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Abstract

Alternative land use remains a controversial issue in Indonesia, particularly with regard to regions outside Java. This paper aims to highlight forest land use dynamics in Indonesia, and particularly the difficulties of resolving the conflicts between conservation, the need to preserve local livelihoods, the demands of the logging industry, both legal and illegal, and the pressures to convert land from forest use to other uses, mainly agriculture, plantations and mining. The paper also stresses the importance of more research into who benefits from these competing uses of forest lands, and how these benefits have been distributed within Indonesian society. In conclusion, this paper argues that the underlying causes of deforestation in Indonesia are complex, and cover various aspects of market failure, inappropriate policy implementation in relation to forest management, lack of governance capacity at central and district levels, and other, broader socioeconomic and political issues.

Keywords: forest management, deforestation, plantation, mining, climate change

JEL classification: Q23, Q54, Q56, Q58

Forest Land Use Dynamics in Indonesia

Introduction

Joan Hardjono's interest in land use and the environment in Indonesia can be traced back at least as far as 1971, when she wrote a book on land and the people of Indonesia (Hardjono, 1971). Her PhD dissertation, which subsequently was published as a book: *Land, Labour and Livelihood in a West Java Village* (Hardjono, 1987), also dealt with this topic. Her broader interest in various environmental issues in Indonesia is evidenced by several papers and her edited book (Hardjono, 1991). In most of her writings on land use and the environment, Joan's intention has been to observe and understand the complex determinants of land use change in Indonesia. She contributed to an understanding of these determinants in the case of agrarian change in Java (Hardjono, 1986, 1987 and 1994). She has been heavily involved in policy debates regarding land use in West Java, and specifically in Bandung and its urban periphery (Hardjono, 1991, 1994 and 2005). Joan has argued the need for balancing environmental conservation, which typically also implies securing a livelihood for local communities, with economic development objectives.¹ She believes that the emphasis so far has been overwhelmingly on economic development. Combined with the occurrence of market and policy failures, this has resulted in a rapid rate of land use conversion from conservation to other purposes (Hardjono, 2005).² She has often observed that these economic activities have mostly benefited an elite group, consisting of capital owners and a few high level government officials, to the detriment of the majority of the local people.

In spite of Joan, and others, having argued the importance of tackling these issues for many years and having provided some policy suggestions, alternative land use remains a controversial issue in Indonesia, particularly with regard to regions outside Java. Some policies have been enacted to deal with these issues, but many problems remain. This paper highlights the complexities inherent in analysing alternative forest use in Indonesia. For a long time there has been a conflict between the uses of forest for conservation, as a source of local livelihoods, and logging and conversion from forest to other uses, which typically leads

¹ Economic development in this context is typically new economic activities on the land to generate higher monetary returns. But these returns are not necessarily distributed to the local populations.

² Market failure implies that the free market situation is not optimal; i.e. there exists another conceivable outcome providing a higher social benefit to society as a whole. Policy failure typically refers to a condition in which implemented policies have not been able to correct market failure, in that they have not produced the best outcomes for society as a whole.

to deforestation. Forest conversion is mainly due to agriculture (including plantations), urban sprawl, and mining exploration.³ This paper also tries to examine who benefits most from the use of forest land, and from conversion to other uses.

The rate of deforestation in Indonesia has been estimated at between 500 thousand and 1.5 million hectares per annum; resulting in the loss of some 30 million hectares of Indonesia's 127 million hectares of natural forest in the last three decades to 2010 (FAO, 2010). This deforestation rate is quite high compared to several other countries with substantial tropical forests (Table 1). In addition to both legal and illegal timber harvesting, the conversion of forests to other land uses significantly contributed to this deforestation (Baplan, 2002). This high rate of deforestation has become a national issue in Indonesia and also a concern globally. It has major consequences for the national economy, and for community livelihoods, as well as for global forest biodiversity and climate change. The pressure is on Indonesia to reduce this rate of deforestation and to achieve a better balance between the use of forest land for conservation (including carbon storage), community livelihood and economic development.

This paper reviews why this deforestation has occurred, and illustrates the complexity of the issues involved. The next section will examine forest management in Indonesia. This is followed by a discussion of plantations, looking especially at forest and palm oil plantations as the ones that are now most prevalent. We then examine the growth of mining activities and how they intersect with forest cover. The last two sections will look at REDD (Reducing Emissions from Deforestation and Forest Degradation) initiatives, and offer some brief conclusions.

Forest Management

Forest management regimes in Indonesia since independence can be divided into four periods.⁴

(1) Period 1950–75: Intensive agricultural expansion and initial policy regarding logging concessions

During the first 25 years of Indonesia's post-independence history, the focus of forest management policies was on implementing agricultural expansion into forest areas, whilst

³ In theory, conversion to mining activities is temporary, since mining activities are supposed to only 'borrow' the land. After mining, the land should be restored to the original use. However, owing to the high level of environmental destruction conducted by mining operations, the conversion can become permanent.

⁴ Detailed discussions of forest management in Indonesia can be found in Nawir et al. (2007) as well as in Colfer and Resosudarmo (2002).

taking conservation into account, to increase national output (FWI/GFW, 2002). As part of agricultural area expansion in the outer islands, the transmigration policy was launched jointly by the Ministry of Transmigration and implemented more intensively after 1970; the aim was to reallocate the population from high-density areas, such as in Java and Bali, to other islands with low-density population, mainly in Sumatra and Kalimantan (Hardjono, 1977; Nawir et al., 2007).

Agricultural area expansion and transmigration had three effects on forest cover in the outer islands: forest was converted for agricultural cultivation, new forest areas were cleared and converted where agriculture on the initially designated land was unsuccessful, and pressure was placed by the transmigrants on the land and forests managed by local people (Sunderlin and Resosudarmo, 1996). In addition to the agricultural expansion policies, the government started to give logging concession permits to companies to further boost the national economy (Mursidin et al., 1997; FWI/GFW, 2002).

(2) Period 1975–90: Timber revenues from logging and intensive forest conversion

Important new policies were imposed after 1975, including further intensifying the policy of releasing permits for commercial logging concessions which had begun with a presidential decree in 1970 (PP 21/1970 on Forest Exploitation Rights) (Seve, 1999; Kartodihardjo and Supriono, 2000; Sembiring, 2003). From the mid 1980s, permits were given for establishing industrial forestry plantations under HTI (*Hutan Tanaman Industri*) on logged-over areas (ex logging concessions) to rehabilitate these areas. The development of fast-growing plantations under HTI has become the main strategy in the rehabilitation programme for *Imperata* grasslands (Potter and Lee, 1998; Otsamo, 2000).

