision (PSDH = *Provisi Sumber Daya Hutan*) (the ministerial decree of the Ministry of Industry and Trade Nr.444/MPP/Kep/6/2003). These physical forms of timber include: round wood; small round wood (< 30 cm); logging waste; wood chips; other forms of wood; timber from plantation forest; and timber from the Perhutani Company in Yogyakarta Province. Indonesia's islands are divided into zones: Zone I covers Sumatra, Kalimantan, Sulawesi and Maluku; zone II covers Papua, Nusa Tenggara and Bali. Round wood groups are categorised as follows: (1) meranti (*Shorea spp.*) group and mixed woods (*rimba campuran* or multi-species timber) group; (2) fancy wood and *torem* wood (*Manilkara kanosiensis* Lam.) and (3) another wood group.

Although ironwood is considered to be a protected tree species, a contribution to its reforestation is included in its trade prices. Ironwood timber is included, along with 32 other kinds of timber in the fancy wood category (see Appendix 3) with a standard price for calculating the Forest Resource Rent Provision (PSDH) at about Rp. 905,000 per cubic metre. The ironwood Reforestation Fund (DR = *Dana Reboisasi*) takes about 18 dollars per cubic metre of timber, but the ironwood business remains profitable. Informally obtained ironwood timber is easier to trade than other kinds of timber. In order to understand this, table 6.2 compares the types of timber in relation to the Reforestation Fund and the Forest Resource Rent Provision.

Table 6.2. Comparison between Reforestation Fund and Forest Resource Rent Provision by timber group in Indonesia

No.	Island Zone	Species Group	Forest Contribution	
			Reforestation Fund (US\$)	Forest Resource Royalty (Rp)
1.	Kalimantan and Maluku	1. Meranti ¹⁴	US\$ 16/m ³	500,000
		2. Mixed woods (Rimba) ¹⁵	US\$ 13/m ³	300,000
2.	Sumatera and Sulawesi	1. Meranti	US\$ 14/m ³	500,000
		2. Mixed woods (Rimba)	US\$ 12/m ³	300,000
3.	Papua, Nusa Tenggara and Bali	1. Meranti	US\$ 13/m ³	414,000
		2. Mixed woods (Rimba)	US\$ 10.5/m ³	221,000
4.	All Indonesia	1. Ebony ¹⁶	US\$ 20/m ³	6,000,000
		2. Natural teak	US\$ 16/m ³	192,000 s.d 764,000
		3. Fancy wood (Sonokeling, Ramin ¹⁷ and ironwood)	US\$ 18/m³	905,000
		4. Cendana ¹⁸ wood	US\$ 18/m ³	700,000 up to 7,000,000
		5. Chip or particle wood	US\$ 2/m ³	204,000
		6. Logging waste and other special sortimen	US\$ 2/m ³	204,000

Source : Ministerial decree of the Ministry of Industry and Trade Nr. 444/MPP/Kep/6/2003 and Indonesian Government Regulation Nr. 92/1999.

As a result of clear-cutting conversion forests, local people and foresters generally categorise ironwood stems as waste (*limbah*). The term *limbah* is confusing because according to the regulation issued by the Ministry of Forestry, it means of a small log (*kayu bulat kecil*), with a length of less than 1.20 metre. Initially, no rules or licences were implemented for the gathering of ironwood waste. However, once waste began to become valuable and the demand for ironwood timber increased, the Provincial Forest Service had to step in and manage and regulate this forest product. According to the Provincial Forest Service staff in Samarinda, in order to avoid misinterpretation, the term *limbah* has been changed to mean ‘rejected timber’ (*kayu rejek*). This was done

¹⁴ Meranti from Dipterocarpaceae such as (*Shorea spp.*), *kapur* (*Dryobalanops sp.*), *keruing* (*Dipterocarpus sp.*) and *bangkirai* (*Shorea laevis*).

¹⁵ Mixed woods (*Rimba campuran*) comprise many different tree species.

¹⁶ Ebony or *kayu hitam* (*Diospyros spp.*): the best quality wood in Sulawesi.

¹⁷ Sonokeling (*Dalbergia latifolia*) and Ramin (*Gonystylus spp.*).

¹⁸ Cendana (*Santalum album*).

following an increase in the number of timber clearance permit (*Izin Pemanfaatan Kayu* - IPK) and timber extraction and utilisation permit (IPPK¹⁹ or *Izin Pemungutan dan Pemanfaatan Kayu*) (see box 6.1) applied for by local people in the form of a cooperative (*Koperasi Unit Desa*, KUD) proposing to utilise the timber waste. A number of local organisations are also involved in ironwood gathering and trade cooperatives (see table 6.3) and *HIPKABA* (*Himpunan Pengusaha Kayu Bangunan*) building material entrepreneur associations. Each co-op has a permit to establish itself, and some of those currently engaged in logging may have permits from the local government that allow for cutting.

Ironwood collection is classified as a small-scale, forest-based enterprise. Recently, local people established cooperatives such as the *Koperasi Unit Desa* or village cooperative (KUD), cooperative with enterprise or *Koperasi Serba Usaha* (KSU), and the villagers' work group (*Kelompok Tani*). They requested timber utilisation permits (*Izin Pemanfaatan Kayu* or IPK) from the Provincial Forest Service for ironwood and other timbers species. In fact, there are two types of utilisation permits for ironwood: (1) timber utilisation permits for ironwood in waste form and dead tree, and (2) permits for cutting new ironwood trees. This last permit relates to the cutting of ironwood trees in forests that are designated for conversion.

Box. 6.1 Timber Clearance or Utilisation Permit (*Izin Pemanfaatan Kayu*, IPK)

The IPK is a permit that is given to a company by the Provincial Forest Service to enable the exploitation of logs in conversion forests. A conversion forest is classified as having a standing volume of less than 20 m³/ha that has been proposed for conversion for agriculture/plantation/transmigration or industrial forest plantations (*Hutan Tanaman Industri/HTI*). A company wanting an IPK permit to clear the forest must supply the following documents to the Provincial Forest Service:

- land allocation decree from Governor
- report of micro wood survey result
- yearly work plan (*Rencana Karya Tahunan/RKT*) that is signed by the Provincial Forest Service to indicate that the actual developments in the field such as base camps, nursery, planting, have been installed.

¹⁹ IPPK (*Izin Pemungutan dan Pemanfaatan Kayu*) is a timber extraction and utilisation permit, which allows timber harvesting associated with forest conversion in areas designated as Social Forest or privately owned forest. Granted by district-local government since 1998.

Box. 6.1. (continued)

Generally, an IPK permits exploitation for one year, but this can be extended depending on the work plan of the company and the progress. Logs produced under an IPK belong to the company, but they can cooperate with a cutting subcontractor of the company. When such co-operation occurs, the company with the IPK pays royalties to the company carrying out the exploitation. The amount paid will depend on the standing volume in cubic metres, the size of the area, the condition of the area and its location.

Staff at the Provincial Forest Service in Samarinda explained that, based on a Department of Forestry letter, Nr. S.669/VI-BPHA/2006 (August 15, 2006), the location of sources of ironwood must be identified and the physical condition checked before a permit can be issued. Table 6.3 provides data on the volume of ironwood harvested by village cooperatives in 2006.

Table 6.3. The permit volume of ironwood from some village cooperatives in the districts of East Kalimantan in 2006

No.	Name of timber utilization permit and village cooperative	Volume (m3)
I.	Kutai Kertanegara District	
1.	KSU Karya Bhakti	813.00
2.	KSU Rakyat Desa Jonggon	13,110.00
3.	KSU Mujur	14,216.23
4.	KSU Timbau Lestari	1,050.00
5.	Koperasi Primer Karya Baru	841.00
II.	West Kutai District	
1.	IPK PT. Harapan Rimba Raya	2,049.00
2.	IPK PT. Kruing Lestari Jaya	7,340.00
III.	East Kutai District	
1.	KUD Karya Bhakti	813.00
IV.	Samarinda Municipality	
1.	Hamsyah Art Shop	
2.	Koperasi TNI-POLRI Purna Yudha	
Total		47,967.23

Source: Provincial Forest Service, 2006

6.3.2. Illegal cutting or timber poaching of ironwood

Concession forest areas

As continuous exploitation of ironwood trees results in a decrease in conversion forests, loggers are forced to go deeper into the forest. Loggers and gatherers are not concerned with the status of forests and this attitude has resulted in overexploitation. To keep the sawmills supplied with ironwood raw materials, woodcutters and loggers move further and further into accessible, remote areas but also re-enter previously logged forests to look for or cut and salvage small-diameter ironwood logs. The result has been a wave of destructive logging. A further source of pressure on the forests comes from new export processing industries established to produce semi-finished or ready-to-use products. The investments in these wood processing industries necessitate the permanent flow of ironwood to these centres. These were meant to be supplied with raw materials from illegal cutting but often these raw materials were short in supply and unable to meet the needs of sawmills and industries. As the demand for ironwood raw material increases, particularly in terms of inter-island and export trading, intensive cutting of ironwood trees occurs in many accessible concession areas. The result is that these sawmill and industries have to use ironwood raw material from other sources, or even obtain it from protected areas or indigenous reserve forests (*hutan adat*). The extensive areas where the forest was opened up by re-entry logging were subject to fires. Timber poachers of ironwood are a 'significant source' of fires in the areas in which they were operating, especially in the Sangatta, Sangkulirang, Menamang and Bengalon regions in the East Kutai District of East Kalimantan (Vayda 1999; Anonymous 2000a; Salam 2007). Fires were either started deliberately to facilitate removal of trees, or accidentally by cigarettes or campfires. The combination of these factors contributes significantly to the enormous damage to forests in parts of Kalimantan.

Almost all logging in tropical forests involves the short-term extraction of valuable timber species with little concern for the future of the forest. The logging activities are an inefficient extraction of timber and cause unnecessary damage to remaining trees, excessive waste wood left in the forest, soil erosion and river pollution. The ironwood raw materials come from excessive waste wood and fresh cutting of ironwood stands as a result of the Indonesian Selective Cutting and Planting System (TPTI = *Tebang Pilih Tanam Indonesia*) activities in concession areas such as the opening up of the working areas for base-camps, log yards, forest road infrastructure, and logging operations. To facilitate the transport of timber products, the logging concessionaires opened up roads to reach logging areas using heavy equipment (see box 6.2). The increased accessibility of forest areas opened by concessionaires is leading to greater problems of uncontrollable exploitation in large parts of the forests of Kalimantan. The opening up of access routes to and within forests further facilitates the entry of illegal loggers into the area. Currently the road network attracts outsiders looking for ironwood waste and who cut down the residual stands of ironwood in accessible concession areas that are

the target of selective illegal logging. These activities then result in illegal logging inside cutting blocks that have been exploited, or inside logged-over areas (LOA), which leave residual stands including ironwood. As the residual stands suffer from severe damage during the logging operation, extraction of the biggest trees of the most valuable species leads to destruction of vast areas. Large areas of forest have also been newly cleared and burned to create new agricultural plots. Concessionaires claim that logging gangs burn camps and logging trucks if a company attempts to interfere with their illegal activities. As more non-local people become involved in the collection of ironwood, this leads to more intensive logging practices. Migrants from Java, Sulawesi and other areas in Indonesia, who initially arrived as transmigrants, are interested in working in the ironwood business in order to boost their incomes.

