

CHAPTER 4 : SOCIAL SUSTAINABILITY OF FORESTRY MODELS

This chapter shows how current logging practices within Central Africa are not currently socially sustainable. While logging can bring some benefits, these are often limited and are outweighed by the negative impacts.

In the first article, Helen Newing describes how local peoples' rights are severely limited within the existing national legislation, and furthermore, that these rights are often ignored, Pygmy peoples being particularly severely affected. In particular, logging impacts on access to and availability of non-timber forest products, including bushmeat as well as many important plant products. These problems are clearly illustrated by the case of Moabi, described by Sylvian Angerand in Article 4.3.

Prioritising of timber over the local values of forest resources often results in conflict, as Samuel Nguiffo describes for Cameroon, where local communities have been excluded from the forest, and furthermore, have limited opportunities for legal redress. Logging can also have devastating consequences for the health of local populations, as Simon Counsell describes. Not only do logging practices encourage the spread of diseases, but it is a highly dangerous industry for its workers, with poor health and safety practices being the norm.

Timber extraction inevitably has some negative impacts on local forest users, and compromises need to be reached between the different stakeholders. However, under the current legal framework, the balance is tipped towards industrial interests – the needs and concerns of local communities are given little attention, and these broader impacts, including those on health, are not taken into account in decisions to expand timber operations.



Forest communities in Cameroon, who have lived with logging concessions for many years, see few benefits from industrial logging. Photo: Cath Long

4.1 SOCIAL IMPACTS OF INDUSTRIAL LOGGING CONCESSIONS: EFFECTS ON FOREST USER RIGHTS

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This report documents the social and cultural impacts of logging concessions in Central Africa.¹⁶⁶ A high percentage of the population in central Africa is rural and is dependent on forest resources for their daily subsistence needs.¹⁶⁷ Central Africa is home to an estimated 500,000 indigenous hunter-gatherers ("Pygmies"),¹⁶⁸ who are particularly vulnerable to the impacts of logging, both because of their close dependence on the forest and also because of their subordinate position in society.

Over the past ten years, the region has begun a process of zoning its forest areas into permanent forests (subdivided into those for production and those for protection) and non-permanent forests, and then allocating plots within production forests as concessions for industrial logging.¹⁶⁹ By the early 2000s, some 45% of the total forest area had been divided up into logging concessions (Table 1).¹⁷⁰ Forest communities have had minimal input into the zoning process and have suffered widespread loss of access to forests and their resources as a result. In addition, logging operations have reduced the abundance of many forest resources that are important to local livelihoods – either through direct removal (where the same species are important for timber and for local use), or through the wider impacts of logging activities on non-timber species and on forest ecosystems. In addition to the economic costs to local people that this entails, loss of access to forests is also associated with loss of cultural identity and traditional ecological knowledge of many forest peoples.¹⁷¹ Logging activities also have broader social and cultural impacts through changes in settlement patterns, local social dynamics and so on. In this report, evidence for each of these types of impact is examined, and recommendations are made on measures to address them.

¹⁶⁶ Central Africa is defined in this report as including Cameroon, the republic of Congo, Equatorial Guinea, Gabon, the Democratic Republic of Congo (DRC), and the Central African Republic (CAR); ¹⁶⁷ This is the highest in Equatorial Guinea, this applies to 80-90% of the population; and in CAR (70%). (Forests Monitor (2001) *Sold down the river: The need to control transnational forestry corporations: a European case study*. Forests Monitor Ltd, Cambridge.); ¹⁶⁸ For a comprehensive account of the current situation of indigenous peoples in Central Africa, see: Jackson, S. (2005) *Implementation of international commitments on traditional forest-related knowledge: indigenous peoples' experiences in Central Africa*. Pp. 151-303. In: H. Newing *et al.* (Eds.) *Our knowledge for our survival*. Vol. 1: regional case studies on traditional forest related knowledge and the implementation of related international commitments. IAITPTF & CIFOR, Chiang Mai; ¹⁶⁹ The zoning process is based on guidelines established by the International Tropical Timber Organisation (ITTO). (Foahom, B. (2001) *Integrating Biodiversity into the Forestry Sector: Cameroon Case Study*. Paper prepared for an international workshop on "Integration of Biodiversity in National Forestry Planning Programme". Bogor, Indonesia, 13-16 August 2001. CIFOR, Bogor.); ¹⁷⁰ Minnemeyer, S. (2002) *An Analysis of Access into Central Africa's Rainforests*. WRI, Washington, D.C.: p.9; ¹⁷¹ Giles-Vernick, T. (2002) *Cutting the Vines of the Past: Environmental Histories of the Central African Rainforest*. Charlottesville: University of Virginia Press. Pp. 176 & 190.

Legislation on resource rights within production forests

General measures on use-rights of forest communities are defined in the National Forest Laws of Cameroon, CAR, DRC and Gabon.¹⁷² In all four countries a distinction is made between use of forest resources for domestic use, which is permitted within certain limits, and for

commerce, which is prohibited or undefined. Clearly, the prohibition on resource harvesting for sale is a major restriction on local peoples. Furthermore, resource rights can be extinguished by the government in both Cameroon¹⁷³ and DRC.¹⁷⁴

Table 1: Measures on resource rights specified in National Forest Laws¹⁷⁵

Country	Forest Law	Resource use rights
Cameroon	1994	<p>"User or customary rights...shall be those recognised of the local people to exploit all forestry, wildlife and fisheries products with the exception of preprotected species, for personal use".¹⁷⁶</p> <p>Hunting of defined species is permitted for domestic use only, using traditional methods (materials of vegetable origin), and subject to quotas. However there is no mechanism to implement this system.</p>
CAR	1990	<p>No restrictions on forest products harvested for domestic use.</p> <p>Agriculture is permitted but may be restricted.</p>
Congo	2000	<p>Use rights are not defined in national law. These rights may be defined in permits and management plans for individual forest concessions</p>
DRC	2002	<p>Forest communities retain rights to harvest forest resources for domestic use, subject to management plans.</p> <p>Agriculture is not permitted.</p>
Equatorial Guinea	1997	<p>According to Ekobo,¹⁷⁷ the Forestry Law recognises traditional uses of forest resources.</p>
Gabon	2001	<p>The Forest Law states specifically that holders of a timber permit do not have rights to other forest products.</p> <p>Customary user rights are recognised for domestic use, including:</p> <ul style="list-style-type: none"> • The use of trees for construction and the use of dead timber or branches as firewood • The collection of secondary forest products such as tree bark, latex, fungi, medicinal or edible plants, stones, lianas; • Small-scale hunting and fishing; • Grazing in the savannah, in clearings, and the use of branches and leaves as fodder; • Subsistence farming; • Grazing and water use rights. <p>However, "the exercise of customary user rights shall be free in rural forest estates for the members of village communities living traditionally near such forests and on condition that they respect the restrictive regulations for management or protection."</p> <p>Local rights to commercial exploitation are currently undefined.</p>

