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On the Theory of Decentralization, Forests and Livelihoods

Luca Tacconi
Yulia Siagian
Ronny Syam

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On the Theory of Decentralization, Forests and Livelihoods

Luca Tacconi*
Asia Pacific School of Economics and Government
Australian National University

Yulia Siagian
Center for International Forestry Research

Ronny Syam
PT Quest Geophysical Asia, Jakarta, Indonesia

Abstract

The current theory and narrative states that democratic decentralization of forest management leads to sustainable forest management and improved livelihoods. Three assumptions underlie this theory and narrative: i) democratic decentralization is a means of institutionalizing and scaling up community-based natural resource management; ii) rural people benefit from the forest and will conserve it; iii) the success of decentralization can be measured by lack (or lower rates) of deforestation. The paper argues that the first two assumptions do not hold when tested with primary and secondary data and that the third assumption is incorrect and should be discarded. A revised theory of decentralized forest management needs to be developed and an initial sketch is discussed.

*Contact author: Luca Tacconi, Asia Pacific School of Economics and Government, Crawford Building (#013), Australian National University, Canberra 0200, Australia. Telephone: +61 2 6125 7554, Fax:: +61 2 6125 8448. Email: luca.tacconi@anu.edu.au

Key words: Decentralization, forests, poverty, livelihoods, Indonesia

1. Introduction

Many developing countries in Africa, Asia and Latin America have introduced some form of decentralization in the management of forests (Larson 2005). This trend has spawned considerable interest in development circles and the research community. The debate on decentralization of forest management has focused particularly on the relationships between decentralization and forest management (Kaimowitz et al. 1998, Casson 2001, Larson 2002, Andersson 2003, Gibson and Lehoucq 2003, Pierce Colfer and Capistrano 2005). The issue of livelihoods needs to be included in studies of decentralized forest management for two reasons. First, there are significant relationships among decentralization, forest management and livelihoods. Studies on decentralized forest management that do not take these relationships into account are limited at best. Second, the increased attention devoted by national governments and donor agencies to poverty reduction results in increased information needs concerning the relationships among decentralization, forest management, and livelihoods. This paper contributes to filling this gap in research on the relationships among decentralization, forest management and livelihoods.

It has been noted that 'under the right circumstances, the theory can hold true: democratic decentralization can improve efficiency, equity, democracy and resource management' (Larson and Ribot 2004, p. 12). A related narrative underpins the research concerning the relationships between decentralization and forests: democratic decentralization will have positive environmental outcomes by empowering local communities (Ribot 2002b). The stated theory and the related narrative clearly indicate that democratic decentralization is expected to lead positive environmental outcomes. This belief has been noted by Oyono (2004) who notes that several scholars *assume* democratic decentralization would result in sustainable environmental management. We argue that the study and the design of decentralized forest management would benefit from the development and testing of a coherent theory that clearly outlined the assumed causal relationships among the many variable involved. This paper aims to contribute to the development of such theoretical framework by identifying three assumptions that underpin the narrative of decentralized forest management noted above. We argue that two of these assumptions need to be treated as hypotheses and tested. We will show that the third assumption is incorrect and should be abandoned.

We argue that while decentralization is often described to have the potential to bring about sustainable forest management, the complex linkages existing among decentralization, forest management and livelihoods imply that it is not possible to state *a priori* whether decentralization will lead to sustainable forest management and to increased livelihood benefits. In fact, under certain conditions, decentralization might contribute to deforestation, or at least might not reduce it. We focus particularly on the benefits of land uses alternative to forests that central governments, local governments and rural people face. We argue that these benefits are a significant cause of forest cover change. We focus specifically on this issue because the literature on decentralization and forest management pays little attention to the economic and financial benefits that may drive public and private sector decisions and to the related normative aspect of what governments *should* do. These benefits need to be taken into account in development of a theory of decentralized forest management and in the design of decentralization programs.

The paper consists of two main parts. Section 2 highlights three key assumptions at the core of the current decentralization theory and narrative and discusses existing information to test them. The assumption that rural people benefit significantly from the forest and that they will conserve it is still controversial and there is limited secondary information to test it. Section 3 presents a case study carried out in Sumatra, Indonesia, which is used to test the latter hypothesis. The case study focuses particularly on the economic, financial and livelihood aspects of forest management. Following the two main parts of the paper, Section 4 presents the conclusions.

With regard to the research methodology adopted, it is useful to recall that a hypothesis cannot be validated, it can only be refuted or corroborated (Popper 1972). Existing information or a single event, such as a case study, can be used to test a hypothesis (Robson 2004). The implication is that one case study is sufficient to show that a hypothesis is not valid, at least in its general form, and the theory should be either discarded or modified.

