Multi-disciplinary Ecosystem Service Assessments for mountainous watersheds in Southeast Asia

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Introduction

The concept of ecosystem services (ESS, the benefits and goods people obtain from ecosystems) has been increasingly recognized for its importance and potential in decision making processes concerning environmental policy and sustainability issues. In the past decades extensive land use changes have been and are still taking place in Montane Mainland Southeast Asia, oftentimes associated with deforestation and the abandonment of swidden farming systems in favour of cash crop cultivation. The expansion of rubber plantations and its impacts on ESS in Xishuangbanna, China, was chosen as a pilot study project.
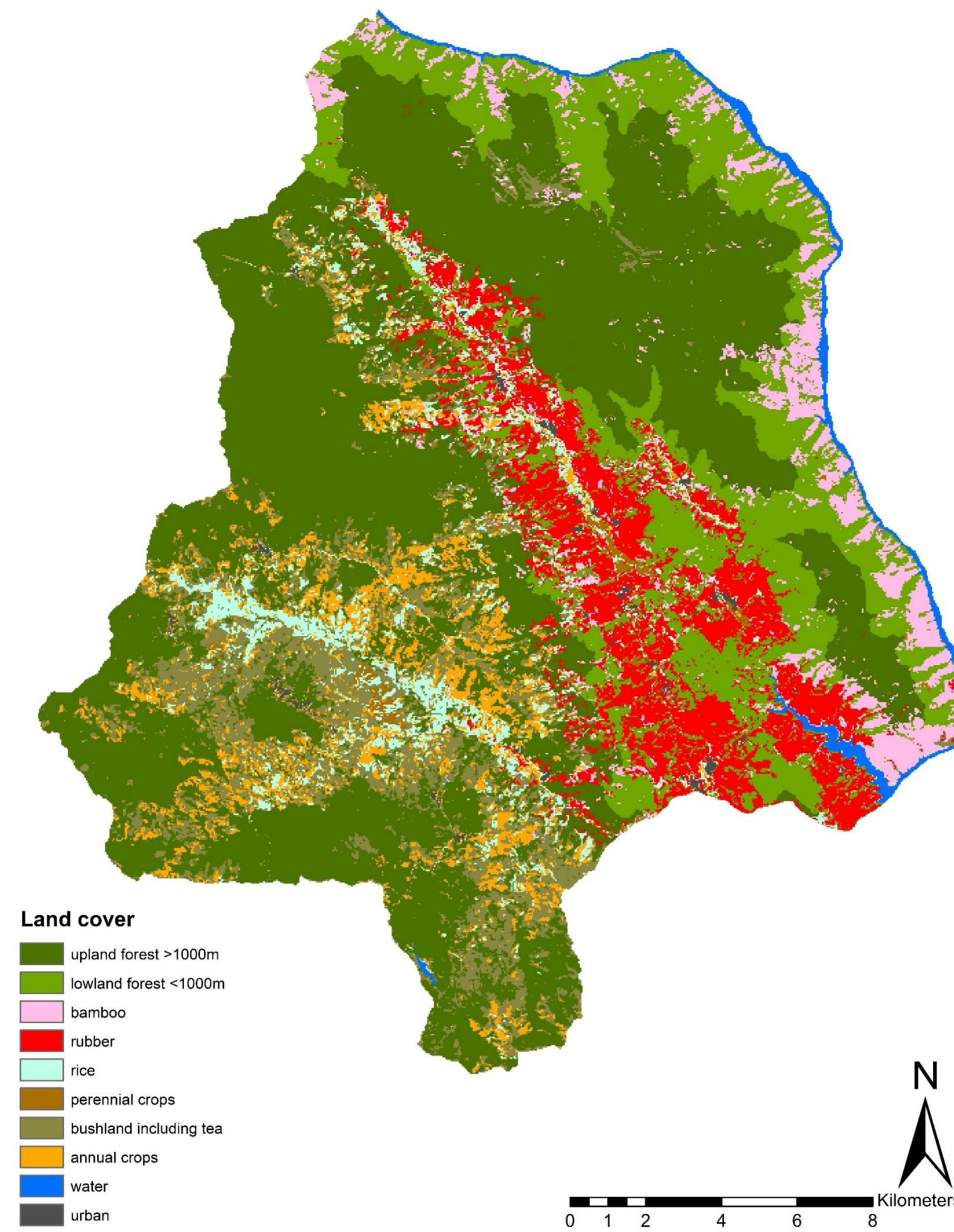

Figure 1: Land cover map of the Naban River Watershed National Nature Reserve, Xishuangbanna, China (2015).