¹⁷² No information is available on Equatorial Guinea; ¹⁷³ Art 8 (2), Forestry Law, 1994; Cited in: Nguiffo, S. (2003) Forestry Law and the marginalisation of Pygmy populations. p.9 In: CED (Ed.) Forest management transparency, governance and the law: case studies from the Congo Basin; ¹⁷⁴ Jackson (2005) *op.cit.*; ¹⁷⁵ Source: Jackson (2005) *op.cit.* pp. 300-303, except where otherwise stated; ¹⁷⁶ Cited in Nguiffo (2003) *op.cit.*; ¹⁷⁷ Ekobo, P. (2001) *El Estudio de Perspectivas del Sector Forestal en Africa (FOSA): La Republica de Guinea Ecuatorial. Miniterre de l'agriculture, des peches et forets, Malabo-Bioko Norte*; ¹⁷⁸ Quoted in: praxede-Mapangou, M. (2003) Illegal exploitation of Gaboon resin in Gabon. In: CED & T.R.F.F. Monitor (Eds.) Forest management transparency, governance and the law. Report prepared for the Ministerial Conference on Africa Forest Law Enforcement and Governance (AFLEG). Yaounde, October 13-16, 2003. Pp. 62-66; ¹⁷⁹ For guidelines on forest management plans see: See Foaham (2001) *op.cit.*; ¹⁸⁰ Jackson (2005) *op.cit.*; Lescuyer, G. (2003) Forest Law Enforcement and Rural Livelihoods: a case study in Cameroon. Draft report. CIFOR; ¹⁸¹ Jackson (2005) *op.cit.*; Sinafasi, A., & M. Pacifique (2005) An assessment of the implementation of international commitments on traditional forest-related knowledge in the Democratic Republic of Congo. In: H. Newing *et al.* (Eds.) Our knowledge for our survival. Vol. 2: National case studies on traditional forest related knowledge and the implementation of realted international commitments. IAITPTF and CIFOR, Chiang Mai. Pp. 108-145; ¹⁸² Jackson (2005) *op.cit.*: p.253, based on forest laws of CAR; & Lescuyer (2003) *op.cit.*;

In the Republic of Congo, use rights and mechanisms to regulate resource access should be defined in the legislative documents connected to the granting and management of individual concessions, based on prior socio-economic surveys and identification of community needs. Preparation of management plans in Cameroon,¹⁷⁹ Gabon¹⁸⁰ and DRC¹⁸¹ (but not CAR¹⁸²) should also be based partially on local consultation. Measures that may be added to management agreements include changes in concession boundaries, or measures to restrict felling of trees that are important in local livelihoods, such as the sapelli tree (*Entandophragma cylindricum*).¹⁸³

However, consultation is frequently not carried out,¹⁸⁴ or is carried out after the concession application has been approved.¹⁸⁵ Moreover, since local people are frequently unaware of the contents of such documents, and government monitoring and enforcement of logging regulations is extremely poor in all six countries,¹⁸⁶ *de facto* access to forest resources is often not in accord with the law.

Social and cultural impacts of logging

Logging companies have both positive and negative impacts on local forest communities, and in many areas local people support them, at least initially. Government presence in many areas is minimal, and many logging companies take on a quasi-statal role, undertaking social development projects such as the construction of roads, schools and clinics.¹⁸⁷ Logging companies are also often the main employer in the region.¹⁸⁸ Pygmies are often hired as guides to find the best trees and to hunt, and make up between 30% to 47% of the workforce in logging camps around the borders between CAR, Cameroon and the Republic of Congo (although they usually receive a lower wage and fewer benefits than other workers).¹⁸⁹ However, frequently, the majority of jobs go to

outsiders; at least one case has been documented where the company imports cheap labour from Malaysia and the Philippines rather than employ local people.¹⁹⁰ Also, working conditions are often very poor.¹⁹¹ Loggers live in much larger villages than is customary for pygmies, resulting in increased health problems and social conflict;¹⁹² alcohol has also become a problem; malaria, ulcers and tuberculosis are widespread in the camps;¹⁹³ and many Pygmies have become heavily indebted to other villagers. More positively, there has been a rise in literacy and an improvement in health care, since schools and clinics are more available, but Pygmies are discriminated against in relation to other ethnic groups working in the camps and have less access to these services.

Inevitably, the power relations between logging companies and local forest communities are extremely unequal, and local communities have very little leverage to influence the activities of logging companies. Indeed, it has been reported that when complaints or discontent are voiced, some logging companies act to intimidate not only community groups, but also local and even international NGOs.¹⁹⁴ Moreover the indirect effects of logging operations, such as the opening of access via logging roads, increased immigration and the presence of hunters from outside the villages, can lead to increased tensions between villagers themselves.¹⁹⁵

The common characterisation of logging conflicts is that they comprise interactions between two sets of primary, opposing actors - external loggers and local people.¹⁹⁶ A second level of conflict caused by logging activities is that between different subsections of the local population - most dramatically, between Pygmies and neighbouring farming populations. Many Pygmies have lost their traditional lands, and live in extreme poverty on the margins of neighbouring farming villages, where they hold

¹⁸³ Forests Monitor (2001) *op.cit.* The report goes on to say "but unless villagers take direct action such as blocking the loggers' roads with barricades, their needs are rarely listened to or respected."; ¹⁸⁴ Forests Monitor (2001) *op.cit.*; ¹⁸⁵ Sinafasi & Adrien (2005) *op.cit.*; Jackson (2005) *op.cit.* In practice, some logging companies do carry out some earlier informal consultation with local communities; however, it is at their discretion; ¹⁸⁶ In Equatorial Guinea, in 2004, "INDEFOR currently does not have a clear picture of what is taking place or where... It is clear in some areas that forests are being overcut...". (Palmer, J. (2004) USDA-Forest Service Technical Assistance Trip Equatorial Guinea: Final report. Mission Dates: July 31 - August 15, 2004. USDA). Only one management plan had been written (and not implemented). In Gabon in 1999, "only five of more than 200 logging companies ... had started or planned to start writing a management plan." » (Forests Monitor (2001) *op.cit.*). See also Jackson (2005) *op.cit.*; CIAJE (n.d.) Résumé d'impacts des activités forestières des compagnies européennes sur les populations locales et l'environnement, Gabon. Pp. 50-52; Collomb, J.-G. et al. (2000) A first look at logging in Gabon. A Global Forest Watch Report. WRI. Washington, D.C.; Nsosso, D. (2003) Recovery of penalties in the Congolese forest sector. In: CED (Ed.) Forest management transparency, governance and the law: case studies from the Congo Basin. Pp. 31-44; ¹⁸⁷ Forests Monitor (2001) *op.cit.*; Jackson (2005) *op.cit.*: 237; ¹⁸⁸ For example, see: WRM (2002) Logging Jobs Benefit Pygmies, But Imperil Their Forest Home. World Rainforest Movement; ¹⁸⁹ Jackson (2005) *op.cit.*; Forests Monitor (2001) *op.cit.*

a highly subordinate position; Bantu and other farming peoples often perceive Pygmies as "belonging" to them, and officials tend to agree with this view. Thus forestry companies usually only enter into negotiations with Bantu villagers, not Pygmies, and Pygmies are further disadvantaged as they are excluded from any resulting benefits – either employment or social development projects.

Furthermore, the cultural identity of many forest peoples is deeply bound up with their daily interaction with the forest. Giles-Vernick¹⁹⁷ has described how for the Mpiemu in CAR, the loss of forest access was not simply a loss of livelihood; it also affected an individual's sense of self and connection to their cultural history. Forest degradation, uptake of waged employment, settlement in large villages, and scarcity of forest products all contribute to the erosion of traditional ways of life and the loss of traditional knowledge about the forest and its resources.

Indirect impacts on resource use: the bushmeat crisis

Logging also tends to increase local pressure on resources, both by attracting immigrants and through the construction of logging roads that open access to new areas of forest. Jobs are often only temporary, and immigrants who are only employed for a short time then have to look for other livelihoods,¹⁹⁸ competing with local people both for employment and for local resources. Road networks are expanding rapidly, partly as a result of logging, especially in eastern Cameroon, northern Republic of Congo, and southern CAR. Once loggers leave the area, poachers and settlers come in on these roads.

The Congo Basin is currently undergoing a crisis in overexploitation of bushmeat,¹⁹⁹ and whilst this is not only because of logging, roads

established and maintained by logging concessions intensify bushmeat hunting by providing hunters greater access to relatively unexploited populations of forest wildlife, and by lowering the costs of transporting bushmeat to market.²⁰⁰ Moreover, many workers in logging camps rely on hunting for their food and some companies are reported to actively favour hunting. In Bayango (CAR), the decrease in populations of game animals has increased conflict both within Bayaka Pygmy communities and between Bayaka and incomers. Incoming trappers have accused Bayaka of stealing animals from their snares, which has led to the Bayaka being jailed, beaten or killed.²⁰¹ As a result of the increasing scarcity of game, forest communities find it increasingly difficult to meet their daily needs.²⁰²

Direct impacts on resource use: non-timber forest products (NTFPs)

The extensive use of NTFPs by forest communities in Central Africa has been well documented.²⁰³ Timber concessions can reduce the availability of NTFPs through three mechanisms: restriction of access to forest resources, logging of timber species that are also important as NTFPs, and indirect impacts of logging activities on other forest resources (most notably, bushmeat). The above section has dealt with forest access and indirect impacts; this section will examine the effects of logging on specific resources.

