THE EFFECTS OF ECONOMIC CRISIS
AND POLITICAL CHANGE
ON INDONESIA’S FOREST SECTOR, 1997-99

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Foreword

This is the latest in a series of papers by CIFOR that provides an overview of how recent changes in Indonesia have affected the country’s forests and the people who rely on them. It summarises the preliminary findings of several streams of research on the crisis and policy changes underway. It is not a comprehensive report on the subject, and because much of the research is still in mid-course some of the findings should be considered preliminary and tentative. Like past versions, this paper draws liberally on media sources to fill in the information gaps; these sources often provide timely insights on issues that are not yet adequately understood. For the best explanation of the information summarised here, the reader is urged to consult the primary research documents referred to in this paper once they have been published.

Abstract

An economic crisis and political changes that have occurred in Indonesia since 1997 have presented grave dangers but also important opportunities for the country. On the one hand, the depreciation of the rupiah against the dollar is part of a drastic economic downturn, but on the other hand, it represents an opportunity for increased competitiveness of Indonesian exports and for increased prosperity for those involved in the export economy. The changeover of regimes from Suharto to B.J. Habibie led to much political instability, which compounded economic problems, but at the same time it has offered the potential for fundamental policy changes. This article assesses the consequences of these changes — both negative and positive — on people living in forested areas, on commercial activity within the forest sector and on the extent of forest itself. Among the findings are that: (1) two-thirds of the people in forested areas have become worse off during the crisis compared with their situation in the year before the crisis; (2) small farmers are increasingly interested in clearing forests for perennial tree crops rather than raising food crops in shifting cultivation systems; (3) pulp and paper have replaced plywood as the mainstay source of export revenue in the forest sector, although the origins of this transformation pre-date the crisis and the change cannot be solely explained by the crisis; (4) illegal logging has boomed during the crisis, but also cannot be entirely explained by the crisis; (5) oil palm development has slowed in the crisis period but is poised for future growth; and (6) positive forest policy changes have been introduced but in general fall short of the expectations of the reform community in Indonesia.
I. INTRODUCTION

Beginning in mid-1997, Asian currencies lost value against the US dollar, leading to an unprecedented region-wide economic crisis. Among all the Asian countries affected, none fared worse than Indonesia. As explained by the World Bank (1998:1), “No country in recent history, let alone one the size of Indonesia, has ever suffered such a dramatic reversal of fortune.” In the period 1967-97, Indonesia had experienced average annual economic growth of 6.5%; in 1998, the economy contracted 13.6%. This was by far the biggest setback among Southeast Asian countries, and Indonesia was the only country in the region to experience serious inflation in 1998 (Hill 1999:23-24). A study for the World Bank (Poppele et al. 1999:14) says the aggregate poverty rate in Indonesia increased from 11% in 1996 to 14-20% in 1998. Assessments of why the crisis was so bad in Indonesia focus on the fact that a high degree of corruption during Suharto’s administration had allowed dollar-denominated private sector debts to proliferate with little monitoring and control (Sadli 1999:16; Cole and Slade 1998).

Although it is still too early to say that Indonesia is emerging from the economic crisis, the rate of economic growth is expected to be about 0% in 1999 — a considerable improvement over 1998. Other signs of possible improvement include a trend toward strengthening of the rupiah against the US dollar, positive GDP growth in the first half of 1999, negative inflation in March-June 1999 and a decline in benchmark interest rates (Pardede 1999:5-8).

Economic observers and policymakers stated early on during the crisis that agriculture (and natural resources in general) would play a key role in moderating the effects of economic decline and in leading the way to recovery. This has proven to be the case. An analysis of the first three quarters of each year in the period 1994-98 shows that all sectors declined in absolute terms in 1997-98 except the joint agriculture, livestock, forestry and fisheries sector. When this sector is disaggregated, the forestry sub-sector demonstrated by far the fastest growth in the period 1997-98 (NRMP 1999: 7 and 12). The output of the agriculture sector [Note: the term will be used here to include the forestry and fisheries sectors] has been constant during the crisis, whereas the construction sector collapsed dramatically and all other sectors fell between these two extremes (Hill 1999:25-26). During the crisis, the agriculture sector has shown the largest year-on-year improvement of all sectors, but it is still down overall since September 1998. The main reasons for the slowdown are increased competition from exports from other countries, the collapse of demand in other Asian countries and a general decline in commodity prices (Pardede 1999:12-13).

Although the relative share of agriculture in the economy has declined substantially over the years, agriculture remains extremely important because at the beginning of the crisis it employed an estimated 41% of the total national workforce (Johnson 1998:16-17). From 1997 to 1998, agriculture’s share of the total workforce expanded from 40.7% to 45.0% — the only sector in which the workforce expanded (Hill 1999:39). Because of the crucial role of agriculture during the crisis, the Department of Agriculture plans to make the case for recognising agriculture as the leading sector of the country in the government’s forthcoming five-year planning period.

The main reasons the agriculture sector has been crucially important during the crisis is that it: (1) has been relatively independent of the debt-laden dollar economy and has therefore suffered less than other sectors; (2) provides basic needs commodities that are a strategic
priority of the government to preserve the conditions for stable and legitimate rule; (3) can help absorb unemployed people forced out of the manufacturing and industrial sectors, as well as new entrants to the labour force who are unable to find work in urban areas; (4) can help reduce costly imports of agricultural commodities; and (5) provides the opportunity for lucrative export income because the depreciation of the rupiah makes Indonesian commodities cheap on the international market and because earnings are in US dollars while most costs are in the local currency (Sunderlin 1998). This last point is true not only of agriculture in the narrow sense but also of natural resources in general, including forests, fisheries and minerals.

An assessment of how the economic crisis and policy changes have affected forests and the people who live in and around them must be grounded in an analysis of changes in the agriculture sector. People living in forests depend largely on agriculture for their livelihood; thus, crisis-induced changes in the sector are likely to have a direct impact on their economic status and their use of the forest. In addition, the growth of agricultural and commercial timber activities in recent years has greatly influenced forest conversion and degradation, so understanding how the crisis and policy changes have affected these economic activities is important.

At the level of theory, the economic crisis could have either positive or negative effects on the livelihood of forest-dwelling people and the existence of remaining natural forests. Inflation and increased cost of living and of agricultural inputs, for example, would pose a setback for many households. On the other hand, livelihood may be improved by developments such as increased profitability of export crops. A breakdown of law and order during the crisis, as occurred in Indonesia, is a contributing factor that also cuts both ways. It allows greater access to resources that may have been off limits in the past. Yet some farmers may decide to curtail production because they cannot be sure that they, and not others, will derive the benefits of their labour.