Ironwood cutting in logged-over areas of concessions occurs in many areas in Kalimantan, such as in the cutting blocks and conversion forests of the P.T. ITCIKU (Timber Company) areas, Sepaku sub-district, Penajam North Paser District. Indeed, such activities were observed during visits to the area and field research. Gangs involved in illegal cutting are operating freely along logging roads. Numerous piles of ironwood sawn timbers indicate extensive portable saw mill operations within the forest. Within concessions, basic security measures are lacking, and road barriers are unmanned. I observed that a skid trail used by the illegal gangs to drag out rough-sawn timber even crossed one concessionaire's yard. Local entrepreneurs (known as '*cukong*') pre-finance these gangs; loans are paid back with timber delivered to sawmills and warehouse gates.

Box. 6.2 The tragedy of open access

Opportunities to exploit ironwood are facilitated by roads built for the timber industry. The following case-study from West Kalimantan illustrates the problem: First, there was a rapid individualisation of all standing ironwood trees, regardless of their size and the needs of village households. As traders began to seek out ironwood, most village men hurried into their forest territory and painted their names on as many trees as they could. Previously, only one or two trees would be claimed in advance, because this was sufficient to build a single structure for a household. The new practice resulted in claims by individuals to whole sections of the common territory. Traders made arrangements with individuals rather than the village as a whole; 'taxes' on contracted trees also went to individuals.

Box. 6.2. (continued)

Next, a variety of tenure arrangements emerged for sharing rights, contracting trees, buying ironwood 'territories' and transferring rights. This was followed by the development of a range of trading arrangements for selling the wood products. Villagers, however, were at a distinct disadvantage. Although they could buy or rent chain-saws and invest their labour in cutting and hauling timber to the roadside, they could not afford to buy or rent trucks, to pay the unofficial 'user fees' required of all non-company trucks using the logging roads or to buy fuel for their chain-saws.

The lack of capital led to the development of working arrangements with outsiders. Neither the locals nor the outsiders tried to prevent the overexploitation of ironwood or to protect the ecosystem where they might regenerate. Outsiders were unconcerned with the future of the local land and forest. Villagers, seeing outsiders flocking into their territory with the means to extract their forest products rapidly, were responded by trying to benefit in whatever way possible before others.

Source: Fox, 1993

During my observations, I noticed that there were two different groups involved in ironwood cutting and the ironwood products that originate from these areas are shingles, beams and square blocks. The first group consists of four people in an unlicensed woodcutting team who cut ironwood trees into beams of four metres in length. The work pattern of the team is called *sistem koboi* (cowboy system). This 'cut and run' system is simple and effective. The second group cuts ironwood trees for shingles. Most of these ironwood products are cut from fresh beams. The ironwood felled either by professional wood fellers or by chainsaw operators or peasant villagers is collected by affluent middlemen who in turn sell it to timber dealers in port towns such as Samarinda, Balikpapan, and Sangata. In some cases, dealers collect the timber directly by employing teams of wood fellers or they buy it from independent fellers. During my interviews, loggers admitted that ironwood, the highest priced timber species, has become scarce because of uncontrolled logging. As none of them has a logging permit, no single person can stop the others from cutting down ironwood trees in the forest. In the eyes of the law, their activities are considered illegal.



Figure 6.3. (A) Ironwood beams from fresh cutting in the P.T.ITCIKU concession in Sotek, Penajam North Paser; (B) Loading beams onto a truck; (C) Basecamp of loggers or woodcutters; (D) Portal-post of the timber company – ‘Do not cut and take away the white timber or wood’

The other sources of ironwood products in East Kalimantan are districts such as East Kutai (sub-districts of Sangata, Sangkulirang, Muara Bengkal, Bengalon), Kutai Kertanegara, Berau, Bulungan and Penajam North Paser. According to Peluso (1992), where a HPH was valid, the holder had the right to organise local villagers to collect and trade ironwood. However, all the wood that was to be cut by villagers within the concession area had to be reported to and approved by the Forest Service as part of the timber company’s annual logging plan. Few if any companies are willing to go to such trouble. These legal and logistical snares have made virtually all village ironwood cutting for commercial disposal illegal. Ironwood stands in concession areas are not easy for the Forest Service to control. The timber company that the Forest Service placed in charge of managing the forest and the trees, including the ironwood, within its concession, is not willing to manage what the local people perceive to be their forest resources. Although ironwood trees are found in concession areas, the timber companies can not cut or log and harvest ironwood for commercial purposes. Fig.6.3 (D) pictures a sign that informs people that it is forbidden to cut and take away commercial tree species from the area, including those trees of the *Dipterocarpaceae* family with white colour

wood. However, they can cut ironwood, because ironwood has a black colour wood and perceived as the 'people's tree species'.

Exploitation in protection²⁰ and conservation²¹ forest areas

My field observations also yielded information about the exploitation of ironwood in protected and conservation forest areas. Many accessible protected and conservation forest areas have become the target of timber poaching and illegal logging. In fact, the poaching of ironwood timber occurs in many accessible protected areas. Natural parks are attractive because of their commercially valuable stands. In addition, transmigration and so-called 'spontaneous' immigration into East Kalimantan from other provinces has continued. Some resettlement communities in the lowlands were badly disrupted by the droughts and fires of 1982-83, and consequently, a number of people from these communities have moved to other locations within the lowlands. Population growth has been especially rapid around the coastal town of Bontang, where industrial and mining projects have attracted immigrants. This has contributed to accelerated encroachment into the nearby Kutai National Park (KNP), East Kutai District. At the same time, in recent years, increasing attention has been paid to Kutai National Park in the far interior of the province, where the human population is sparse and threats to natural forest are less than in the heavily exploited lowlands.

Although ironwood cutting is illegal, the practice continues. It is speculated that woodcutters sneak across borders to cut ironwood trees in Kutai National Park. These protected areas are home to some of Asia's most threatened animal species, such as the grizzled leaf monkey (*Presbytis comata*), silvery gibbon (*Hylobates moloch*), Sumatran rhinoceros (*Dicerorhinus sumatrensis*), Asian elephant (*Elephas Maximus*), Asian rhinoceros (*Rhinoceros unicornis*), proboscis monkey (*Nasalis larvatus*) and orangutan (*Pongo pygmaeus*) (Schweithelm 1999). Clearly, the issue will remain a matter of controversy between environmentalists and ironwood producers.

In indigenous reserve forest

The penetration of roads has facilitated outsiders' access to formerly remote areas. Chainsaws and logging roads have facilitated villagers' commercial harvest of ironwood and generated changes in the villagers' management of the wood. Outsiders look for opportunities to cooperate with indigenous people for the exploitation of ironwood trees. Ironwood is a forest product in Kalimantan that is traditionally has been managed

20 This is forest that is intended to serve environmental functions, to maintain vegetation cover and soil stability on steep slopes and to protect watersheds.

21 Forest that is designated for wildlife or habitat protection, usually found within national parks and other protected areas.

according to local ethics of access, but this is frequently ignored. According to Peluso (1992), private control has taken precedence over common (village) controls, and the ethics of access have been transformed.

Outsiders attempting to cash in on this forest product, which they perceive to be 'free goods', have caused unnecessary damage to ironwood stands; for example, in Lusan village, close to Muluy village, in Muara Komam sub-district, Paser District. In my interview with Lusan villagers, it was stated that there is evidence of timber company guards illegally cutting ironwood. Such acts sometimes led to violent confrontations between local inhabitants and company guards or loggers (Ardiansyah, PEMA personal communication, August 2005). This is a threat to the continued existence of ironwood stands. This also happens in other areas in Kalimantan. Although local groups such as the Muluy people have tenure rights over the resource, which could play a role in preventing damage, the enforcement of such laws is a perilous and persistent problem.

As a result, the tribal people in remote areas are increasingly and actively protesting against any cutting and harvesting of ironwood in their forests. For example, in 2001, Loir Botor Dingit, a notable and famous leader of the Dayak in East Kalimantan and the holder of The 1997 Goldmann Environmental Award, wrote an open letter and took action against an official timber company that was impinging on customary law. Dingit imposed *adat* fines on the company, namely P.T. Rimba Karya Rayatama, for cutting down community-owned ironwood trees in Bentian and Muara Pahu Districts equal to 50,000 cubic metres (Letter by L.B. Dingit, June 17, 2001; Kompas, May 25, 2003). Many cases of ironwood logging in indigenous reserve forest or *hutan adat* occur in East Kalimantan. This results in conflicts between indigenous people and outsiders and internal conflicts.

6.4. Ironwood processing and industries

Ironwood products are differentiated into three types: (1) sawn timber as construction materials, i.e. posts, beams and planks, (2) roof shingles, and (3) modern processing products, i.e. moulding. Each type of product is processed at a different location and due to its high durability ironwood is the most important commercial timber species used for heavy construction, such as building materials (pillars for houses, column, pile foundation, floor), bridges and footpaths, posts, industrial flooring, furniture, printing blocks, quay, ship industries and roof shingles. This rare tree is extremely hard and classed as high quality wood. This makes it useful for many products in industrial and local enterprises. In fact, there are many ironwood industries, ranging from small local industries to large private companies. The industry size depends on the type of ironwood products that are processed.

6.4.1. Indispensable construction material in Kalimantan

Faced with growing populations and rising housing needs, the provinces of Kalimantan are devoting increasing amounts of their forest resources to meet the domestic demand. Climate is one of the factors influencing housing design, along with culture and tradition, which vary widely in character, and the idea of the house as an animate entity, as a kinship unit, as a forum for the expression of social relationships and as an image of power and wealth. Houses are at the centre of a web of customs, social relations, traditional laws, taboos, myths and religions that bind the villagers together. People everywhere have evolved their traditional houses and their methods of utilising available materials to suit local climatic conditions. Cultural influences are shown in the distinctive styles of the traditional housing that is unique to each ethnic group in Kalimantan. Despite the diversity of styles, the traditional homes of Kalimantan share a number of common characteristics, such as timber construction, a varied and elaborate roof structure, and a pole and beam construction that takes the load of the house straight to the ground.

During my fieldwork, I observed that, as a hardwood, ironwood is used as foundation for most houses. It is generally used for poles and a combination of soft and hardwoods is used for the upper house's non-load bearing walls. These are often made of lighter wood or thatch. Although indigenous construction materials such as cement, bricks and tiles abound in many districts of East Kalimantan, and significant amounts of iron and steel bars are also imported, ironwood remains the most important construction material that is available in the region in substantial quantities. There is an escalating demand for ironwood as a timber species, but the quantity of ironwood available to local people is only a fraction of its former amount. In the coming years, ironwood will almost certainly be both a major construction material and recognised as incredibly vulnerable.