Studies from Cameroon and elsewhere confirm that many commercially valuable timber species are also of economic and cultural significance to pygmies.²⁰⁴ Indeed, 61% of the top 23 timber species exported from Cameroon are valued as non-timber forest products by local communities,²⁰⁵ and therefore direct competition for use of these species is the norm in logging concessions. In addition to their economic value, many NTFP species of

¹⁹⁰ Euloge-N'zobo, R. (2003) Forest exploitation in the Republic of Congo: The case of Tamann Industrie Limited in the Mayombe forest. In: CED (Ed.) Forest management transparency, governance and the law: case studies from the Congo Basin. Pp. 45-50.; Forests Monitor (2001) *op.cit.* ¹⁹¹ A case study with details of working conditions is presented in: Forests Monitor (2001) *op.cit.* ¹⁹² Similarly, in settlements along roads in CAR, Ba'aka people were found to have significantly heavier parasite loads than the neighbouring Bantu. (Lilly, A.A. et al. (2002) Intestinal Parasites in Gorillas, Chimpanzees, and Humans at Mondika Research Site, Dzanga-Ndoki National Park, Central African Republic. *International Journal of Primatology* 23:555-573) ¹⁹³ Euloge-N'zobo, R. (2003) Forest exploitation in the Republic of Congo: The case of Tamann Industrie Limited in the Mayombe forest. In: CED (Ed.) Forest management transparency, governance and the law: case studies from the Congo Basin. Pp. 45-50.; Forests Monitor (2001) *op.cit.* ¹⁹⁴ A case study with details of working conditions is presented in: Forests Monitor (2001) *op.cit.* ¹⁹⁵ Similarly, in settlements along roads in CAR, Ba'aka people were found to have significantly heavier parasite loads than the neighbouring Bantu. (Lilly, A.A. et al. (2002) Intestinal Parasites in Gorillas, Chimpanzees, and Humans at Mondika Research Site, Dzanga-Ndoki National Park, Central African Republic. *International Journal of Primatology* 23:555-573); ¹⁹⁶ Forests Monitor (2001) *op.cit.*;

high commercial value as timber (such as *moabi* and *bubinga*) are also of cultural importance to Pygmy communities. Felling of such species by logging companies contributes to altering the foundation of Pygmy life and to the destruction of their culture.²⁰⁶

NTFPs are particularly important for women, both in producing daily household meals and also, as they become more reliant on cash income, in sale of products such as honey, medicinal plants, and fruits.²⁰⁷ When the availability or quality of NTFPs declines, women must seek alternative sources of income, and this can lead them into prostitution, either in neighbouring communities or in logging camps. Apart from the individual suffering it causes and the strains it places on local social and kinship structures, prostitution also introduces serious health risks to local communities. Evidence for this chain of events was found during an environmental and social impact assessment on a logging operation in Cameroon.²⁰⁸ Also in Cameroon, an unusually high prevalence of HIV (nearly 25%) has been found amongst young women in commercial logging areas.²⁰⁹

Box 1 describes a case study from Cameroon that demonstrates the different ways in which logging can impact on NTFPs.²¹⁰ Caterpillars need sapelli – an important timber tree – as their host plant, and their numbers have diminished as a direct result of timber extraction. A patch of forest rich in wild mangoes was destroyed by construction of the sawmill. Bushmeat has become scarce as logging roads and camps provide forest access to commercial hunters. The reason for the decrease in fish is not stated; the most probable cause is water pollution and siltation, causing increased mortality in fish.

Box 1: The impacts of logging on NTFPs in concession 10-004, Cameroon.²¹¹

Sapelli (*Entandophragma cylindricum*)

One of the most important timber species in Cameroon is the sapelli tree.

- Sapelli bark is used to heal wounds and for digestive problems.
- It is also the host tree of the "ossié" caterpillar, which, as well as being consumed directly by local people and a significant protein source, has an annual market turnover of some CFA 10,000 per tree. A significant sum in local economies.
- The caterpillars have become increasingly scarce.

Wild mangoes (*Irvingia gabonensis*)

- The sawmill site destroyed an important harvesting site for wild mangoes, which are important for nutrition.
- Wild mangoes are possibly the most valuable NTFP in the forest in terms of market trade. One tree produces fruits worth CFA 100,000 - 150,000.
- Local people say they must now travel much further to find them.

Fish:

- Women have noticed a significant drop in fish catches.
- In some villages they now have to travel 20km to fish.

Bushmeat:

- Bushmeat is the main source of animal protein for local people and is also an important source of cash.

¹⁹⁷ Giles-Vernick (2002) *op.cit.* Pp. 171-172, 176; ¹⁹⁸ Giles-Vernick (2002) *op.cit.*; ¹⁹⁹ Binot, A., & D. Cornelis (2004) Synthèse Bibliographique du Secteur «Viandes de Brousse» au Gabon: Rapport Final. Rapport Cirad-emvt N° 04- 14 Avril 2004. CIRAD-EMVT, Montpellier, France.; Bowen-Jones, E. et al. (2003) Economic commodity or environmental crisis? An interdisciplinary approach to analysing the bushmeat trade in central and west Africa. *Area* 35:390-402; Brown, D. & A. Williams (2003) The case for bushmeat as a component of development policy: issues and challenges. *International Forestry Review* 5:148-155; East, T. et al. (2005) Determinants of urban bushmeat consumption in Rio Muni, Equatorial Guinea. *Biological Conservation* 126: 206-215; Fa, J.E. et al, (2003) Bushmeat and food security in the Congo Basin: linkages between wildlife and people's future. *Environmental Conservation* 30: 71-78; Wilkie, D. et al, (2000) Roads, development, and conservation in the Congo basin. *Conservation Biology* 14: 1614-1622; ²⁰⁰ Minnemeyer (2002) *op.cit.*; ²⁰¹ Minnemeyer (2002) *op.cit.*; ²⁰² Forests Monitor (2001) *op.cit.*; ²⁰³ For example see: Ndoye, O., & J. C. Tieguhong (2004) Forest resources and rural livelihoods: The conflict between timber and non-timber forest products in the Congo Basin. *Scandinavian Journal of Forest Research* 19: 36-44; Dkamela, G. P. (2001) Les institutions communautaires de gestion des produits forestiers non-ligneux dans les villages périphériques de la Réserve de Biosphère du Dja. *Tropenbos-Cameroon Documents* 7. Tropenbos, Kribi, Cameroon;

- Animals have been displaced by forestry operations.
- Commercial hunters in logging camps have reduced game populations.
- Local people have had to change hunting routes to avoid forestry routes, and so must travel much longer distances.
- Alternatively they buy from commercial hunters, at greater expense to themselves. Household budgets are being significantly affected by these increased costs.
- The Baka are suffering increased malnutrition as a result of meat shortages during the dry season.

NTFPs used for subsistence are "invisible" in the national economy, and therefore tend to be given little attention in legislation and planning. However, when they gain commercial significance, it does not follow that local people's rights improve. Box 2 describes the case of Gaboon resin. Local medicinal use has prompted pharmacological trials, and as a result, a significant international trade has developed. However, rather than reinforcing local use rights, this has only served to exclude local people further from its use. Instead, logging companies have begun to exploit the resin – in spite of the fact that the law states clearly that they do not have rights to NTFPs within their concessions.

