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# A Kinder Cut: Making Malaysian Logging Less Destructive

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Attempts to save the world's remaining tropical rainforests often focus on conserving specific protected areas or prohibiting the harvesting of rare species. A new study from Malaysia focuses on another approach - improving the efficiency and effectiveness of logging companies.

The study was conducted by Mohd. Shahwahid Haji Othman and Awang Noor Abdul Ghani from the Universiti Putra Malaysia. →

**A summary of EEPSEA Research Report 2003-RR1, Responses of Timber Concessionaires to Selected Policy Instruments: The Case of Peninsular Malaysia by Mohd. Shahwahid Haji Othman and Awang Noor Abdul Ghani (Research Management Centre, Universiti Putra Malaysia 43400 UPM, Serdang, Selangor D.E. Malaysia. Contact: msho@econ.upm.edu.my)**

# Higher harvesting intensity *requ*

The researchers found a Catch-22 situation in which an increase in both harvesting rates and the number of trees left standing led to more environmental damage. In response, the researchers make a number of suggestions for regulatory and technological improvements that would allow logging companies to overcome this problem and improve their environmental performance.

## What Type of Concessions are Best?

The study was undertaken because there is virtually no empirical evidence about which elements of a concession agreement have the greatest impact on the environmental performance of the company working that concession. The researchers aimed to fill this information gap so that the regulation and taxation of logging activities could be focused to improve environmental quality, economic output and government revenue in forest areas. The researchers analyzed logging data from forty forest compartments in the district of South Terengganu in Peninsular Malaysia. They chose this area because pre- and post-felling inventories existed for the forests in the area. This made it possible to disentangle the impacts of forest conditions, logging company characteristics, fiscal regimes, and regulatory structures on harvesting performance.

## Reducing "Logging Damage"

The researchers focused on the impact that differences in logging concessions had on the condition of the trees left behind after felling had taken place. It is well known that this "logging damage" to residual trees has a significant influence on environmental quality. For example, higher disturbance of the forest following unsupervised logging below the cutting limits increases erosion rates and accelerates surface runoff. Moreover, studies show that when the damage to uncut trees is reduced, the remaining standing forest is healthier and provides more environmental services.

## Inventories and Other Information

The researchers collected information on a number of variables for each concession. This data included pre- and post-felling timber inventories. These inventories were conducted by the State Forestry Office (SFO) and were based on a 10% systematic linear sampling system. They provided mean (per hectare) values of the number of trees and timber volume by species and diameter class in each compartment. The researchers also collected data on the logging companies and the logging contracts they had entered into. They also investigated timber prices and various factors affecting logging costs such as forest type, the average slope of each site and the types of machinery and logging techniques used by each concessionaire. Much of this information was obtained from the concessionaires themselves, from the District Forest Office and from specifications detailed in forest licenses.

The researchers encountered a number of problems in obtaining the data they needed. Despite the stipulations of the Malaysian forest management code, they found that information about post-felling inventories was not collected in the same format or detail as for pre-felling inventories. This meant that an assessment of damage and harvesting was not straightforward. Instead, a subjective report was collected on the level of damage and the need for rehabilitation activities. The study was also constrained by the limited number of available sample points.

**Forest Area of Peninsular Malaysia, 2000**

| | Hectares |
|---|---|
| Total Land Area | 13,162,314 |
| Forested Area | 5,979,649 |
| • *Permanent Forest Reserve* | 4,837,500 |
| • *Stateland* | 444,817 |
| • *Wildlife Reserve* | 650,302 |
| • *Other Reserved Area* | 47,030 |
| Non-Forested Area | 7,182,665 |

# res greater monitoring and control

## A Dilemma for the Logging Business

The researchers found that the major sources of logging damage were the total number of trees harvested and the total number of residual trees, and that damage is more prevalent among the non-dipterocarp species group. They found that a 1.2% rise in logging damage could be expected for every 1% increase in the density of residual stands (using current harvesting technology). They also found that for every 1% increase in the harvesting rate, the logging damage would increase by 0.68%.

According to the researchers, this creates a dilemma for those in the logging business. Raising harvesting productivity - by exploiting more trees per hectare - increased logging damage. Yet harvesting fewer trees raised the density of residual stands, which also increased the level of logging damage.

## The Impact of Concession Periods

The researchers found that there was no significant link between the length of a concession period and the amount of damage caused to the trees left after logging. They suggested that this was because the sub-contracting of harvesting jobs is still widely practised and long-term concessionaires are often not directly involved in felling and transporting out the logs. This means that there is little difference in the behaviour of short- and long-term concessionaires.

In respect to harvesting behaviour, the researchers found that long-term concessionaires observed the harvesting cutting limits that had been set by the regulators. They argued that this reflects the companies' need to reserve enough residual trees for their next cutting cycles. In light of this finding, the researchers recommended that the State Government offer concessions to integrated and long-term concessionaires so that the good management of each concession is in the best interests of the concessionaire.

## Improving Logging Techniques

The researchers highlight the fact that the findings from their study should be treated as preliminary, until more data is available from other districts. Nevertheless they felt that their findings held several implications for forest management, at least in the study area. The researchers note that without raising productivity, concessionaires might not have the incentive to comply with environmental regulations. In other words, compliance costs money and concessionaires have to find a source to compensate this loss.

In light of this observation and their research findings, the researchers recommend that even well-intended planning that raises the residual stand density - such as setting quotas on the minimum economic cut - may not be good for sustainable management. In place of such policies, the researchers suggest that the Malaysian government should introduce and encourage more environmental-friendly harvesting techniques where, for example, pre-felling climber cuttings and directional felling are implemented and closely supervised. With the application of these and other less damaging harvesting methods, such as helicopter logging and the incorporation of reduced impact specifications, damages could be much reduced. The application of helicopter logging is not

**Log Production by Forest Types, 2000**

| | Cubic metres | Percentage |
|---|---|---|
| Permanent Reserve Forest | 2,957,880 | 58 |
| Stateland | 1,706,067 | 34 |
| Alienated Land | 408,203 | 8 |
| Forest Plantation | – | – |
| **Total** | **5,072,105** | **100** |

unrealistic, since Malaysia has already experimented with this technique in the state of Sarawak.

## Increasing Harvesting Intensity

The researchers also argue for an increase in harvesting intensity using the less-damaging harvesting techniques they had highlighted. They make the case that allowing a higher harvesting intensity would reduce the number of forest areas that have to be opened up to meet annual timber requirements. This would also limit the amount of logging damage associated with high residual stand densities. They therefore suggest that this approach should be incorporated into government policy.

The researchers note that lowering cutting limits would require modifications to the current forestry management regulations. Given a thinner residual stand density, they said, cutting cycles would have to be extended beyond the current range of 25 to 30 years. This would mean that the current "bi-cyclical" cutting cycle - where harvesting is done twice within a rotation of 60 years - would no longer be feasible. Instead a single cutting cycle of once in every 50-60 years would have to be implemented to give the residual stand sufficient time to recuperate and regenerate.

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