Most of the traditional, local houses and submerged buildings such as bridges, wharves and boat building locations in Indonesia, particularly in Kalimantan and neighbouring islands, are constructed on top of huge logs and beams of ironwood. Ironwood remains an important component of these structures, even today. Because ironwood does not easily decay, it is ideal for submerged constructions, quays, bridges, dugouts, and boat structures. Local people believe that ironwood timber is better than bricks or iron because the boards and posts made from ironwood can last for three to five generations. Even when households migrate or build new houses, the ironwood components of the structure are re-used.



Figure 6.4. Figure 6.4 (A) House in coastal area of Balikpapan above water with ironwood pillars and posts; (B) Footpath or bridge made from ironwood timber

During my fieldwork I found that, typically ironwood beams have a length of four metres and that the price of the beam per cubic metre is higher than for other local products made from ironwood. Local people use ironwood timber in the form of large planks (*papan*), small planks (*siring*) and beams and bars (*balok*). These products can be found in timber construction shops in Samarinda, Balikpapan, Bontang, Tarakan, Tanah Grogot and many other small towns. Because of the limited supply of ironwood, the price continues to increase. In the local and regional market, the demand for ironwood is very high, which causes the price to become high when compared with the prices of other timber species such as *meranti* (*Shorea spp.*), *kapur* (*Dryobalanops sp.*), *keruing* (*Dipterocarpus sp.*) and *bangkirai* (*Shorea laevis*). The forms, size and price range of local ironwood products in Samarinda are presented in the table below.

Table 6.4. Prices and forms of local ironwood products in Samarinda

Forms	Size	Price Range (Rp/m ³ /unit)	Uses
Beam and bar (<i>Balok</i>)	5 cm x 5 ^{up} x 4 m 8 cm x 8 cm x 4 m 10 cm x 10 cm x 4 m	1,500,000 - 1,750,000/m ³	For post and pole
Plank (<i>Papan</i>)	2 ^{up} x 20x 4 m 2.5 x 10 x 4 m	1,000,000 – 1,250,000 /m ³ 1,450,000 – 1,600,000 /m ³	For fence, floor. Profile (pla-fond)
Small plank (<i>Siring</i>)	1 cm x 11 cm x 2 m	20,000/packet (10 pieces)	For fence

Source: Primary data, interviews carried out during July 2006.

The prices of many forms of ironwood timber vary depending on the selling location in Indonesia, and because the costs of transportation differ per location. Ironwood beams command the highest prices in the local market. In 2007, the price of ironwood material for building construction reached between Rp.1.5 - 2 million (US\$ 150) per m³ in the local markets of East Kalimantan, while the prices were as high as Rp. 3.5 million (US\$ 350) per m³ in South Sulawesi (Salam 2007).

Distribution channels

The flow of square blocks of ironwood within Indonesia

Ironwood construction materials are in great demand through-out Indonesia; the market is seemingly insatiable and the highly prized wood must be imported from Kalimantan. Sawn log blocks or square blocks (*balok*) and long planks (*lepan* in the Bugis language) of ironwood from East and South Kalimantan are exported to a large number of destinations within Indonesia itself, including South Sulawesi and the provinces of Java. According to Salam (2007), a considerable volume of ironwood - a major material for house construction and boat building in South Sulawesi comes from Kalimantan, via a number of islands in the Spermonde Archipelago which is located off the west coast of South Sulawesi in the Makassar Strait. The ironwood trade from East and South Kalimantan across the Makassar Strait is closely related to the development of trading enterprises of people in the Spermonde Archipelago. The main actors in this trade are those who live on the islands and in the Bugis frontiers on the west coast of their homeland. They pioneered the felling of wood for the inter-island trade and they have been operating its transportation and distribution on both sides of the strait. Salam (2007) estimates that the volume of ironwood trade from Kalimantan may reach 2,400 - 4,800 m³ per year, with a monthly average in the range of 150 - 400 m³.

The distribution channel for ironwood construction material involves chainsawmen or woodcutters, collectors, processors, traders, retailers and local or inter-island consumers. Figure 6.5 shows the market chain of ironwood construction material.

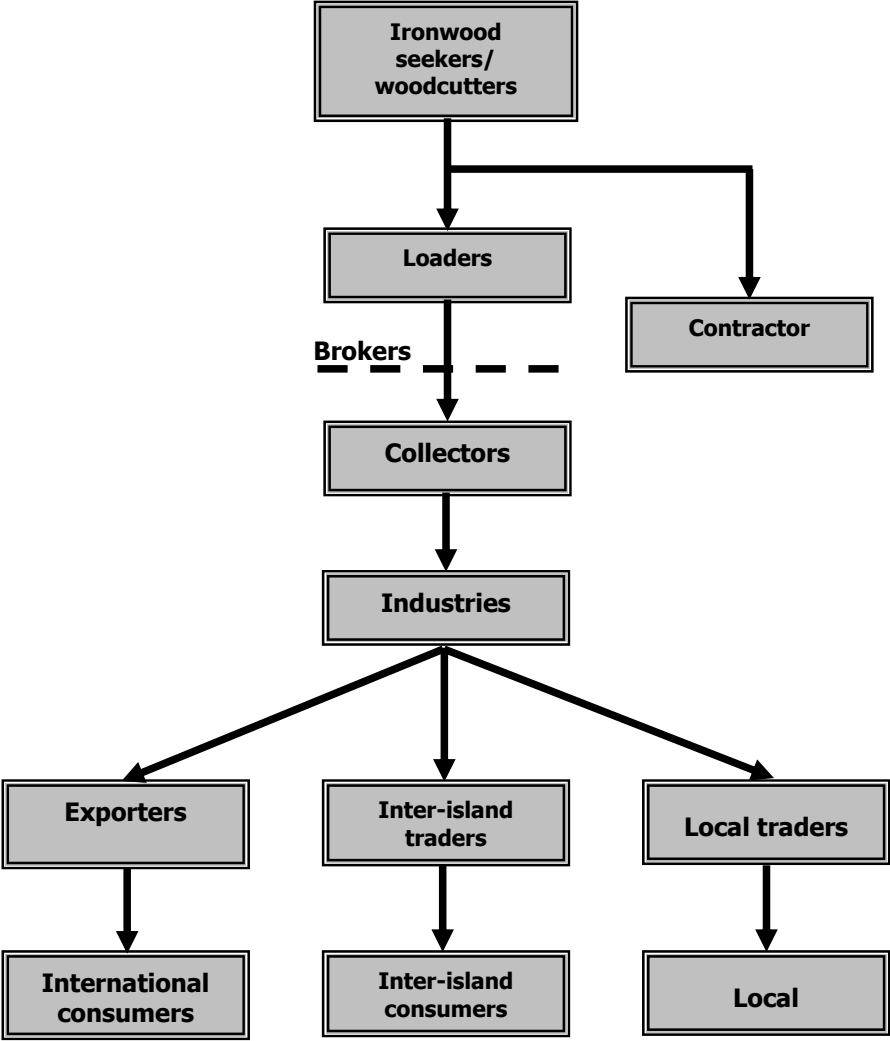


Figure 6.5. Flow chart of ironwood construction material market chain in East Kalimantan

Legality and regulation of domestic inter-island wood trading

The ministers of transportation (Nr. KM 3/2003), forestry (Nr.22/Kpts-II/2003) and trade and industry (Nr.33/MPP/Kep/I/2003) jointly issued a decree that regulates inter-island wood trading in Indonesia. This decree is designed to control and tackle illegal logging, the distribution of illegal wood and the preservation of raw material resources for the wood industry. The legislation deals with both log wood and primarily processed timber being transported through ports for domestic inter-island trading. The monitoring and checking of timber transportation through ports includes the flow of timber, i.e. the flow of timber entering the port until it is loaded on to a ship, as well as the flow of timber being unloaded from a ship until it is trucked out of the port.

Only ships sailing under the Indonesian flag can transport timber for domestic inter-island trade. These ships are operated by a licenced national shipping company or so-called 'peoples' shipping enterprise' (*usaha pelayaran rakyat*). According to these regulations, the checks include examination of the SKSHH document (*Surat Keterangan Sahnya Hasil Hutan* or Legal Forest Product Transportation Permit) and the physical appearance of the timber, i.e. the type of wood, its dimensions, volume and amount. The SKSHH is an official document that is regulated by a decree of the Ministry of Forestry (Nr. 132/Kpts-II/2000). A SKSHH contains the name and registration number of the PKAPT²² (*Pedagang Kayu Antar Pulau Terdaftar* or Registered Inter-Island Timber Trader) that owns the products, as well as the physical data (type, dimension, volume and amount) relating to the products. Based on an official assessment, the SKSHH is issued by the Department of Forestry of the district or town where the forest products are sourced. It is proof of legality and is to be used in the transport, holding and ownership of forest products. Copies of SKSHH must also be sent to the offices of trade affairs in the districts or towns of origin and destination.

The regulations do not provide specific rules for any particular wood species. They cover all forest products, timber or non-timber. Therefore, the inter-island ironwood trade is considered legal as long as the shipment is accompanied by a SKSHH. In South Kalimantan, the inter-island shipping of ironwood had been forbidden by provincial regulation, but in 2002, as an acknowledgement of the demand for timber for boatbuilding, it was permitted again. In July of this year, a governor's decree (No. 522.21/3820/Proda 2.1/EK) was issued, which gave special permission to a firm to cut 50,000 m³ of ironwood within a one year period by land clearing for an industrial tree plantation. This measure had a significant impact on ironwood timber flows. Such restrictions on the trade and logging or cutting of ironwood have never been applied in East Kalimantan (*Kaltim Post* 21 November 2003).

22 A PKAPT is a person or a firm authorised for the inter-island trading of timber or forest products. The authorisation is acquired from the General Directorate of Domestic Trade under the Ministry of Trade and Industry. The PKAPT requires companies or individuals to submit monthly reports to the Directorate General of Domestic Trade, through the Market and Distribution Section, on its trade records.

The progressively increasing volume of ironwood timber trade results directly in the over-exploitation of the species and, ultimately, will cause its local extinction. The Minister and Director General of the Department of Forestry (S.147/MENHUT-VI/2006, 9 March 2006 and S.669/VI-BPHA/2006, 15 August 2006) issued a letter to four governors in the provinces of Kalimantan, suggesting that ironwood timber collection should not be allowed to be commercialised or exported and marketed outside Kalimantan.

Occasional news reports of 'illegal' logging and smuggling of cut timber have appeared in the national and regional press (see e.g. Anonymous 2003b), but efforts to stop it have been meagre. Locals are of the opinion that nothing will be done about it because of local-level corruption, with government officials, military and police being paid off by the timber bosses or their representatives. In addition, there has been a challenge to local communities' territorial boundaries. Since the logging boom began there have been a number of instances of community disputes over forest. In at least one case, the dispute was over forest land that had never been part of any traditional community territory. Locals have felt it necessary to make hasty claims on timber resources in order that they may profit from logging rather than outsiders.