Box 2: Exploitation of Gaboon resin (*Aucoumea klaineana*)²¹²

Gaboon resin, or "okoumé" is the most important commercial timber species in Gabon, contributing about 90% of production. However, it is also important to local people, who tap the resin from the standing tree. Gaboon resin is used in certain initiation rites and also for water purification, for treating abscesses, as an insecticide and deodorant. There is a significant local market, and it provides the main source of income for some families.

Research in the late 1990s revealed that some logging companies have begun to exploit the resin illegally in industrial quantities for export,²¹³ and in the early 2000s, the resin was the subject of pharmacological screening and cosmetics tests. The tests revealed that the resin had anti-protease and anti-inflammatory properties. Further supplies were required to develop cosmetic products. It was originally planned that they would be supplied by local communities, but as the supply was insufficient, a logging company was contacted to supply the resin – although logging concessions do not give rights to exploitation of non-timber products. Local communities were cut out of the supply chain and lost the income they had derived from the early stages of the project. Since the industrial exploitation is not licensed or taxed, there is no benefit to the State either. Meanwhile, there is little information on the impacts of resin harvest on the tree itself, and thus the sustainability of the increased harvest levels is unknown.

²⁰⁴ Nguiffo (2003) *op.cit.*: p.8; ²⁰⁵ Ndoye & Tieguhong (2004) *op.cit.*; ²⁰⁶ Nguiffo (2003) *op.cit.*: 8; ²⁰⁷ Ndoye, O. et al. (1998) The Markets of Non-timber Forest Products in the Humid Forest Zone of Cameroon. ODI Rural Development Forestry Network Paper 22c. London, ODI; Brown, K. & F. Ekoko (2001) Forest Encounters: Synergy among agents of forest change in southern Cameroon. *Society and Natural Resources* 14(4): 269-290; ²⁰⁸ Forests Monitor (2001) *op.cit.*: 17-19, citing Lapuyade (2000); ²⁰⁹ Laurent, C. et al, (2004) Commercial Logging and the HIV Epidemic, *Rural Equatorial Africa. Emerging Infectious Diseases* 10: 1953-1956; ²¹⁰ A similar case in CAR is documented in: Mogba, Z. & M. Freudenberger (1998) Human Migration in the Protected Zones of Central Africa: The Case of the Dzanga-Sangha Special Reserve. In: H. Eves, R. Hardin & S. Rupp (Eds.) *Resource Use in the Trinational Sangha River Region of Equatorial Africa: Histories, Knowledge Forms, and Institutions*. Yale University, New Haven, Connecticut. Pp. 104-129; ²¹¹ Source: Forests Monitor (2001) *op.cit.* p.21 (citing Lapuyade, 2000); ²¹² Source: Praxede-Mapangou (2003) *op.cit.* p.64-66; ²¹³ The research was the BIODIVALOR-Gabon programme, funded by French Cooperation and implemented jointly by the Gabonese government body IPHAMETRA and Pro-Natura International. For details see: Praxede-Mapangou (2003) *op.cit.*

Recommendations

Governments of the six Central African countries should:

- Call a moratorium on the allocation of new concessions and logging until the government has sufficient information and capacity for effective monitoring and enforcement.
- Rethink forest policy with a view to local capture of benefits.
- Review the forest zoning process proposed in DRC, in a participative manner. In particular, information is needed on lands that are in use by forest communities within production forests.
- Recognise the rights of Pygmies independently of their Bantu neighbours.
- Review the law in order to give greater recognition of customary institutions.
- Halt logging operations that don't have a legally recognised management plan.
- Where not already in place, develop enforceable standards on relations with local people (employment, health, consultation processes) and ensure that they are followed.
- Where not already in place, develop enforceable procedures to reduce the impact of logging operations on NTFPs – especially those from timber species.
- Control immigration and bushmeat hunting along logging roads. Ban commercial hunters from logging camps.

NGOs / researchers:

- Further research is needed on: the distribution of forest communities, especially Pygmies; on current conflicts with logging concessions; and on the ecology and management of key NTFP species – especially those that are also timber species.
- Substantial support and training to indigenous organisations is required in order to build an effective indigenous system of representation and communication.



Afromosia has already been logged to commercial extinction in much of its range outside the Congo. Trade in its wood is supposed to be controlled under CITES, but it is already being heavily exploited illegally in DRC.
Photo: Cath Long



The involvement of local people in forest management decision making is fundamental to sustainable forest management and poverty alleviation. Photo: Sylvain Angerand



Forest communities depend heavily on non timber forest products to meet their livelihood needs: a factor not taken into account in the logging concession model. Photo: Cath Long



Bafoto community leader agreeing on their map with members of the communities concerned, Equateur, DRC. Photo: Cath Long



Villagers look on with concern at the departure of resources from the forests upon which they depend in DRC. Photo: Filip Verbelen

4.2 SOCIAL CONFLICTS ARISING FROM INDUSTRIAL LOGGING PRACTICES IN CAMEROON

SAMUEL NGUIFFO, CED, CAMEROON

Industrial logging brings with it massive potential for conflict in Cameroon, due to the number and variety of players, the various interests and expectations in play, and the perceptions that revolve around forest areas and timber. At the local level, such divergent interests are resulting in increasingly violent conflicts around forest timber concessions.

Three principle causes have been identified for such conflicts between the local communities and the logging companies over their practices:

- The imbalance of legal pluralism around the forest, with the coexistence of a patchwork of customary laws and colonially-inspired "modern" laws. The former embody the principle of land and forest resources being communal property, while local communities have little knowledge of modern laws, which therefore lack legitimacy in their view. These modern laws establish the State as the sole owner of the forests, and provide for forest management methods which sometimes go against those embodied in customary law, in particular with regard to the assignment of land and resources. It thus results in local communities being marginalised during the assignment of logging rights.²¹⁴
- The socio-economic impact of the forest industry. On the one hand, there are claims for an equitable share of the forest income to which local communities – and in particular the Bantus – consider they have a right to, both as guardians of the forest and as compensation for the rapid erosion of forest biodiversity. On the other hand, timber logging operations are having negative socio-economic consequences, in particular with the removal of disputed species²¹⁵ and the recurrent destruction of crops.
- The local communities challenge forest zoning because it takes no account of the way they have used the forest traditionally, placing vast areas of the forest under concessions or under special protection, defined as "permanent forest" under the national forest zoning system. This new distribution of forest area confines most of the local population's activities to forest areas which are not as rich as the permanent forest which are subject to draconian restrictions. In this context, the indigenous populations are most affected as their traditional territories are often at the heart of these permanent tracts of forest.

Research carried out at the end of the 1990s²¹⁶ showed that conflicts were arising with neighbouring communities in virtually all the forest concessions. In general these remain dormant because the industrialists have far more clout and resources than the communities. In addition, the government sometimes sides with the logging companies, considering the local communities' desire to contest this new order as breaches of the peace. Such cases of conflict are rarely brought before the Courts because of the difficulty the local communities have in accessing the legal system, and also because of their ignorance of modern law. In addition, the alternative mechanisms for settling disputes do not always work in Cameroon, with forest conflicts usually coming to an end with the departure of the logging company once there is no more timber left to extract.