At the same time, natural forest cover can either benefit from or be harmed by the effects of economic crisis. When the profitability of export crops increases, more forest land is likely to be converted for agriculture; similarly, higher profitability of exported forest products can be expected to promote greater exploitation of the forest and its resources. In a different scenario, however, forests may benefit if national or regional demand for agricultural and forest products is depressed or when concessionaires and plantation owners are unable to realize their development targets because of debt burden or other economic problems.

Sorting out these interrelated and often contradictory effects of the economic crisis, in order to better understand the extent of their impact on forests and forest people, is a considerable challenge of this research by CIFOR. This paper reviews some preliminary research findings in five areas. Following the Introduction, Section II examines the effects on small farmers. Section III looks at the effects on the commercial timber sector (in particular the plywood and pulp and paper sub-sectors). Section IV summarises the effects on the oil palm sub-sector, considered to be one of the leading causes of forest conversion. Section V assembles information on the effects of miscellaneous extra-sectoral factors such as export crops, roads, and mining. Section VI reviews the effects of policy change. The paper closes with a summary of the findings and their implications.
II. EFFECTS ON SMALL FARMERS IN FORESTED AREAS

This section is based on research conducted by William Sunderlin, Ida Aju Pradnja Resosudarmo and Arild Angelsen titled “The Effects of the Economic Crisis on Small Farmers and Natural Forest Cover in the Outer Islands of Indonesia.” [http://www.cgiar.org/cifor/research/projects/publications/farmers.pdf] The two main objectives of the research project are to determine: (1) how the crisis has affected the economic well-being of people in forested areas; and (2) how changes in farming practices have affected the clearing of forest. It is assumed that both of these effects are strongly determined by how much access farmers have had to export commodity markets and income during the crisis. Agricultural export production is an attractive option because of the higher prices such commodities command in rupiah terms as a result of depreciation of the rupiah against the dollar.

With regard to the first objective, it is assumed that farmers with a high degree of export commodity income (“high ECI”) will be better off than they were before the crisis, whereas those with little or no export commodity income (“low ECI”) will be worse off. In the second objective, it is hypothesised that high-ECI households will clear more forest land than previously because they have both the incentive (high export commodity prices) and the means to do so. Forest clearing activities of low-ECI households are expected to vary between two extremes. Some of these farmers will clear more land to make up in volume of agricultural production what they have lost in real purchasing power; others will clear less land either because they lack the means to do so or because they have become labourers on the land of high-ECI households.

These hypotheses were researched through a sample survey of 1,050 households in five provinces: Riau/Jambi, Lampung, West Kalimantan, East Kalimantan and Central Sulawesi. Thirty-five households were selected randomly in each of six villages in each of the five provinces. The household survey focused mainly on family members’ recall of household status, farming practices and forest clearing practices in three periods: (1) the year prior to the onset of the economic crisis (mid-1996 to mid-1997); (2) the first year of the crisis (mid-1997 to mid-1998), which included the period of severe drought and fires related to the El Niño-Southern Oscillation phenomenon; and (3) the second year of the crisis, after the drought had ended (mid-1998 to mid-1999).

A key preliminary finding related to the first objective is that two-thirds of the respondent households viewed themselves as worse off, and one-fifth as better off, during the second year of the crisis as compared with the year prior to the crisis (see Figure 1). This confirms a preliminary assessment of the researchers that “the crisis had a larger negative impact than initially hypothesised” (Angelsen and Resosudarmo 1999:1).
This finding contradicts the conventional wisdom about the effects of the crisis in rural Indonesia. It was generally assumed that most rural Indonesians, notably those outside of Java, would suffer relatively little from the crisis, and some would in fact prosper. For example, Evans (1998:34) says that people outside Java “have been doing somewhat better (than people in Java), with their tradable commodities securing higher prices (at least in rupiah terms).” From May 1997 to May 1998, farmers’ terms of trade were lower in Java, but higher in Bali, Sulawesi and Sumatra (Evans 1998:28). Hill (1999:27-28, 45) concurs with other researchers in assuming that, generally speaking, people in rural areas have either not been badly affected by the crisis or have actually benefited from the depreciation of the rupiah. Jellinek and Rustanto (1999) say the Javanese poor have not suffered greatly because of resilience in the agriculture and informal sectors. Booth (1999:137) says the devaluation will increase the rupiah price of agricultural products and boost producer incomes.

Why is it that our findings differ from the conventional wisdom? Specifically, why is it that two-thirds of our respondents find themselves worse off, in spite of the fact that the majority (77%) have had at least some income from export commodities? Pending verification through analysis of the data, we suspect it is because the cost of living and the costs of agricultural inputs have, in some cases, increased faster than the rise of income from certain export commodities. Moreover, the export prices of many commodities peaked in mid-1998 and then tended to decline. Two case studies give preliminary indications of the same general phenomenon. The high increase of input costs for rice producers in Java, in connection with a low increase in the price of rice, meant a net drop in income for producers (Ratnawati et al. 1998:23-24). A study by Elmhirst et al. (1998:106-111) in Lampung shows that food growers are not always shielded from the effects of the crisis, as commonly assumed. Through the combined effects of the crisis and the drought, most respondents were worse off than they were before the crisis.

In regard to the second objective of the study, the respondents were asked to indicate whether they had cleared forest land in each of the three survey years and if so, for which of the following three purposes: (1) shifting cultivation only; (2) shifting cultivation and cultivation of permanent crops; and (3) cultivation of permanent crops only. The results are shown in Figure 2.
It can be seen that there was a substantial increase in the frequency of forest clearing in the second year of the crisis (1998-99) compared with the prior two periods (1996-97 and 1997-98). It is not entirely clear why this increase occurred, but among the factors that may explain it are that 36% of the households that were worse off during the crisis decided to expand their area of cultivated land, and 17% of those who were better off decided to buy land or to otherwise increase their area of cultivated land.

It should be noted that there has been a pronounced shift in emphasis over time from shifting cultivation (mainly production of food crops) toward cultivation of permanent crops (especially production of tree crops). This is understandable given the sudden and substantial increase in prices of such crops as cocoa, coffee and pepper during the crisis, especially in period 2. There may be a lag effect between the time of the highest price level for these crops (1997-98) and the increased clearing of lands for cultivation of such crops (1998-99). It is not clear whether this phenomenon is transitory, linked to price instability, or more long-lasting.