6.4.2. Roof shingles

During my fieldwork, I investigated the flow of shingles from production to the market. Borneo ironwood (*Eusideroxylon zwageri*) shingles, locally called *sirap ulin* are torn pieces of wood and are a traditional roofing material in Kalimantan. The word *sirap* means 'shingles' and is used to describe the *Eusideroxylon zwageri* variety, which has straight fibres and is easy to crack or split, making it the usual choice for shingles. The size of shingle is between 50 to 60 cm in length, 7.5 to 8 cm in width and the thickness is between 1 to 3 mm. One corner of the shingle has a triangular shape. They are highly valued in local markets for their ability to resist termites. Moreover, they do not rot. They have been used for hundreds of years by local people for traditional housing. In colonial times, the Dutch introduced shingles to the rest of the archipelago and they are now found on many large government buildings as well as on luxury houses (www.tropicalbuilding.com).

Sirap trees

Ironwood varieties have been recognised by Paser and Dayak indigenous people in East Kalimantan. Field observations at the research sites revealed a number of varieties of ironwood, namely *telien baning*, *telien sirap* or *jambu* (by Rantau Layung people) and *telien jupe*. According to Muluy people, the variety of *telien baning* is the most suitable *ulin* for construction. The Muluy and Rantau Layung people use the name *telien sirap* or *jambu* for *ulin sirap*. The Dayak Agabag people in Nunukan District call it *tagas*

agintanga. This variety is scarce in forests around some villages, including Muluy and Rantau Layung in Paser District, and even in villages along the Sembakung River in Nunukan District. Therefore, these villagers do not make roof shingles for their house from this species.

The *sirap* makers also cut *sirap* trees. The makers are local people who have been living in the forest for several decades. When looking for ironwood trees suitable for *sirap*, they check and identify the tree using a machete. According to *sirap* makers, of every ten *ulin* trees checked, they might find only two *sirap* trees. The morphological characteristics of a *sirap* tree are, according to *sirap* makers: (1) the position of the first bough of the tree always faces up, whereas for beam ironwood trees, the first bough is horizontal, (2) the *sirap* tree has small boughs and bright bark, and (3) when the bark is cut, the fibres are revealed (see fig. 6.6-A). The tools for making *sirap* are the *kapak* (traditional axe), *mandau* (traditional knife) and a short machete. These tools are used to make torn pieces of the wood and to crack the fibres. The timber's straight fibres make slicing sections into shingles with an axe or a bush knife (*parang*) relatively easy and quick. These makers work in groups of eight to ten people.



Figure 6.6. Checking the fibre direction; (B) *Sirap* making; (C) *Sirap* packets (D) A building with *sirap* roof.

Evidence that *ulin sirap* trees are declining was obtained from the personal experiences of *sirap* producers, and from official statistics relating to the declining number of *sirap* maker groups in operation. The quantity of trade has declined as the *ulin sirap* tree species has become increasingly scarce or underreported. In areas where *sirap* trees have been depleted or became rare, other varieties of ironwood can still be used for making beams (*balok ulin*). Ironwood beams require a length of about four metres. The stumpage is the waste of the stem and is about one metre in length. It should be noted that fibre structure is not a problem when these species are cut with a circular saw. The makers use a Dompang circular saw for making *sirap*. The machine produces *sirap* with a thickness of 3-5 mm, while those produced manually 1-3 mm thick. Both versions of this products can be recognised by their fibre direction.

Price and profit margin

The *sirap* is bundled in packets of one hundred pieces. One bundle of shingles consists about one metre square of roof. The income of *sirap* makers depends on the number of packets that they can produce per day. If *sirap* raw materials are available, a *sirap* maker can produce between 1000-1500 pieces (10-15 packets) of *sirap* per day. In 2006, the price of one packet was approximately Rp.10,000 (US\$ 1) at the makers level.

Box 6.3 Sirap traders

During interviews with collectors and traders of *sirap* in Pemaluan, Sepaku Sub-district, North Penajam Paser District, I was informed that *sirap* production stopped 18 years ago, because there were no more buyers. Initially, they started to make *sirap* in 1974 and this continued until 1982. In 2000, they started to make *sirap* again. They obtained ironwood timbers, the raw material for *sirap* from logged-over concession areas owned by the P.T. ITCIKU company. Because they work in concessions areas, there is an unwritten rule that each truck load of *sirap* products has to pay Rp.100,000 (equal to US\$ 10) to the company staff when it passes through the portal.

In 2006, the price for *sirap* bought at the collector level in Samarinda, the capital of East Kalimantan, was Rp. 35,000 per packet (equal to US\$ 3.50). The price paid for *sirap* from a middleman was Rp. 25,000 (equal to US\$ 2.50). Interviews with traders in Samarinda revealed that their business had received a Forest Products Clearance Permit (IPHH = *Izin Pemanfaatan Hasil Hutan*) from the Provincial Forest Service. The permit has to be renewed every year.

Source: Interview, August 2006

Distribution channel

In Samarinda, most *sirap* products come from upstream Mahakam, and from many sub-districts between Muara Pahu and Melak in West Kutai District, as well as from the regional border area between East and South Kalimantan. Every month a trader exports *sirap* to Java (Jakarta, Bandung) and Bali. *Sirap* are transported by container, which can hold about 1500 packets. Traders have to pay a Forest Product Royalty (*Juran Hasil Hutan* or IHH) of about Rp. 2,000 per packet to transport the products. *Sirap* buyers have to pay for renting a container. The costs of the rent of the container to Jakarta reached Rp. 4 million, but transportation to Bali was between Rp. 8 to 9 million, because of the fees for transiting in the port of Surabaya. These *sirap* are also used for tourist accommodation on the beaches in places such as Bali because *sirap* roofs are more resistant to salt water compared to metal roofs. They also make a more authentic impression. Although, the price of *sirap* is increasing according to local people in Kalimantan, the market continues to grow.

Sirap in packets are mostly exported within Indonesia to Jakarta (approximately 70 per cent). The remainder (30 per cent) is transported and sold in East Java, West Java, North Sulawesi and Bali. Until 2004, official documentation categorises ironwood products such as shingles as a non-timber forest product, even though it is clearly timber. However, the fact that the gathering and processing of ironwood is classified as a small-scale, forest-based enterprise means that its products are considered as non-timber forest product.

Those provinces in Indonesia importing *sirap* from East Kalimantan (Samarinda and Balikpapan) between 2003 and 2006 are indicated in figure 6.7.

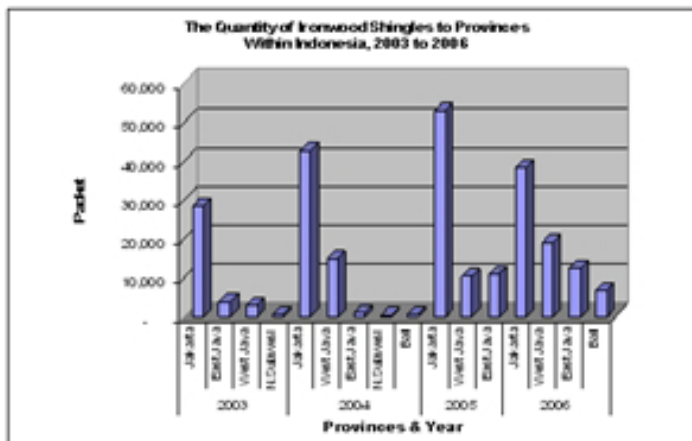


Figure 6.7. Data export of ironwood shingles to provinces within Indonesia from East Kalimantan, 2003 to 2006 (Source: Data obtained and processed from Provincial Forest Service, 2007)

The distribution channel for ironwood shingle roofs in East Kalimantan involves shingle makers, collectors, traders, retailers and local/foreign consumers. Figure 6.8 describes the ironwood shingles or *sirap* market chain.

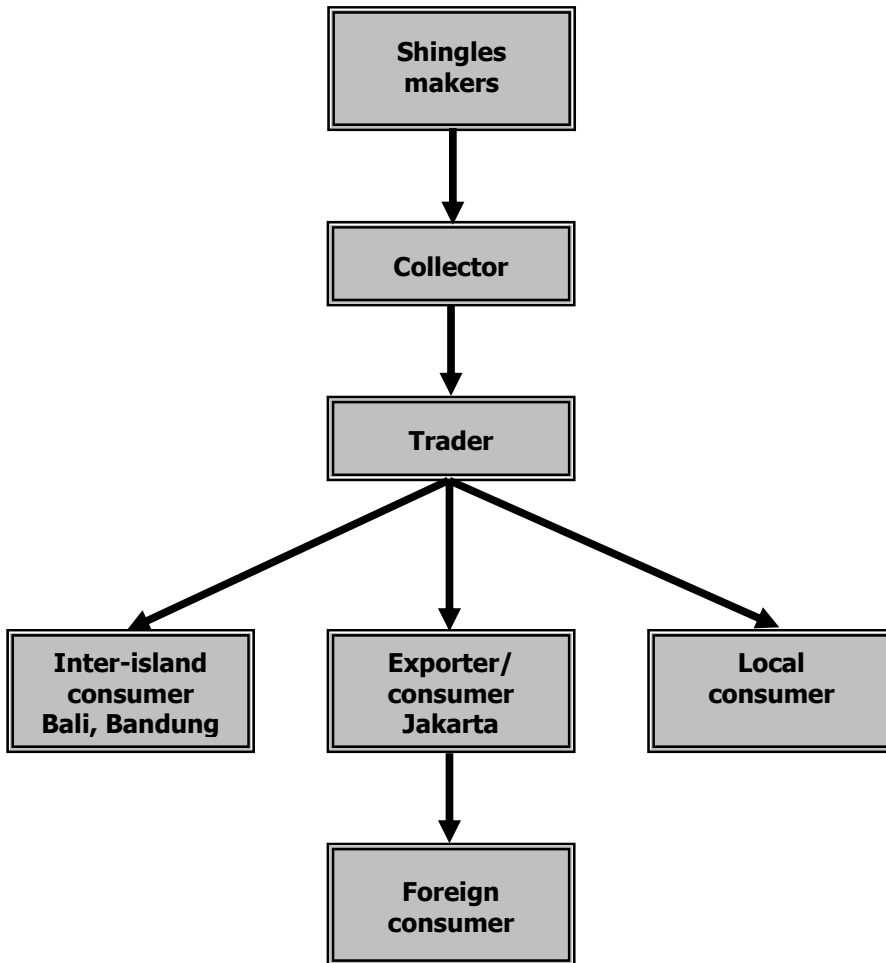


Figure 6.8. Actors in the ironwood shingles market chain

There are three quality grades used in trading of shingles. The shingles are selected by private sellers and then classified into grades by the Forest Service. These grades are based on the mean thickness of each 100 pieces (because the product is sold in packets).

The shingles can last for several generations. In the past, often when old houses were torn down, the ironwood shingles were carefully removed to be used again. However, ironwood shingles have become too expensive for local communities and they are being replaced by corrugated metal, zinc roof or thatch made of palm leaves in particular sago palm leaves (*Metroxylon warburgii*), known locally as *atap rumbia*. Roofs of thatched fronds are much cooler than the metal version, but must be replaced every two or three years.

