ECONOMIC VALUATION OF FOREST CATCHMENT CONSERVATION: TRADE-OFFS BETWEEN PROTECTION AND ALTERNATIVE USES

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Keywords: economic valuation, forest catchment, trade-offs, on site and off-site costs, externalities.

Introduction

Forested catchments provide multiple goods and services, many of which are joint-production activities. Joint-production is characterised by inter-dependency whereby one use can impose externalities upon others. The objectives of the study were: (i) To identify the stakeholders or users of the forested catchments; (ii) to model sediment yield in forested catchments under total protection and alternative land use options; (iii) to value the benefits and costs of managing forested catchments under protection and alternative land use options; and (iv) to determine the trade-offs between these different land use options.

Materials and Methods

Two study sites were selected, (i) Hulu Langat Forest Reserve (HLFR), Selangor and (ii) Sungei Ikan Catchment (SIC), Cameron Highlands, Pahang. In the HLFR site the study determines the economic trade-offs between total protection and logging while in the SIC site the study establishes the on-site and off-site economic costs of converting forested catchment for vegetable farming. Soil erosion and sedimentation were computed using data from field measurement as well as from literature review. The physical impacts of these erosion and sedimentation rates were determined. These physical impacts were monetised using economic valuation techniques. Off-site costs upon hydro electric power (HEP) and water treatment plants were evaluated using the change in productivity technique while the on-site costs of erosion was computed based on the replacement cost and net value marginal product of fertiliser input.

Results and Discussion

Analysis at the compartment level in the HLFR, suggests that the central issue of joint production in forested catchment is not the intensity of logging methods to adopt. Rather the point is which water use can be combined with timber production that can generate the net present values greater than the status quo total protection option. The returns from timber cannot meet that from the status quo production of treated water but complementing water uses with reduced impact logging in forested catchments is efficient in hydro electric power (HEP) catchments. The analysis does not incorporate the effects of logging options on the other attributes of natural forests such as recreation, bio-diversity values and non-timber forest products (NTFP). This factor may be an important consideration in future evaluations. Findings from the SIC site suggests that the on-site cost of soil loss from erosion can be quite large. Farmers have to make replacement costs in the form of additional fertilisers, otherwise they would incur losses in the form of foregone net value marginal products (of nutrients). The soil erosion from farming causes sedimentation of the waterways, which imposes externalities upon downstream users. An important affected user is the HEP company which run a cascade of power plants downstream. The analysis values the various external costs being borne, including investments on sediment traps and desanders, incremental maintenance costs, foregone HEP revenues during idled maintenance days, and incremental cost of differential power production by other independent power plants to compensate for the reduction in power generation by the plants in Cameron Highlands.

Conclusions

The study establishes that soil erosion and sedimentation are not costless. External costs are being borne upon downstream users which ought to be accounted. Otherwise a project such as logging and vegetable farming on cleared forested catchment would have been passed as financially viable which in fact is incurring substantial social cost upon society. It is recommended that any economic activity that generates large impacts on soil stability would have to undergo more comprehensive evaluation particularly on the externalities that it can impose upon society.

Supported by IRPA Grant 05-02-04-0008