Not all HTI development has achieved the objective of rehabilitating degraded forest areas. Since logging approvals were provided to HTI permit holders in the belief that they would reforest logged-over areas, most investors were mainly interested in receiving the right to clear cut and sell any remaining vegetation. This right was provided by the Timber Clearance Permit (IPK – *Ijin Permanfaatan Kayu*) for concession areas. Furthermore, highly subsidised incentives were available to develop HTI over large-scale areas (Haeruman, 1993; Hasanuddin, 1996; Potter, 1996; Potter and Lee, 1998; Otsamo, 2000). Specifically, these have included interest-free loans provided from the Reforestation Fund, which was set up in 1980 from a reforestation tax levied on concessionaires, accompanied by low-concession land taxes. The planting realisation rate was low, approximately 23.1% by 1998, which was at least 15 years after the scheme was first initiated (Kartodihardjo and Supriono, 2000). It is

also important to note that, since areas of concessions and HTI in many cases overlapped with forests managed by local people, conflicts with local communities over forest resources have emerged everywhere and also hampered the development of HTI.

Despite government policies and regulations to ensure sustainable logging practices during this period, logging contributed to an estimated 77,000–120,000 hectares of deforestation annually. This is about 10–20% of the total deforested area (Sunderlin and Resosudarmo, 1996). During this period, the Ministry of Forestry (MoF) also released permits for forest areas to be developed for oil palm plantations and mining exploration, based on the Forest Land Use by Consensus policy (TGHK – *Tata Guna Hutan Kesepakatan*) produced in 1984 (Seve, 1999; Kartodihardjo and Supriono, 2000; Sembiring, 2003). This policy ended up creating another major challenge to the implementation of HTI. Local governments at the district level were more supportive of private investment in oil palm plantations and mining, because they saw them as providing more local government revenues.

(3) Period 1990–98: The imposition of sustainable forest management (SFM) regulations

In the last eight years of the Suharto era, government policy aimed to improve forest conditions by imposing sustainable forest management. There was also international pressure demanding more responsible practices towards sustainable forest management and more socially and environmentally friendly timber production (Elliot and Septiani, 1994; Septiani, 1994). Major policies that endorsed SFM practices were launched during this period. The RTRWP – *Rencana Tata Ruang Wilayah Propinsi* (Provincial Regional Spatial Management Plan) introduced in 1992 was integrated with TGHK (*Tata Guna Hutan Kesepakatan*) as the basis for forest planning. A timber certification programme was introduced, and in 1998 the TPTJ – *Tebang Pilih dan Tanam Jalur* (System of Selective Cutting and Line Planting) was endorsed. A New Basic Forestry Law was passed in 1999 (Nawir et al., 2007).

The integration of TGHK and RTRWP was mainly conducted in a top-down manner and did not solve the de facto claims by local communities and other parties on the ground. In fact it led to negative social and economic conflicts (Kartodihardjo and Supriono, 2000). The implementation of the TPTJ did revoke some HPH (*Hak Pengusahaan Hutan*) concessionaires who could not comply with a proper selective cutting procedure and did not undertake replanting to promote regeneration (Nawir et al., 2007). Ex-HPH concessionaire areas, due to lack of supervision, became huge unmanaged open access fields or logged-over

areas. Many of these activities were undertaken without permission and thus were deemed illegal encroachment on forest lands. Often on the ground also, these areas were converted and invested in for non-forestry development purposes, based on permits provided by district governments, such as for growing estate crops (Potter and Lee, 1998; Kartodihardjo and Supriono, 2000; Nawir et al., 2007).

(4) Period 1998–present: Transition from New Order Era to Reformation Era and from centralised to decentralised government

The economic crisis in 1997/1998 changed Indonesia's political system. The crisis ended the New Order Era and changed the form of government from a centralised to a decentralised one. This change was one result of *Reformasi* and is often referred to as the development of regional autonomy (Resosudarmo, 2005). After the change of regime, local communities in many provinces reclaimed their customary rights inside state forests and demanded that these rights be acknowledged (Suwarno et al., 2009). With the intention of finding other sources of livelihood after the economic crisis, people cleared new land which included primary forests in the Outer islands. These trends were very obvious in the provinces of Riau, Jambi, Lampung, West and East Kalimantan, and Central Sulawesi (Sunderlin et al., 2000).

Forest encroachment, commonly known as illegal logging, has also become a serious problem, particularly in areas where competition for land use is high. Although one farmer might clear only a small area of land to practise shifting agriculture, the net impact of many farmers is often very damaging to the natural forests (Scotland et al., 2000). In addition, other parties have taken advantage of the situation, for example outsiders and investors in oil palm plantations, to encroach on state forest areas (Nawir et al., 2007). It was estimated that illegal logging contributed 64% of total timber production in 2000, and 83% in 2001 (Tacconi et al. 2004). Since 2001, the trend has been for the number of logging companies to decline, following increased rates of deforestation and increased volumes of wood logged illegally which have led to a continued process of deforestation (Tacconi et al., 2004).

Through these four periods, the dynamics of national forest policies have dominated forest management in the country. These policies were driven by the country's political economy, and were mainly intended to generate national revenues from forest resources at the expense of conservation. The immediate impact was rapid deforestation.

Plantations

In accordance with the TGHK forest classification system, forestry-based commercial activities can be implemented in Production Forests through both timber and non-timber forest product (NTFP) extraction and the development of forestry plantations. Logging concession companies (HPHs) are allowed to perform selective felling inside Limited Production Forests, while clear felling is permitted inside Permanent Production Forests (GoI/FAO, 1990; Kartodihardjo and Supriono, 2000; Otsamo, 2001). Logged-over areas left by HPHs are usually granted to HTI concessionaires for forestry industrial plantation development (Nawir et al., 2007). This policy of commercial logging and HTI has been criticised on several grounds. Most HTI enterprises have not been successful in reforesting ex-logging areas. And since the beginning of intensive state forest management in the 1950s, there has been no significant transfer of benefits (economic rents) from large-scale companies to local forest communities (Nawir et al., 2007; Suwarno et al., 2009).

Forestry-based commercial activities have also created a significant imbalance in access to production forests. Up to 2010, the majority of production forest areas were managed by private companies, totalling 34.3 million hectares, which is about 97.5% of total production forests (Table 2). It is also clear from this table that areas allocated for communities to manage under the community-based plantation programme (HTR), the community forestry scheme (HKm), and village forests (*Hutan Desa*) only accounted for 678,414 hectares in total (about 2% of total production areas).

Most forest areas that have been converted to other land types have become oil palm plantations. Table 3 shows the trend of conversion from forest areas into other land types (including oil palm plantations) up until 2005. In 2008, it was estimated that oil palm plantations covered approximately 4.4 million hectares, and 70% of these plantations were developed on former state forest land. By the end of the first decade of the 21st century, Indonesia had become the world's largest palm oil producer (Sheil et al., 2009). As demand for palm oil, both for food and non-food products (including biofuels in the future), is expected to remain high, it is probable that the development of oil palm estates will accelerate (Resosudarmo et al., 2011a). It has been argued that, under oil palm plantation development, there are more opportunities for local communities to capture the economic rents of these converted lands for several reasons. First, there are significantly more economic benefits from harvesting oil palm fruit compared to NTFPs and timber production, because of the shorter time from planting to harvest (the first harvesting is four years after

planting) (Nawir et al., 2003). This is important for local communities who are in need of regular cash incomes. Second, poor community members in rural areas are usually the households who do not have land and have to find other sources of income, including wage employment. Palm oil plantations and industries have provided employment opportunities to most poor rural communities; in 2006, it was estimated that around 1.7 to 2 million people worked in the palm oil industry (Zen et al., 2008). Third, local smallholders have important roles in developing and managing small nucleus estates, besides the larger private and government plantations. In 2008, over 41 percent of oil palm plantations were managed by smallholders, 49 percent were owned by private companies and 10 percent were managed by government plantations (World Growth, 2011).

