



2.3 The chainsaw economy in Tanimbar Archipelago, Indonesia

JEAN-MARC RODA, PATRICK LANGBOUR and BAYUNI SHANTIKO

Introduction

The Tanimbar Islands are of great interest for their biodiversity (Lidon and Kartiwa 2005). Located in the Province of Maluku, Indonesia, their main city, Saumlaki, is also a district capital. The islands were extensively studied during the Tanimbar Land-use Planning Project, funded by the European Commission, which covered land-use planning, biodiversity protection and biodiversity enhancement through participatory approaches (Jewell et al. 2006; Astawa et al. 2006).

The project team analyzed the wood production system in the southern part of Yamdena Island (Lidon and Kartiwa 2005), where chainsaw activities supply most of the wood to local villages, Saumlaki, other Indonesian islands, and abroad. Two villages of South Yamdena, Wermatan and Ilngei, specialize in chainsaw milling, although at a very rudimentary level. Wermatan is accessible only by sea and has an economy shaped by its traditional social structure. Ilngei, which is very close to Saumlaki and connected to it by a paved road, has a comparatively advanced state of economic development that is reflected in its wood production system (Shantiko et al. 2004).

Wermatan

How tradition shapes the chainsaw economy

The wood activities in Wermatan basically consist of community-based chainsaw milling. Trees are felled with chainsaws and processed on site into beams or planks. The process is not efficient; the recovery rate¹ is less than 5%. A typical work team consists of one chainsaw operator and two assistants. Usually the chainsaw operator owns the machine. Sometimes a relative borrows a chainsaw; in that case, the owner and operator share the income. A team usually spends a working week² in the forest harvesting trees, processing the timber, and carrying it to the river. A team produces about 10 m³ of sawn timber per week.



IN THE ABSENCE OF FORMAL RESOURCE MANAGEMENT, NOTHING PREVENTS THE OVER-EXPLOITATION OF THE MORE PROFITABLE SPECIES.

Jean-Marc Roda works for CIRAD, Kepong, Malaysia; Patrick Langbour works for CIRAD, Montpellier, France and Bayuni Shantiko works for the Center for International Forestry Research (CIFOR).

The sawn timber is transported to the village by boat along the rivers, the only routes available, and stored along the seashore. Later, the timber is transported by a bigger boat to Saumlaki, where it is sold.

Development of chainsaw milling

Compared to the other villages of Yamdena, Wermatan's chainsaw milling is recent; that is, less than a generation old. Its introduction follows some of the common stages of localized industrial development: introduction by a pioneer; innovation; and cooperation among actors and diffusion of know-how.

In Wermatan, the pioneer (Mateus) had worked in the timber industries in Irian Jaya. He demonstrated that buying or borrowing a chainsaw in Saumlaki was profitable since the sawn timber could be used in the village or sold at a good price. Chainsaw teams do not usually produce more than 20 m³ per year. Chainsaw milling is perceived by the villagers as complementary to their subsistence work to quickly earn some cash to buy goods such as electric generators or boat engines.



The innovation process was also introduced by Mateus, who taught people how to use a tinted and tensed wire to mark a straight line on the wood before cutting it with the chainsaw. This method, although simple, was previously not known to the villagers and allowed them to produce straight-sawn timber. For more specific uses, the timber must be resawn or planed with industrial tools such as planers or circular saws, which are available in Saumlaki.

Skills are progressively transferred. Assistants work for a chainsaw operator for several months, and when they feel that they know enough, they acquire a chainsaw and become operators themselves. They in turn hire new assistants, and so on.

Financial cooperation exists; operators form alliances to obtain cash in order to acquire more production tools. For example, a villager wanting to buy a chainsaw³ would establish a joint harvesting operation with a relative who already owns one. The first person provides the fuel and the two share the work and the income from timber sales. In this structure, around 25 to 78 m³ of sawn timber need to be produced in order to pay for a new chainsaw, depending on the harvested species (Table 1).

The interests of the assistants differ from those of the chainsaw owner for several reasons. First, as shown in Table 2, the income of the assistants is the same for all species, while the work is easier with more diverse species.⁴ Second, cash flow (Table 3) is not equal for all members of the community according to the different species. The higher income from the more valuable species does not benefit the assistants; they earn more from species that are less valuable but easier to process. This apparent inequity gives advantages to some actors in the value chain.