III. EFFECTS ON THE PLYWOOD AND PULP AND PAPER SUB-SECTORS

This section draws largely on preliminary findings of research done by Chris Barr under the title “Banking on Sustainability: A Critical Assessment of the World Bank’s Structural Adjustment Reforms in Indonesia’s Timber Sector.” [A hyperlink to this paper will be established here in early 2000.] Any citation of this material should refer to Barr (1999).

The plywood and pulp and paper sub-sectors account for approximately 90% of total annual export revenues in Indonesia’s forestry sector. Indonesia has been the world’s leading exporter of tropical plywood since 1987. In recent years it has aspired to become one of the world’s leading pulp and paper producers, and has made strides in that direction. Figure 3 shows annual export revenues from plywood and pulp and paper from 1993 to 1999. Figure 4 shows the production of plywood in millions of cubic meters from 1990 to 1999. And Figure 5 shows changes in installed capacity of pulp and paper production from 1993 to 1999. (All figures for 1999 are estimated.)
Sources: NRMP (1999); Adli (1999)

Sources: APKINDO; Adli (1999)
Together these figures demonstrate that in 1998 and 1999, the pulp and paper sub-sector has overtaken the plywood sub-sector as the leading contributor to Indonesia’s forestry export earnings. If this is indeed a lasting change — and it gives every indication of being one — it has major implications for the nature of timber-based industries in Indonesia and their impact on forests.

As Barr explains: “From the mid-1980s through the mid-1990s, the timber industry was structured to channel the bulk of the forestry sector’s rents to plywood producers, particularly those that controlled the export of Indonesian wood panels through APKINDO’s (Indonesian Wood Panel Association’s) marketing cartel. Over the last several years, however, exceedingly large sums of investment capital have been pumped into the nation’s rapidly growing pulp and paper industry. Although the investment costs in pulp and paper are exponentially higher than they are in plywood, so too is the value-added per unit of wood — and, therefore, the potential profits. In this way, the primary locus of rent capture in Indonesia’s forestry sector is rapidly shifting toward pulp and paper.”

**The decline of plywood**

The fact that pulp and paper have overtaken plywood during the crisis suggests that the crisis itself had a role in bringing about this change. Some commentators have argued that the crisis has had a key role in the downturn of the fortunes of the plywood sub-sector. For example, Kristiyono Fajari, director of the Association of Indonesian Wood Panel Producers (APKINDO), says the downturn in plywood exports in the period 1997-99 is attributable largely to the decline in demand by some of the leading importers of Indonesian plywood (notably Japan, South Korea and Taiwan) and to competition from low-cost producers such as China and Brazil. He adds that the government’s decision to reduce the export tax to 10% and the recent revocation of various timber concession licenses obtained through corruption, collusion and nepotism is likely to further damage the plywood industry.

While there is much to be said for this explanation, a look at Figures 3 and 4 shows that it is only part of the story. The decline of plywood production began long before the onset of the
Barr (1999) explains increasing constraints on plywood production over time in this way: Over the years, a structural timber deficit has emerged in the timber sector. As a result, annual log consumption (53 million cubic meters in 1996) now greatly exceeds legal log production from officially sanctioned sources (25 million cubic meters in 1996). This means that 28 million cubic meters annually are coming from illegal sources. The amount of timber coming from production forests has declined from 24 million cubic meters in 1990 to 16 million cubic meters in 1998. This decline in supply from production forests is the result of past exploitation at rates that exceeded those of renewal. The decline is concurrent with an abrupt reduction in concessions, from a high of 652 in the early 1990s to 389 in 1998. The reason for this decline is that the licenses were either revoked (because of poor management) or not renewed (because of lack of interest in continuing). The shortfall of timber from concessions in production forests has been made up by increasing the extraction of timber from conversion forests. This trend is clearly unsustainable not only because of the progressive drain on legal sources of timber, but also because dependence on conversion forests is increasing at the same time that the amount of such forests is shrinking.

The rise of pulp and paper

The rapid growth of the pulp and paper industry in Indonesia long predates the economic crisis, as can be seen in Figures 4 and 5. Indonesia has been well suited for this kind of economic activity because of its ample raw materials, the abundant seed capital available to industrialists who made their fortunes in the Suharto era, and existing marketing channels to meet growing demand in other Asian countries. It is possible, but by no means clear, that there is a relationship between the decline of the plywood industry and the rise of the pulp and paper industry. It stands to reason that the degraded forest resources left behind from plywood and sawn timber production are now more optimally suited to conversion to pulp and paper, but there is no clear causal link at the aggregate level. Research is needed to determine what extent such a causal link might exist.

It is noteworthy that international pulp and paper prices have been extremely favourable in 1999, and that this has spurred a hopeful outlook in the industry. International prices of pulp and paper had been declining since 1995 before showing an increase in 1999. The price of pulp has risen from $410 per ton in 1998 to $550 per ton in 1999 (Lazuardi and Ardi 1999), and the price of medium-grade paper has risen from about $190 to $235 per ton (Winarti 1999). These high prices will probably be maintained through the end of 1999 because world stocks are currently low. The Indonesian Pulp and Paper Association estimates that the value of Indonesian pulp and paper exports will increase from $3.5 billion in 1998 to $5 billion in 1999 (Lazuardi and Ardi 1999).

Illegal logging and effects on protected areas

It has been widely assumed during the crisis that illegal logging has increased significantly. There is ample evidence to support this assertion. A report by the UK Tropical Forest Management Programme finds that the illegal supply of logs from the natural forest is now about equal to the legal supply (ITFMP 1999:13). The international consultancy firm Enst & Young stated in November 1999 that 52% of Indonesia’s log consumption comes from illegal sources. According to Hartadi, the director of production for the State Forestry Corporation, the value of teak timber lost to theft in Java increased 700% in 1998 as compared with 1997. A case study by Elmhirist et al. (1998:113) at a site in Lampung province says that
illegal logging existed before the crisis, but was greatly aggravated by the crisis to the point where local supplies of timber were exhausted.

It has been widely assumed that the increase in illegal logging can be wholly explained by crisis-related factors such as increased poverty and greater difficulty in guarding forests because of a decline in law and order. But as Barr’s research (1999) indicates, the tendency toward increased illegal logging predates the crisis. It is clear that both non-crisis and crisis factors help explain the situation.