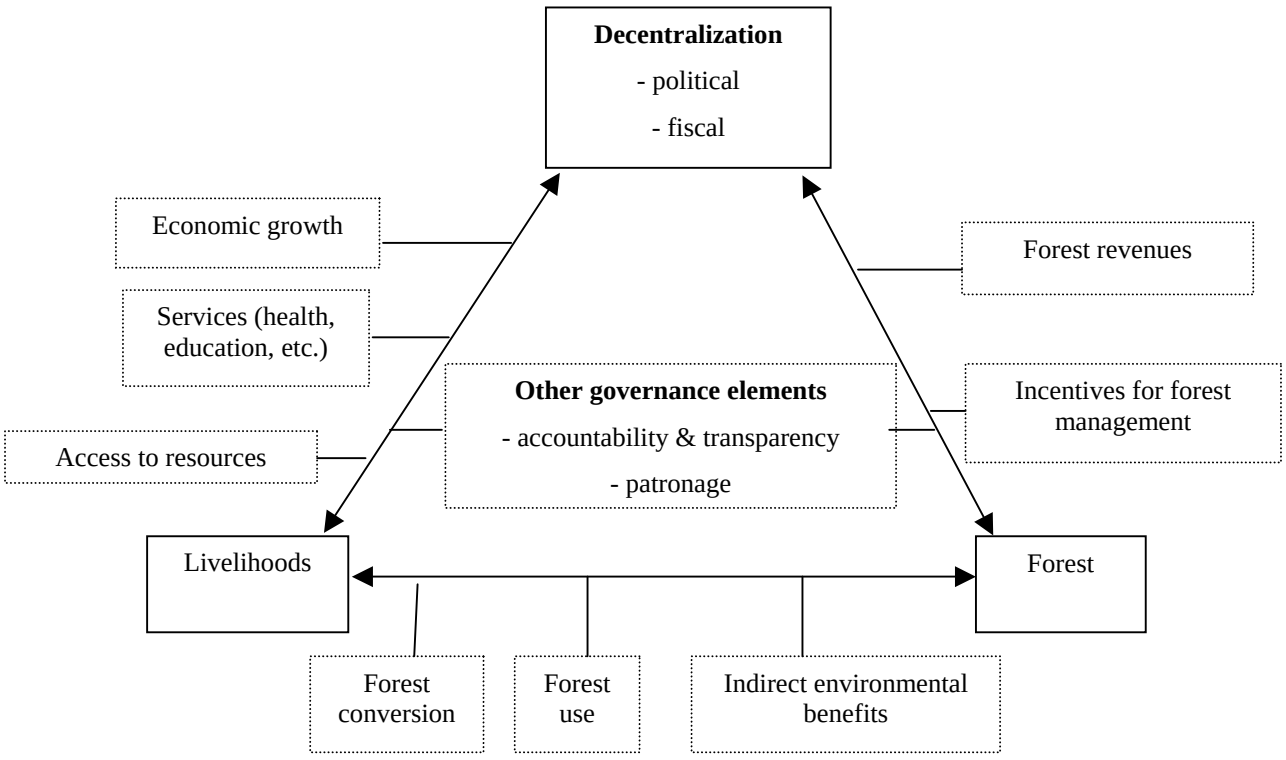
Before proceeding, we define key terms and the scope of the paper. Decentralization involves both deconcentration, in which local governments are given responsibilities previously carried out by central agencies, and devolution, in which local governments are granted political and financial authority to undertake assigned duties (Litvack et al. 1998). Democratic decentralization involves the transfer of authority to local governments that are accessible and accountable to their citizens, who enjoy political rights and liberty (Blair 2000). Political and administrative devolution of government authority does not necessarily imply devolution of control over forest resources to lower level governments or to private stakeholders, including local communities. The term decentralized resource management has also been used to refer to common-pool resource management (eg Agrawal and Gupta 2005). In this paper we are concerned principally with the process of decentralization of forest management from the state to local level governments (eg Kaimowitz et al. 1998, Casson 2001, Larson 2002, Andersson 2003, Gibson and Lehoucq 2003) and the expectation that it could contribute to scaling up community-based natural resource management (CBNRM).

2. Assumptions about decentralization, forests, and livelihoods

The current theory and narrative state that democratic decentralization will have positive environmental outcomes by empowering local communities, as noted above. This narrative is based on three assumptions. The first assumption is that democratic decentralization is a means of institutionalizing and scaling up CBNRM. A scaling up of CBNRM is thought to be beneficial because of a second assumption: rural people benefit from forest exploitation and will conserve it. This assumption has implications for what local governments should do and what they would do if they were truly democratic: they should listen to their citizens and conserve the forest. The third assumption therefore is that the success of decentralization can be measured by lack (or lower rates) of deforestation, ie if there is deforestation local governments are not truly democratic or are doing something wrong. In the reminder of the paper we will refer to the first two assumptions as hypotheses as they need to be tested to determine whether the theory is valid.

The following discussion is carried out within the analytical framework summarized in Figure 1. This framework highlights the multiple variables that might influence each other with (yet) uncertain effects. It is therefore unlikely that the outcome of these interactions could be predicted in advance, as postulated by the theory that decentralization improves forest management. In discussing the assumptions we note the complex relationships among decentralization, forest management and livelihoods. They will have to be considered in further efforts to develop a theory of decentralized forest management.

Figure 1. Framework to analyse decentralization, forest management and livelihoods relationships



2.1. The democratic decentralization hypothesis

In the first hypothesis, democratic decentralization is a means of institutionalizing and scaling up the popular participation approach that makes CBNRM an effective way to improve environmental management, equity and justice for local people (Ribot 2002b). Decentralization reforms are not

delivering on these objectives, according to Ribot (2002b), because they do not transfer sufficient power to local institutions and the latter often do not represent and are not accountable to local communities. This statement in itself throws some doubt on the validity of the hypothesis. Let us consider existing knowledge about whether democratic decentralization is actually taking place in the ideal form stated in the hypothesis or has to the potential to be implemented that way. Whether democratic and accountable governance systems would result in sustainable environmental management depends in part on the definition of sustainability and is discussed in a later section.