Social structure and capitalization ability

In Wermatan, the society is divided into seven groups representing ancestors who arrived on the island in a mythical canoe in some distant past and founded the village. This type of traditional social structure is widespread in Melanesia, Micronesia and Polynesia.⁵

Table 1. Production costs for different wood species in Wermatan (Rp/m³)

| item | wood species | | | |
|--|------------------|-----------------------|---------------------|-----------------|
| | <i>Intsia</i> sp | <i>Pterocarpus</i> sp | <i>Manilkara</i> sp | diverse species |
| chainsaw costs | 157,500 | 157,500 | 157,500 | 94,500 |
| labour costs | 200,000 | 200,000 | 200,000 | 200,000 |
| boat transportation cost | 200,000 | 200,000 | 200,000 | 200,000 |
| income of chainsaw owner | 342,500 | 642,500 | 442,500 | 205,500 |
| price paid by retailer in Saumlaki | 900,000 | 1,200,000 | 1,000,000 | 700,000 |
| retail costs | 450,000 | 300,000 | 500,000 | 150,000 |
| price paid by final consumer in Saumlaki | 1,350,000 | 1,500,000 | 1,500,000 | 850,000 |

Note: As of June 2006, US\$1 = Rp 9500

The chiefs of the seven groups are ranked according to their place inside the canoe, from the bow to the stern. Each group and its members have specific traditional roles, and different access rights to land and timber. Not surprisingly, the two groups with decision-making power on use of the land and the forest own the most chainsaws (Figure 1).

Table 2. Production costs for different wood species in Ilngei (Rp/m³)

| item | Wood species | | | |
|--|------------------|-----------------------|---------------------|-----------------|
| | <i>Intsia</i> sp | <i>Pterocarpus</i> sp | <i>Manilkara</i> sp | diverse species |
| chainsaw costs | 157,500 | 157,500 | 157,500 | 94,500 |
| workforce transport to the forest | 8,333 | 8,333 | 8,333 | 8,333 |
| workforce costs | 83,333 | 83,333 | 83,333 | 83,333 |
| income of the chainsaw owner | 500,833 | 900,833 | 600,833 | 313,833 |
| price paid by the retailer on roadside | 900,000 | 1,300,000 | 1,000,000 | 650,000 |
| retail costs | 450,000 | 200,000 | 500,000 | 200,000 |
| price paid by final consumer in Saumlaki | 1,350,000 | 1,500,000 | 1,500,000 | 850,000 |

Ironically, the group to which Mateus the pioneer belonged owns few if any chainsaws. Since the group had limited influence over land use, it did not develop timber skills; Mateus's know-how essentially benefited two other groups.

Chainsaw milling is a diversification activity that allows households to capitalize and increase their income beyond traditional subsistence activities. The households that can diversify their activities are those that already have the “symbolic capital” provided by access and rights to forest resources, and that have accumulated money over the years.

Ingei

How market access changes the economy and social structure

Ingei is a village on the eastern coast of the Island, ten km from Saumlaki. It is less traditional than Wermatan, and its traditional social structure is no longer evident in the timber production system.

Its economic development is more advanced. There are two major structural differences in the wood production systems of Ingei and Wermatan:

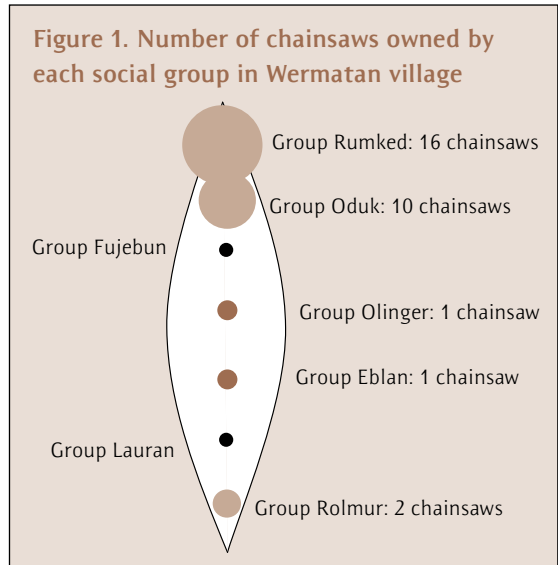
- Ingei’s proximity to the Saumlaki market increases the potential for further development of the timber activity; and
- There is a track for vehicles that extends well into the forest (*see photo, below*). This extends the villagers’ range in the forest, but only in the direction of the road. In the other direction, operators have to walk; in that case they do not travel further than the Wermatan villagers do from their river system.