The research literature as well as media reports indicate that illegal logging is taking a noticeable — and in some cases alarming — toll on conservation areas and protection forests. Researchers from the Natural Resource Management Project have noted increased illegal logging at Kutai National Park in Kalimantan and Lore Lindu National Park in Sulawesi (Merrill and Effendi 1999:15). Their research shows that a third to half of national park managers in Indonesia believe there has been increased encroachment by local people during the crisis. At the same time, an analysis of a database shows that the budget for protected area management has been inadequate. Although it has risen in current rupiah value, it has declined year by year since 1996 in real terms (NRMP 1999:48).

Other accounts provide additional evidence of increased illegal logging in protected areas. According to an exposé by EIA/Telapak (1999:14), illegal logging in Tanjung Puting National Park in Central Kalimantan — one of the major reserves in the world for orangutans — has increased dramatically in the last year. Such activity reportedly has been done in full view of the authorities. In another major conservation area for orangutans, Gunung Leuser National Park in Aceh province, illegal logging has also grown considerably during the crisis. This theft is said to involve timber barons and the military and police — and even conservation authorities (PKA) — acting to take advantage of a power vacuum (EIA/Telapak 1999:14, 31-34). Meanwhile, thousands of hectares of reforestation trees in the Gunung Balak conservation forest in the province of Lampung have been cut down for charcoal production; illegal logging recently became rampant in conservation forests in Sumatra’s Jambi province; and the situation of illegal logging in the conservation forests of Kalimantan has in general become dire.
IV. EFFECTS ON OIL PALM

This section summarises research by Anne Casson titled “The Hesitant Boom: Indonesia’s Oil Palm Sub-sector in an Era of Economic Crisis and Political Change.” [http://www.cgiar.org/cifor/research/projects/publications/casson.pdf]. Any citation of this material should refer to Casson (1999).

Oil palm development has received much attention in recent years because it is viewed as an important cause of the conversion of Indonesia’s natural forests to non-forest uses. Indeed, from 1967 to 1997, the oil palm sub-sector increased 20-fold in amount of planted area (from 106,000 ha to 2,516,000 ha), and crude palm oil production increased 12% annually (Casson 1999).

At the beginning of the crisis in late 1997, it seemed that conditions would propel even faster growth in oil palm development. The depreciation of the rupiah against the US dollar made the export of palm oil products even more profitable than before, and conditions imposed by the International Monetary Fund removed constraints on foreign direct investment in palm oil.

But as it turned out, the growth of the oil palm sub-sector slowed during the crisis. The total area of planted oil palm continued to grow, but at an increasingly slower rate since its peak in 1997 (see Figure 6). In 1998, production of crude palm oil (CPO) declined for the first time since 1990 (see Figure 7).

![Figure 6: Palm oil area growth in Indonesia, 1990-1999 (est.)](image1)

Source: Director General of Plantations, 1999

![Figure 7: CPO production growth, 1990-1999 (est.)](image2)

Source: Director General of Plantations, 1999
These changes can be explained by nine factors: (1) a 40-60% export tax on oil palm products imposed by the government from April 1998 to January 1999 to ensure adequate domestic supplies of cooking oil; (2) higher than expected production costs; (3) political instability and a subsequent decline in foreign investment; (4) changes to the government-regulated system for marketing and distributing oil palm products; (5) credit access difficulties; (6) changes in the state-owned plantation sector; (7) reformist policies that targeted the oil palm sector (for example, revocation of license if cleared land was not planted); (8) damage to crops resulting from the 1997-98 drought and fires; and (9) a steep decline in the world price of oil palm products.

This slowdown is apparently only temporary, and growth of the oil palm sector can be expected to resume. Among the factors that will stimulate growth are: (1) a drastic reduction of the export tax imposed earlier; (2) lower interest rates; (3) various regulations that remove obstacles to oil palm development; (4) collaboration between Indonesia and Malaysia in setting the world price of oil palm products; (5) the availability of additional land cleared during the drought and forest fires in 1997-98; and (6) growing global demand for crude palm oil.

Although the Indonesian government is committed to oil palm development in eastern Indonesia over the long term, particularly in Kalimantan and Irian Jaya, most expansion in the near term can be expected to occur in Sumatra. Oil palm companies, however, will continue to apply for concession areas in Kalimantan, Irian Jaya and Sulawesi to gain access to timber. Unless there are fundamental changes in the way forest land is allocated in Indonesia, further oil palm expansion will continue to pose a significant threat to the country’s natural forests.

V. EFFECTS OF MISCELLANEOUS EXTRA-SECTORAL FACTORS

Other factors outside the forest sector also affect the amount of natural forest in Indonesia. This section briefly examines the effect of the crisis on several export commodities other than palm oil, on mining, on the construction and maintenance of major roads in forested areas, and on the Indonesian government’s transmigration program.

Other export commodities

Cocoa and coffee are two smallholder crops that have important implications for natural forest cover. Figure 8 shows that in 1997 there was a strong drop in the volume and value of cocoa and coffee exports. The decrease in cocoa production is largely the result of the ENSO drought phenomenon. The decrease in coffee production, too, is linked in part with the drought, but also occurred because of the high cost of inputs and weak international demand related to excessive world supply (CIC 1998a:60). Both crops showed a strong recovery in 1998 in both the volume and value of exports.
In the recent cocoa production marketing year (October 1998 – September 1999), 336,000 tons were produced, representing an increase of 6% over the previous year. The reason is that many cocoa trees planted 4 to 5 years ago in Sulawesi — the center of cocoa production in Indonesia — have begun to bear fruit. Production for marketing year 1999/2000 is expected to reach 350,000 tons because of favourable weather and price conditions. Price increases have been a strong incentive for production. The price rose dramatically from 3,300 rupiah/kg prior to the crisis to 17,500 rupiah/kg in July 1998, then declined to 6,000 rupiah/kg in August 1999. Traders contend that the crop will remain profitable as long as the farmgate price remains above 5,000 rupiah/kg (USDA 1999a:1-2). The Indonesian Cocoa Association projects that 500,000 tons of cocoa will be produced in the year 2005.\(^{22}\)

