



## ECONOMY AND ENVIRONMENT PROGRAM FOR SOUTHEAST ASIA

### POLICY BRIEF

#### ECONOMIC BENEFITS OF WATERSHED PROTECTION AND THE TRADEOFF WITH TIMBER PRODUCTION: A CASE STUDY IN MALAYSIA

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Forested catchments provide various use and non-use goods and services. These include commodities like water, timber, and rattan; and environmental services such as carbon storage, climate regulation, nutrient cycling, flood control, and biodiversity conservation.

Of these, timber and water appear to have the most significant direct impact on the economy. Malaysia's rapid economic development, for instance, has increased the demand for treated water, electricity, and timber.

With exhaustion of the most accessible forests, increased pressure to log in forested catchments is expected. If permitted, logging will have adverse impacts (e.g. sedimentation of rivers) on the hydrological attributes of forested catchments. There is a need to value and compare the less tangible and non-priced benefits of forested catchment protection with the tangible economic benefits of timber production. Such comparisons, in monetary terms, can help policy makers make rational decisions about land use options.

A study was conducted in four catchments in the Hulu Langat Forest Reserve in Malaysia to determine the production trade-off between two land use options. In the first option - total protection from logging (TP) - water is used for hydroelectric power (HEP) generation and in a water regulatory dam to support continuous treated water production downstream. The other option - reduced impact logging (RIP) - integrates water uses with logging practices. With TP, natural sediment flow into the river system is

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low. Under RIP, sediment volume increases severalfold: almost five times in the water regulatory dam and almost three times into the three HEP water intake ponds.

Maintaining forested catchments for water uses and logging is efficient if the water regulatory dam with large live storage capacity does not affect the continuous water flow from the Langat River to the downstream water treatment plants. As for the HEP water intake ponds, a comparison of reduced impact logging with total protection shows a higher present value of the external costs of dredging sediments and maintenance cost of RM129,495 to RM326,570. The present value of forgone net benefits of HEP generation under RIP is also higher at RM381,012 as compared to RM52,805 in the TP option. The study suggests that a land use option which combines timber production and HEP production is viable in the forested catchments. The incremental present value of the net benefits from the combined uses is RM16,167,151.

Distribution of the potential rent from logging and water uses among stakeholders is an important issue that state governments ought to look into. Some state governments have been able to capture portions of the resource rent in timber production. Under a non-tender concession, the State Government could obtain only 17% of the resource rents. In a tender concession, the State Government could capture 80% of the resource rents. In the case of water uses, there is no rent that can be captured by the State Government .

Since logging increases the sediment yield, an environmental impact assessment should be conducted prior to issuance of logging permits in forested catchments. Furthermore, the licensing agreement should stipulate that logging contractors be required to internalize the opportunity cost of increased sediment yield - in a sense, purchasing the rights to pollute. Mechanisms could be introduced for the aggrieved party (i.e., the HEP plant) to be compensated for the external cost brought about by the logging companies.

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*2.5 RM = 1 USD. The findings of this study are site-specific and cannot be directly applied to other forested catchments, owing to the unique setup of the Langat Dam and the three HEP water intake ponds. Furthermore, the study is limited to the production trade-off between the net benefits of timber and water use under two land use options. Other net benefits from forest attributes were not examined. Future research should probe the valuation and production trade-off of other attributes.*

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