Recommendations

The way in which the forest is logged gives a very strong impression of injustice towards the local communities. Logging makes only a marginal contribution towards local development and sometimes has an irreversible negative impact on the local communities'

²¹⁴ With regard to Cameroon's forests, customary laws are fundamentally different to modern law, especially with regard to the ownership of land and resources (customary law gives ownership to the people whereas modern law grants the State ownership) and rights of use (in modern law the State as owner grants usage rights according to conditions it itself sets, whereas under customary law it is the communities that grant the rights to use forest resources and areas). Because modern law reduces the rights of local communities to their forests, these communities often reject modern laws out of hand;²¹⁵ These are species having a high commercial and cultural value. Highly prized by logging companies, their logging results in a drop in the living standards of the local communities. See also: CED (2001) *Les essences disputées dans le Sud forestier du Cameroun*. Yaoundé;²¹⁶ Bigombe, P. & B. Dabire (2002) *Gérer autrement les conflits forestiers au Cameroun*. Yaoundé; Nguiffo, S. (1997) *Les conflits liés à la gestion des forêts au Cameroun*. Paper presented at a workshop on the alternative management of natural resource conflicts, Niamey.

living conditions. Three sets of measures could help reverse the trends that encourage conflict in Cameroon's forests:

- Organising preventive mechanisms. This consists of imposing obligations on all external players, for example, requiring them to observe the rights and interests of local communities. Such a requirement could in fact be extended to protected area managers. With regard to logging companies, such mechanisms would be embodied in contracts with the State, and could be contained in their contracts. Finally, the rules governing the logging of timber and exploitation of non-timber forest products should be based on a rigorous analysis of the environmental and socio-economic impacts of the logging companies' activities.
- Acceptance of the right of local communities to defend themselves. This could consist of making communities more directly involved in the forest management decision-making, and giving them the right to complain to the legal authorities should a dispute arise with the logging companies or other external players. This solution could be implemented through giving local communities the ability and legal status to act in all matters pertaining to the forest.
- The government should be flexible in how they deal with local forest communities regarding customary law. Wherever possible, it should aim at balancing constitutional law pertaining to forest management with customary law in order to avoid undermining the legitimacy of the nation's forest legal framework.

4.3 THE EXPLOITATION OF MOABI: CONFLICT SURROUNDING A TREE OF HIGH SOCIAL VALUE

SYLVAIN ANGERAND, FRIENDS OF THE
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In Europe and especially in France, moabi is highly regarded for the quality of its wood, the ease with which it can be worked and its fine grain – which gives it a wonderful uniform pink to brown tint. In Central Africa, the moabi has multiple uses and occupies a central place in traditional societies. As such, its commercialisation by foreign-financed companies is generating many conflicts.

Moabi ecology

The moabi (*Baillonella toxisperma*) is characteristic of the Congo Basin's dense humid tropical forest. Its natural distribution extends from north of Gabon and the Democratic Republic of Congo to southern Nigeria, with southern Cameroon and Equatorial Guinea representing the centre of its range. In these forests the biggest moabis emerge from the canopy at a height of 70 metres and their large sinuous branches overhang the old growth (or "primary") forest. In the undergrowth, the trunk is massive (up to 5 metres in diameter) and the easily-identified bark is a deeply creviced reddish brown. To reach such proportions, the moabi must withstand competition from the other species in the undergrowth, and wait for an old tree to fall in order to make the most of the resultant gap in the canopy. Moabis which dominate the forest are therefore very old, generally between 600 and 700 years of age, although some scientists have even reported trees which were up to 2,500 years old.²¹⁷

The moabi is somewhat rare in the forest, with usually just one fruiting tree for every 20 hectares. However, this distribution is not homogeneous as moabi populations generally have an aggregate structure, with point concentrations of between 5 and 50 individuals in what the Bantu refer to as "clumps" or "sites".²¹⁸

The Moabi's place in Pygmy and Bantu traditions

There are two ethnic groups within Cameroon: the Bantu, agriculturalists who migrated into the area and settled along the edges of the forest stands; and the commonly-called "Pygmies", an indigenous, semi-nomadic people who until very recently lived exclusively in the forests but who are now the subject of government programmes aimed at encouraging them to settle in villages with road access. Both the sedentary and the semi-nomadic Pygmies maintain a very direct relationship with, and have an in-depth knowledge of, the forest.

The moabi is highly present in both Pygmy and Bantu traditions. The tree is featured in many Bantu songs and stories, while in the Dja region of south-eastern Cameroon, the word *edjoh*, which means moabi in Badjoué, the local Bantu language, is at the root of several village names such as *Medjoh* (which literally means "moabi nursery"), *Nemedjoh* or just simply *Edjoh*. In Gabon, the capital of the *Doigny* département is very simply called Moabi.

The cultural importance of the moabi is further strengthened by its mode of dissemination. The fruit are consumed by elephants and the seeds are expelled in their faeces, with their passage through the intestinal tract slightly accelerating the germination process. Elephants are already regarded by local populations as symbolic, so the moabi's place in their cultural traditions is only further accentuated by this association. For the Pygmies, this interaction between the elephant and the moabi gives the tree a sacred dimension as follows: *Jengi*, the spirit of the forest, appears only when an elephant dies, and guides the hunters in tracking game in the forest. The Pygmies believe that the whole of the elephant's ecosystem, in particular the moabi whose large juicy fruits the elephant is particularly fond of, is the symbolic embodiment of *Jengi*.

²¹⁷ Jacques Weber, Director of the Institut Français de la Biodiversité, personal communication; ²¹⁸ Mapaga, D. *et al.* (2002) Moabi. Forafri & IRAF, Libreville, Gabon & Cirad-forêt, Montpellier, France.

Indeed, the Baka Pygmy hunters not only use large moabi trees as markers to guide them through the forest, they also use them to make themselves "invisible". During the traditional ceremony called "yeyi", witch doctors reduce moabi bark fragments to powder and concoct a "camouflaging potion" which the hunters cover their bodies in so they can go undetected through the forest.

The Pygmies are also highly regarded healers and have a good knowledge of the properties of forest plants. For example, they use moabi bark to produce brews which relieve back ache and abdominal pains. Ethnobotanical research conducted by Jean Lagarde Betti in the Dja reserve, Cameroon, during 1994 and 1996 under the ECOFAC programme, produced a list of almost 350 plant species used to treat more than 77 illnesses or symptoms, and recorded 50 different uses for moabi alone.²¹⁹

But above all the moabi is known and appreciated for the oil which can be produced from its seeds – which for a long time was the only oil available from the forest. In fact, the moabi seed kernel is extremely toxic when eaten raw (hence the tree's scientific name "toxisperma" or "toxic seed"). However, when crushed, boiled and pressed, the result is a delicious, edible oil rich in palmitic acid. The women – whose role traditionally has been to prepare the oil – also know that if boiled a second time, it can be used to produce a butter which very closely resembles "karité" or shea butter, and which can be used as a cosmetic. Thus the Bantus often call the moabi "karité" simply because it has many of the characteristics found in *Vitellaria paradoxa* (called variously the shea nut tree, the shea butter tree, karite and karité). Trading in this oil provides a significant source of revenue, more than that generated from the sale of moabi timber.

In 1995, Schneemann²²⁰ compared two scenarios: taking a moabi tree with a diameter of 100 cm (the minimum diameter which may be commercially felled legally in Cameroon), he evaluated the tree's economic value in terms of its timber and its oil (not taking into account any discount rate). Such a tree would produce an average volume of approximately 9 m³ of timber. Given that the value of the timber is approximately 100,000 CFA Francs (the minimum roadside or expert price according to ONADEF²²¹ volume tables) then the tree is worth about CFAF 900,000. Conversely, given that a moabi only fruits abundantly once every 3 years, that a tree can produce approximately 150 litres of oil every 3 years, and that this oil is worth at least CFAF 1,000 at the roadside, then such a tree would generate revenue in the region of CFAF 180,000 every 3 years: within 15 years the revenue from the commercialisation of the oil is greater than the economic value of the timber.²²²

Conflicts between forest exploitation and social uses

Moabi seeds are harvested during July and August when the fruit reach maturity. Bantu men will go and find the fruiting moabi trees in the forest, and clear the area surrounding the tree to facilitate the harvesting of fruit which fall to the ground. To optimise the harvest, one or several Bantu households may be involved in setting up camp for several weeks close to the large trees in the forest. During fruiting, the Bakas will also use the occasion to move their camp close to a clump of moabis. In practice, he who first discovers a moabi in the forest can lay claim to it by clearing the undergrowth from around the tree and by placing a mark on the trunk. Thus a family can claim ownership of a tree and pass it down from generation to generation, and this is a traditional right.²²³