Coffee is experiencing a gradual recovery from the effects of the 1997 drought. Production levels have been increasing because of strong blooms after heavy rains in early 1999. Domestic consumption of coffee has been decreasing during the crisis, so producers have relied more heavily on a growing export market motivated by strong rupiah returns (USDA 1999b:1-2). The head of the Association of Indonesian Coffee Exporters, Oesman Soedargo, predicts that coffee production will increase to 450,000 tons from October 1999 to September 2000 — an increase of 18.5% over the previous period.\(^{23}\)

Other farm commodities that have important implications for natural forest area are rubber, pepper and aquaculture shrimp. The depreciation of the rupiah against the dollar did not stimulate higher rubber production for several reasons: weak demand at the world level; the high cost of inputs; and importers of Indonesian rubber (such as Japan and South Korea) were also suffering from the crisis (CIC 1998a:61-62). In mid-1999 the price of rubber fell to its lowest level in the last 25 years,\(^{24}\) dimming prospects for increased production. In regard to pepper, Indonesia is the world’s leading producer of white pepper and the second highest producer of black pepper after India. From 1994 to 1997, Indonesian pepper production ranged from 50,000 to 59,000 tons (CIC 1998a:63). However, production is expected to plunge from 47,000 tons in 1998 to 26,000 tons in 1999 because of heavy rains in the key growing areas of Bangka Island and Lampung.\(^{25}\) Finally, high export prices for shrimp during the crisis — a trend that appears likely to continue — appears to be the reason behind

Sources: CIC (1998A); USDA (1999a); USDA (1999b)
increased reports of uncontrolled clearing of coastal mangrove forests in Indonesia for conversion to shrimp aquaculture. This is an under-researched issue that should receive urgent attention. Of special note is the fact that the gestation period for shrimp can be relatively short (less than a year), which means investors may have a high incentive to clear land immediately to take advantage of existing high prices. This situation differs from that of tree crops (such as oil palm, cocoa, and rubber) in which the gestation period is measured in years, thus lowering the degree of producers’ confidence that they can take advantage of peaks in prices.

**Mining**

In a past iteration of this report, it was noted that the mining of minerals (including coal, gold, iron and nickel) has potentially important impacts on forest cover in Indonesia in relation to the crisis because the rupiah depreciation has boosted export incentives and because some mineral reserves are in forested areas, including protection forests. Of particular concern, although predating the crisis, are reported intentions to mine coal in Kutai National Park and Bukit Soeharto Recreation Park in East Kalimantan and Lorenz National Park in Irian Jaya (Sunderlin 1998).

Sources differ on whether the crisis has affected the mining sector positively or negatively. A report by NRMP (1999:7) says that, measured in terms of constant 1993 rupiah returns, there has been a decline in the growth of the mining and quarrying sector. A report by CIC (1998b:94), however, says that, as in the case of agriculture, the crisis has either helped the mining sector or not affected it, and has created opportunities for large profits in rupiah terms. Kuntoro Mangkusubroto, the former Minister of Mining and Energy, said in May 1999 that even though Indonesia tends to charge higher royalties from mining than other countries, foreign investors remain interested in the opportunities offered in Indonesia.

In coal exports, a strong year-to-year increase from 1994 to 1997 was followed by a downturn in 1998 (CIC 1999:16). Growth is expected to resume because of high world demand along with government attempts to diversify local energy sources. With the exception of the slump in 1998, coal production has generally benefited from increased growth during the crisis related to the industry’s low content of imported materials, the rupiah depreciation and increased world demand (CIC 1999:3).

The experience of other mineral commodities has been mixed. Bauxite production underwent a steep decline from 1994 through 1997, followed by an increase in 1998 driven by higher export sales. The production and export of nickel (with the exception of nickel mate) declined in 1998 compared with 1997. For tin, there was a steady increase in exports from 1991 through 1998, but the value of exports declined in 1997 and 1998 because of a weaker international market (CIC 1998b:101-104). In spite of the sluggish market for tin, the net profits of Tambang Timah, one of the leading tin mining companies in Indonesia, soared 190% from 1997 to 1998 because of the rupiah depreciation. The company’s mining activities on Bangka Island reportedly have caused serious environmental problems. The production of iron grew steadily from 1990 through 1998 (CIC 1998b:101-104).

Gold exports during the crisis have increased 10%, and gold mining has become an important alternative source of income for thousands of people, notably in Kalimantan. A
negative effect is that small-scale mining activities have extended into sensitive conservation areas, such as Tanjung Puting National Park in South Kalimantan, where it is reportedly causing serious environmental problems. Minister of Mines and Energy Kuntoro has decried the environmental and health effects of small-scale mining. But larger-scale mining is also a source of concern. For example, the mining company PT Aneka Tambang has been accused of causing environmental destruction from its gold mining operations in Gunung Halimun National Park in West Java.

Roads

The construction of roads is recognized as one of the main indirect causes leading to conversion of natural forests to other uses. Road (and bridge) construction facilitates tropical deforestation by enabling logging and the establishment of plantations in areas that were formerly inaccessible, and by facilitating spontaneous and directed settlement. As reported in a past iteration of this paper (Sunderlin 1998), there has been a considerable decline in government funding for the construction and maintenance of major highways in Indonesia during the crisis, meaning that certain negative effects on forests may have been (inadvertently) avoided. Of special concern are plans to link the major urban areas in Kalimantan, although as of late 1988 the situation apparently remained largely unchanged. For example, the completion of a 190 km road between Palangka Raya and Buntok in Kalimantan will be delayed until 2005 because of a lack of funds. Severely limited government funds will also make it difficult to put an asphalt surface on the southern leg of the Trans-Kalimantan highway (between Central and South Kalimantan), although Japan is set to provide some foreign assistance for maintenance of the road.

Transmigration

Indonesia’s long-established transmigration programme has been an important institutional source of pressure on natural forests. Since 1905, more than 6 million people have been moved under the programme from land-scarce Java and Bali, mainly to once-forested areas of Sumatra, Kalimantan and Sulawesi. A key aim of the programme since the early 1980s has been to supply labour to plantations producing timber and tree crops such as rubber and oil palm. On the eve of the economic crisis in mid-1997, the transmigration programme focussed heavily on supplying labour to then-President Suharto’s controversial one-million hectare peat land project (Proyek Lahan Gambut, or PLG) in Central Kalimantan. The plan entailed resettling 316,000 families at the PLG site over six years; 20,000 families were to be moved transmigrants for that period. Since mid-1997, the PLG project has collapsed. It was terminated because of budget constraints and because it was deemed an inappropriate use of the designated lands. (President Suharto had insisted on clearing the area in spite of strong objections from the scientific and NGO communities.) Meanwhile, the transmigration programme has been reoriented and no longer poses the institutional threat to forests that it once did. Whereas previously it supplied labour to plantations, it now is used mainly to accommodate the many people in Indonesia who seek to relocate to other areas for a variety of reasons. These refugees are being settled mostly in urban or already-settled areas rather than on forest lands cleared for agriculture. During the crisis, the transmigration budget decreased by 22% in nominal terms (and even more in real terms).
Despite the transmigration programme’s change in focus, it should not be assumed that migration and settlement are no longer a threat to natural forests. Tree crop and timber plantations continue to be established, and they require large labour forces. Yet recruitment is now done largely through the private sector and government institutions other than the transmigration programme.