On the other hand, it has been argued that the conversion of forest land to oil palm plantations has been the major cause for continuing deforestation rates, which in turn contribute to CO₂ emissions. The environmental implications are even greater in the case of conversion of peat land forests that is occurring in many parts of Sumatra and Kalimantan (Zen et al., 2008; Sheil et al., 2009; World Growth, 2011). But the evidence suggests that the growth of palm oil is only one factor contributing to deforestation and probably less important than commercial logging and mining. There are, however, several policy challenges which have to be tackled in order to enhance the benefits of palm oil cultivation for local communities. The low buying prices at the farm gate are one problem. In addition, the tenurial problem needs to be resolved, particularly for smallholders that are engaged in oil palm plantation development under a partnership scheme with a large company.

Companies have an obligation to set the buying price with a reference to a formula determined by the Ministry of Agriculture which is adjusted to international market prices. This should allow communities to receive an income which reflects international price movements. In practice, the buying price is often lower than the standard price based on the Ministry of Agriculture formula (SETARA et al., 2007; Zen et al., 2008). But no penalty is imposed on the companies who have applied these lower prices, and in doing so fail to comply with government regulations. This is because there is no monitoring on the ground (SETARA et al., 2007). Furthermore, in the absence of effective and active cooperatives to collect the fresh fruit bunches and sell them on behalf of farmers to a company, farmers often have to deal with brokers, who take advantage of the perishable nature of the fresh fruit bunches and set low buying prices (Zen et al., 2008).

Communities engaging in a partnership scheme with a company are required to hand over their land certificates to be used as collateral by the company to obtain loans from the

bank (SETARA et al., 2007). There is no certainty that the land returned to the community partners will be of a similar size as the blocks initially handed over to be managed under the partnership scheme (SETARA et al., 2007). For example, in Sanggau, West Kalimantan, the average land parcel handed over per household was 4.21 hectares, and the average land returned was 1.03 ha (Zen et al., 2008). There is a false conception among community partners that this land is actually being lent to the company and will be returned after the partnership contract has finished, but this is often not the case (SPKS, 2006; Zen et al., 2008).

Mining

Since 2000 mining activities in Indonesia have increased rapidly. In 2000, coal and mineral mining contributed approximately three percent of the total government revenue; in 2009 this increased to approximately six percent. Another striking indication of the increasing importance of Indonesia's non-oil and gas mining industry is the growth of export of ores and minerals. These exports increased from USD three billion, approximately five percent of the country's total export value, in 2000 to USD 26 billion, or around 16 percent of the country's total export value in 2010. This implied an increase of 25 percent annually (CEIC Asia Database; Manning and Purnagunawan, 2011).

Coal has probably become the most important of the nonoil and gas mining operations. By 2007, approximately 70 per cent of the mining contribution to government revenue was from coal production (US Commercial Service, 2007). Furthermore, since 2003, the export value of coal has been higher than other mining commodities, reaching approximately USD 18 billion in 2010, which was approximately 70 percent of total non-oil and gas mining exports. Coal production has also been increasing sharply. While the production of copper and gold showed a declining (or at most, steady) trend, and tin and nickel a slowly increasing trend, coal production in 2008 was more than triple that of 2000 (CEIC Asia Database). In 2007, Indonesia was one of the largest coal producers and exporters in the world (US Commercial Service, 2007). It shipped approximately 165 million tons in that year, and was predicted to supply almost 30 percent of the world coal market (Ewart and Vaughan, 2009).

In the last few years, there have been several challenges faced by mining operations in the country (PWC, 2008; Resosudarmo et al., 2009). But if the high world prices persist, it is expected that coal and other mineral mining operations will keep expanding. What are the implications for land use? Mining activities in forested areas, and particularly in forest

conservation areas, have been a growing cause of deforestation. Coal and other mineral extraction involve open mining practices, which often deforest large parts of the mining area. The removal of trees, animals and soil from an extensive coverage area upsets the ecosystem. Reclamation is often only conducted in the small area where the soil has been moved to, and many times non-native species are planted. A much larger ex-mining area is left without fertile soil and therefore few species can grow again. Coal mining operations in Kalimantan and Sumatra are of particular concern, since they cover a huge forest area (Resosudarmo et al., 2009)

For a long time mining activities in Indonesia have been governed by the outdated Law 11/1967 on the Basic Provisions of Mining, which has only recently been replaced by Law 4/2009 on Mineral and Coal Mining. On state forest lands, the mining industry must also comply with the earlier Basic Forestry Law, Law 5/1967, and the more recent Forestry Law, Law 41/1999. On private lands, these activities are regulated by the Basic Agrarian Law, Law 5/1960. The Forestry Law is of critical importance in terms of land acquisition for the issuance of mining rights/licenses and their legitimised implementation, as two thirds of the nation's land area — known as *Kawasan Hutan* or Forest Lands — is under the control of the Ministry of Forestry. The Ministry of Forestry has the authority to determine which forest areas can be used for non-forestry activities. These areas are 'leased' to mining operators through the issuance of lease use permits (Government Regulation No. 24/2010 on Use of Forest Areas and Ministry of Forestry Regulation No. 18/2011 on Guidelines for the Use of Forest Lease Use). For example, between 2005 and May 2011, for all types of mining, the Ministry of Forestry issued lease use permits for 459,800 thousand and 1.58 million hectares of forest area for mining exploitation and exploration, respectively (Resosudarmo et al., 2011a). This is a significant increase in the forest area where mining is permitted.

Implementation of regional autonomy policies has added further complications regarding the rights of mining operations. Since the enactment of Law 22/1999 on Local Government, local governments have the right to grant mining licences and some mining interests have sought licences from them. The new mining law, Law 4/2009 on Mineral and Coal Mining, also supports these local government rights. Thus, all levels of government may issue mining licenses and apply certain levies and charges. Local governments who see this as an opportunity to generate revenue quickly issue many licenses with little consultation with other agencies. It is now difficult to know exactly how many mining licenses exist. One estimate is that, prior to 2000, there were only approximately 600 mining licenses, but,

by August 2010, more than 10,000 licenses had been issued (Jawa Post National Network, 2011). No less than 8,000 were licenses issued by local governments. Many of these licenses overlap with each other in the sense that several permits were issued over the same area (Business Indonesia, 2012). For example, in 2008, a local government issued a license to a third party for a nickel mining area in Southeast Sulawesi that had previously been granted to the large multinational, Rio Tinto Ltd. by the national government (Resosudarmo et al., 2009). This lack of coordination among government agencies in granting licenses creates confusion and legal uncertainty over mining rights and makes the expansion of mining activities difficult to control, including those in forest areas which have been designated for conservation.

