

# **Biodiversity and Social Benefits in Community-Based Forest Management: The Leuser Ecosystem, Indonesia**

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## **Abstract**

*The Leuser Ecosystem, located on the Indonesian island of Sumatra, is an area of global significance for biodiversity. It is the only place on earth where elephants, rhinoceros, orangutan and tiger are found together. Included in this 2 million hectare wilderness is Gunung Leuser National Park. However, many of the most diverse areas are located beyond park boundaries; participation by local communities in associated Buffer Zones is an important strategy in protecting them. This paper examines the ability of Community Based Forest Management (CBFM) systems in the Leuser Ecosystem to balance the protection of keystone and other significant species while providing benefits to local communities. The CBFM system is guided by traditional laws known as Adat, which are used by the community to manage resources in a variety of forest zones.*

## **Introduction**

This paper provides an overall summary of the research findings and conclusions as to the effectiveness of the CBFM system in Manggamat as a buffer zone initiative in the Leuser Ecosystem. It also provides recommendations on improvements to the CBFM system, including potential roles to be played by the Manggamat Community and the Leuser Management Unit<sup>1</sup> (LMU) in implementing them.

The Leuser Ecosystem is situated in the Indonesian provinces of D.I. Aceh and North Sumatra, as shown in Figure 1. The ecosystem is one of the richest expanses of tropical rainforest in Southeast Asia. Approximately two million hectares in area, it is the last place on Earth where elephants, rhinoceros, orangutans and tiger are found in one area. Moreover, some two million people depend directly on this area for their water resources.

## **Research Goal**

The research was conducted with the goal of examining the relationship between keystone and other significant species of wildlife and social benefit in a variety of forest zones, within the context of a Community-based Forest Management (CBFM) system. The research was prescribed to address the question of whether CBFM can serve the dual function of safeguarding biodiversity while providing for the needs of local communities.

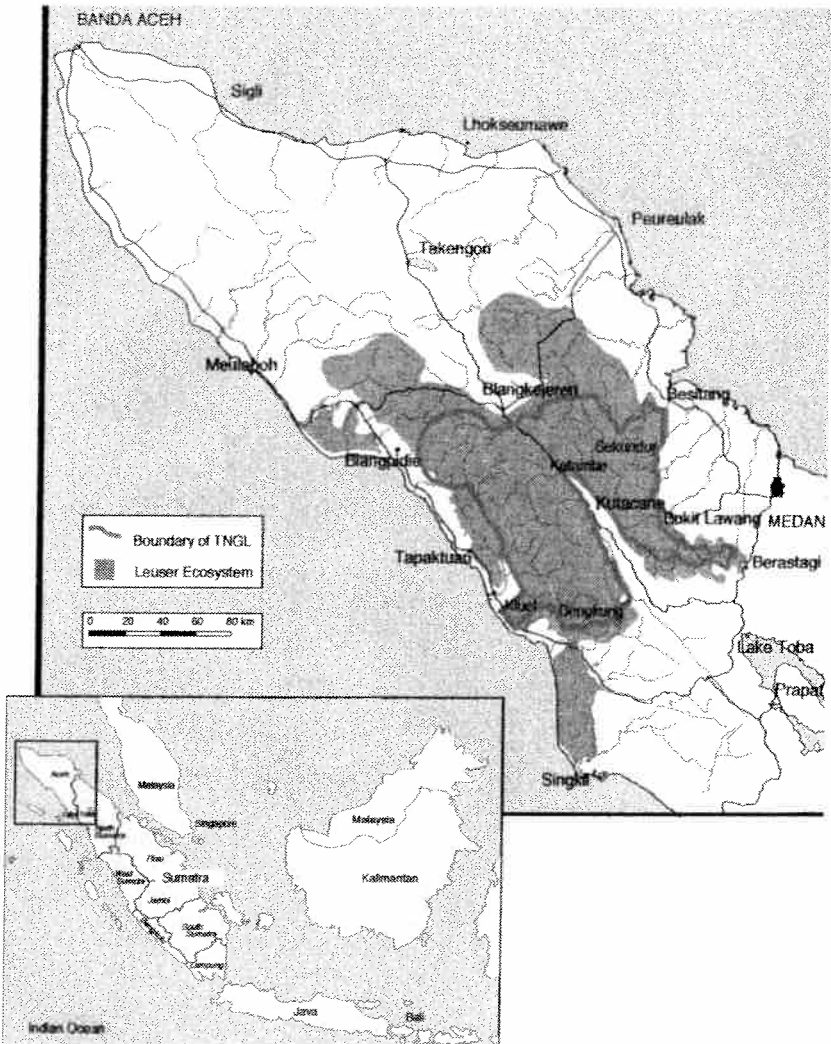


Figure 1. Location of the Leuser Ecosystem, Indonesia

## People and Protected Areas

Through literature review, it was shown that tropical forests are important in their ability to protect genetic diversity (IUCN 1996, 1997), as well as provide for the livelihoods of rural communities (WCED, 1987). However, these forests are quickly disappearing, and community participation for managing these areas is a critical component in ensuring them into the future (WCFSD, 1999). The most recent model being used to apply this approach is Integrated Conservation Development Projects (ICDP). Wind (1991) states that one of the shortcomings of many ICDPs in undertaking buffer zone initiatives around protected areas is the lack of clearly-defined objectives which enable them to relieve pressure from conservation areas.