The most fundamental aspect of decentralization is that it is expected to improve governance (Litvack et al. 1998, Francis and James 2003), which could have positive impacts on livelihoods. For example, increased local accountability and transparency could result in the needs of the poor to receive increased attention in local governments' development activities, while greater local participation in decision-making may improve the provision of infrastructure and services (Litvack et al. 1998, Francis and James 2003). However, many countries have weak representative decision-making processes; local elites and vested interest groups can often manipulate the institutions and opportunities created by decentralization for their own benefit (Litvack et al. 1998, Francis and James 2003). Numerous studies have shown that seldom decentralization has brought about improved governance through the promotion of local accountability and transparency and by enfranchising local populations (Francis and James 2003). Concerning the effects of decentralization on corruption, the jury is still out. Fjeldstad (2003) finds that theoretical studies presents reasons explaining how decentralization can both lead to increased or decreased corruption. That review also finds that cross-country regression studies, single-country econometric studies, and case studies are similarly inconclusive. It is worthwhile noting that improved governance could reduce corruption practices in the forestry sector, as well as influence the use of forest resources as a means to maintain political power (Ascher 1999), referred to as patronage in Figure 1.

The above discussion implies that decentralization reforms cannot be expected to create ideal democratic and accountable governance systems overnight and democratic decentralization might not lead to the scaling up of CBNRM as hypothesised. It is also worthwhile noting that decentralization could have indirect impacts on the forest through changes in governance. However, these impacts are not necessarily positive, such as in the case that decentralization worsened corruption.

If democratic decentralization in its ideal form were actually implemented, its outcomes would *in part* depend on the hypothesis that follows. We emphasise 'in part' because democratic governments do not simply follow requests from their electorates. They also shape citizens' views. Governments' decisions on forest management are also shaped by economic considerations, as noted in a later section.

2.2. Hypothesis about rural people's benefits from the forest and its conservation

The second hypothesis is that rural people derive significant benefits from the forest and would conserve it if they fully controlled it. This hypothesis is based on a 'romantic' view, which underpins some of the literature on CBNRM, that communities live in harmony natural resources (McCay 2001). People living in or near forests are defined as forest dependent, natural resource dependent and pursuers of traditional and sustainable livelihoods (Li 2002). This romantic view has been thoroughly disputed and while there are cases in which local people have conserved forests and other resources in their natural state, conservation should not be presumed (Tacconi 2000). A recent test of the common-pool resource management theory is also relevant in this context. It shows that many factors affect resource management decisions and it is not possible to say whether sustainable resource management will take place even when the key theoretical requirements for common-pool resource management are present (Agrawal and Chhatre 2006).[1] Let us now consider existing knowledge on the contribution of

[1] See Olson (1971) and Ostrom (1990) for discussions of the factors influencing common-pool resource management.

forests to peoples' livelihoods. This is particular important because if people benefit from forests more than other land uses they might conserve them for pure utilitarian reasons.

Livelihoods benefit from the use of forests and forest lands in three different ways. Forest conversion involves the substitution of forests with other land cover types, such as annual and perennial crops. Forest conversion is a long-term historical trend which is associated with economic change and development (Williams 2003, Bhattarai and Hammig 2004). The general indication from existing literature is that forests have a lower capacity to support livelihoods than other land uses. For example, in eastern Indonesia a hunting-gathering system supports up to 3 people/km^2, a shifting cultivation system about 30 people/km^2 and a savanna-based palm system up to 120 people/km^2 (Monk et al. 1997). Rural people are interested in using resources at their disposal, which may involve logging and converting forests to agricultural land use, as demonstrated by the fact that agriculture is 'the leading proximate cause of tropical deforestation' (Geist and Lambin 2001 p 24). Strictly speaking, forest conversion may benefit livelihoods but it does not represent a contribution of forest management to livelihoods if the focus is on sustainable forest management. Conversely, shifting agriculture and collection of timber and non-timber forest products may result in livelihood benefits as well as the maintenance of forest cover. The collection of wild non-timber forest products may supplement the income of the very poor, but it has little potential to contribute to poverty reduction (Neumann and Hirsch 2000). Indirect environmental benefits accrue as a result of the environmental functions of forests, such as soil and water conservation. It is often assumed that the environmental benefits of forests for local livelihoods are significant. However, these benefits vary according to many conditions and they might not be as significant as previously thought, as discussed later.

In exploring the links between poverty alleviation and forests, (Sunderlin et al. 2005) note that forests may contribute to:

a) poverty avoidance or mitigation by fulfilling a safety net function in times of emergency or in seasonal periods of low income through the provision of forest resources; and

b) poverty elimination through the contribution of forests to lifting people out of poverty.

These two hypotheses have yet to be tested under different ecological, social and economic conditions. We do know, however, that the widespread use of forest products provides a safety net function in some cases, even if rural people tend to minimize their reliance on the forest safety net when other resources allow them to (McSweeney 2004, Pandit and Thapa 2004). Wunder (2001), however, is sceptical about the contribution of forests to poverty elimination because forestry activities (i) present limited opportunities to increase the benefits received by the poor who produce and consume timber products, and (ii) tend to be relatively capital intensive rather than labour intensive. Wunder's arguments are based on the discussion of mainly theoretical concepts supported by limited empirical evidence and cannot therefore be considered as fully valid empirical evidence to refute the hypothesis addressed here. Levang et al. (2005) find, however, that in Kalimantan the members of the Punan community who live outside the forest, close to services and towns, are not as poor as those who inhabit isolated forest villages. But Dounia *et al*. (2004) describe qualitatively factors that may lead to decreased health among the Punan of Kalimantan, Indonesia, as a result of sedentarization and deforestation. It is obvious that the hypothesis considered here is still controversial and more empirical evidence is required to test it. We will present further evidence in the section discussing the case study.