Further expansion of mining operations has also been due to people's mining, often termed "illegal mining". Law 11/1967 on the Basic Provisions of Mining explicitly allows members of the local population in possession of a mining permit (*Kuasa Pertambangan* or KP) to exploit minerals in areas designated by the Ministry of Mines to have no economic significance. Law 4/2009 also allows members of the local population to obtain a mining permit. This law even provides equal opportunity between corporate and people's mining in occupying a particular mining land. However, owing to license processing difficulties — usually the result of long, slow, complicated and expensive bureaucratic red tape — many, if not the majority, of these miners are reluctant to obtain a permit (Zulkarnain et al., 2004). Thus, they automatically become engaged in mining activities that fall into the illegal category and typically operate on the periphery of an area that has been licensed to large mining operations.

In the 1980s, the government 'ignored' the activities of these illegal miners as their number was relatively small and the practice was viewed officially as a way to boost mining output. Since the late 1990s, and especially after the *Reformasi* following the fall of Suharto, illegal activities significantly expanded. For example in South Kalimantan, the total coal production of illegal miners in the area surrounding the operation of PT Arutmin (the corporation holding a large mining license in that province) in 2003 was almost the same as the production of PT Arutmin itself (Resosudarmo et al., 2009). The same situation happened in the Bangka-Belitung islands. The amount of tin produced by illegal miners in 2001 was predicted to be as much as the production of PT Timah, the main state mining company.

There are several reasons for this increase in illegal mining activities. First, the economic crisis in 1997/1998 encouraged people to seek an alternative livelihood. Besides

being involved in illegal logging, many participated in illegal mining. Second, the rise in world mineral prices made their sale an attractive source of income. In addition, people seized the opportunity to reclaim traditional rights over lands controlled by the government. In this regard, it is important to note that in rural areas of the outer islands, land certificates are not the norm; rather, land rights are recognised traditionally and informally within and among local indigenous communities. According to the Basic Agrarian Law (Law 5/1960), customary (*adat*) or indigenous land rights are recognised to the extent that they exist and their use is not in conflict with the national interest. Under Law 11/1967, licensed mining operators can conduct their operations over a piece of land as long as an agreed compensation has been provided to the land holders (including those operating under customary law).

It is often argued that over time, land holders realised that they had been 'pushed' to accept inadequate compensation, and thus felt cheated of their *adat* rights. During the Soeharto era, when the power of central government and the military was strong, local people did not dare to challenge mining operators over inadequate compensation. After the 1999 *Reformasi*, which reduced the power of central government and the military, many land holders tried to reclaim their lands and conducted illegal mining or contracted their land out to illegal mining operators.

Of the Forest Lands, particularly important are "Protected Forests". They cover a large area of forest, approximately 22.5 million ha (MoF, 2007), and typically have inherent geological characteristics that mean they often contain mineral ores, metals and coal (Ekawan, 2002). Prior to 1999, forest land use and development were governed by the Basic Forestry Law (Law 5/1967), which did not include prohibitions for mining activities in Protected Forests. This situation provided an opportunity for the government to issue mining permits, mostly for coal mining, over massive forest areas, in particular in Protected Forests. Since 1999, forest land has been controlled by Forestry Law 41/1999 which strictly prohibits open pit mining activities in Protected Forests. This has severely limited the development of the mining industry in these forests, which, as noted above, are precisely where the most commercially viable mineral ores and metal deposits are often found. Conflict concerning these two sectors, mining and forestry, is thus inevitable (Patlis, 2005).⁵

Proponents of conservation have applauded the Ministry of Forestry's efforts to maintain the functions of protected and conservation forests amidst strong pressures from the mining sector. But this new policy was seen as a major setback in the government's effort to

⁵ Details of the socio-economic conflicts in Indonesia's mining industry are given in Resosudarmo et al. (2009).

lure investors into the mining sector. Continuing legal uncertainty deterred many potential investors in Indonesia's mining ventures. Only a few new investments in exploration activities were made between 1999 and 2005 (PWC, 2008). Strong opposition from the mining sector and their lobbying resulted in the issuance of the Government Regulation in Lieu of Law (PERPU) 1/2004, which then became Law 19/2004. This regulation states that all mining contracts or licenses made prior to the issuance of the 1999 Forestry Law remained valid. This meant that 13 mining companies (covering approximately 850,000 hectares) which had acquired a mining contract or license over protected or conservation forest areas before the enactment of the Forestry Law were allowed to continue with their activities (Direktorat Sumber Daya Mineral dan Pertambangan, 2004).⁶

Nevertheless, the government issued a regulation that requires these companies to compensate for the area where mining activities are carried out by setting aside a certain area of forested land to maintain the level of protection and conservation. This requirement was seen by mining supporters as another barrier to their activities. They argued that it was difficult to provide compensation in the form of land, and thus continued to lobby the government for a change in the regulations. Consequently, in early 2008 the government issued another regulation (PP 2/2008) whereby the use of forest lands for mining activities must be compensated with a monetary payment. Environmental and community NGOs strongly opposed this Government Regulation because the rate of 'rent' of land leased to mining companies is deemed too low and is seen as ignoring the protected or conservation functions of the forests which are to be mined. These confusing changes in government policies in the forestry sector reflect the fluidity of regulatory frameworks governing mining activities in Indonesia. This fluidity not only serves as a constant reminder of the uncertainty of the regulatory environment in Indonesia, but also reflects the growing power of conservation interests vis-a-vis mining.

These on-going debates are really about the extent to which the fast development of coal mining activities, either by large companies or by people's mining, benefits the majority of local people and by how much. It may well be that local people are receiving benefits from mining activities in their area, either through their direct involvement in these activities or indirectly through local economic booms created by the mining activities. Because of the lack of evidence, the dominant argument so far has been that mining operations everywhere have not significantly contributed to local poverty alleviation. Meanwhile local people

⁶ See Keppres 41/2004.

typically have to shoulder the burden of the loss of forest that used to be their livelihood as well as the environmental destruction and social conflict created by mining activities (McMahon et al, 2000; World Bank Extractive Industry Review Advisory Group, 2003; Jatam, 2005).

REDD+

The issue of climate change has brought tropical forests and peatlands to centre stage through an initiative referred to as Reducing Emissions from Deforestation and Degradation or REDD. It is a scheme whereby financial value is placed on the carbon stored in forests. Incentives, rewards and payments, are offered to governments, companies or forest owners in developing countries to reduce emissions from forested lands conditional upon the reduction of deforestation and forest degradation. REDD+ goes beyond deforestation and forest degradation to include the role of forestry in conservation, sustainable forest management and further development of forest carbon stocks. REDD+ is expected to produce co-benefits of maintaining biodiversity and improving community livelihoods.