The literature cited reveals that priority in ICDPs should be placed on maintaining ecological integrity both in the core conservation area and adjacent buffer zones. Other objectives, such as increasing the livelihoods of local people or providing alternatives to them should be considered as secondary to the principal objective of maintaining ecological integrity.

Even with a clear emphasis on maintaining ecological integrity over the provision of social benefits, the nature of buffer zones and ICDP dictates that the cooperation of local communities be enlisted in order to be effective. Furthermore, the literature reveals that conservation cannot succeed unless it is linked to economic opportunities and investments targeted at those whose pursuit of livelihood threatens the viability of the conservation area. The Biodiversity Plan for Indonesia (BAPPENAS, 1993) provides clear support for CBFM as one of the means whereby communities can play a critical role in the ICDP process, especially in the planning and management of forested buffer zone areas.

## Research Techniques

A variety of techniques were applied during the course of the research, including:

- Literature review;
- Key Informant Interviews;
- Focus Groups with Village Elders;
- A Survey of Resource Users;
- Comparative analysis of keystone species and other significant wildlife in the Study Area and research stations in the Leuser Ecosystem; and
- Comparative analysis of socio-economic indicators in the Study Area, other buffer zone initiatives, and Kabupaten<sup>2</sup>-level and provincial-level population census data.

Field research investigated the viability of CBFM, through the examination of the Manggamat Community Conservation Forest, a 12,000 hectare forest block located in South Aceh Regency on the island of Sumatra in Indonesia. Field research was undertaken in Manggamat with the support of LMU and financial assistance from the CIDA Awards Program for Canadians from May to September, 1999.

## The CBFM Model

The CBFM model in Manggamat comprises three integrated components: *Adat*, or traditional law; five *Forest Zones*, as shown in Figure 2; and *CBFM Activities*, which are conducted in the Forest Zones according to *Adat*. *Adat* in Manggamat was formed through centuries of Social Learning (Friedman, 1987), resulting from the adaptation of successful short-term coping mechanisms into long-term adaptive strategies at the community level. The Manggamat CBFM model in its current form is relatively new, having been formally adopted in November 1998. As

such it is still vulnerable to some manipulation and to external threats, most notably price fixing by unscrupulous middlemen and illegal logging. However, it is a dynamic model, empowered by the community-based framework, and supported by Indonesian law, which enables it to address these shortcomings.

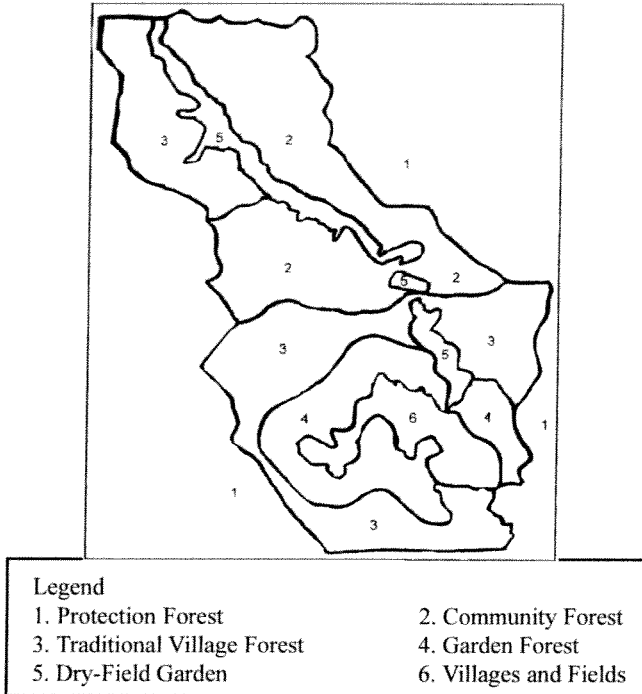


Figure 2. Forest Zones in the Management Community Conservation Forest

### Findings

CBFM plays a vital role in providing benefit to the residents and economy of Manggamat. Two types of benefits are generated through the extraction of forest products: those for direct consumption by the household and those harvested for sale and/or trade. Almost all households in Manggamat have an income associated with CBFM and some households are completely dependent upon them. It is estimated that almost 50% of the total local cash economy is derived from forest products, as well as the provision of many basic foodstuffs and building materials. In total, the CBFM system provides Manggamat with a total estimated annual benefit of almost Rp 80 billion (CDN \$16 million<sup>3</sup>), comprised of Rp 17.2 billion (CDN \$3.5 million) used in the household and Rp 62.7 billion (CDN \$12.5 million) in commodities that are either sold or traded. However, this income is not evenly distributed, nor is it sustainable at the higher end of the spectrum. This is because about 11% of the resource-users in Manggamat over-extract timber for sale from two of the Forest Zones, namely from Traditional Village Forest (*Hutan Adat Desa*) and Community Forest (*Hutan Kemukimam*).