Before considering the third assumption it is useful to stress that the foregone discussion has considered only the direct relationship between livelihoods and forests. Decentralization, however, can be expected to have relevant indirect effects on livelihoods and forests. Martinez-Vazquez and McNab (2003) note that fiscal decentralization is often assumed to contribute to economic growth. Increased economic growth can have positive implications for poverty reduction (e.g. Timmer 2004), although the extent of this effect is disputed (Adams 2004). However, it is unclear whether and how fiscal decentralization actually affects economic growth (Martinez-Vazquez and McNab 2003). Fiscal transfers to local governments—and forest revenues raised directly by local governments—can impact positively on livelihoods if they increase the quality and/or quantity of services. Economic growth appears to be linked to deforestation (Angelsen and Kaimowitz 1999). Fiscal decentralization can affect forests through decisions taken by local governments concerning the extraction of forest

revenues. The provision of public services tends to attract rural people away from forests (Froment 2004), while roads increase the profitability of agricultural land uses, facilitate access to forests and increase deforestation (Angelsen 1995). The impacts of decentralization on livelihoods and on forests are uncertain due to the large number of variables involved and their uncertain causal relationships. They will have to be taken into account in the development of a theory of decentralized forest management.

2.3. The environmental success assumption

The environmental success of decentralization is assumed to equate with lack (or lower rates) of deforestation, or reduced 'overexploitation' of timber (Andersson 2003, Gibson and Lehoucq 2003, Larson 2005). This assumption is based on the view that deforestation is always a negative event that leads to unsustainable environmental outcomes for all the stakeholders. For example, it has been pointed out that in Indonesia greater local control over forests has resulted in an increase in logging contracts with little concern for environmental effects (Larson 2005). Cameroon and Uganda have had a similar experience, according to Ribot (2002a): the transfer of rights to local bodies resulted in overexploitation[2] of timber. In the context of mainland South-East Asia, Dupar and Badenoch (2002) consider under what conditions decentralization contributes to environmentally sustainable development, a term they leave undefined: the preservation of forest cover is one of the dimensions that require, according to them, the setting of national standards to be adhered to by local administrations and supported by central government's enforcement.

The view that deforestation necessarily leads to negative environmental outcomes is common to much of the forestry literature (Poore 2003). However, this view needs to be considered in the context of a range of stakeholders, environmental problems and landscape levels. The replacement of forest by other land use systems does not necessarily result in negative environmental changes, at least at the local level, as recognized by IUCN guidelines on conservation planning (Poore 2003). In relation to biodiversity conservation, work carried out by Conservation International in Mexico shows that the conservation of a relatively small percentage of forest would result in the conservation of a significant share of the country's biodiversity (Brandon et al. 2005). The implication is that the deforestation of some of the forest areas not included in protected areas would not necessarily lead to an irreversible loss of biodiversity. Recent reviews of the literature also show that forests may not be always as important as previously thought in affecting rainfall and water yields, and in reducing soil erosion, sedimentation and floods (Bruijnzeel 2004, FAO and CIFOR 2005). This is partly due to the fact that many of the agricultural systems that replace forests provide good ground cover, and often also include trees. But even grasslands, for instance, have been found to protect the soil as much as forests do. In relation to climate change, deforestation results in emissions that may contribute to the rise in temperature and in that case there is therefore a case to reduce deforestation. The issue is, however, that the negative impacts of climate change arising from deforestation are not clearly linked to local level activities and there is a limited or no incentive for local people and local governments to reduce deforestation. Overall, the well-know problem is that many of the costs of conservation are borne at the local level while the benefits manifest themselves at the global level (Wells 1992).

We conclude that local people and local governments may have good reasons to carry out deforestation activities, which might also have limited or no (visible) environmental impacts. This may lead democratic governments to authorize deforestation. Therefore, the assumption that successful decentralization equates with lack of deforestation is inappropriate in its current form. We will return to this issue in the conclusion.

We now turn to the case study to further test the hypotheses that the livelihoods of rural people are best served by conserving the forest and they would conserve it if they controlled it.

[2] The term overexploitation was not defined by Ribot (2002a).

3. Land use change in Tanjung Jabung Barat district and its drivers

3.1. Land use change

The district of Tanjung Jabung Barat in Jambi province represents well the changes taking place in the Sumatran landscape where forests have declined from 63.6% of total land area in 1985 to 52.6% in 2003 (Tacconi and Kurniawan 2005). It has the three broadly defined ecological zones of Sumatra: i) the lowlands with large swamp and peat swamp areas along the east coast; ii) the intermediate flat to rolling uplands; and iii) the hills and mountains on the western side, which includes the south-western part of Bukit Tigapuluh National Park. Almost all the major agricultural and forestry activities found in Sumatra are represented in the district, such as swidden cultivation; rubber, coconut and oil palm plantations; oil palm mills; timber plantations; illegal logging; sawmills, a plywood mill and a pulp mill.