Put simply, the basic principal of REDD is as follows. The emission reductions from avoided deforestation are counted as carbon credits. The amount of carbon credits collected for a certain period in a certain area can be sold to an international voluntary carbon market. An alternative is to submit these emission reductions to a 'funding institution' (which presumably can be an individual country, or group of developed countries or donors) who will provide compensation to those developing countries participating in REDD. Similar schemes apply for carbon sequestration or carbon stock enhancement (i.e., REDD+). Three important criteria for REDD+ are permanence, additionality, and leakage. Permanence refers to the protected area which must remain forested and not degraded for the duration of the emission reduction agreement. Additionality refers to the forest area which is saved or would have been lost if not for REDD. Leakage means direct emissions elsewhere caused by the emission reduction in the REDD project. Within the countries receiving REDD+ funding, this compensation should be fairly distributed to the relevant stakeholders including those who have contributed to the reduction of deforestation and those who have the right to forest lands or carbon tenure (Angelsen, 2008; Resosudarmo, 2010).

For Indonesia, while high rates of deforestation present clear challenges, they also bring opportunities for REDD+. There are about 22 million hectares of peatlands in the country, which emit high levels of GHG when they are converted to other uses or drained.

Both the threat of deforestation and the emissions from the use of peatlands highlight the importance of REDD+ for Indonesia (UKP4, 2011).

The REDD+ policy process at the national level has involved a series of major events. Indonesia's participation in climate change mitigation was affirmed at the UNFCCC COP 13 in Bali in 2007. This commitment was firmly reiterated by the President's pledge in September 2009 to reduce emissions by 26 per cent by 2020. This policy was to be articulated by relevant ministries and implemented as part of their sectoral development strategies. In May 2010 the Government of Norway pledged to support Indonesia in its preparations for REDD+, promising one billion USD conditional on Indonesia fulfilling several points as set out in the Letter of Intent (LOI) between the two countries. These conditions include the establishment of REDD+ institutions, selection of pilot provinces, formulation of a national REDD+ strategy, and moratorium on further conversion of primary forests and peatlands. These two major events precipitated the REDD+ national policy process (Resosudarmo et al., 2011a).

Although not as swift as some would like it to be, as of December 2011, the Indonesian government has made substantial progress, including the establishment of a REDD+ task force under the UKP4 (Presidential Delivery Unit for Development Monitoring) and the issuance of a government policy on moratorium on forest and peatland conversion. There are over 30 REDD+ demonstration activities throughout Indonesia at various stages of implementation. Around half are in Kalimantan (UN-REDD Programme Indonesia, 2011; Resosudarmo et al., 2011a; Indrarto et al., forthcoming). But although some progress has been made at the national policy level, implementation of REDD+ on the ground has been sluggish and is not without challenges, for several reasons. First, the international negotiations concerning REDD have been slow. This uncertainty affects policy decisions and political support for REDD+ at the national and local levels, and in turn affect the development of REDD+ projects on the ground.

Second, there are serious issues concerning land tenure (Resosudarmo et al., 2011b) and associated carbon rights (and liabilities). These will have implications among others, for communities' access to and control of forests once REDD+ projects come on line, for the distribution of benefits from REDD+, and on who will be responsible for the long-term reductions. Social safeguards need to be in place, including the application of Free and Prior Informed Consent (Resosudarmo, 2010). Those whose livelihoods depend on forest products, even those living far from the forests, will also be affected (Resosudarmo and Yusuf, 2008; Resosudarmo, 2010).

Third, other land-based short-term economic developments, such as mineral extraction and oil palm expansion, are competing with forms of sustainable forest management, including REDD+. For example, investors continue to put their money into mining investments rather than into forest ventures.

Fourth, weak forest governance and governance in general, although have improved significantly in the last decade, continue to hinder the application of the principles of accountability and transparency, such as those that relate to the allocation of REDD+ projects and to the distribution of benefits. Past experience in the forestry sector shows that the rents from forests lead to conflicts of authority among various levels and types of government agencies, and also between government agencies and communities. There are also internal conflicts within communities, often involving those who take part in illegal natural resource extraction or other land-related activities, which in turn have adverse impacts on forest management (Resosudarmo, 2010). Under these circumstances, choices have to be made to make REDD+ work.

Final Remarks

This paper has highlighted forest land use dynamics in Indonesia, and particularly the difficulties of resolving the conflicts between conservation, the need to preserve local livelihoods, the demands of the logging industry, both legal and illegal, and the pressures to convert land from forest use to other uses, mainly agriculture, plantations and mining. The paper also stresses the importance of conducting more research into who benefits from these competing uses of forest lands, and how these benefits have been distributed within Indonesian society. There can be little doubt that various pressures have led to a high rate of deforestation in Indonesia, and that this process is now threatening the livelihood of many people as well as the global environment.

It is true that some deforestation has been caused by natural conditions, such as El Niño, natural fires, floods, geomorphological conditions, and high rainfall. For example, there are forest landscapes that are prone to deforestation caused by natural catastrophes such as landslides and erosion due to geomorphology and high rainfall (1,500–4,000 mm per annum) (Santoso, 2005). Nevertheless, human activities, such as legal and illegal logging, and forest conversion to other uses, are argued to be the major cause of deforestation (Sunderlin and Resosudarmo, 1996; FWI/GWF, 2002; Tacconi et al., 2004). These forestry-based human activities, particularly in state forests, are the result of government policies and

regulations that provide access and management rights. In many cases, as has been discussed in previous sections, these policies have created disincentives to sustainable management.

The underlying causes of deforestation in Indonesia are complex, and cover various aspects of market failure, inappropriate policy implementation in relation to forest management, lack of governance capacity at central and district levels, and other, broader socioeconomic and political issues. Often, indirect and direct causes cannot be separated, because there is a long chain of events that ultimately leads to deforestation (Contreras-Hermosilla, 2000). Since the late 1980s, market failures have been identified as one of disincentives to managing forests sustainably, which means that, because of distorted or malfunctioning markets, prices do not necessarily reflect the social and environmental values of the resources (Pearce et al., 1989; Perman et al., 1996). In Indonesia, even the most commercialised forest product, such as timber, has been undervalued as the domestic market for round wood has been protected. This is reflected in the stumpage fees and obligatory reforestation fund payments set by the government (Gray, 1996). With an abundant supply from illegal logging due to policy failures, the value of timber is even further reduced; this provides no incentive to conserve forest resources and leads to even faster deforestation.

