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"Solidarity in a competing world — fair use of resources"

Multi-Criteria, GIS and InVEST for Evaluation of REDD+: Case Study in Northern Thailand

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Abstract

The 'Reducing Emissions from Deforestation and forest Degradation' (REDD+) programme is promoted, in Southeast Asia and particularly in Thailand, as a cost-effective climate change mitigation option with co-benefits to improve food security, local livelihoods and to foster sustainable forest management. The needs of local communities are critical to develop REDD+ strategies that will be sustainable in the long run.

An integrated assessment framework for REDD+ and its effect on the social, environmental and economic aspects is presented for a case study area (22.4 km^2) in Northern Thailand. Land use map and participatory approaches to develop scenario storylines based on local stakeholder opinions were combined in a GIS-based analysis to identify the most appropriate sites on a local scale. Spatially-explicit scenarios were developed using Multi-criteria Evaluation (MCE) by merging social and physical boundaries in combination with stakeholder interviews representing different levels of REDD+ knowledge, interest and influence as part of a suitability analysis. Field studies and aerial photos were employed to update and validate existing spatial land use information serving as further model input datasets. Model simulations with the Integrated Valuation of Ecosystem Services and Tradeoffs model (InVEST) were conducted to assess different stakeholder-driven future REDD+ scenarios to quantify environmental services and their tradeoffs.

Three REDD+ futures scenarios were obtained: 'Community', from interviews with community headmen, 'Compensatory' and 'Pragmatic' from the analysis of REDD+ factors as evaluated by key informant interviews. 'Compensatory' showed a higher preference of social over physical boundaries in MCE. Meanwhile, the physical boundaries such as distance to road, to community and slope were more relevant in 'Pragmatic'. The scenarios were evaluated with InVEST.

The participatory methods for scenario development can break down distances and incorporate community knowledge, hopes and perspectives into the REDD design process. This study illustrates a method for identifying and mapping landscapes for setting up a local REDD+ project. The framework and GIS tools demonstrated in the study could help policymakers, and project proponents to target projects considering multiple criteria that reflect the multiple expectations of REDD+.

Keywords: InVEST, multi-criteria evaluation, Thailand, participatory approach, REDD+

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