This track allows for the development of other services, too. For example, a minibus now brings the workers to their work site. This allows villagers to diversify their activities. While Wermatan villagers typically have to spend a whole week in the forest to harvest trees and process timber, the Ingei villagers spend only three days a week in the forest. This leaves two days for other activities.



The great number of villagers involved in chainsaw milling has led to the over-exploitation of the most valuable tree species in the area. This has resulted in the harvesting of more *Kayu putih* (white wood), which are diverse and less valuable species.

Another impact of road access is the ease of selling to the market. The villagers can either bring the sawn timber to Saumlaki or just wait for traders to come along the track, with their own lorries, to buy it. For the villagers, this is an advantage, as they do not have to pay transportation costs.



Development of chainsaw milling

The development of the timber industry began at least ten years earlier than in Wermatan and is more widespread. With more time available, tasks have become more specialized and the work force is now divided into several categories. Although the typical team still exists (chainsaw operator and one or two assistants), many teams have a chainsaw owner and/or operator, a skilled and specialized assistant, and two or three basic assistants or carriers. Wages vary according to tasks.

In the cost structure in Ilngei, a larger part of the income goes to the chainsaw owner than in Wermatan. Economies of scale at the village level do not mean equity, and the savings in transportation costs are not shared by the workers of the community, but kept by the chainsaw owner. The ranking of tree species according to financial return is the same as in Wermatan, but the chainsaw owners' profit is significantly higher (Table 2).

As in Wermatan, the interests of the assistants differ from those of the chainsaw owner: the assistants' fees are the same for all species; and cash flow is also not equal among the team members (Table 3). Given the same total cash flow, assistants earn proportionally more from the less valuable and easier species. This means that they actually benefit from the disappearance of valuable species by over-exploitation, since more of the harvest then comprises diverse species.

Table 3. Cost structure of sawn timber production, Wermatan and Ilngei (%)

| item | diverse species | | <i>Pterocarpus</i> sp | |
|----------------------------|-----------------|--------|-----------------------|--------|
| | Wermatan | Ilngei | Wermatan | Ilngei |
| chainsaw costs | 11 | 11 | 11 | 11 |
| transport costs | 24 | 1 | 13 | 1 |
| chainsaw owner income | 24 | 37 | 43 | 60 |
| community workforce | 24 | 27 | 13 | 16 |
| retail costs | 18 | 24 | 20 | 13 |
| final consumer in Saumlaki | *100 | 100 | 100 | *100 |

*Due to rounding, totals do not equal 100

Social structure and capitalization ability of the village

With the longer history of timber activity and better road access, the traditional differences in social groups and access to the forest have been reduced. Differences are barely discernable. Nevertheless, a villager who wants to buy a new chainsaw would, just as in Wermatan, first borrow a chainsaw from a relative or work with him in order to save money.

Trade in timber products

Our interviews in Yamdena showed that the Tanimbar Islands supply chainsawn timber to markets as far away as Java. A typical journey between Tanimbar and Java by boat — such as the traditional or modernized *perahu*, handled by traders from Indonesian seafaring communities — would take 15 days.

In recent years, the Indonesian government's efforts to curb the illegal trade of logs and timber has led to more enforcement in Javanese harbours. According to the interviews, this has not suppressed trade, but instead has made operators use smaller boats or mix species in their loads. It has, however, made trade to Java more difficult and expensive. As a result, many traders have allegedly shifted their sales to other destinations, such as the Philippines, where some Saumlaki people have family contacts. The loads traded to the Philippines are very likely traded again to Vietnam and southern China, either directly or after regrouping in a larger load from the Indonesian outer islands,⁶ as suggested by data from Chinese customs⁷ regarding timber imports from Indonesia, although this needs to be investigated further.



Conclusion

In the case of Tanimbar Islands, the traditional social structure gives pre-eminence to some groups in land use and benefits from the forest resources (Laumonier 2006). This leads to disproportionate capitalization ability for certain groups, with little possibility for other groups to directly benefit from chainsaw operations. Social structures are the primary basis of financial cooperation and tend to keep benefits within the same social class. But, as the economic development of IIngei underlines, once economic development is firmly established, the differences in these traditional social structures are quickly eroded by other factors such as market access or infrastructure. In a community with no easy access to the market, small-scale chainsaw operations clearly bring economic benefits that can supplement subsistence activities, although benefit sharing is limited by the existing traditional social structure. In a community with easier market access, such social determinants are less powerful, and the benefits are spread more widely. But, although more people benefit, it does not mean that the benefits are more equitable.