Policy failures in relation to forest management in Indonesia have been influenced mostly by changes in government policies and the economic conditions of the country. In this paper, we have grouped these changes into four periods: 1950–75, 1975–90, 1990–98, and 1998–present. The period from 1950–75 was marked by intensive agricultural expansion and the formulation of an initial logging concessions policy. The second period, 1975–90, saw the boom of timber revenues from logging and the start of intensive forest conversion for different uses, including mining and oil palm plantations. The period from 1990–98 saw the initiation of intensive efforts by the Ministry of Forestry (MoF) to improve forest management within the framework of Sustainable Forest Management (SFM). The last period, from 1998 to the present, has been mainly the transition period from the *Orde Baru* (New Order) to the *Era Reformasi* (Reformation Era) and from a centralised to a decentralised government system. There have been significant changes regarding forest policy and regulations, and there are now more options for local community involvement in state forest management.

Joan Hardjono has for many years identified the issues of market and policy failures in discussing land use policies in Indonesia. She is certainly among the pioneers working on these complex questions in Indonesia. Unfortunately, we do not yet have enough knowledge to correct the problems which have arisen, or to avoid further problems in the future. Policies

already enacted might lead to some progress, but much remains to be done. This paper has concerned itself with the factors which have caused the loss of forest lands, and the initiatives which Indonesia has pioneered, including the implementation of REDD+. The results however are yet to be seen.

References

- Angelsen, A. (ed.) (2008), *Moving Ahead with REDD: Issues, Options and Implications*, Bogor: Center for International Forestry Research (CIFOR).
- Baplan (2002), "Kebijakan Penyusunan MP-RHL (Master Plan Rehabilitasi Hutan dan Lahan)". Presentation by Dr. Dwi Sudharto of Indonesian Ministry of Forestry in CIFOR, Bogor, 30 Agustus.
- Bisnis Indonesia* (2012), "Potensi Korupsi: Izin Usaha Pertambangan", 8 January. Available from: <http://www.bisnis.com/articles/potensi-korupsi-izin-usaha-pertambangan>.
- Colfer, C.J.P. and I.A.P. Resosudarmo (2002), *Which Way Forward? People, Forests and Policymaking in Indonesia*, Washington D.C.: Resource for the Future.
- Contreras-Hermosilla, A. (2000), "The Underlying Causes of Forest Decline", Ocasional Paper No. 30, Center for International Forestry Research (CIFOR), Bogor.
- Direktorat Sumber Daya Mineral dan Pertambangan (2004), "Mengatasi Tumpang Tindih antara Lahan Pertambangan dan Kehutanan", Available from: http://www.bappenas.go.id/index.php?module=Filemanager&func=download&pathext=ContentExpress/&view=85/6tambang_final.pdf.
- Ekawan, R. (2002), "Mencari Solusi bagi Penambangan di Hutan Lindung", *Sinar Harapan*, 30 September. Available from: <http://www.sinarharapan.co.id/berita/0209/30/ipt02.html>.
- Elliot, J. and A. Septiani (1994), "Viability of Ecolabelling and Other Initiatives to Ensure Sustainable Forest Management", Natural Resources Management Project (NRMP), USAID, Jakarta.
- Ewart Jr., D.L. and R. Vaughn (2009), "Indonesian Coal", Marston & Marston Inc. Available from: http://www.marston.com/Portals/0/MARSTON_Review_of_Indonesian_Thermal_Coal_Industry.pdf
- Food and Agriculture Organisation (FAO) (2010), *Global Forest Resources Assessment 2010*. Rome: FAO. Available from: <http://www.fao.org/docrep/013/i1757e/i1757e.pdf>.

- Forest Watch Indonesia/Global Forest Watch (FWI/GFW) (2002), *The State of the Forest: Indonesia*, Bogor: Forest Watch Indonesia.
- Government of Indonesia/Food and Agriculture Organisation (GoI/FAO) (1990), "Situation and Outlook of the Forestry Sector in Indonesia", Volume 2: Forest Resource Base, UTF/INS/065/INS: Forestry Studies, Technical Report No. 1, (Volume 2 of 4), Directorate General of Forest Utilisation, Ministry of Forestry, Jakarta.
- Gray, J.A. (1996), "Tropical Forest Pricing Policies and Rent Collection in South East Asia", *Journal of the Asia Pacific Economy*, 1(2): 171-84
- Haeruman, H. (1993), "Inter-sectoral Linkages in Indonesia, Forestry Policies of Selected Countries in Asia and the Pacific", FAO Forestry Paper 115, Food and Agriculture Organisation, Rome.
- Hardjono, J. M. (1971), *Indonesia, Land and People*, Jakarta: Gunung Agung, Jakarta.
- Hardjono, J. M. (1977), *Transmigration in Indonesia*, Kuala Lumpur: Oxford University Press.
- Hardjono, J. (1986), "Environmental Crisis in Java", *Prisma*, 39: 3-13.
- Hardjono, J. M. (1987), *Land, Labour and Livelihood in a West Java Village*, Yogyakarta: Gadjah Mada University Press.
- Hardjono, J. (ed.) (1991), *Indonesia. Resources, Ecology, and Environment*, Singapore: Oxford University Press.
- Hardjono, J. (1994), "Resource Utilization and The Environment", in Hal Hill (ed.), *Indonesia's New Order: The Dynamics of Socio-economic Transforamtion*, Sydney: Allen and Unwin, pp. 179-215.
- Hardjono, J. (2005), "Local Government and Environmental Conservation in West Java", in B.P. Resosudarmo (ed.), *The Politics and Economics of Indonesia's Natural Resources*, Singapore: Institute of Southeast Asian Studies (ISEAS), pp. 216-230.
- Hasanuddin, L. (1996), "Hutan Tanaman Industri: Blunder Kedua Kebijakan Kehutanan di Indonesia", *Jurnal Lingkungan Hidup*, 1: 13-17.
- Indrarto, G.B., P. Murharjanti, J. Khatarina, I. Pulungan, F. Ivalerina, J. Rahman, N.M. Prana, I.A.P. Resosudarmo and E. Muharrom (forthcoming), "The Context of REDD+ in Indonesia: Drivers, Agents and Institutions". CIFOR and ICEL, Bogor.
- Jaringan Advokasi Tambang (Jatam) (2005), *Tambang dan Kemiskinan: Kasus-Kasus Pertambangan di Indonesia 2001-2003*, Jakarta: Jatam.