Houses or buildings with *sirap* roofs in Kalimantan are gradually disappearing. Meanwhile, new types of roofs are being produced from zinc, aluminum, metal and clay. The use of these modern products affects the use of ironwood shingles. The number of houses using ironwood shingles has declined. Compared to modern shingles, traditional *sirap* shingles have certain disadvantages: They only come in one colour and need more support materials for making the frame of the roof. Roof shingles structuring requires special skills. However, the advantage of *sirap* is that it is light weight and extremely durable, with a life span of between 15 and 20 years. That said, *sirap* trees are becoming scarce and the result is that other raw timber materials are being used. Recently, *sirap ulin* has been substituted by other timber species such as teak (*Tectona grandis*) and *sepang* (*Caesalpinia sappan* Linn). According to the *sirap* makers, roofs from Simpur (*Dillenia spp.*) timber may look more decorative, but their strength and endurance are inferior to those of *sirap ulin*.

6.4.3. Ironwood processed export products

New uses for ironwood have been found within the fluid context of modernisation in Asia. Ironwood utilisation has shifted in accordance with changes in social and economic conditions, for example, after the introduction of sawmills. The fact that transportation of ironwood products has become easier has also added value to the wood. Ironwood square blocks are now manufactured into sawn timber or semi-finished and furniture parts such as flooring, dowels, decking, trimming board, fence material, decorative mouldings and broom handles. This exotic hardwood is rich in colour, durable and becoming increasingly popular. From interviews carried out for this research, it became clear that the boom modern ironwood products reached a peak in 2003. These products are marketed locally, regionally and also exported to some countries abroad. For example, decking made from ironwood is incredibly water resistant and as a processed product, in 2006, it commanded a price of between US\$ 780-970/m³.

Throughout the years, the majority of sawmills have been concentrated close to harbour towns like Samarinda and Balikpapan. These towns have become the central processing industry of ironwood products before the finished products are exported. Balikpapan is the largest central point of ironwood square block flows in East Kalimantan. Large-scale industries for processing export products in Balikpapan are

supplied by ironwood raw material from South and Central Kalimantan, East and West Kutai and North Penajam Paser.

Ironwood processed products flows within Indonesia

Official data on the production of ironwood products which flow within Indonesia and to international markets are recorded and obtained from the Forest Service in two large cities in East Kalimantan, Samarinda and Balikpapan. Ironwood moulding is a common trade name for all forms of ironwood product and regularly features in reports from the forestry and trade service office. Interviews with provincial staff of the Forestry, and Trade and Industry Service in Samarinda, revealed that ironwood processed products, such as flooring are classified as 'fancy products' (*produk* or *kayu mewah*). Based on information about sale destinations within the provinces of Indonesia, the products are exported for finishing products to provinces of Java (East, Central, West Java, Banten, and Jakarta), South Sulawesi, Bali and East Kalimantan. Most ironwood semi-processed products are still being processed in industries in Balikpapan for export orders. From 2003 to 2006, East Java accepted the majority of ironwood processed products from Samarinda. Figure 6.9 shows the trade volume and details the Indonesian provinces that imported processed ironwood products from Balikpapan and Samarinda between 2003 and 2006.

The international export market

There are many kinds of ironwood products. Semi-finished parts are commonly called 'cutting size': S2S (surfaced two sides sawnwood is smooth) and E2E (two corners are bent), while finished parts are called 'invoice size': S4S and E4E. The largest portion of the international trade of ironwood products is in semi-finished parts and in the form of ready-to-use shapes or finished products such as *flooring*, *decking*, *trimming board*, and *letis*. These products are exported to countries such as China, Japan, Korea, Taiwan, Hong Kong, England and Germany. They are sold to the public by home improvement stores. These products will eventually find their way into homes and buildings in the lucrative markets of those countries. As previously mentioned, the main attributes of ironwood include its weather resistance, strength, durability and dimensional stability, making it particularly suitable for outdoor applications such as garden furniture. In Japan most garden furniture, modern flooring, facade and terrace applications use ironwood (see www.ecowood.jp). In Australia this timber is currently only available as domestic decking, although it is likely to emerge as flooring because of its technical suitability. Although previously not common in Australia, in recent years it has become readily available, particularly as decking, because of its high durability and its low or almost non-existent level of leaching (see www.timber.net.au/species).

From 2003 to 2006, the three countries which imported the largest volumes of ironwood processed products were Japan, China and Korea. During that period, Japan imported the highest volume from industries in Balikpapan, while China imported the highest volume from industries in Samarinda. In terms of volume, Japan is the biggest importer country of ironwood processed products from East Kalimantan. The criteria grades of Chinese importers are relatively easy to fulfill, when compared to other countries such as Japan. Indeed, Chinese importers accept all grades and it is not difficult for a grader or quality controller to check the condition of ironwood products. For example, grade A has as criteria of: *one face clear, no crack*. By comparison to Japan's grade A criteria is: *two faces clear, no crack*, and *no pinhole*. Although Japan's criteria are difficult to fulfill, the prices are higher than in China. For example, in 2005, the price of all grades of flooring forms to China was US\$ 570/m³ CNF²³ Shanghai, compared to Japan US\$ 750/m³ CNF Tokyo. In China, the products will be further processed and exported to the United States and European countries. China and the US are both importers and exporters in this case.

The trade volume and the countries that imported ironwood products from Balikpapan and Samarinda between 2003 and 2006 can be seen in detail in figure 6.10.

23 CNF means cost and freight. The seller is responsible for shipment and ocean freight.

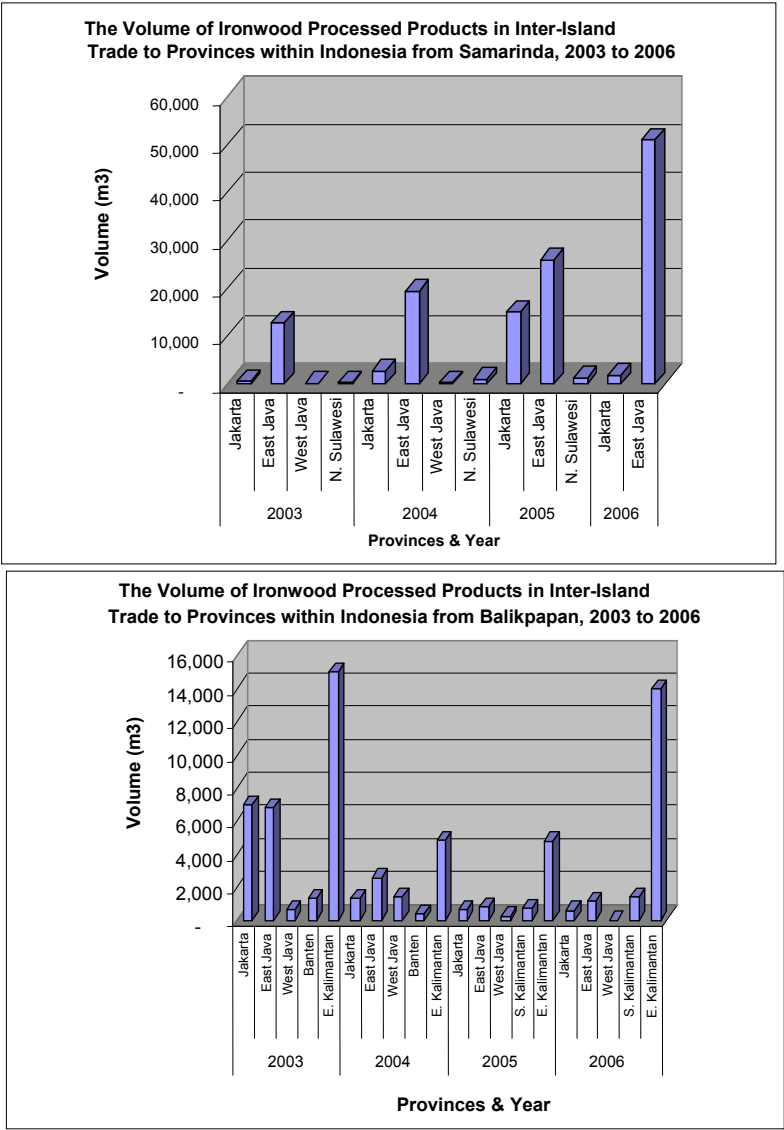


Figure 6.9. The volume of ironwood semi-finished products in inter-island trade from Samarinda and Balikpapan to provinces within Indonesia, 2003 to 2006.

Source: Data obtained and processed from Provincial Forest Service, 2007.

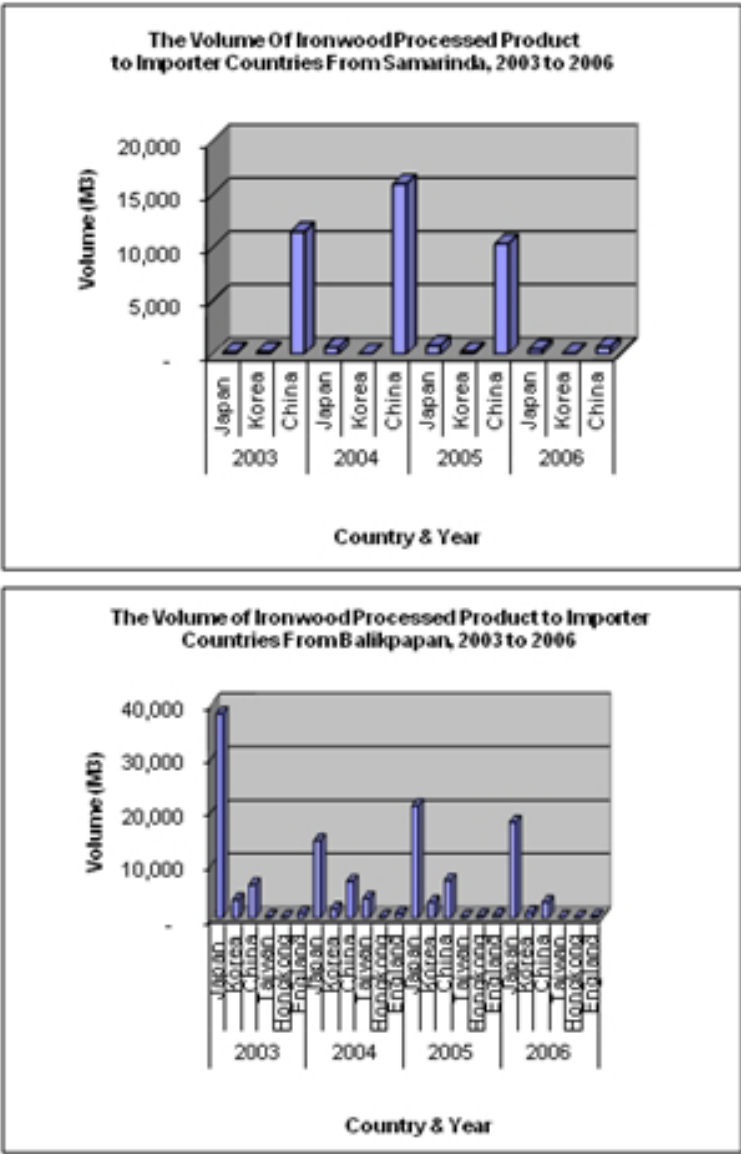


Figure 6.10. The volume of ironwood products to three importer countries from Samarinda and Balikpapan, 2003 to 2006.