Expected results

o **Information on how land use changes affect the supply of ESS such as water yield, sediment export, habitat quality and carbon sequestration on a landscape level**

o **Verification of applicable land use concepts for sustainable agriculture**

Aims

o **Testing the applicability of the InVEST modeling framework for the identification of tipping points in the provisioning of ESS**

Objectives

A) Integrating biophysical models and stakeholder feedback to assess ecosystem service supply

B) Evaluating future land use scenarios for ESS supply potential, synergies and tradeoffs

C) Identifying tipping points in the provisioning of multiple ESS and ecosystem functions

Conceptual framework

o **Future land use scenarios have been developed by the SURUMER project (Sustainable Rubber Cultivation in the Mekong Region)**

o **ESS for every land use scenario are modeled in annual time steps with InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs) to identify tipping points**

o **ESS evaluations for these scenarios are based on stakeholder rankings**

Outlook

o **Adapting the developed methodological framework for the Nan province in Thailand with a focus on water quality and quantity for human consumption and agricultural use**
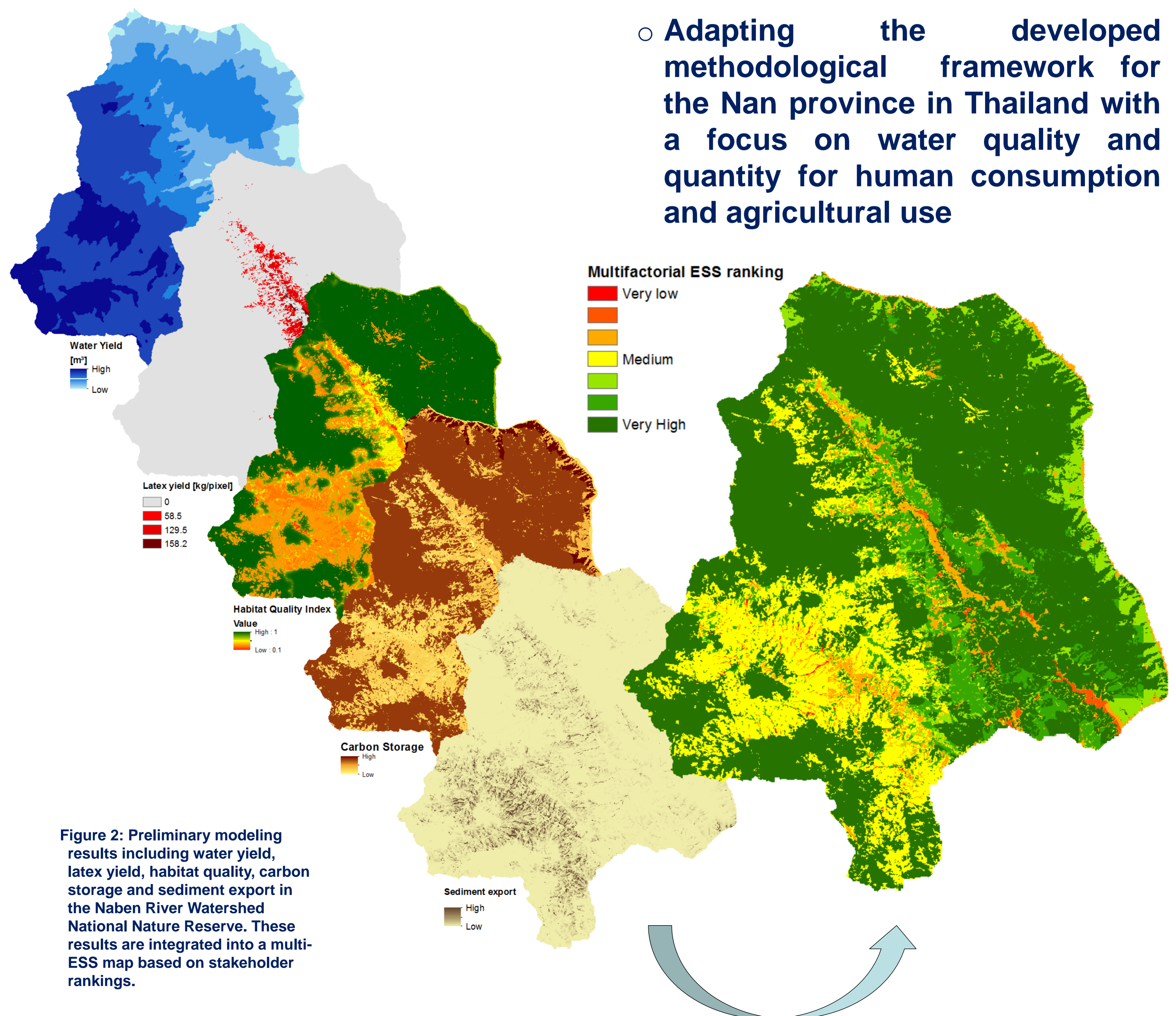

Figure 2: Preliminary modeling results including water yield, latex yield, habitat quality, carbon storage and sediment export in the Naben River Watershed National Nature Reserve. These results are integrated into a multi-ESS map based on stakeholder rankings.

Figure 3: Typical landscape in the Naben River Watershed National Nature Reserve, Xishuangbanna, China.