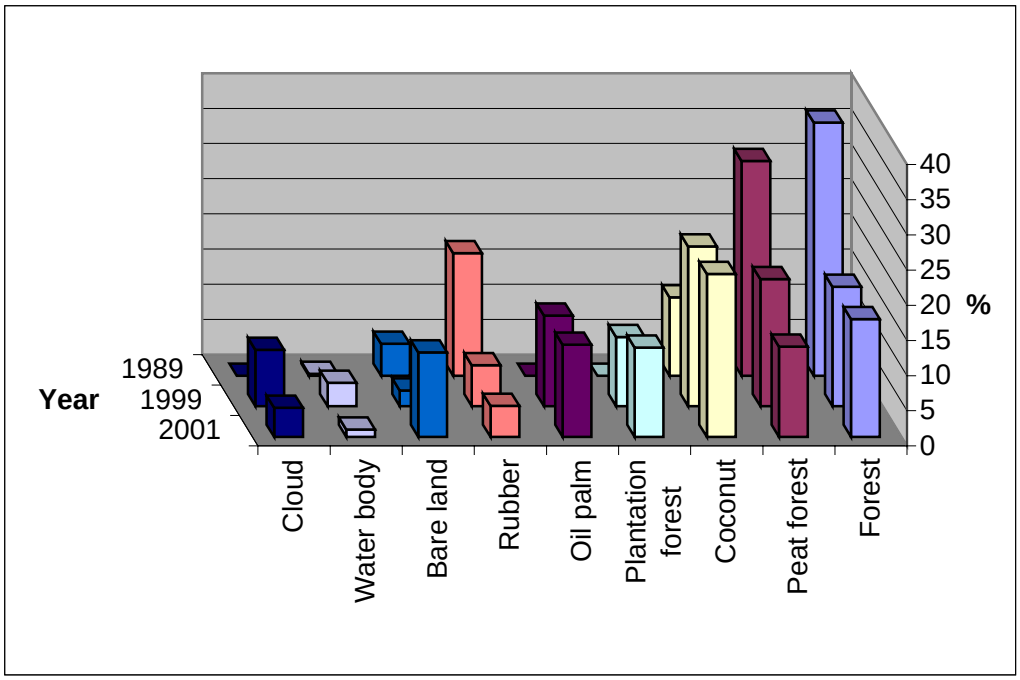
In 1986, forestland[3] covered about 66% of the district according to the plan prepared by the Ministry of Forestry. We assessed changes in land use categories (by comparing land use plans) and in forest cover (with Landsat remote sensing images) in the various forestland classes between 1989 and 2001.[4] The total area allocated to production forest decreased to 32% (in the 1999 spatial plan) from 40% in 1986. In 1999, natural forest cover in the production forest area accounted for just 32% of the area, forest plantations occupied 39% and agricultural plantations a further 15%. The area allocated to agriculture increased from 33% in 1986 to 59% in 1999. Protected areas increased from 2.4% of the total area in 1986 to about 9% in 1999. With regard to land cover change, forests and peat forests were cleared at a yearly rate of 5.2% and 4.1%, respectively, over the period 1989 to 1999. Forests did not decline much further between 1999 and 2001, but peat swamp forest was cleared at a yearly rate of 14.6%. The peat swamp forest areas are mainly being planted with oil palm, often by smallholders. Overall, the forest and peat forest area decreased from about 66% in 1989 to about 20% of the district land area in 2001. At the time of the survey in 2003, the district had mainly secondary forest remnants. The productive forest has been logged and the large forest concessions have ceased their activity. Small-scale informal (or illegal) logging appears to be taking place in former concession areas and in the national park.

The reduction of forest cover stems from the expansion of large- and small-scale agricultural and industrial forestry plantations (Figure 2). Agricultural and industrial forestry plantation expansion is taking place in the most suitable areas, particularly the plain and the terrace land systems (Figure 3). The swampland system, which accounts for 19% of the district, has also seen a considerable increase in agricultural use. The peat swamp area that is protected has deep peat, is unattractive for agricultural activities and, according to the law, cannot be developed. The other swamp areas have shallow peat and are suitable for oil palm. The alluvial valley and hill land systems have also experienced a considerable reduction in forest cover, but they account for a small share of district land (3% in total). The mountain land system has also experienced a reduction in forest cover, although to a considerably lower degree than the other land systems. This analysis shows that agricultural and plantation development has taken place in the most suitable areas. This type of agricultural development, authorized by the national and local governments, does not necessarily result in negative environmental changes at the local level as discussed above. These land use changes are explained by the economics of land use and the livelihood preferences of rural people, which we consider in turn.

[3] Forestland is land use category. The state has authority over forestland.

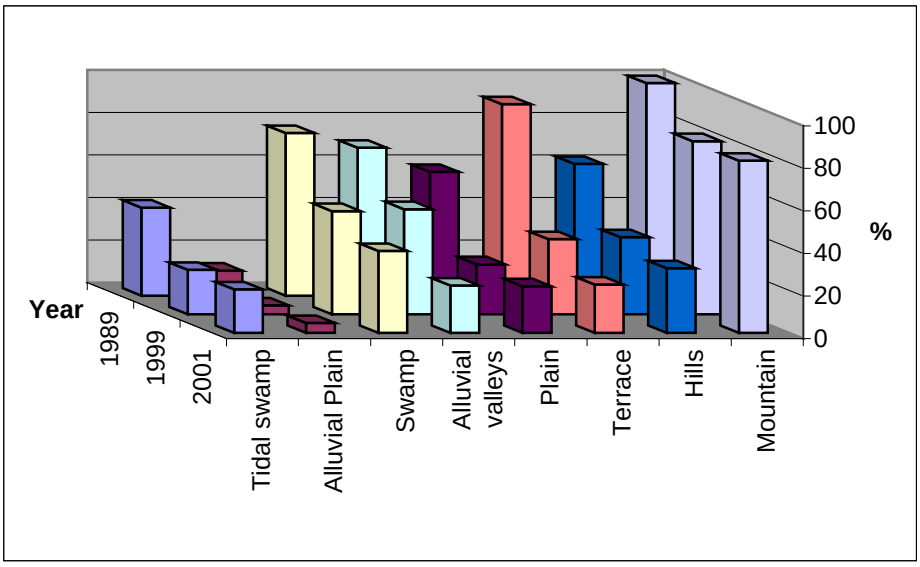
[4] We could not assess forest cover in 1986 because we could not source appropriate remote sensing images for that year.

Figure 2. Land use and vegetation change between 1989 and 2001



Note: The analysis is based on provincial spatial plans and supervised classification of Landsat remote sensing images from 1989, 1999 and 2001.

