

Ecosystem service valuation for rubber plantations using InVEST between and nature conservation – a case study from Xishuangbanna, PR China

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Since 2012, the project [Sustainable Rubber Cultivation in the Mekong Region](#) – SURUMER is running in Xishuangbanna Dai Autonomous Prefecture, Yunnan Province, PR China. The aim is to develop an integrative, applicable, and stakeholder validated concept for sustainable rubber cultivation. Different thematic subprojects are dealing in detail with specific ecosystem functions and services. Data collection mainly takes place in rubber plantations and in tropical forests in the Naban River Watershed National Nature Reserve. Subprojects are working on carbon dynamics, water issues - local water balance and water management -, and pollinators. The aim of these studies is to gather detailed data for specific disciplinary models, e.g. Land Use Change Impact Assessment (LUCIA); Water Management Tool (WMT); Mobile-agent-based-ecosystem services (MABES). These sophisticated models will yield in-depths knowledge of specific ecosystem functions and services. However, for the communication with regional policy and other decision makers (e.g. administration and researchers) it is necessary to convert these results into an integrated ecosystem service assessment. This will give a more holistic picture and allow for trade-off analyses between different ecosystem services. The conclusive goal is to include a monetary valuation of the studied ecosystem services. This information will help regional stakeholders to design policy mechanisms aiming at improving livelihoods and rural development in the region while at the same time being able to take the benefits of ecosystem services into account.

InVEST (Integrated Valuation of Environmental Services and Trade-offs), a toolbox of deterministic models to evaluate different ecosystem services biophysically and monetary, is used for the above mentioned integrated ecosystem service assessment. This includes also the optional monetary valuation of ecosystem services for different land use change scenarios. In order to supplement ongoing data collection efforts, additional information from previous data, literature and expert knowledge have been compiled to allow for model preparation and validation. Results of the models carbon storage and sequestration, hydropower production, water purification / nutrient retention and sediment retention will be presented.

Integrative Ecosystem Service Assessment as a challenge to interdisciplinary projects – the SURUMER concept

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With today's need of a project to meet inter-, multi- and trans-disciplinary standards as well as integrating stakeholder based decision making processes into a research framework, project management staff and project proposal writers face quite difficult tasks. Not only do the Subprojects need to meet their own disciplinary standards, but also it is expected that from the fruitful interdisciplinary interaction something bigger is born.

Within the SURUMER project we aim to establish and test a working framework that allows for an integrative Ecosystem Service Assessment (ESA) aiming at bringing together both the needs of disciplinary data acquisition and high quality research with interdisciplinary modeling approaches under the umbrella of a stakeholder based steering mechanism.

A continuous stakeholder process focusing on three different groups of decision-makers (village heads and innovative farmers, regional planners as well as politics) in our project region develops key questions related to ESS to be addressed by the project scientists. Based on these questions, scenarios are designed in an iterative process during the stakeholder process. These scenarios are analyzed by multiple disciplinary and interdisciplinary modeling and assessment approaches, leading first to a bio-physical assessment of the scenario. This assessment is, in a second step, supplemented with socio-economic appraisals on expected changes in household income and economic welfare. Finally, these assessments are combined and adapted to be returned into the continuous stakeholder process for information exchange and possible adaption of key scenario questions.

Two aspects are considered to be important in the creation of a working framework: First to combine the integration of stakeholder groups into the decision making processes and at the same time to identify relevant research focal points. The second aspect is to provide an iterative assessment with multiple feedback loops. Herewith we hope to create a framework that enables our project researchers to contribute not only to their specific fields of research, but also to guarantee an impact "on the ground" in a genuine multi- and transdisciplinary setting.