Source: Data obtained and processed from Provincial Forest Service, 2007.

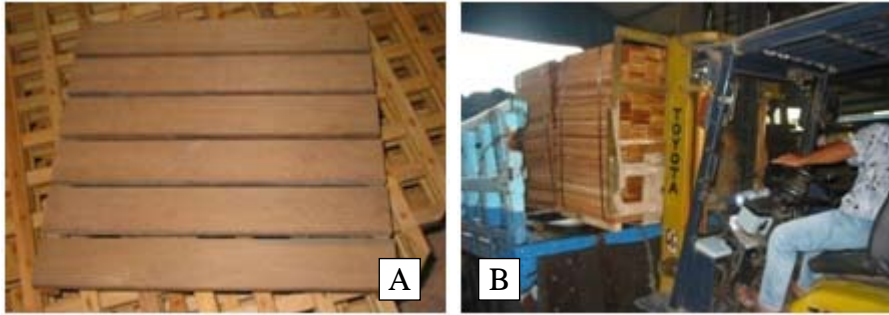


Figure 6.11. Ready-to-use shapes of ironwood export products; (B) Packing export products

In 2006, the price of ironwood products for export orders reached between US\$ 750-970 per cubic metre and increased to US\$ 1,100 in 2007 (www.kompas.com, accessed on 18 May 2007). In 2006, the export volume of ironwood products reached 3.48 million cubic metres, with a value of US\$ 1,6 billion. However, in 2007 this volume decreased to about 1.31 million cubic metres and a value of US\$ 659,9 million (Majalahtrust.com, accessed on 11 March 2011). These processed products for export (FOB²⁴: 'free on board' condition) reached prices that were five to six times higher than the prices obtained in the domestic market. The disparity price is attractive and the strong demand from buyers willing to pay the price for ironwood products creates a powerful incentive for ironwood trees to be cut illegally and poached. Export of ironwood flooring, moulding, decking and FJLB (Finger Joint Laminating Board) to these countries still takes place, particularly from industries in Balikpapan and Samarinda. In 2005, the total export value of ironwood products in East Kalimantan reached a value of US\$ 50 million.

To reduce ironwood timber waste, the remaining raw material is also processed into finger joint laminating board. This product is created by a process that joint together small pieces of waste timber and off-cuts, which might otherwise have been discarded, to form longer pieces of wood. Finger-jointed floorboards are a better alternative to long, single-length floorboards because long boards usually have come from very large, very old, majestic trees, which are few in number these days.

Interviews with staff of a company called CV. Diana Bhakti in Balikpapan which processes ironwood products for export, revealed that most of their ironwood raw materials came from timber clearance permits (IPK or *Izin Pemanfaatan Kayu*) and timber extraction and utilization permits (IPPK or *Izin Pemungutan dan Pemanfaatan*

²⁴ The term 'free on board' or FOB (often seen as f.o.b.) is commonly used in the shipping of goods to indicate who pays loading and transportation costs, and/or the point at which the responsibility of the goods transfers from shipper to buyer. FOB shipping is the term used when the ownership/liability of goods passes from the seller to the buyer at the time the goods cross the shipping point to be delivered.

Kayu). About half of the raw materials came from Central Kalimantan and the rest came from East Kalimantan. This company has processed ironwood export products since 2002.

Legality and regulation of international forest industry product trade

Since October 2003, Indonesian timber exporters have been required to apply for a new licence: the ETPIK (*Eksportir Terdaftar Produk Industri Kehutanan* or Registered Forest Industry Product Exporter). To obtain an ETPIK certificate, a company must join BRIK²⁵ (*Badan Revitalisasi Industri Kehutanan* or The Forest-based Industry Revitalization Body). Companies or mill owners must supply three documents to obtain the ETPIK: a report containing the volume of timber consumed by their mill from 1 January 2003 until the application date (*Laporan Mutasi Kayu*); a copy of each transportation document or SKSHH (*Surat Keterangan Sahnya Hasil Hutan* or Legal Forest Product Transportation Permit) that has accompanied each load of logs received; and the total volume of plywood, sawn timber or mouldings manufactured at the end of each year. All data are entered into the BRIK computer system and the amount of timber each factory is consuming is calculated and compared with its output. Furthermore, a licenced company must inform BRIK each time it wants to export wood products.

The BRIK system relies heavily on SKSHH documents as proof of the legality of timber. However, SKSHH documents are the weakest link in the chain of verification. They are the responsibility of the Department of Forestry, not BRIK and they are produced centrally, and then issued in batches to provincial and district forestry offices. Local authorities appear unable or unwilling to stamp out the thriving illegal trade in real and forged SKSHH documents. Since the introduction of regional autonomy, forestry officials in Jakarta certainly have no authority to control them. If a company with a SKSHH and sufficient quota asks BRIK to endorse a shipment for export, BRIK must grant this. It can only refer documents to the Forestry Department at a later date if these are found to be counterfeit.

Like the regulations for domestic inter-island wood trading, the ETPIK licence also covers all forest industry products such as plywood, sawn timber, pulp and paper and mouldings. However, it does not provide specific rule for any certain wood species. According to the head of BRIK, there are no clear regulations for ironwood processed products for export. There is disharmony between the two ministries about the regulations. The General Directorate of Forest Production under the Ministry of Forestry issued a letter Nr.S.266/VI-BPHA/2006 on 15 August 2006, which forbids

25 BRIK was jointly established by the ministers of Trade and Industry and Forestry in December 2002. It is an independent organization or a non-profit organization managed and funded by business representatives and non-government officials, such as forestry industries (mills and factories), which serve as members. Its broad brief encompasses 'realising sustainable forest management, supporting forest industry revitalisation and improving the development and utilisation of technology in the forestry sector'.

the trade of ironwood timber for export from Kalimantan. However, another regulation from the Ministry of Trade Nr.09/M-DAG/PER/2/2007, issued on 14 February 2007 and regarding the determination of export forest industry products states that ironwood processed products are not excluded from trade as long as the technical requirements are fulfilled.

More on the Indonesian sawn wood ban

Information obtained from the Indonesian Ministry of Trade and Industry (DPRIN) sheds further light on the Indonesian regulation of 2 February 2006 on sawn wood and other forest products, which supersedes the previous regulation of October 2004. Under the new regulation:

1. Exports of railway sleepers (HS 4406) are forbidden.
2. Exports of sawn wood (HS 4407) are banned, with the following exceptions: surfaced four sides sawnwood (S4S), kiln or air dried and a cross-section no greater than 4,000 mm²; door or window jambs S4S (including HS 4407) no more than 60 mm thick and 150 mm wide; door or window frames S4S (including HS 4407) no thicker than 40 mm and no wider than 200 mm; and finger jointed S4S (including HS 4407) made of dried chip wood no longer than 1,500 mm.
3. Tolerance: all processed wood products must have maximum 16 per cent moisture content (except palette) and maximum 5 per cent machine defect of export volume.
4. Only registered exporters, registered as an Exporter of Forestry Industrial Product (ETPIK) are allowed to export forest products.
5. Endorsement from Forestry Industry Revitalisation Agency (BRIK) is required for export of HS products 4407, 4408, 4409, 4410, 4411, 4412, 4413, 4415, 4418, 4421.90.50.00, 9406.00.92.00, by processing the product export notification (PEB) document.
6. Any exception may only be decided by the Minister of Trade or the authorised department after due consideration by the Departments of Forestry and Industry.

6.4.4. Trade, market chain and channel of distribution of ironwood

In general, actors in the trade and market chain of ironwood products comprise producers, collectors, traders and local and foreign consumers. Ironwood product traders and producers (small industries and manufacturers) are linked together, forming the market chain. The various trade patterns depend on the sources of raw material. Actors

involved in the trade and market chain of ironwood products can vary, depending on short- or long-term distribution channel patterns and the location of sources of raw material.

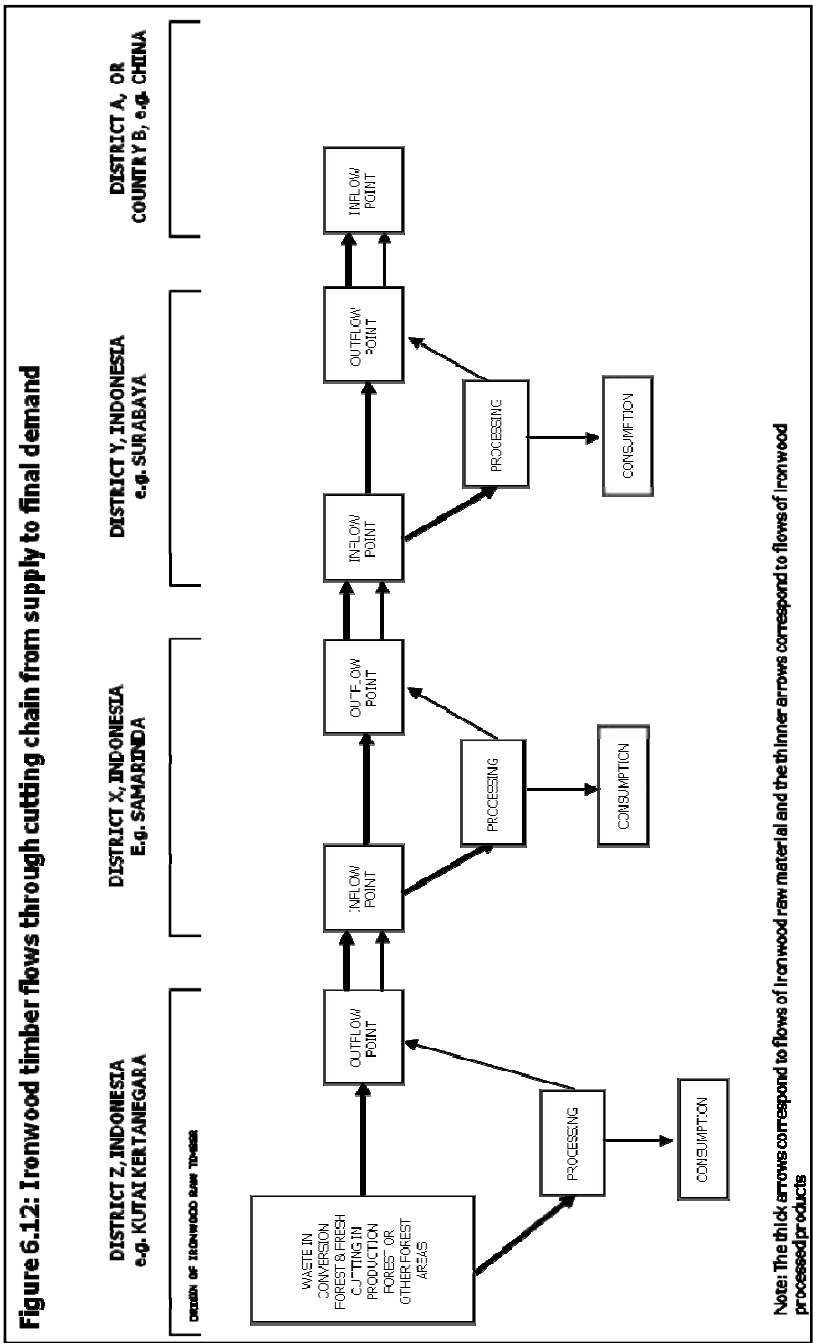
Moreover, prices of ironwood vary considerably and there are strong fluctuations due to international demand and exchange rates. Furthermore, traders offer higher prices when products become scarcer. In addition, prices can vary with the place of transaction, from remote upriver settlements to coastal market towns, due to high transportation costs and with the perceived grade or quality of the products. Profits for traders are generally high, but also depend on the number of middleman along the trade and market chain, with major traders in Samarinda and Balikpapan dealing directly with Surabaya, China and Japan. In general, actors involved in activities within the ironwood market channel can be identified as follows:

1. **Ironwood seeker** (*pencari*) also acts as a chainsaw man. Activities are to seek and cut waste and squared blocks of ironwood from the source areas.
2. **Loader** (*tukang pikul*), is somebody who loads ironwood squared blocks from cutting areas or hauls timber to the roadside or to the collection field at a point along the road.
3. **Contractor** (locally call *animer* that adapted from Dutch language *aannemer*) is a person who provides logistics and capital to ironwood seekers and loaders. Typically, they own or have access to transportation cars to facilitate the loading of timber and transporting of sawing machines for processing. They also load the semi-finished processed products themselves and transport to the manufacturer.
4. **Collectors, brokers or upstream trader middlemen** (*tengkulak* or *pengumpul*). These people have a direct link to the ironwood seekers. A broker sells ironwood raw material, such as square blocks, to the sawmill. Their main bases in East Kalimantan are in Berau, East Kutai and Bulungan Districts.
5. **Middle man** (*pedagang perantara*) is an agent between the *animer* and industry.
6. **Sale retailer** (*pedagang pengecer*) sells ironwood products directly to consumers (commonly for domestic or local need). The products are bought from a broker or wholesaler (*tengkulak*) in the form of semi-finished construction material shapes, i.e. planks, thin planks, roof shingles and beams.
7. **Ironwood industry producer**, also acts as a wood processor. There are three kinds of industries: primary, secondary and finished manufacturer, which process ironwood raw material obtained from *animers*, commission agents and wholesalers in order to process export products such as flooring, decking, trimming and moulding. Most industries directly process raw material into ironwood products without the intervention of exporters.

8. **Exporter agency or broker** is an organisation that exports processing products from industry. This exporter is located in Java (Surabaya and Jakarta).
9. **Consumers: Local and foreign consumers.**

There are two forms of ironwood (sawnwood and moulding) distribution channels: (1) marketing channels (through which information flows and sales of products are made); and (2) delivery channels (through which products flow). Many companies are members of both distribution channels (as defined above), such as importers and timber and builders merchants. Others, for example some agents, are only members of the marketing channel as they never take ownership of the product. In this case, the ironwood product passes directly from the overseas producer to ironwood timber importers and merchants or sometimes directly to end users. However, from interviews carried out for this survey and other research, it is clear that the traditional collectors and traders are still the main actors dealing with ironwood producers and exporters. Finished product traders are engaged in the commercialisation of the Indonesian market, the international market, or both. They may be retailers, wholesalers or both. Those agents and importers contacted for this research emphasised the changing nature of the distribution channels and the need to adapt to these changes.

There are many outside participants, who are not primary actors, involved in these channels and the wider system. These include state institutions such as the Provincial and District Forest Services, which come under the Department of Forestry (*Dephut*), Department of Industry and Trade (*Depperindag*), BRIK (*Badan Revitalisasi Industri Kehutanan* or The Forestry Industry Revitalisation Agency) and local and international associations such as *HIPKABA* (*Himpunan Pengusaha Kayu Bangunan* or building material entrepreneur association) and ISA (International Sawn Timber Association). These actors are involved in policy formulation and the trade chain. Ironwood timber flows from supply to final demand can be seen in the figure below.



6.5. Ironwood production in East Kalimantan

According to the regulation of the Minister of Trade and Industry No. 18/M/Kep/2/2005 about the establishment of the calculation of fixed prices for Forest Resource Rent Provision (PSDH or *Provisi Sumber Daya Hutan*) for timber and rattan, ironwood timber is included in the fancy wood category. Based on the volume of log species during the seven years in East Kalimantan from 1999 until 2005, ironwood occupied the seventh level of twelve timber species with a percentage of 0.6 per cent (see fig.6.13).

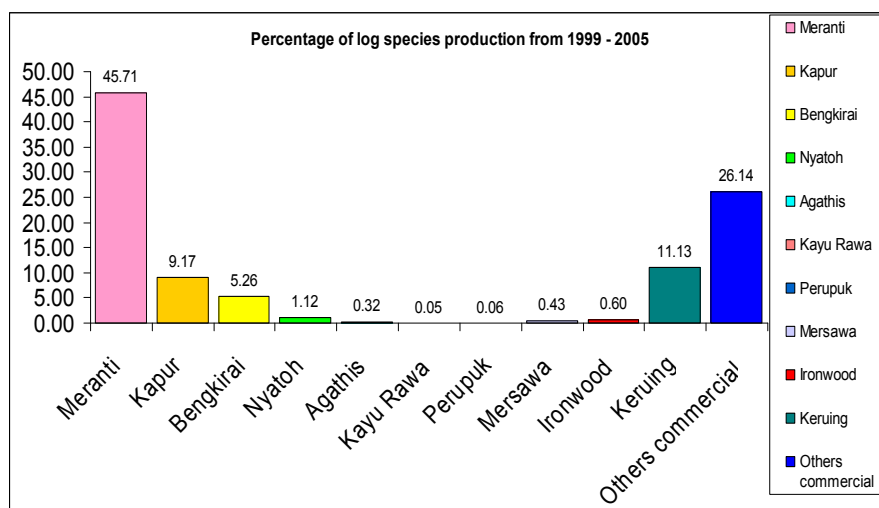


Figure 6.13. Percentage of log species production from 1999-2005

Source: Data obtained and processed from Provincial Forest Service, 2006

Research undertaken for this study shows that there is very little quantifiable information on the amount of ironwood rough sawn wood (in the form of square block) flowing from various sources in remote upriver areas in some districts of East Kalimantan. Information on ironwood production data collected from the Provincial Forest Service (*Dinas Kehutanan Tingkat I*) of East Kalimantan in Samarinda does not reflect entirely the ironwood cutting. Ironwood timber production is often not reported. Information available on the cutting volume of ironwood is also far from complete.

The volume of ironwood cutting by concession holders is reported by timber companies to the Provincial Forest Service, but not all holders of timber clearance permits (IPK) and timber extraction and utilisation permits (IPPK) provide this data about the volume ironwood cutting. Consequently, information about the volume of ironwood

log production from the Provincial Forest Report in 1999 reports a peak of 91,735 m³; this declined to around 747 m³ in 2004. This situation corresponds with the decreased log production from forests in East Kalimantan in general. In 2004, ironwood log production increased slightly due to land clearing activities for plantations and mining operations. As the table below shows, ironwood log production has decreased drastically since 2002. Since June 2005, there have been no reports sent to the Provincial Forest Service about ironwood log production, although in reality there was a large volume of timber movement in East Kalimantan during that year. It is important to note that the ironwood processing industries are still receiving raw ironwood material that has been transported from various sources. For example, from 2003 to 2004, the total volume of ironwood trade (flow within Indonesia 5,005.02 m³ and to international market 9,701.20 m³) far exceeded the official production of ironwood, which was reported to be only 747.40 m³ (see figure 6.14).

A comparison of data on the volume of ironwood log production (all legal log supply) at provincial level with the volume of ironwood processing products flow within Indonesia (domestic shipping) and the flow to international markets (according to estimates from reporting companies), show that ironwood trade far exceeded logs production, as officially recorded in 2003 and 2004.



Figure 6.14. A comparison of ironwood log production with domestic shipping and international market, 2003-2004.

Source: Data obtained and processed from Provincial Forest Service, 2006.

The volume of officially processed ironwood products far exceeds the volume of ironwood logs or round wood. This can be explained by the fact that ironwood square blocks (raw material) come from the logs left over from clear-cutting in timber estate plantations, transmigration sites, mining areas, concession areas, many timber clearance permits (IPK), timber extraction and utilisation permits (IPPK), as well as from illegal ironwood logging and poaching from accessible protected and conservation forest areas.

From 2003 to 2006, there were no reports of ironwood production from IPK. The forest land needed for oil palm and timber plantation affected the volumes of ironwood logging. As figure 6.15 below shows, the volume of ironwood from IPK is higher than that from TPPI.

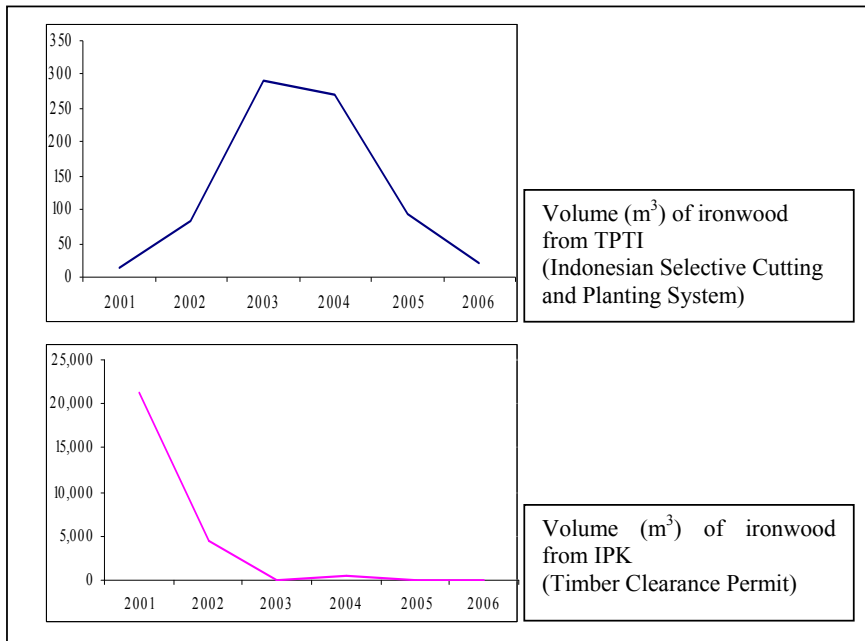


Figure 6.15. The volume of ironwood production from TPPI and IPK.