- Jawa Pos National Network* (2011), "Dirjen Baru Tertibkan Izin Tambang Daerah", 7 Mei.
Available from: <http://www.jpnn.com/read/2011/05/07/91340/Dirjen-Baru-Tertibkan-Izin-Tambang-Daerah>.
- Kartodihardjo, H. and A. Supriono (2000), "The Impact of Sectoral Development on Natural Forest Conversion and Degradation: The Case of Timber and Tree Crop Plantations in Indonesia", Occasional Paper No. 26(E), Center for International Forestry Research (CIFOR), Bogor.
- Manning, C. and R. Purnagunawan (2011), "Survey of Recent Developments", *Bulletin of Indonesian Economic Studies*, 47(3): 303-332.
- McMahon, G., E. Subdibjo, J. Aden, A. Bouzaher, G. Dore and R. Kunanayagam (2000), "Mining and the Environment in Indonesia: Long-term Trends and Repercussions of the Asian Economic Crisis", An EASES Discussion paper series 21438, November.
Available from: http://www.natural-resources.org/minerals/cd/docs/twb/mining_indonesia.pdf.
- Ministry of Forestry (MoF) (2007), *Statistik Kehutanan 2007*, Jakarta: Ministry of Forestry.
- Mursidin, T. Priyo, R. Achlil, N. Yuliarsana, Soewondho, Wartam, B. Basuki and Sudarto (eds.) (1997), *35 Tahun Pengijauan di Indonesia*, Jakarta: Presidium Kelompok Pelestari Sumberdaya Alam, Direktorat Jenderal Reboisasi dan Rehabilitasi Lahan Departemen Kehutanan and Direktorat Jenderal Pembangunan Daerah Departemen Dalam Negeri.
- Nawir, A. A., L. Santoso and I. Mudhofar (2003), "Towards Mutually Beneficial Company-Community Partnerships in Timber Plantation: Lessons Learnt from Indonesia", Working Paper 26, Center for International Forestry Research, Bogor.
- Nawir, A.A., Murniati and L. Rumboko (eds.) (2007), *Forest Rehabilitation in Indonesia: Where to After More than Three Decades?*, Bogor: Center for International Forestry Research (CIFOR).
- Otsamo, A. (2001), *Forest Plantations on Imperata Grasslands in Indonesia - Establishment, Silviculture and Utilization Potential*, Doctoral Dissertation, University of Helsinki, Helsinki.
- Otsamo, R. (2000), "Integration of Indigenous Tree Species into Fast-growing Forest Plantations on Imperata Grasslands in Indonesia - Silvicultural Solutions and Their Ecological and Practical Implications", Tropical Forestry Reports 21, Viikki Tropical Resources Institute, Helsinki.

- Patlis, J. (2005), "New Legal Initiatives for Natural Resource Management in a Changing Indonesia: The Promise, the Fear and the Unknown", in B.P. Resosudarmo (ed.), *The Politics and Economics of Indonesia's Natural Resources*, Singapore: Institute of Southeast Asian Studies (ISEAS), pp. 231-247.
- Pearce, D., A. Markandya and E.B. Barbier (1989), *Blueprint for a Green Economy*, London: Earthscan Publications Ltd.
- Perman, R., Y. Ma and J. McGilvray (1996), *Natural Resources and Environmental Economics*, London: Longman.
- PricewaterhouseCoopers (PWC) (2008), *MineIndonesia 2007: Review of Trends in the Indonesian Mining Industry*, Jakarta: PWC.
- Potter, L. (1996), "Forestry in Modern Indonesia, in J.Th. Linbald (ed.), *Historical Foundations of a National Economy in Indonesia, 1980s to 1990s*, Amsterdam: Royal Netherlands Institute of Arts and Sciences, pp. 369-384.
- Potter, L. and J. Lee (1998), "Tree Planting in Indonesia: Trends, Impacts and Directions", Occasional Paper No. 18, Center for International Forestry Research (CIFOR), Bogor.
- Resosudarmo, B.P. (ed.) (2005), *The Politics and Economics of Indonesia's Natural Resources*, Singapore: Institute of Southeast Asian Studies (ISEAS).
- Resosudarmo, B.P. and A.A. Yusuf (2008), "Preliminary Analysis of REDD and the Indonesian Economy", paper presented in the Climate Change Impacts and Adaptation Workshops, Nautilus Institute for Security and Sustainability, Melbourne, 18 November. Available from: <http://nautilus.org/projects/cc-workshops/melbourne/research/draft-papers/redd.pdf/view>
- Resosudarmo, B.P., I.A.P. Resosudarmo, W. Sarosa and N.L. Subiman (2009), "Socioeconomic Conflicts in Indonesia's Mining Industry", in R. Cronin and A. Pandya (eds.), *Exploiting Natural Resources: Growth, Instability, and Conflict in the Middle East and Asia*, Washington, DC: The Henry L. Stimson Center, pp. 33-48.
- Resosudarmo, I.A.P. (2010), "Pengelolaan Hutan, REDD, dan Emil Salim", in I.J. Azis, L.M. Napitupulu, A.A. Patunru and B.P. Resosudarmo, *Pembangunan Berkelanjutan: Peran dan Kontribusi Emil Salim*, Jakarta: Kepustakaan Populer Gramedia, pp. 327-350.
- Resosudarmo, I.A.P., S. Mardiah and N. Utomo (2011a), "Extractive Land Use, Spatial Planning and Their Implications for REDD+ in Indonesia: A Preliminary Analysis", paper presented in the 3rd IRSA International Institute, Padang, 19-21 July.
- Resosudarmo, I.A.P., S. Atmadja, P. Astri, A.D. Ekaputri, D.Y. Intarini and Y. Indriatmoko (2011b), "Can the Existing Tenure System foster Effective REDD+ Implementation?"

- Reflections from Five REDD+ Projects in Indonesia", Powerpoint presentation in the Land Tenure and Forest Carbon Management Workshop, University of Wisconsin, 21-22 October.
- Santoso, H. (2005), "Arah Kebijakan dan Implementasi Rehabilitasi Hutan dan Lahan", Presentation in the National Workshop Review of Rehabilitation Initiatives: Lessons from the Past in CIFOR, Bogor, 22-23 February.
- Scotland, N., J. Smith, H. Lisa, M. Hiller, B. Jarvis, C. Kaiser, M. Leighton, L. Paulson, E. Pollard, D. Ratnasari, R. Ravanell, S. Stanley, Erwidodo, D. Currey and A. Setyarso (2000), "Indonesia Country Paper on Illegal Logging", paper prepared for the World Bank-WWF Workshop on the Control of Illegal Logging in East Asia, Jakarta, 28 August. Available from: http://www.illegal-logging.info/item_single.php?it_id=171&it=document
- Septiani, A. (1994), "Institutional Approaches for Ecolabelling of Indonesian Forest Products", Natural Resources Management Project (NRMP), USAID, Jakarta.
- Seve, J. (1999), "A Review of Forestry Sector Policy Issues in Indonesia", EPIQ (Environmental Policy and Institutional Strengthening IQC) under Natural Resource Management Project, Jakarta. Available from: http://nrm.bappenas.go.id/Doc/Rpt_Tech/%2334%20Review%20of%20Forestry%20Sector%20Policy%20Issues.pdf.
- Sembiring, S. N. (2003), "Summary of the Legislation on Regulation Regarding the Natural Resources Management and Environment in Indonesia", Indonesia Natural Resources Law Institute (IHSA), Jakarta.
- SETARA, Yayasan Keadilan Rakyat and PSHK-ODA (Pusat Studi Hukum dan Kebijakan dan Otonomi Daerah) (2007), "Partnership or Power Relationship? Studi Kemitraan di PT Sari Aditya Loka/Astra Group di Propinsi Jambi", Laporan Studi, SETARA, Jambi.
- Sheil, D., A. Casson, E. Meijard, M.v. Noordwijk, J. Gaskell, J. Sunderland-Groves, K. Wertz and M. Kanninen (2009), "The Impacts and Opportunities of Oil Palm in Southeast Asia. What do We Know and What do We Need to Know?", Occasional Paper No. 51, Center for International Forestry Research, Bogor.
- Serikat Petani Kelapa Sawit (SPKS) (2006), "Deklarasi Serikat Petani Kelapa Sawit Kabupaten Sanggau, Kalimantan Barat, Indonesia", Wisma Tabor Pusat Damai, Sanggau, June 9. Available from: <http://www.forestpeoples.org/sites/fpp/files/publication/2010/08/declunionoilpalmfarmersjun06bahasa.pdf>.