VI. FOREST POLICY CHANGES

In the 17-month regime of President B.J. Habibie and the tenure of Muslimin Nasution as Minister of Forestry and Estate Crops (May 1998 – October 1999), there has been tremendous ferment in forest policy reform. These can be classified into two categories. The first, here called “exogenous reforms,” are those that were imposed on Indonesia through the provisions of the International Monetary Fund’s (IMF) $40 billion debt relief agreement with the government. Among the provisions of the agreement, the Government of Indonesia was required to (1) remove restrictions on oil palm investment; (2) make changes in the forest concession system that included implementing a performance bond, introducing new resource rent taxes, increasing stumpage fees, allocating concessions through auctions and delinking the ownership of concessions and processing facilities; (3) eliminate the Indonesian Plywood Association’s (APKINDO’s) monopoly over plywood exports; (4) transfer control over all government-owned commercial forestry companies from the Ministry of Forestry to the Ministry of Finance; and (5) incorporate the reforestation fund into the national budget and use the money in the fund only for reforestation purposes. A second group of reforms, here called “endogenous reforms,” have been introduced by various groups with a stake in Indonesia’s forests rather than being imposed from the outside. One example is former Forestry Minister Muslimin’s initiatives to allocate concessions to cooperatives and to ratify a new forestry law; another is a campaign by NGOs to raise the status of community-based forest management and to assure the rights of traditional forest communities.

In spite of the exuberance many people felt during the 17-month period in anticipation of reforms, the outcome has fallen far short of the vision. On one hand, there has been notable achievement in the elimination of some of the excesses of corruption, collusion, and nepotism that prevailed during the Suharto years. APKINDO’s influence has been reduced, many of the concession contracts of Suharto family members and associates have not been renewed, and some of the money allocated through the Reforestation Fund that had been misused has been returned. On the other hand, there has been little progress in reducing the huge industrial overcapacity (especially for plywood and pulp and paper) that is threatening remaining natural forests. In relation to this, there has also been little progress in reorienting forestry priorities from production to protection and conservation. Moreover, there has been little meaningful progress in assuring the rights of forest dwellers and increasing their access to forest resources.

Because a new government was recently installed and many policy and programme changes are likely, little attention will be given here to reviewing policies that were enacted during President Habibie’s term in office or that are pending. Nonetheless, it is useful to briefly examine some of the recent policy changes and debates inasmuch as they might be carried over into the subsequent era of policy reform. The remainder of this section examines the following topics: area limits on forest concessions and resource rents; the allocation of
concessions to cooperatives through auctions; community forestry and adat (traditional) rights; and the new forestry law.

**Area limits and resource rents**

In 1998 Minister Muslimin created a regulation that limited forest concessions to 50,000 ha. When he took office, individual concession areas ranged from 22,000 to 560,000 ha, and nine holding companies had total concession areas of 1.3 million ha to 3.5 million ha. The stated intention the new regulation was to curb collusion, corruption, and nepotism in the forestry sector and to lay the groundwork for the transfer of smaller units to cooperatives (see “Cooperatives” below).

Researchers, NGO activists and industry representatives alike disapproved of the limitation on concession size. Scotland (1998: x-xi) says that concessions smaller than 50,000 ha are not commercially viable and do not capture sufficient rents for the government. He argues that 80,000 ha is the threshold for profitability and the optimum area is 100,000 to 150,000 ha. Indro Tjahjono, the coordinator of SKEPHI (NGO Network for Forest Conservation in Indonesia) opposes small concessions on the grounds that they are unprofitable and also encourage deviations from regulations and thus may hasten the process of deforestation. The head of Masyarakat Perhutanan Indonesia (Indonesian Forestry Society) contends that area limits would make it difficult to attain sustainable management of Indonesia's forests.

In mid-September 1999, the Ministry of Forestry and Estate Crops announced an intention to revoke the regulation limiting the size of concession areas. Waskito Seojodibroto, director general of production forest utilization, acknowledged that the change was made in response to a request by industry. As of November 1999, timber firms were pressing for definitive revocation of the regulation.

**Auction system and cooperatives**

The allocation of concessions through an auction system was implemented to introduce efficiency and fairness into the awarding of timber access rights. Likewise, Minister Muslimin (who has since been replaced) championed the idea of awarding concessions to cooperatives to ensure that forest wealth is not monopolized by the rich and powerful. The auction system began in May 1999 with an offer of 170,000 ha in Irian Jaya and Central Kalimantan that had belonged to concessions whose licenses were suspended. Five cooperatives have been awarded concessions of 10,000 ha each in Irian Jaya.

In spite of the good intentions, both the auction system and the practice of awarding concessions to cooperatives have been criticized. The IMF has criticized the auction system developed by the Ministry of Forestry and Estate Crops because it imposes stipulations on the suitability of awardees and is therefore not fully free-market oriented. Minister Muslimin introduced restrictions on who could participate in the bidding, which were based on the size of a company and its past silvicultural practices.

The awarding of concessions to cooperatives has also been subject to criticism for a variety of reasons. SKEPHI’s Tjahjono says that only 15% of concessions whose licenses should have been revoked because of corruption, collusion and nepotism have been acted on. Furthermore, he rejects the idea of distributing concessions to cooperatives on the basis that they will not
be accepted at the local level, in part because the term “cooperative” has acquired a bad reputation as a result of past failures of government-established cooperatives. Brown (1999: ii) says cooperatives constitute a “new system of patronage” because they can be used to favour politically connected recipients and will be inefficient. He says that experience in Sabah, Malaysia, suggests that small, short-tenure concessions are unsustainable. Zain Masyhur, the head of the reform wing of Masyarakat Perhutanan Indonesia, says the new system is not transparent and has requested a government investigation into whether new incidents of corruption, collusion and nepotism have occurred in the awarding of concessions. Similar charges have been made in the national media.