The important factors in economic development are market access and infrastructure. In the absence of formal resource management, nothing prevents the over-exploitation of the more profitable species. This is a good reason to balance the promotion of CSM with good resource management through participatory approaches or other means.

Our interviews show that Tanimbar timber products are traded to Java or abroad through complex organizational structures. This larger trend, also noticed in other Indonesian Islands (Roda and Shantiko 2005), should be investigated further because it has many important policy implications:

- how is the trade organized?
- how does national governance have an effect at regional and local levels?
- since the operators and authorities may belong to different ethnic groups, is it more difficult to establish effective resource management?
- what strategies would curb informal harvests and the trade of these products?

These are some of the many questions that can be answered only by further investigation of the determinants of this trade.

Endnotes

1. The recovery rate is: [volume of sawn timber produced]/[volume of the log in the forest]. It is usually expressed in %. Conversely, 100% — recovery rate = % of waste from the process.
2. A working week is five working days.
3. A new chainsaw (Stihl) costs 8 million Rp and a secondhand one costs around 4 to 4.5 million Rp.
4. These species, being lighter and softer, demand less physical effort in chainsaw operations.
5. In the Cook Islands the same word means “tribe” and “canoe” (Sissons 1994). The mythical canoe (“vaka”, “waka”, “waga” or “prao”) is an important symbolic component of many societies in the Pacific (Malinowski 1922; Finney 2007).
6. From the Javanese point of view, “outer islands” is the common term to refer to all the other Indonesian islands that are not Java nor Madurai.
7. See Statistics Department, General Administration of Customs of China. Online data obtained in 2009. www.customs.gov.cn/publish/portal0.

References

- Astawa, I.M.B., A. Tao, B. Shantiko, S. Huninhatu, D. Amarduan and J. Pareira. 2006. *Building a common vision on Yamdena Island development*. European Union–Tanimbar Land Use Planning Project Technical Series, Number 10. Office of the European Commission Delegation in Jakarta, Indonesia.
- Finney, B. 2007. *Vaka Moana. Voyages of the ancestors: the discovery and the settlement of the Pacific*. Honolulu: University of Hawaii Press.
- Jewell, N., Y. Laumonier, R. Nasi, J.-M. Roda and A. Billand. 2006. *Land-use planning, forestry and ecotourism in the Tanimbar Islands*. European Union–Tanimbar Land Use Planning Project Technical Series, Number 9. Office of the European Commission Delegation in Jakarta, Indonesia.
- Laumonier, Y. 2006. Tanimbar land-use planning project. Final recommendations. Unpublished report. CIRAD, Jakarta, Indonesia.
- Lidon, B. and B. Kartiwa. 2005. *Appraisal of agroclimatological and hydrological conditions of Tanimbar Islands: potential and constraints*. European Union–Tanimbar Land Use Planning Project Technical Series, Number 6. Office of the European Commission Delegation in Jakarta, Indonesia.
- Malinowski, B. 1922. *Argonauts of the western Pacific*. London: Waveland Press.
- Purwanto, Y., Y. Laumonier and M. Malaka. 2004. *Anthropology and ethnobiology of the people of Yamdena in Tanimbar Archipelago*. European Union–Tanimbar Land Use Planning Project Technical Series, Number 4. Office of the European Commission Delegation in Jakarta, Indonesia.
- Roda, J.M. and B. Shantiko. 2005. *Community forestry in Tanimbar, and industrial prospective scenarios*. No. 40399, Papers, CIRAD, Forest department, UPR40, <http://econpapers.repec.org/RePEc:epf:wpaper:40399>.
- Shantiko, B., Y. Andries, B. Moriolkosu and D. Amarduan. 2004. *Socioeconomic analysis of rural Tanimbar*. European Union–Tanimbar Land Use Planning Project Technical Series, Number 3. Office of the European Commission Delegation in Jakarta, Indonesia.
- Sissons, J. 1994. “Royal backbone and body politic: aristocratic titles and Cook Islands nationalism since self-government.” *The Contemporary Pacific* Vol. 6, No. 2, Fall 1996: 371–396.