Figure 3. Forest cover change in physiographic systems between 1989 and 2001



3.2. Economics of land use

Natural forest conservation may provide indirect economic benefits (such as biodiversity values) but, according to the data presented in Table 1, it does not provide local direct economic returns. This lack of locally enjoyed benefits could be an underestimation, given that non-timber forest products are often collected in natural forests. The net present value (NPV) of non-timber forest product collection in a

forest area of about 13,000 ha in Jambi province was found to be relatively low at Rp 139,925 per hectare per year at a discount rate of 20% (Adiwinata 1999).[5] Community-based forest management yields high returns to labour, but provides very low returns to land and low employment compared with other land uses. Oil palm monoculture provides the highest returns to land and labour, providing employment opportunities second only to rubber agroforests. Directly comparable data are not available for smallholder oil palm plantations and timber plantations, but oil palm was found to be the most financially attractive tree crop from a smallholder perspective with an NPV of about Rp 4.2 million per hectare per year at a discount rate of 10.5% (Adiwinata 1999). A smaller percentage of farmers cultivating oil palm and rubber was found to be poor than farmers cultivating other tree crops (Indonesian Center for Estate Crops and Development 2002). In Indonesia there has been significant criticism of the expansion of the oil palm industry on livelihoods and environmental grounds (Ruwindrijarto et al. 2000). Oil palm plantations have indeed generated conflicts and have often had negative impacts on local livelihoods, for instance, by taking land away from farmers. These criticisms should not be generalized to the whole oil palm industry, however, given that it does also generate significant benefits for livelihoods (Potter and Lee 1998), particularly when oil palm is planted by smallholders.

In Jambi, smallholder plantations of fast-growing species (*Acacia* sp.) supplying a pulp mill were found to have relatively high financial benefits (Nawir et al. 2003). At a stocking volume of 150 m^3/ha, the NPV was about Rp 3.4 million and Rp 1.72 million per hectare per year, respectively, at discount rates of 12% and 20%. Data recalculated from Kosonen *et al.* (1997) indicate that a 1,000 ha fast-growing timber plantation (*Acacia* sp.) in South Kalimantan had an NPV of about Rp 1.73 million per hectare per year at a discount rate of 15%, at a stocking volume of 150 m^3/ha.

The economic benefits of different land use systems vary across Indonesia depending, for instance, on soil quality and distance to markets. They also vary over time with changes in input and output prices. Therefore, we do not imply that the land use values discussed above represent all the various areas of the country, or even of Sumatra, and at all times. They are broadly indicative, however, of the relative local benefits provided by intensive agricultural and agroforestry systems compared to extensive forestry systems. A study considering the economics of land uses in West Kalimantan province (Tyynelä et al. 2003) reported similar findings. These alternative land use values imply economic development goals such as poverty reduction can be served by converting natural forest to other land uses to promote economic development, expand employment opportunities and reduce poverty.[6]

Economic analyses of land use are fraught with problems, for example because of the scarcity of data available, and are often criticized for not reflecting well the full value of ecosystems, and particularly natural resources' contributions to livelihoods (Tacconi, 2000). For this reason, it is important to also seek directly the views of the rural people concerned about the alternative land use opportunities they face.

[5] We converted the value at an exchange rate of US$1 = Rp 2,400. The data for NPV from this study and those cited below have been deflated to 1997 using the national Consumer Price Index. In November 2004, the exchange rate was around US$1 = Rp 9,000. The discount rates are those reported in the original studies. Lack of access to data from all studies precluded the conversion to a single discount rate.

[6] The development of land uses with the highest returns faces various constraints. This analysis indicates that: a) if the constraints were removed, the land uses providing the highest returns would provide a greater contribution than other land uses to reducing income poverty; and ii) as landholders build their financial capital and knowledge, they are likely to establish the land uses with the highest returns.

Table 1. Economics of land use in Sumatra

Land use	Scale of operation	Returns to land at social prices (Rp 1,000/ha/yr)	Employment (day/ha/yr)	Returns to labour at private prices (Rp/day)
Natural forest conservation	25 ha fragment	0	0	0
Community-based forest management	35,000 ha common forest	9.4 to 18	0.2 to 0.4	11,000 to 12,000
Commercial logging	35,000 ha concession	-32 to 2,102	31	-17,349 to 2,008
Rubber agro-forest	1-5 ha plots	73	111	4,000
Oil palm	35,000 ha estate	1,480	108	5,797

Source: Summarized from Tomich *et al.* (2001) Table 12.2. The study collected information in field sites in Lampung and Jambi provinces, in the peneplain agro-ecological zone, with a maximum altitude of 100 m above sea level and consisting of about 10% of alluvial soils and 90% gently undulating uplands. The data was collected in 1997; the discount rate was 15% and the exchange rate,

Rp 2,400 = US$1.

3.3. Livelihoods and natural resources

The views of villagers concerning natural resource use and their contribution to livelihoods were considered in four villages in Tanjung Jabung Barat district (Table 2). The information was gathered in two phases through rapid rural appraisal involving village meetings, women's group meetings, semi-structured interviews and informal discussions involving 129 men and 63 women. In September 2003 we invited men and women to participate in a focus group in each village. Stakeholders represented in the focus groups included the village head, village secretary, village representative body, the customary leader, a women's group, a youths' group, entrepreneurs, rubber and oil palm farmers and loggers. The villages were visited again in May 2004 to confirm the information collected earlier. The group was asked to determine socio-economic stratification in the village (e.g., poor and rich) on the basis of specific indicators of their choice. They were also asked to consider the activities that most contributed to the livelihood of each group, including the contribution of forests.