**Community forestry and adat rights**

Fay and Sirait (1999), researchers at the International Center for Research on Agroforestry (ICRAF), say that significant progress is being made in the reform era to improve systems of community forestry and to secure the rights of traditional (adat) communities. Two tracks of formal policy reform are being pursued: the government’s community forestry program (called “hutan kemasyarakatan”) and a draft adat decree. Fay and Sirait (1999) say that, generally speaking, the hutan kemasyarakatan programme has improved compared with the situation during the Suharto years. Yet the Ministry of Forestry and Estate Crops has moved away from some of the guiding principles. The biggest deviations are a requirement that community forestry be linked with cooperatives and a provision stating that only conditional rights will be awarded on adat lands. The Bureau of Lands has issued potentially ground-breaking “Guidelines to Resolve Adat Communal Rights Conflicts,” which will spell out criteria for the recognition of customary common property rights (hak ulayat) (Fay and Sirait 1999). Campbell (1999) says the hutan kemasyarakatan programme is an important first step forward, but new policies related to community forestry unfortunately remain rooted in the assumption that the government has the sole right to control forest lands.

**New forestry law**

An Indonesian forestry law enacted in 1967 had long been regarded as out of date when deliberations on a new forestry law were begun in 1989. Subsequently, more than 10 draft laws were produced over a decade. During the Habibie presidency, Minister Muslimin pressed hard for passage of a new forestry law, and one was finally ratified on 30 September 1999.

Prior to ratification, the new forestry law came under heavy criticism for a variety of reasons. Two former ministers (former Minister of Forestry Djamaludin Suryohadikusumo and former Minister of Environment Emil Salim) said the law should be substantially revised prior to approval. Djamaludin criticized the proposed law on the grounds that it does not recognise the rights of forest-dwelling people, does not encourage giving sufficient value to forest biodiversity and is not in accordance with international conventions on forests, biodiversity and climate change. Salim said the proposed law would allow the timber industry to increase its production capacity by 30%. The NGO community has reacted strongly against the proposed law. WALHI, a coalition of Indonesian environmental groups, says the new forestry law is quite similar to the 1967 Law on Forestry Management, which treated natural forests as resources to be exploited, and thus has asked the House of Representatives (DPR) to drop it. WALHI’s chief, Emmy Hafild,
urged that a more overarching natural resources bill be considered to reduce competition among economic sectors in the governance of resource use. According to Hassanu Simon, head of the Forum Komunikasi Kehutanan Masyarakat (Communication Forum on Community Forestry, or FKKM), the process by which the forestry law was written was not open, and the issue of adat rights has been neglected. Abdon Nababan of Forest Watch says adat forest should be treated separately from state forest, but this is not reflected in the proposed legislation. Without such a provision, state rights would continue to prevail over local rights.

Lini Wollenberg (1999), a CIFOR researcher, says the broad scope in which the new forestry law can be interpreted means there are no guarantees that adat communities’ rights will be respected in the process of devolving management from the central to the local level.

VII. SUMMARY AND CONCLUSION

Although some people living in forested areas have benefited from certain income-enhancing effects of the crisis, the majority of households were worse off two years into the crisis than they were in the year before the crisis. The differential effects of the crisis on levels of living are largely explained by the degree of household access to export commodity income, as balanced against increased costs of living and of agricultural inputs.

The effects of the crisis on the forests themselves are not as easy to ascertain because no time-series satellite imagery data are available yet to compare the pre-crisis and crisis situations. Nonetheless, as this paper has indicated, there clearly have been both positive and negative consequences. In spite of the lack of precise knowledge at the aggregate level about the effects of the crisis on forest cover, some tentative conclusions can be made at the sub-aggregate level:

- Small farmers have tended to clear more forest land in response to the crisis, and they have mainly been interested in planting tree export crops, although whether this pattern is a lasting one is not clear.

- The commercial forest sector appears to be placing ever growing demands on forest resources that are reaching increasingly unsustainable levels, but this trend predates the crisis and it is not known precisely how it is affected by the crisis.

- Oil palm development, both in terms of area growth and production of crude palm oil, has slowed during the crisis, but there are signs that growth will resume.

- The higher export value of certain commodities (such as cocoa, shrimp and coal) has clearly increased pressure on forests, including protected areas. However, demand for and production of some other export commodities have been relatively stagnant (as in the case of rubber) or in decline (pepper, for example).

- The government has found it difficult to meet budget requirements for building and maintaining major roads in forested areas, which presumably has alleviated additional pressure on natural forests from roads.
Although it is important to understand the effects of the crisis on the forest sector, which research by CIFOR aims to do, it is critical to keep this point in mind: The country’s natural forests are under serious threat, and the threat predates the economic crisis. Excess processing capacity by the industrial timber industry, an over-commitment to production at the expense of conservation and insufficient forest access rights at the local level are the key policy issues, as they were long before the crisis. The Habibie administration made only tentative progress in addressing these critical issues, and it remains to be seen if the current administration under Abdurrahman Wahid and Megawati Soekarnoputri, with its stated commitment to reform, will be able to make meaningful progress in securing the rights of forest-dwelling people, enforcing greater guarantees of biodiversity protection, stemming the rampant illegal felling of trees and implementing other measures that are needed to protect Indonesia’s remaining natural forests.

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ENDNOTES

1. Evans (1998:5) offers another assessment, saying that “Indonesia’s economic collapse is the most profound to affect any significant market-oriented economy in decades.”

2. Early studies by Indonesia’s Central Bureau of Statistics and the International Labour Office put the poverty rate at 30-40%, an assessment that has been criticised as methodologically flawed and overly pessimistic (Cameron 1999:13-14). Hill (1999:41-42) says Poppele et al.’s (1999) estimate of poverty at 14-20% is the most reliable available.

3. In recent years the rates of annual agricultural growth have been: 4.2% (1995); 1.9% (1996); 0.7% (1997); and 0.2% (1998) (Hill 1999:25-26).

4. The decline in exports during the crisis is unexpected, given the depreciation of the rupiah against the US dollar. The main reason for this decline, according to Hill (1999:30-31), is the low price of oil and gas. (Non-oil and gas exports declined in dollar terms but rose in rupiah terms.) Other important reasons for the export decline include cancelled orders; problems in getting credit; shipping bottlenecks; the weak Japanese economy; disruption of law and order; and the reduced presence of export-oriented multinational corporations (Hill 1999:30-31).