²¹⁹ Betti, J.L. (2001) *Usages traditionnels et vulnérabilité des plantes médicinales dans la réserve de Biosphère du Dja et dans les marchés de Yaoundé, Cameroun*. PhD Thesis. Sci. Agro., ULB, Brussels;²²⁰ Schneemann, J. (1995) Exploitation of Moabi in the Humid Dense Forests of Cameroon. Harmonization and improvement of two conflicting ways of exploitation of the same forest resource. *BOS NEWSLETTER* 31, Vol. 14(2): 20-32;²²¹ Mapaga et al. (2002) *op.cit.*;²²² Angerand, S. (2006) *La société R. Pallisco et l'exploitation du moabi dans l'est du Cameroun*. Friends of the Earth/Shepa. Unpublished;²²³ Schneemann (1995) *op.cit.*

In 1995, Schneemann²²⁴ tried to evaluate the number of moabi sites frequented and their distances from four Bantu villages in southern Cameroon. He observed that each village frequents on average ten or so sites and that around 80% of the trees are 30 km or more distant, or in other words at least one day's walk through the forest. However, this spacing juxtaposes with the forestry concessions. Forest operators and villagers may each end up claiming rights to a tree, thus giving rise to numerous conflicts. In eastern Cameroon around the Dja reserve where there are dense moabi populations, the conflicts have increased since the arrival of the logging companies: several times the villagers have blocked the roads and protested against the felling of the moabi trees which they consider belong to them. At the beginning of the 1980s, the government tried to impose restrictions on the logging companies, stipulating that no moabi could be felled if it was within 5 km of a village. Despite having no relation to the reality of the situation, given that the visited moabis were often more than 30 km from the nearest village, the decree in any event went unheeded.²²⁵

Economically, ecologically and socially unsustainable exploitation

Today, the selective logging of moabis in this region provides no opportunity for reconciling economic, social and ecological interests. In 1998, Debroux²²⁶ showed that in eastern Cameroon 90% of trees measuring more than 100 cm were felled – the remaining 10% being deformed – representing 75% of seed trees. By modelling the moabi population dynamics, he concluded that logging operations working on a 30 year cycle were endangering the survival of the species, and therefore the moabi would be unable to sustain production.

This study was carried out on concessions owned by R. Pallisco, a subsidiary of the French Pasquet Group of Companies which specialises in moabi logging. In 2004, Doucet and Vermeulen²²⁷ showed that after a first selective felling, sufficient seeds remained to satisfy the oil needs of the neighbouring populations. It would however be dangerous to conclude that the social impact has been lessened, given that no account has been taken of the sacred nature of this tree for the indigenous populations present in the concession. In addition, the identified seed requirements of local people represents a harvest of 40% of the total seed yield from the moabis left standing after the logging operations (75% of the seed trees having been felled): this harvest was not taken into account by Debroux and therefore heightens still further the impact of his conclusions.²²⁸

Many other trees in Central Africa are of major social importance and yet are exploited intensively, including the bubinga, a tree considered sacred by the Pygmies, and the sapelli, on which can be found an edible caterpillar which is rich in protein and highly valued by local populations.

Conclusions

The moabi is the archetypal resource around which conflicts of use gather, like moths around a flame. To date the social value of these trees has rarely been taken into account in the management plans of forest enterprises.

The conflicts created by the logging of moabi underline the limits of a harvest model based on the intensive logging of a small number of species. Yet, non-timber exploitation of this tree (through oil production) could result in very significant economic benefits which are compatible with both the ecological requirements and the social uses of the moabi.

²²⁴ Schneemann (1995) op.cit.;²²⁵ Mapaga et al. (2002) op.cit.;²²⁶ Debroux, L. (1998) L'aménagement des forêts tropicales fondé sur la gestion des populations d'arbres : l'exemple du moabi (*Baillonella toxisperma* Pierre) dans la forêt du Dja, Cameroun. PhD Thesis, Faculté des Sciences agronomiques de Gembloux, Belgium;²²⁷ Vermeulen, C. & J.L. Doucet (2004) Conservation and sustainable use of non-timber forest products in favour of local communities within integrated forest management in Central Africa. Proceedings of the International Symposium on Tropical Forests in a Changing Global Context. Royal Academy of Overseas Sciences, United Nations Educational, Scientific and Cultural Organisation. Brussels. 8-9 November 2004;²²⁸ Angerand (2006) op.cit.

Recommendations

It is essential to affirm the rights of local populations, and in particular the indigenous populations, to use trees having a high social value.

To do this, the local and indigenous populations must be made to participate more when drawing up zoning maps (e.g. participative mapping), in particular on the areas earmarked for timber exploitation.

When a company exploits a forest on which populations depend, very precise contracts must be drawn up which take account of the exploitation of these high social value trees and which, where necessary, prohibit their felling.

Wherever possible, such as with the moabi, other economic development methods need to be compared with timber extraction and promoted as part of the struggle against poverty.

4.4 LOGGED TO DEATH: THE IMPACTS OF THE TROPICAL TIMBER INDUSTRY ON HUMAN HEALTH

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Introduction

The human health aspects of the tropical logging industry – some of which are specific to the industrial logging concession model – are usually overlooked. However, there is growing evidence that the human health costs of rainforest logging are significant, if difficult to estimate fully.

This paper suggests that, at best, the tropical logging industry, and those that advocate its continuance and expansion, are directly undermining the achievement of Millennium Development Goal #6, which seeks to reduce suffering from diseases such as malaria and HIV-AIDS. The paper also highlights that health and safety conditions for workers in tropical logging concessions rank as amongst the worst in the world.

Malaria

The relationship between the incidence of malaria and modification of tropical forests has long been appreciated. The United Nations notes that "Deforestation and road building often disrupt forest and river systems increasing the habitats for malaria-carrying mosquitoes and migration of workers into previously inaccessible areas is increasing the population at risk."²²⁹ A recent study in the Peruvian Amazon has shown that the incidence of the malaria vector, *Anopheles darlingi*, increased more than 200-fold in deforested areas compared with intact rainforest.²³⁰

The increase in mosquito populations appears to be due to the availability of standing water suitable for reproduction in effected areas. Industrial logging practices in tropical forests are usually associated with an increase in such mosquito breeding sites due to ponding of streams and rivers through road and skid-track construction, blocking of watercourses by

erosion and logging debris, deep ruts and gullies caused by heavy equipment and lorries, as well as stagnant pools occurring in and around logging camps. Clearance of overhead vegetation can also cause a reduction in the acidity of surface water, thus creating better conditions for anopheles mosquitoes to breed.²³¹

The ecological changes brought about by commercial logging and other forms of forest disturbance and damage can also cause changes in the prevalence of different types of malaria, as different species of mosquito benefit from these changes. A study in Cameroon has shown that transmissions of malaria from the bite of *Anopheles gambiae* increased from 0% of total transmissions in a still-forested area to 13% in a clear-felled area of 370 hectares some three kilometres away (most malaria transmissions in the study area were from *A. moucheti*).²³² *A. gambiae* is the most efficient vector of the highly dangerous form of malaria, *Plasmodium falciparum*.²³³ In Africa, "A. gambiae prefers sunlit pools with turbid water with little or no emergent vegetation",²³⁴ conditions unlikely to be found in unlogged forest but likely to occur where there has been heavy logging damage. In one study in Latin America, the presence of *P. falciparum* malaria in nomadic Waorani hunter-gatherers inhabiting undamaged forest has been found to be zero, whereas it was present in Waorani living in permanent settlements in a modified environment. This suggests that *P. falciparum* is not readily transmitted in undisturbed rainforest but is readily transmitted in disturbed or cleared areas.²³⁵

A study of the "zone of influence" of two logging companies in Brazil has shown that the incidence of *P. vivax* and *P. falciparum* in the town near to one logging company's operations increased 4-fold and 20-fold respectively, whilst for the second company the increases were 119% and 195% respectively.²³⁶ It was believed by the authors of this study that infected log