Located on the trans-Sumatran highway, Suban village has the best road access among the four villages studied. Suban has forest on the north-west side and an industrial timber plantation on the eastern side. Lubuk Bernai village, which is not serviced by a sealed road, has oil palm plantations on the southern and western sides. Cultivated land and old rubber plantations dominate the landscape of the village. Forest is found in a former forest concession. Penyabungan village is located on a provincial road, near oil palm plantations. Lubuk Kambing village is the most remote of the four villages. It encompasses part of Bukit Tigapuluh National Park and the buffer zone within its administrative boundaries. Forests and old rubber plantations dominate the landscape of the village. A former forest concession is found near the village.

In all four villages, the villagers stratified the population into poor, medium well-off and rich groups. The status of households is a relative, not absolute, position given that the group was asked to rank households within the village. Yet, Suban village excluded, the perceptions of villagers regarding the conditions characterising a poor household seem to reflect well the official definition of poverty, which uses a 2002 monthly poverty line of Rp 93,739. Except for Lubuk Kambing, the percentage of

households viewed as poor in each village is also compatible with the incidence of poverty of about 15% in the respective subdistricts (Badan Pusat Statistik 2002).

The poor are characterized by poor-quality houses and livelihoods mainly based on swidden agriculture. They lack education, but to a certain degree this is a characteristic shared with the other groups. Monthly income is uncertain and around Rp 100,000. In Suban, the income level of poor households was indicated to be in the range of Rp 150,000 to 350,000, although this estimate applies to rubber farmers and may be lower for households involved in other agricultural activities (e.g., swidden) and logging.

Villagers in Lubuk Bernai and Lubuk Kambing noted that there is available land and there is no need to obtain a formal permit to clear it. Financial capital is the constraining factor for agricultural development. The poor are the ones mainly involved in logging as labourers. People in Suban and Penyabungan villages noted that only a limited number of people are involved in logging because of the high capital cost and the high personal risk of accidents. An investment of about Rp 40 million is required for a small logging concession. The head of Penyabungan village noted that they are 'more interested in opening an oil palm plantation in the ex-concession area and in their private land [than in logging], but unfortunately do not have enough capital to invest'. It is not just the poor who are involved in forest-related activities. Some of the medium well-off households in Suban were involved in logging as both middlemen and loggers, but direct extraction of timber and non-timber forest products is associated with poor households in Lubuk Kambing village.

The medium well-off and rich groups are characterized by ownership of rubber and oil palm plantations and generally a greater diversity of income sources, such as small businesses and off-farm employment. This finding corroborates the argument presented in the previous section that intensive land use systems such as oil palm plantations provide high returns to labour and land, and therefore present greater opportunities for villagers to move out of poverty than the maintenance of extensive land use systems such as forestry activities.[7] We also note that the two villages with the most problematic market access had the highest percentage of households defined as poor.

The evidence presented above further strengthens the findings of Section 2 that the hypothesis that rural people benefit from the forest and would conserve it does not hold. The foregone discussion also implies that democratic local governments could choose to authorize deforestation to stimulate economic development and reduce poverty. The need to balance these objectives with national sustainable environmental management is discussed below.

[7] Extraction of forest products may enable the poor to raise financial capital needed to develop intensive land uses. Thanks to Sven Wunder for pointing this out.

Table 2. Poverty and livelihood activities in four villages in Sumatra

Categories	Lubuk Bernai village Tungkal Ulu district Population: ±640 hh (±3,500 people)	Suban village Tungkal Ulu district Population: 489 hh (±2,270 people)	Lubuk Kambing village Merlung district Population: ±900 hh (±2,960 people)	Penyabungan village Merlung district Population: ±700 hh (±2,500 people)
Poor	• 70 hh poor (11%) • Small wooden house • Lack of education • Children do not go to school, ±215 out of total 562 of age 7–15 yr • Uncertain income as rubber labourers; monthly income ±Rp 100,000 • Do not have land, do swidden cultivation: ±42 hh	• 15–20 hh poor (4%) • Small hut on cultivated land, no floor, grass roof. Move following rotation of swidden cultivation • Mostly no education • Income Rp 150,000–350,000/ month for rubber farmers • Varied agricultural activity: swidden cultivation, rice, corn, legumes; land 1 ha • 10 hh labour in logging	• ± 250 hh poor (27%) • Wooden house, no floor, grass roof • Lack of education: 60% of poor hh did not go to or finish school • 70% are rubber labourers (monthly income ±Rp 120,000) and 30% loggers • Other income sources: bird hunting (±5 households), collecting petai[b] in forest (±10 hh) • 50% conduct swidden cultivation, easy access to land (±1–3 ha)	• 58 hh poor (8%) • Wooden house • Labourer in rubber plantations, earn Rp 120,000–160,000/month • Some are logging labourers; least preferred option because of high risk and high cost, about Rp 40 million initial investment required for a group of 10 men
Medium well-off	• Houses have floors of better-quality materials, e.g., sawn wood • Majority has completed elementary school • Income Rp 100,000–Rp 250,000/month for rubber farmers • ± 20 hh have oil palm plantation • Have land, on average 1 ha per households	• About 50% of hh • Wooden house, wooden or cemented floor • 40% of this category has motorbike and TV • 60% have completed junior high school • Income Rp 500,000/month, several income sources • 2–3 ha of swidden cultivation land, oil palm, and some working as labourers • 20–30 households involved in logging, as middlemen and loggers	• About 650 hh (72%) • House of stone and wood, iron roof, cemented floor • 60% have completed elementary school • Have their own land, majority rubber plantation, 1–2 ha productive, total area about 2–5 ha • Monthly income from rubber Rp 500,000–700,000/ha • Some ±39 hh have small shop returning Rp 500,000/month • Women labour in oil palm plantation for Rp 12,000/day	• Houses are semi-permanent, materials a combination of stone and wood • Education, clothing and food are sufficient • Majority have finished elementary school • Work as labourers in rubber plantation