- Sunderlin, W.D. and I.A.P. Resosudarmo (1996), "Rates and Causes of Deforestation in Indonesia: Towards a Resolution of the Ambiguities", Occasional Paper No. 9, Center for International Forestry Research, Bogor.
- Sunderlin, W. D., I.A.P. Resosudarmo, E. Rianto and A. Angelsen (2000), "The Effect of Indonesia's Economic Crisis on Small Farmers and Natural Forest Cover in the Outer Islands", Center for International Forestry Research (CIFOR), Bogor.
- Suwarno, A., A.A. Nawir, Julmansyah and Kurniawan (2009), "Participatory Modelling to Improve Partnership Schemes for Future Community-Based Forest Management in Sumbawa District, Indonesia", *Environmental Modelling & Software*, 24(12): 1402-1410.
- Tacconi, L., K. Obidzinski and F. Agung (2004), "Learning Lessons to Promote Forest Certification and Control Illegal Logging in Indonesia", Center for International Forestry Research (CIFOR), Bogor.
- UN-REDD Programme Indonesia (2011), *Semi Annual Report 2011*, Jakarta: UN-REDD Programme Indonesia
- Unit Kerja Presiden Bidang Pengawasan dan Pengendalian Pembangunan (UKP4) (2011), *Strategi Nasional REDD+*, Jakarta: Kantor UKP4.
- US Commercial Service (2007), "Indonesia: Coal Mining Equipment". Available at [http://commercecan.ic.gc.ca/scdt/bizmap/interface2.nsf/vDownload/IMI_8691/\\$file/X_4867069.PDF](http://commercecan.ic.gc.ca/scdt/bizmap/interface2.nsf/vDownload/IMI_8691/$file/X_4867069.PDF).
- World Bank Extractive Industry Review Advisory Group. 2003. *The Final Report of the Extractive Industries Review: Striking a Better Balance*, Volume I&II, Washington, D.C.: World Bank. Available from: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC/0,,contentMDK:20306686~menuPK:592071~pagePK:148956~piPK:216618~theSitePK:336930~isCURL:Y,00.html>.
- World Growth (2011), "The Economic Benefit of Palm Oil to Indonesia", Palm Oil Green Development Campaign, World Growth, Arlington. Available from: http://www.worldgrowth.org/assets/files/WG_Indonesian_Palm_Oil_Benefits_Report-2_11.pdf.
- Zen, Z., J.F. McCarthy and P. Gillespie (2008), "Linking Pro-poor Policy and Oil Palm Cultivation", Policy Brief 5, Australia Indonesia Governance Research Partnership, Crawford School of Economics and Government, ANU College of Asia and the Pacific, The Australian National University, Canberra.

Zulkarnain, I., T.N. Pudjiastuti, A. Saidi, and Y. Mulyaningsih (2004), *Konflik di Daerah Pertambangan: Menuju Penyusunan Konsep Solusi Awal dengan Kasus pada Pertambangan Emas dan Batubara*, Jakarta: LIPI Press.

Table 1. Deforestation Rates in Rich Tropical Forest Countries

	Forest Area	Annual change rate					
	2010	1990-2000		2000-2005		2005-2010	
	1,000 ha	1,000 ha/yr	% ^a	1,000 ha/yr	% ^a	1,000 ha/yr	% ^a
Brazil	519,522	-2,890	-0.51	-3,090	-0.57	-2,194	-0.42
D.R. of the Congo	154,135	-311	-0.20	-311	-0.20	-311	-0.20
Indonesia	94,432	-1,914	-1.75	-310	-0.31	-685	-0.71
India	68,434	145	0.22	464	0.70	145	0.21
Peru	67,992	-94	-0.14	-94	-0.14	-150	-0.22
Mexico	64,802	-354	-0.52	-235	-0.35	-155	-0.24
Colombia	60,499	-101	-0.16	-101	-0.16	-101	-0.17
Angola	58,480	-125	-0.21	-125	-0.21	-125	-0.21
Bolivia	57,196	-270	-0.44	-271	-0.46	-308	-0.53
Zambia	49,468	-167	-0.32	-167	-0.33	-167	-0.33

Source: FAO (2010)

Table 2. Land Allocation inside State Production Forest Areas

Types of land allocation	State forests	
	Areas (ha)	Proportion (%)
1. Concession areas inside natural forest		
1a. Logging concessions	24,877,255	70.76%
1b. Restoration Ecosystem ^a	185,005	0.53%
2. Industrial forestry plantation		
2a. HTI concessions ^b	9,393,535	26.72%
2b. NTFPs inside HTI concessions ^c	21,620	0.06%
3. Managed by community		
3a. Community-based forestry plantations ^d	631,628	1.80%
3b. Community forestry scheme ^e	43,387	0.12%
3c. Village forests ^f	3,399	0.01%
Total state production forest areas ^g	35,155,829	100.00%

Notes:

a. Concession rights provided to restore the ecosystem

b. Covers both permanent right (*SK Definitif*) and rights being processed (*SK Sementara*)

c. Rights to harvest NTFPs (Non-timber Forest Products) inside *HTI* concession

d. Under *HTR-Hutan Tanaman Rakyat* Programme

e. Under *HKm-Hutan Kemasyarakatan* Scheme

f. Under *Hutan Desa* Programme

g. Fixed and limited production state forests

Source: Directorate General of Forestry Planning (2011)

Table 3. Type of Land Uses

Type of land uses	Year			
	1990	1995	2000	2005
a. Oil palm plantations				
Area (million ha)*	0.7	1.2	2.0	3.7
Differences (million ha)		0.5	0.8	1.7
b. Agricultural lands				
Area (million ha)	45.1	42.2	44.8	48.5
Differences (million ha)		-2.9	2.6	3.7
c. Forest areas				
Area (million ha)	118.6	109.0	99.4	97.9
Differences (million ha)		-9.6	-9.6	-1.6

Note: * refers to area harvested only. According to the Indonesian Palm Oil Commission the total area of oil palm plantation reached approximately 6 million ha in 2005 and 7 million in 2008.

Source: World Growth (2011)

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