5. According to Rahardi Ramelan, Minister of Industry and Commerce, the drop in exports to Asian countries affected by the crisis has been compensated for by increased exports to countries not badly affected, such as Australia, Singapore, Belgium, China, India, Canada, Malaysia and Thailand. See: “RI masih mampu tingkatkan ekspor.” Bisnis Indonesia. 16 Agustus 1999. (On line.)


7. Riau and Jambi were considered a joint province for purposes of the research. Three villages were surveyed in each of the two provinces.

8. We judged it important to differentiate, to the degree possible, the effects of the drought and fires from the economic effects of the crisis because the effects of ENSO were so severe in Indonesia. As explained by the World Bank (1998:1.11): “What the financial crisis has done to wreck Indonesia’s urban firms, nature seems to be doing to ruin its rural farms.” Hill (1999:37) says that through 1998, the rural poor were affected much more directly, that “export growth rose, to the benefit of those deriving income from the sector” and that “many in the agricultural and informal sectors have experienced no great hardships, and possibly even an increase in incomes.” He says further that “the deterioration of living standards is serious but not catastrophic.”

9. Various kinds of agricultural inputs such as pesticides and various kinds of fertilisers have to be imported and have become very expensive (CIC 1998a:53).


11. Tjipto Wignjoprajitno, executive director of APKINDO, said on 2 March 1999 that the 35% fall in the value of plywood exports from 1997 to 1998 (to $2.5 billion) was because of “weak demand and depressed prices rising from economic crises affecting several main importing countries, particularly Japan and South Korea.” See: “RI plywood exports fall 35% due to tardy market.” The Jakarta Post. 5 March 1999. p. 8.


15. See also Brown (1999: ii), who says the minimum annual illegal log supply is 20 million m³ and the legal production forest supply has declined from 18 million to 16 million m³ in the period 1994-98. In the same period, the conversion forest supply has increased from 5 million to 10 million m³ (Brown 1999: ii).

16. Lore Lindu is also experiencing increased land clearing for cocoa and coffee, as well as increased mining (Merrill and Effendi 1999:15).


20. Lore Lindu is also experiencing increased land clearing for cocoa and coffee, as well as increased mining (Merrill and Effendi 1999:15).


It is noteworthy that among the 668 mining contracts in Indonesia as of April 1999, 372 (56%) were in Sumatra and Kalimantan, two of the most import forest resource regions.

Kuntoro Mangkusubroto, then Minister of Mines and Energy, announced on June 15, 1999, that coal mining would not be allowed in Bukit Soeharto. It had been assumed initially that removing the coal would help relieve the problem of forest fires. The government changed its position when it was shown a low-cost method of putting out coal fires by the United States Office of Surface Mining Reclamation and Enforcement. See: "Minister bans coal mining at Bukit Soeharto." The Jakarta Post. June 16, 1999. P. 8. But in spite of this positive step for the interests of conservation, thousands of hectares of Bukit Soeharto are threatened with conversion to non-forest land uses, in spite of the desire of the local government to maintain the area as a conservation forest. See: "Dikapling, Ribuan Hektar Bukit Soeharto." Kompas. 25 Agustus 1999. P. 17.

"Ilham investasi pertambangan tetap menarik bagi PMA." Bisnis Indonesia. 1 Juni 1999.

"Timah's profits up 190% due to the rupiah plunge." The Jakarta Post. February 20, 1999. p. 8.


See for example the story of the Kahayan River as reported in: "Emas Ditambang Elmaut pun Datang." Kompas. 19 Juli 1999. p. 23.


"Government having difficulty dealing with illegal miners." The Jakarta Post. 28 August 1999. (On line.)

"PT Aneka Tambang Dituding Merosak Taman National." Media Indonesia. 2 September 1999. (On line.)


"Proyek Jalan di Kalimantan Sulit akibat Tanah Berair." Media Indonesia. 7 September 1999. (On line.)


This section is based on an interview conducted on November 5, 1999, with Patrice Levang. Levang is a researcher who worked from 1980 to 1987 and from 1996 to 1999 in the Transmigration Ministry.

The transmigration program’s current activities involve resettling: 10,000 Madurese families from West Kalimantan; 23,000 mainly Bugis and Buton families from Ambon; around 2,000 transmigrant families from Aceh; and 32,000 East Timorese families.

Kartodihardjo (1999a:49) says the IMF forestry provisions can be helpful to improve forest management, but they will be ineffective unless accompanied by efforts at institutional and political/economic reform. Obstacles to implementing these reforms include a domestic constituency that is not strong enough to push through changes on its own, and an international constituency that is strong enough to push through the reforms, but that is focused merely on administrative reform without a sense of ownership of the process. What is needed, according to Kartodihardjo (1999b:44-46), is a link between domestic and international constituents, with full transparency on the part of the international institutions, to build legitimacy and support.

Eight forest concessions with a total area of 1.17 million hectares owned by Suharto’s children and their business associates were revoked because it is assumed they were obtained through corruption, collusion, and nepotism. Thirteen additional concessions with a total area of 1.36 million hectares will not be renewed when they expire in March 2000. See: "Govt revokes vast forest concessions." The Jakarta Post. July 9, 1999. P. 1.

For each industry group, the limits on timber concessions were 100,000 ha per province, and a nationwide limit of 400,000 ha. A ceiling was also placed on the area of plantations: 20,000 ha at the provincial level and 100,000 ha at the national level.


"Konsesi HPH cukup sejuta hektare saja?" Bisnis Indonesia. 20/8/98 (online).

Scotland (1998:x-xi) argues, moreover, that the current resource rent tax, based on a percentage of log prices, means an ever decreasing rent share to the government as log prices increase in the process of economic recovery. He says the current resource rent tax should be replaced with an area-based charge.

"Kecil itu rugi." Media Indonesia. 9 September 1999. (On line.)

"Pembatasan HPH dicabut." Bisnis Indonesia. 17 September 1999. (On line.)

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"Indro Tjahjono (Koordinator SKEPHI): Saya Memang Curiga." Media Indonesia. 9 September 1999. (On line.)

"Cabut HPH Kroni Cendana..." Media Indonesia. 4 Agustus 1999. (On line.)

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"Sejumlah kritikan atas RUUK." Bsnis Indonesia. 31 Agustus 1999. (On line.)