²²⁹ <http://www.un.org/apps/news/story.asp?newsid=13407&cr=infectious&cr1=diseases>;²³⁰ Vittor, A.Y. et al. (2006) The Effect of Deforestation on the Human-Biting Rate of *Anopheles darlingi*, the Primary Vector of *Falciparum* Malaria in The Peruvian Amazon. *American Journal of Tropical Hygiene* 74: 3-11;²³¹ Patz, J. et al. (2000) Effects of environmental change on emerging parasitic diseases. *International Journal of Parasitology* 30: 1395-1405;²³² Manga, L. et al. (1995) Malaria vectors and transmission in an area deforested for a new international airport in southern Cameroon. *Annales de la Société Belge de Médecine Tropicale* 75(1): 43-49;²³³ <http://www.cdfound.to.it/HTML/pla1.htm>;²³⁴ Patz et al. (2000) op.cit.;²³⁵ Coluzzi et al., cited in Patz et al. (2000) op.cit.;²³⁶ Fanzeres, A. (2002) The making and unmaking of forest certification in the Brazilian Amazon; a study on the certification process of two logging companies in the State of Para. In: Rainforest Foundation (Ed.) *Trading in Credibility: the myth and reality*. Forest Stewardship Council. Rainforest Foundation, London.

truck drivers were probably also encouraging the spread of the disease into adjoining communities, some of which were so badly affected by malaria that villages were becoming depopulated.

The Malaria Foundation International notes that logging and other such activities not only bring about ecological changes which favour the proliferation of malaria-bearing mosquitoes, but also increase the availability of human victims: "human environmental changes such as road building, mining, deforestation, logging, and new agricultural and irrigation projects have created new [mosquito] breeding sites. Malaria transmission in newly logged or exploited areas explodes just as a crop of outsiders with no immunity to the disease come into work camps."²³⁷

Several governments, including those of Uganda²³⁸ and Guyana have recognised the relationship between loss of, and damage to, their forests and the incidence of malaria. The government of Guyana, for example has acknowledged that "increased mining and logging activities in the hinterland regions is part of the Government's sustainable development programme, but they also contribute to the problem of malaria".²³⁹

According to the Pan-American Health Organisation (PAHO), the spread of malaria amongst logging workers in Guyana has another worrying dimension. PAHO has reported that "Mining and logging operators having access to foreign exchange, purchase antimalarials and use them indiscriminately to suppress symptoms. This practice not only compounds the difficulties of parasitological diagnosis by health service workers but also eventually enhances the problem of stable resistance".²⁴⁰ In fact, PAHO has found that *P. falciparum* resistant to Chloroquine and Fansidar "has become firmly established in

previously eradicated areas and amongst a very mobile, widely scattered mining and logging population with little or no immunity".²⁴¹ Given that medical treatment facilities in most logging concessions are rudimentary at best, this problem is also likely to be occurring in other countries, thus reducing the ability of humanity to treat malaria effectively.

The International Union for the Scientific Study of Population has noted that traditional practices of forest dwellers served to minimise vulnerability to mosquitoes within the home, whereas modern logging camps allow mosquitoes to proliferate: "In Southeast Asia new techniques of logging such as commercial teak logging have attracted new forest dwellers. Traditional forest people built homes on stilts and cooked on a smoky fire inside the house while livestock remained under the house. New settlers built homes on the ground with no space for livestock under the house and cooked in a detached room."²⁴² The smoky fires act as a natural deterrent for the mosquitoes within the home (though can also be responsible for pulmonary diseases).

HIV-AIDS

There is evidence that HIV-AIDS may have originated from the transmission and subsequent adaptation of Simian Immunodeficiency Disease (SIV), transmitted to humans via the consumption of bushmeat, a disease present in various sub-species of chimpanzee in West-Central Africa's forests. This indicates the danger of proximity of humans to such sources of disease (see below), but there is also growing evidence of the role of commercial logging in the spread of HIV-AIDS.

Logging concessions, in Africa and elsewhere, create conditions in which sexually-transmitted diseases are likely to proliferate: high

²³⁷ <http://www.malaria.org/currentstatus.html>;²³⁸ <http://www.health.go.ug/malaria.htm>;²³⁹ <http://www.gina.gov.gy/archive/daily/b030711.htm#Healthofficials>;²⁴⁰ <http://www.paho.org/english/hcp/hct/mal/cartagena-4-guy.pdf>;²⁴¹ <http://www.paho.org/english/hcp/hct/mal/cartagena-4-guy.pdf>;²⁴² http://www.iussp.org/Publications_on_site/PRP/prp2.php;²⁴³ <http://www.med.harvard.edu/chge/biobrief.html>.

concentrations of mostly male manual workers, often with relatively low levels of education, often migratory and without their families, enjoying regular cash income, located in remote areas where levels of wealth amongst the local female population is often also very low. One recent study in Cameroon, carried out in the village where a sawmill and logging camp is located, as well as in two nearby villages, has shown that nearly one quarter of women aged 25-34 were infected with HIV (compared to an infection rate of 8.3% for this gender-cohort in Cameroon's East Province as a whole).²⁴⁴ According to the researchers, this finding "could be related to commercial logging. In a context in which workers had relatively high salaries (U.S. \$60 to 530 per month), sexual networks were extensive and complex. An estimated 40 female sex workers were permanently living in the logging camp. In addition, ~100 women arrived at the logging camp from towns or neighboring villages at the time of salary distribution (twice a month), to trade or offer paid sex (U.S. \$1.50 per intercourse). Some men and women had sex with several partners a night. Some workers' wives also had extramarital sex... HIV-1 genetic diversity and its distribution were similar to that observed in towns which suggests that the spread of HIV in this rural area results from numerous introductions of the virus." The conditions in the villages and logging camp described in this account would be fairly typical of most logging operations within the Congo Basin.

In addition to the (repeated) introduction of HIV into remote forest areas, it is likely that logging camps also serve as a nexus for infection, with the disease being spread out along log extraction and transportation routes by truck drivers, though this aspect has not yet been the subject of specific study. In parts of West-Central Africa, log transportation routes, especially to the Cameroonian port of Douala,

can be many hundreds of kilometres long, with the return journey taking several days. The larger companies send several thousand shipments each year.

Outside Africa, the only other reports of a relationship between the forest industry and HIV-AIDS has come from Burma where, according to Global Witness, because of logging in Kachin state "the presence of many migrant workers has led to an increase in prostitution, HIV Aids, drug abuse and gambling".²⁴⁵

Other diseases

The full range of diseases likely to be promoted by the combined effects of forest habitat change and new settlement has not been fully documented. However, as has been noted in a Harvard Medical School study, "the majority of important vectors of human and animal diseases [are] found in the rich biodiverse tropical rain forest ecosystems, woodland savannahs, and the edges of these ecosystems".²⁴⁶

The proximity of humans to such vectors encourages the adaptation of vectors to human hosts, especially when alternative hosts become locally scarce.²⁴⁷ Local scarcity of "alternative hosts", especially in the form of large mammals, is a common feature of almost all tropical logging concessions, as logging workers, their dependents, and other people attracted along logging roads, exterminate bushmeat species in order to supplement their usually meagre incomes. Such adaptations in disease and vector behaviour may be varied, but examples from South America include the vectors of leishmaniasis, certain species of sandfly, "which were originally zoophilic and sylvatic [but] have adapted to feeding on humans in peridomestic and even peri-urban situations".²⁴⁸

²⁴⁴ Laurent, C. et al. (2004) Commercial logging and HIV epidemic, rural Equatorial Africa. *Emerging Epidemic Diseases* 10(11);²⁴⁵ Global Witness (2003) A conflict of interests; the uncertain future of Burma's forests. Global Witness, London.;²⁴⁶ Chivian, E. (2002) Biodiversity: its importance to human health, interim executive summary. Centre for Health and the Global Environment, Harvard Medical School.;²⁴⁷ Chivian (2002) op.cit.;²⁴⁸ Walsh, J.F. et al. (1993) Deforestation: effects on vector-borne diseases. *Parasitology*: 106(suppl.): s55-75