Excess timber extraction is stressing the ecosystem's ability to provide service to people in Manggamat. The well-being of the community is being affected by ecosystem-related events such as conflicts with wildlife, diarrhea, erosion, floods, forest fires and malaria, the effects of which are being amplified by the stress placed on the ecosystem. Although the benefits generated from CBFM have enabled the residents of Manggamat to attain a lifestyle that is in many ways superior to those in the other rural areas of south Aceh Regency and the province of D.I. Aceh, they are coming at the expense of ecosystem services and human well-being.

The CBFM system is currently sustaining keystone and other significant species throughout most of the Manggamat Community Conservation Forest at levels comparable to research stations located in more pristine sites in the Leuser Ecosystem. The research shows that levels of these species increase as levels of certain CBFM activities, most notably timber extraction and Dry-field Garden (*Ladang*) related activities, decrease. The Traditional Village Forest zone is the critical interface, where species levels fall as a result of first contact with extensive timber extraction. In the Community Forest zone, where less timber extraction has been conducted, there are significantly higher levels of species. In the Protection Forest zone (*Hutan Lindung*), where timber extraction is prohibited but some environmentally-friendly activities take place, species levels are almost equal to those of the research stations.

## Conclusions

One might consider the current situation as ideal; human activities and areas of high biodiversity are somewhat separated, or buffered, from each other by a strip of forest which decreases in use intensification as it approaches the core conservation area. However, this assumption reveals one of the shortcomings of the system: the sustainability of timber extraction in Traditional Village Forest. The research shows that levels of timber extraction in Traditional Village Forest are not sustainable. The indicator of this is the fact that timber extraction is now being carried out in Community Forest. According to Adat, extraction of any resource from this zone is prohibited unless that resource is no longer present in the resource-users home Traditional Village Forest. It can therefore be assumed that if timber extraction were to be continued at the same rate in Community Forest as it has been in Traditional Village Forest, then the resource would soon be exhausted there too.

The research also shows that almost all of the timber, about 77%, extracted from Manggamat, is sold or traded for profit by a minority of resource users, about 11 percent. Most of this timber is extracted from Traditional Village Forest. All of the timber extracted from Community Forest is currently being sold. As a result, the long-term goal of the CBFM system is at risk. In order to sustain keystone and other significant species at current levels in Community Forest it is critical that this practice be halted.

## Recommendations

The findings and conclusions presented in this report have enabled the researcher to develop three general recommendations that may assist the Manggamat Community and LMU in ensuring the Manggamat Community Conservation Forest as a viable Buffer Zone initiative. These recommendations are consistent with much broader policy interventions suggested by the World Commission on Forests and Sustainable Development (WCFS, 1999:129), and are as follows:

1. Reduce the level of timber extraction for sale;
2. Develop external markets for non-timber forest products; and
3. Increase awareness of the links between conservation and human welfare, equity and sustainability.

### ***1. Reduce the Level of Timber Extraction for Sale***

#### ***Manggamat Community initiatives:***

- All harvesting of timber be closely monitored to ensure that it is used locally.
- Clearly convey the logic for restricting the practice as being in the best interests of the CBFM system and the community at large.

#### ***LMU initiatives:***

- Provide the scientific expertise in determining a sustainable rate of harvest in Traditional Village Forest.
- Assist in monitoring rates of harvest and supporting Adat leaders in enforcing regulations.

### ***2. Develop External Markets for Non-timber Forest Products***

#### ***Manggamat Community initiatives:***

- Establish a locally-controlled marketing cooperative that provides incentives for resource-users to make non-timber forest products (notably Damar, Honey and Krueng) a greater part of their use portfolio.

#### ***LMU initiatives:***

- Conduct a thorough market analysis for these products, including an economic viability analysis, marketing strategy and logistical plan.
- Provide assistance to the Manggamat marketing cooperative in becoming established in the community, and provide training to cooperative members.
- Consider subsidizing the transport of environmentally-friendly products until the cooperative becomes self-sustaining.

### ***3. Increase Awareness of the Links Between Conservation and Human Well-being, Equity and Sustainability.***

#### ***Manggamat Community Initiatives:***

- Organize interest groups in the community, especially those that are directly involved in CBFM activities, to participate in awareness presentations and workshops.

#### ***LMU Initiatives:***

- Develop a program of awareness presentations, focusing on the human-ecosystem relationship as the entry point.
- Conduct extension programs in the field on techniques to reduce the frequency of environment-related events identified by the community (Conflict with Wildlife, Diarrhea, Erosion, Floods, Forest Fires and Malaria).

## Notes

- <sup>1</sup> The Leuser Management Unit, or LMU, is the body formed to implement the Leuser Development Plan, a joint cooperation between the Government of Indonesia and the European Union.
- <sup>2</sup> A Kabupaten is a regional administrative unit, akin to a County or Regional Municipality in Ontario
- <sup>3</sup> In 1999, at the time of this research, CDN \$1 = Rp5,000.

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