Table 2. Continued

Rich	• 20 hh (3%) • ±6 hh have completed junior high school, ±14 hh have not • House of stone, cemented or wooden floor • Motorbike; one hh has motorbike and car • Private land, 2–5 ha of rubber plantation and oil palm	• 240 hh (49%) • House of stone; only ±32 families have bathroom • Have completed junior or senior high school • Income about Rp 2 million/month • Rubber plantation ±2 ha • Swidden cultivation, about ±5 ha, employing day labour • Most households have motorbike, 20 hh have car or truck	• 10 hh (1%) • Houses of stone, cemented or wooden floor • 2 hh did not finish elementary school, 8 hh did not attend school • Income ±Rp. 3–4 million/month from agriculture and other sources • Land, maximum 20 ha (of rubber) and ±30 ha of bare land or unproductive rubber • Small shop selling food etc., income Rp 1.5 million/month • Own car or truck (26 vehicles in the village)	• House made of stone or cement, some have wooden floor or walls • Elementary school • Has a business

Legend. [a] hh: household; [b] Beans from *Parkia* sp. tree eaten raw and cooked.

4. Conclusion

We have shown that true democratic governance may not be achievable and that deforestation does not necessarily entail negative environmental impacts at the local level. Together, these observations throw significant doubt on the expectation that decentralization can lead to sustainable forest management. Even if democratic decentralization could be implemented in the ideal form, local governments could decide to authorize deforestation if requested by rural people, because rural livelihoods do not necessarily benefit from forests more than from alternative land uses. Even if the rural people living close to the forest did not support deforestation, democratic local governments could decide to promote deforestation if it had significant economic benefits for their area, as indicated by the case study we presented. We have also shown that there are several potential indirect effects of decentralization on forests and livelihoods that have not been considered to date in the decentralization and forest literature. They will need to be included in a theory of decentralized forest management.

These findings indicate that the current theory and narrative, that 'under certain conditions' democratic decentralization of forest management leads to sustainable forest management and improved livelihoods, needs to be revised. A more sophisticated theory – that accounts for the complex multidirectional effects of the several variables that affect decentralization, forest management and livelihoods – is unlikely however to predict clearly the outcomes of decentralization processes. This finding parallels that of a recent test of the theory of common-pool resource management which indicates that several variables have a range of influences on other variables and it is therefore unlikely that a general theory of the commons holds (Agrawal and Chhatre 2006).

There are few general laws that hold in social sciences (King et al. 1994). Even if it may be difficult or impossible to develop a complete predictive theory of decentralized forest management, it is nevertheless necessary to consider the development of a more sophisticate theory of decentralized forest management than that which is currently available in order to support the real-life processes that are taking place around the world.

A first sketch of this theory may involve the following general statements:

a) decentralized forest management does not necessarily lead to sustainable forest management;

b) sustainable forest management does not necessarily lead to improved livelihoods.

The following are the implication of these statements:

- the conditions under which sustainable forest management leads to improved livelihoods, and *vice versa*, need to be assessed;
- the socially optimal allocation of forests to different uses (ie. conservation, forest production and agriculture) needs to be considered;
- the conditions under which decentralized forest management leads to sustainable forest management need to be assessed;[8]
- appropriate sets of incentives need to be developed when there is a mismatch of objectives among decentralization, forest management, and livelihood improvement programs.

[8] This issue has been partly addressed by studies that have considered the factors that affect local level governments' decisions concerning forest management (eg Andersson 2003, Gibson and Lehoucq 2003).

The following are some of the immediate practical policy implications that arise from the theoretical arguments presented and that will have to be subjected to further assessment.

The design of the decentralized forest management programs has to be grounded on the potential environmental and economic benefits of alternative land uses at the various geographical scales. Agricultural uses normally provide higher financial returns than forest management, and they have a higher capacity to contribute to poverty reduction. Therefore, it could be expected that in the short term local people and their representative (local and/or national) governments will normally choose to convert forests, as they have done for thousands of years.

According to the principle of subsidiarity, which states that decisions should be made at the lowest appropriate level of government, land use management should be decentralized to the lowest level possible. Local people should have communal and/or private rights to land. Local governments should have authority over most of the land use planning decisions. Depending on the size of watersheds, decisions related to hydrological concerns will have to be considered at local intergovernmental level. The national government should have primary, but not sole, responsibility for biodiversity planning. How biodiversity is managed will depend on ecological, social, financial, capacity and historical considerations. Biodiversity planning needs to occur at the national level (eg Brandon et al. 2005) and be implemented with appropriate management systems that involve local governments and local people, since the top-down approach to conservation has failed to deliver. Financial rewards for conservation may need to be provided (Ferraro and Kiss 2002), and they can be made compatible with customary claims to land and its resources (Tacconi and Bennett 1995). The current commitment period of the climate convention does not include provisions to receive carbon credits for reduced deforestation. The lack of consideration of the climate change impacts of deforestation is a failure of the global environmental management system rather than of subnational and national governments. This fact needs to be taken into account in the next commitment period of the climate convention and in any other alternative agreement.

In conclusion, there is a need to move from a framework which takes maintenance of forest cover as the indicator of successful decentralized management, to a framework that:

a) assigns clear and appropriate authority and responsibility to the various levels of government and other stakeholders, including community groups where appropriate;

b) determines specific objectives and indicators for management at various ecosystem levels by central and local governments, and other stakeholders;

c) allows for participatory planning, monitoring and evaluation of performance; and

d) provides performance-based financial support and penalties.

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