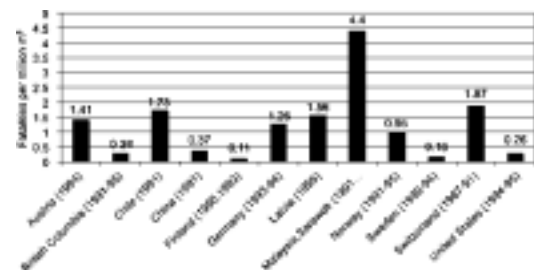
In South America, as one study has noted, "population and commercial pressures have led to the invasion of forests, exposing people to exotic agents and enzootic diseases, including yellow fever, rabies transmitted by vampire bats, arenaviruses, and others."²⁴⁹ Much of what has been noted above concerning malaria is also true of dengue and dengue hemorrhagic fever (DHF); any environmental or cultural changes encouraging the proliferation of mosquitoes is likely to promote the spread of dengue if the disease is present in the area or in those traversed by logging industry workers.²⁵⁰ A further disease spread by the Anopheles mosquito is O'Nyong-Nyong fever, which re-emerged in south-western Uganda in 1996 after an absence of 35 years.²⁵¹

Logging worker health and safety

Industrial forestry is, according to both the UN Food and Agriculture Organisation (FAO) and the International Labour Organisation (ILO), a highly dangerous undertaking:²⁵² "Forestry in general and logging in particular continue to be among the three most dangerous occupations in almost all countries."²⁵³ Even in the United States, forestry is more dangerous (in terms of fatal accidents per worker employed) than mining, fisheries or farming.²⁵⁴ According to the ILO, "forest work is characterised by serious health problems related to excessive physical workloads, noise, vibration, repetitive strain injuries and stress among machine operators to name only the most significant. In fact, most forest workers do not reach normal pension age".²⁵⁵

The situation in the tropics is worse still. According to the ILO, logging fatalities in Sarawak, Malaysia – the one tropical country for which reliable data are available – was between 3 and 40 times the level in developed countries, and 17 times the level of the USA (see Figure 1).

Figure 1. Logging industry fatalities in selected countries²⁵⁶



The figures for Sarawak are probably not unusual for the tropics; the fact that there appear to be no statistics at all available for the African logging industry (outside of southern Africa) is, in itself, indicative, reflecting the fact that occupational health and safety records are not kept, let alone monitored and acted upon. The dangers to forest workers are generally treated by tropical country governments as a matter of low priority²⁵⁷ and are usually left to the logging concessionaire to deal with.

Most accidents in forestry occur during tree-felling and the dangers are much greater in tropical forests: chainsaws are much larger (because trees are larger) and may be stripped of any safety features in order to make them lighter and easier to use. The surface roots and buttresses of tropical trees may make it difficult for chainsaw operators to fell trees safely, and lianas and vines often pull down other surrounding trees. Safety clothing and helmets are usually either not provided or are discarded by the worker, as they are mostly designed for temperate or boreal use and are unsuited to the hot and humid conditions of the tropics. Venomous snakes and other wild animals are an additional danger, especially for tree-spotters and chainsaw operators.

The next main cause of fatalities and serious injury in forestry is usually in operating

²⁴⁹ Brandling-Bennett, D. & F. Pinheiro (1996) Infectious Diseases in Latin America and the Caribbean: Are they really emerging and increasing? *Emerging Infectious Diseases* 2(1);²⁵⁰ Gratz, N.G. (1999) Emerging and resurging vector-borne diseases. *Annual Review of Entomology* 44: 51-75;²⁵¹ Gratz (1999) *op.cit.*;²⁵² http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/x5393e/x5393e07.htm;²⁵³ Blombäck, P. & P. Poschen (2003) Decent work in forestry? Enhancing forestry work and forest-based livelihoods. Paper to the XII World Forestry Congress, Quebec, Canada, 2003.;²⁵⁴ Blombäck, P. (2001) Improving occupational safety and health: the International Labour Organisation's contribution, In 'Applying reduced impact logging to advance sustainable forest management', proceedings of Conference, Asia-Pacific Forestry Commission, Kuching 26 February-1 March 2001.²⁵⁵ Blombäck (2001) *op.cit.*;²⁵⁶ From: Blombäck (2001) *op.cit.*;²⁵⁷ Blombäck & Poschen (2003) *op.cit.*

equipment. Again, this can be more problematic in the tropics because of environmental conditions. Because trees are larger, so equipment tends to be heavier, and safety devices such as seat-belts and protective guards may be unused or disconnected. Heavy rainfall, steep terrain and only rudimentary extraction tracks and roads, which usually have only an earth surface, can create very hazardous working conditions for skidder operators and truck drivers.

Log transportation is itself a notorious cause of death and injury in the tropics, especially in parts of Africa where, as noted above, transportation distances can be very long, roads poor, law enforcement non-existent or easily corruptible, and drivers paid on "piece" rates; all of this provides strong incentives for log truck drivers to work excessive hours, take risks, and often drive under the influence of alcohol or drugs. These conditions frequently prove fatal for other road users and residents along roadsides as well as for the truck drivers themselves.

In the African context, health and safety practices may not be required under national legislation and, even where they are, enforcement is likely to be non-existent. Union representation is often outlawed or strongly discouraged, and workers therefore have little redress over dangerous working conditions; they may anyway fear loss of employment for reporting minor injuries or safety equipment failure.

The full cost of health and safety problems within the logging industry is much greater than the lives lost as a result of timber extraction. As the ILO has pointed out:

"Behind the accident statistics lay much human suffering, all the more so since the many injuries tend to be difficult to treat and heal. For example, cuts by chainsaws often

tear tissue, making surgical repair difficult or impossible. The risk of an accident with dramatic consequences is aggravated when, as is often the case in forestry, it occurs in an isolated place, far from a properly equipped medical centre. Accidents also affect the victim's family, especially in developing countries where forest workers and their families often live under poor conditions with no alternative sources of income".²⁵⁸

Conclusions

There is strong evidence that industrial-scale logging operations in tropical forests are closely linked to the spread of a range of important, often fatal diseases, especially malaria and HIV-AIDS. In addition, there are good reasons to fear that further new diseases will emerge from forest areas undergoing modification, both because of environmental change as well as the proximity of larger numbers of humans to disease vectors. This strongly suggests that the promotion of commercial logging in tropical forests run directly counter to Millennium Development Goal #6, which aims to "combat HIV/AIDS, malaria and other diseases".

To a certain extent, these problems could be mitigated through improved health-care provision and screening. However, in other cases, it is difficult to see what steps can be taken in practice, as the causes for the spread of disease are fundamentally related to the nature of tropical logging: the industry necessarily requires the use of heavy equipment (as commercially viable tropical trees are generally very large), and therefore damage will be done to the soil surface, watercourses and surrounding vegetation that will tend to favour the proliferation of mosquitoes.

²⁵⁸ Blombäck (2001) *op.cit.*

Industrial logging operations invariably require male migrant labour and therefore are always likely to attract sex workers. The logging camps act as foci of transmission of HIV-AIDS. The need for the logging industry to export logs means that these diseases are always likely to be spread along corridors of infection between the logging operation and the export port.

Similarly, the dangerous conditions faced by logging concession workers could be mitigated through adoption and enforcement of stricter health and safety regulations (such as the ILO Code of Practice on Safety and Health in Forest Workers). However, given that most tropical country governments are generally unwilling to fund proper administration and enforcement of even basic forestry standards, such a prospect seems extremely unlikely in the foreseeable future.

Recommendations

In conclusion, the hidden human health costs associated with tropical logging concessions should be considered as inherent within the logging concession system. They should be assessed and internalised within the calculations by national governments and international agencies which promote the expansion of industrial logging in the tropics, and compared with the net economic value of alternative forms of forest management.