Source: Data obtained and processed from Provincial Forest Service 2006 (see Appendix 8).

6.6. Employment and income from ironwood business

Employment and income from ironwood activities are of increasing importance, not only in the rural economy of developing villages in some accessible districts in East Kalimantan but also in the economy of developing cities. Small forest-based enterprise activities constitute one of the largest sources of such income. They also account for a large part of the total harvest from forests in many areas. Ironwood business may generate employment in the short run, but in the longer run it can contribute to the depletion of ironwood timber resources and the subsequent collapse of forest industries.

Many agriculturalists supplement their income by gathering and trading products such as forest foods, medicinal plants and fuel wood. Income from these activities tends to be particularly important during seasonal shortfalls in food and cash crop income and in periods of drought or other emergencies.

Ease of access to forest raw materials means that forest-based activities are particularly important for the poor. However, some of the simpler activities provide very low returns in terms of labour, and may only provide minimal and short-lived livelihood contributions. Some of the most important saleable forest products face uncertain markets because of growing competition from industrial or synthetic alternatives or domesticated sources of the materials. As demand grows, some activities are also threatened by depletion of, or reduced access to, forest resources.

In developing policies in support of sustainable activities, it is important to be able to distinguish between those that have the potential to grow and those that do not. Policy issues include regulations that discriminate against the informal sector, policies that result in the shift from managed to uncontrolled open access use of forest resources, and restrictions on private production and sale of forest products that impede the development of farm-based sources of these products.

Ironwood gathering and trading activities within the local economy

The commercialisation of gathered ironwood timber is affected principally by the growth in urban markets. Ironwood timber that is not sold in rural areas can acquire commercial value as urban demand emerges, and ironwood commercial products are traded in rapidly growing quantities. As previously noted, this creates growing part-time income earning opportunities for rural collectors and seekers, and the emergence of employment, often on a considerable scale, in trade and vending.

Changes in the value of particular products such as ironwood have altered the way they are used. Commercialisation of some products is accompanied by a decline in rural subsistence use of forest products, and the diversion of supplies of saleable products

from use by the collecting household to the market. Rising urban and international demand and prices for ironwood in Indonesia have led to overexploitation.

Growth in forest-based product trade also alters relationships and rights. As pressures on a resource rise, traditional rights of use tend to become circumscribed or removed. Some of the longer established trade relations that were earlier based on barter and credit-based personal ties of mutual obligation are increasingly based on short-term competitive established relationships of expediency (Beer and McDermott 1989). As quantities and values grow, urban traders and wholesalers tend to exercise closer control over their supplies by hiring people to collect on their behalf rather than buying from local gatherers.

Thus, though the growing intrusion of organised trading systems into the rural areas as the value of forest products rises may create additional rural employment and income, it can also divert control and access from those who earlier benefitted from the production and trade of these products.

Nevertheless, the system has recently come under severe pressure. As demand for other gathered forest products declined in face of competition from synthetics, collectors became increasingly dependent on the sale of ironwood. With growing demand for ironwood, and the opening up of the forests in order to exploit timber, short-term traders entered the market, raising prices for producers stimulated increased harvesting. The construction of industrial processing plants in Kalimantan has raised output to levels that observers consider are unlikely to be sustainable.

6.7. Analysis of risk of ironwood depletion

The conversion or transformation of natural forests into agricultural and tree crop plantations is an important cause of forest clearing in Kalimantan. This timber extraction in Kalimantan is an example of how state tenure policies can accelerate destruction of a common-property resource (Peluso 1992). In tropical countries with rapid deforestation, it is widely expected that wood supplies should increasingly come from plantation forest rather than from natural forests. In 1985, the Indonesian government targeted 6.2 million hectares for plantation development (Handadhari 2001). Meanwhile, tree crops such as rubber, palm oil, cocoa, coffee, and coconuts have become important commodities with growing international markets. Malaysia and Indonesia are the main suppliers of palm oil and rubber and have converted thousands of hectares of natural forest into plantations. In addition, Indonesia is the country that has the largest areas of oil palm plantations in the world. The total area of oil palm plantation in Indonesia is 6.2 million hectares. In East Kalimantan, the oil palm plantation estate area has reached 158,786 hectares. Palm plantation estate area in East Kalimantan is bigger than other types of plantations (Kehati et al. 2006)

The concessionaires show little interest in reducing timber waste, mitigating environmental impact and manage their concessions sustainably (see figure below). Indeed, all concessions have some activities that lead to depletion of ironwood. This depletion is set to continue. However, there is a coherent tendency to exploit ironwood from conversion forests and logged-over forest areas belonging to timber companies, as well as conservation and protected forests and even from indigenous reserve forests.

Table 6.5. Number of establishment and HPH-HTI areas by districts and municipality in East Kalimantan between 2004-2009

District/ municipality	HPH		HTI	
	Number of establishments	Areas (ha)	Number of establishment	Areas (ha)
Paser	4	276,959	2	30,600
West Kutai	32	1,306,423	2	47,910
Kutai Kartanegara	11	889,717	5	433,848
East Kutai	16	1,346,146	5	89,235
Berau	10	559,556	4	230,416
Malinau	8	931,900	-	-
Bulungan	7	2,296,475	-	-
Nunukan	5	40,000	-	-
Balikpapan	3	505,903	3	48,853
Samarinda	-	-	1	9,945
Tarakan	-	-	3	799,651
T o t a l	96	8,153,079	25	1,690,458

Source: Data obtained from Statistics for Forest Area Establishment Centre Region IV Samarinda 2009.

As with other tropical wood species, only a few individual ironwood trees occur per hectare. Although the number of cutting areas vary from source to source, this analysis will assume that depletion of ironwood will continue without much state control and law enforcement. Indeed, forest policy itself has had little influence on the current patterns of ironwood cutting.

In Indonesia, forest and land management is based on an agreed forest landuse classification (*Tata Guna Hutan Kesepakatan* or TGHK) which distinguishes protected forest, limited and general production forest and conversion forest, in addition to smaller areas for parks and reserves. The boundary between the production and conversion forest is a controversial one, based on rates of tree stocking. Within the conversion forest, clear felling is allowed, and such activities as transmigration are supposed to be located on

contiguous blocks, after the area has been logged. This does not always happen, as the lack of suitable sites sometimes necessitates the 'swapping' of parcels of land from within the designated production area (Potter 2005).

After thirty years of forest utilisation in East Kalimantan, most of the leased-out area has already experienced an initial round of selective felling. In those areas where concessionaires adhere to regulations that limit them to only a few of the largest diameter trees in each hectare, forest ecosystems have suffered less damage. Nonetheless, depending on the extraction practices utilised, up to 40 percent of the standing stock may be damaged during timber operations. Many concessionaires have had inadequate capital to carry out logging operations according to guidelines. Instead, they have subcontracted small operators who fail to follow the regulations. Other contractors, who have the resources to harvest less destructively, have no incentives to follow regulations. In some cases, the Ministry of Forestry has begun to withdraw logging rights (*Hak Pengusahaan Hutan*, HPH) from concessionaires who have violated felling and extraction procedures. Furthermore, concessionaires have difficulties protecting their thirty-year lease areas from subsequent illegal cutting, which often takes place once a road is built for the initial felling.

Production forest is logged by concessionaires on a 'selection felling' basis, later revised to 'selection felling and planting', as some replanting is now compulsory. There is still considerable ignorance about the location of the best areas of timber. It has been suggested that proper land-use planning needs this information base, in order to reduce settler incursions into protected forests, production forests and also national parks. Such areas should be clearly demarcated, and some of the production forests should be more intensively logged to secure the same levels of production from a smaller coupe, thus making it possible to release other lands, preferably that can be used for tree crops, or for settlement. At the same time, some forest areas may be returned to community control, with community-operated forest 'buffer zones' surrounding important protected areas. Collection activities, especially for ironwood, fuel wood, fruit and rattans would be permitted in such zones (GOI & IIED, 1985).

Furthermore, there appear to be no criteria on how to regulate ironwood harvest in a concession (unless this is stipulated by national law). Again, clear guidance is necessary, in part because ironwood dead wood is a very important component of healthy forests, and the best way to ensure a constant supply of dead wood, at least in the medium term, is to retain ironwood large and fecund or productive trees.

6.8. Discussion and conclusions

The study reveals that, the global demand for ironwood products is met with timber originating from the old-growth forests of Kalimantan through the clear-cutting of conversion forest in combination with illegal cutting from different status forests. The

majority of ironwood entering into international trade is from unmanaged natural forest. Most significantly, a large amount of ironwood timber raw material has been illegally exported within Indonesia's provinces and supplied illegally to ironwood processing industries in East Kalimantan, primarily in Balikpapan and Samarinda.

The main issue for this type of analysis is that, in using official data at a time when all government institutions in Indonesia were in state of rapid change and uncertainty, there is a high risk of error and uncertainty within the data itself. That said, a methodology has been developed that attempts to compare and cross-check a relatively simple and limited data-set at every possible level. However, in spite of these checks, the sheer number of gaps and missing figures imply that I should err on the side of caution with respect to the situation in East Kalimantan, although a large amount of qualitative research allows us to paint a relatively detailed picture about ironwood illegal logging for this province. Although it has long been known that the official production figures for timber output from Indonesia's forests have been far from accurate (Casson & Obidzinski 2002), the record of ironwood processed products shows that ironwood is traded worldwide in significant volumes.

The main reason why this trade exists is because prices for ironwood semi-finished products in East Kalimantan are almost six times higher than domestic and local prices both in Samarinda and Balikpapan in particular, and in East Kalimantan in general. Customs and other government officials can be easily bribed and persuaded to turn a blind eye to this trade, both in East Kalimantan and Surabaya. Local government, through the issuance of timber clearance permits (IPK) and timber extraction and utilisation permits (IPPK) permits, has allowed this trade to continue and expand, although very little taxation is paid and many IPK and IPPK companies underreport log production. All ironwood log production data in Samarinda tends to account for only larger, centrally regulated concessions and not the IPK and IPPK or small concessions that are regulated by district government. The most important observation to be made from the analysis of these flows is that there appear to be significantly large gaps between different types and sources of reporting. This at least indicates the severity and depth of illegal activities in the ironwood problem.

The timber companies or concession holders' responsibilities should control illegal cutting of ironwood and take action to conserve ironwood stands and the planting of ironwood seedlings. They should also avoid outright destruction of ironwood stands in the course of their logging activities. Unfortunately, with many companies not even re-planting trees - and those that are using fast growing exotic species - the potential success of ironwood re-growth is uncertain. Many timber companies blatantly misuse their concession rights. Technically, companies are not allowed to cut and log ironwood, but enforcement is lacking. There is much evidence of timber companies' guards illegally cutting and logging ironwood for commercial purposes, well in excess of the total cut permitted in the first three years of the thirty-year lease (Rudy Suryadi, personal

communication, August 2007) and leaving the province without any pretence of reforestation. Improved enforcement of the logging ban by the responsible Department of Forestry staff is also vital. The government and NGOs should support options for the development of alternative sources of income to reduce dependence on forest resources.