

The Problem

There has been a decline in the area and quality of forest in Indonesia. This means that the amount of timber available for harvest in the second cutting cycle is significantly lower than expected.

If suitable action (initiated by policy revision) is not taken, then the second harvest in areas of natural forest will be the last. Production forest management in Indonesia will no longer be economically viable, opening up vast areas of forest to illegal logging and clearfelling. This will result in a rapid decline in the forest cover, loss of employment opportunities, loss of biodiversity and a serious reduction in forested areas' ability to provide non-timber benefits, upon which a vast percentage of the Indonesian population depend, both directly or indirectly.

Causes of the Problem

(1) Over-harvesting

- Current natural forest management policy (the Indonesian Selective Cutting and Replanting system - TPTI) prescribes the same harvesting system for all areas of forest across the country, regardless of the type and condition of the forest. Logging intensity is specified as minimum diameter limits that are 40 cm for swamp forest, 50 cm for lowland Dipterocarp forest and 60 cm for areas zones as limited production where the slope exceeds 40 %. This system has led to over harvesting in many areas, from which the forest cannot recover to yield a second timber harvest within 35 years.
- There is no upper limit to the volume of timber that can be extracted per unit area, or the number of stems. Extracting too many stems from a given area can result in the creation of conditions that impede recovery (growth) of commercial timber species.

(2) Inaccurate basis for calculating Annual Allowable Cut (AAC) and regrowth

- The calculation of Annual Allowable Cut takes the total volume of commercial timber (measured by inventory), multiplies this by an 'exploitation factor' of 0.8 and then by a 'safety factor' of 0.7 (a total of 0.56) and divides the total by 35 years. This system represents a form of yield regulation, but is a static figure, not based upon the characteristics of the forest area in question. This leads in many cases to over cutting (or undercutting). In addition, the inventory has often been found to overstate the commercial timber volume available and the exploitation factor measured in the field may be as low as 0.5 (Matikainen, Herika & Muntoko, 1998)¹.
- Regrowth of the forest after harvesting is assumed to be at a rate of $1\text{m}^3\text{ha}^{-1}\text{yr}^{-1}$, giving a yield of $35\text{m}^3\text{ha}^{-1}$ at the end of the cycle. However this is an overestimate of the rate of growth, and also fails to take into account natural mortality. The forest is not growing as fast as the TPTI system assumes.

(3) Failure to minimise damage done during harvesting

- Calculations of expected yield in the second cycle have failed to take into account the significant damage done to the residual stand during harvesting. Poor harvesting practice opens the canopy and increases competition to commercial dipterocarps from light loving species. Little effort has been made reduce the damage done during harvesting, contributing to the decline in forest quality, and, in turn, area.

¹ Logging trials in Compartment 17, RKT 1997/98. An internal report prepared by BFMP and Inhutani I, Tanjung Redeb, East Kalimantan.

The Solution

A Silvicultural and Management System designed specifically for logged-over forest

The essential features of this should be-

- (1) **Yield Regulation:** the volume of timber *actually cut* should be strictly regulated to avoid over-harvesting and ensure optimal conditions for regrowth of the residual stand. This means harvesting a maximum of 8 stems per hectare (ha), of diameter at breast height (DBH) 50 cm and above. This carries the advantage for concessionaires that the skidding operation will be more efficient as fewer (and larger) stems will be skidded.
- (2) **Adaptive Management:** the system must recognise that all areas of forest have different stocking and grow at different rates. A strict 35 year cutting cycle is not suitable for all locations. Forest managers should be given the discretion to postpone a harvest at year 35 if the forest cannot yield enough timber to justify the costs involved.
- (3) **Static inventory** needs to be combined with growth and yield models to estimate the productive capacity of the residual stand. This approach should be used to set the volume of timber harvested in the second cycle at a level that can be sustained in subsequent cycles (see Technical Note 6, www.symfor.org).
- (4) **Minimum number of pohon inti:** the current TPTI requirement to leave at least 25 'pohon inti' (residual commercial trees of DBH 25-50 cm) per ha must be stressed and enforced in any new system. These trees must also be well distributed. This is an essential element of sustainable production forest management as it takes explicit consideration of the next harvest during the current one.
- (5) **Directional felling and Reduced Impact Logging (RIL):** the damage done during harvesting must be minimised. This is essential if the timber yield is to be sustained during subsequent harvests. Directional felling and planned skid trails should be used to protect the pohon inti and minimise canopy opening.

Integrating the Solution into Policy

It must be made explicit in policy that the timber yield from logged over forest will be significantly lower than that from primary forest. The condition of logged over areas is much more variable and yield will vary more. Efficiency must therefore be improved.

- (1) The existing silvicultural regulations (TPTI) should be extended and strengthened. These already contain three elements of Yield Regulation - 35 year cutting cycle, minimum felling limit of 50 cm DBH and 25 pohon inti per ha⁻¹ for lowland forest, with a slight modification for swamp forest (note 1). New policy should build upon these important elements, and add the limitation of a maximum extraction of 8 stems per ha, using directional felling and RIL.
- (2) Existing silvicultural regulations should be made less prescriptive and more adaptive. The use of accurate inventory data in conjunction with adaptable G&Y decision support tools should be made a requirement, offering the forest manager greater discretion regarding when to harvest and the level of extraction, subject to the regulations outlined above.
- (3) Stricter social and environmental standards must be introduced. Timber wastage must be reduced and a set of minimum environmental standards for the condition and rehabilitation of the remaining stand adhered to. This will add value to Indonesian timber on the international market by making it compatible with Forest Certification Standards.

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