China, Asia

Upper Mekong

Mean annual rain- fall: ~2000 mm

Trees link to ecosystem services?

Role of biodiversity in wood and litter decomposition

Biodiversity has been shown to affect ecosystem function, especially over larger temporal and spatial scales. However, the role of biodiversity in decomposition is not well understood.

We have been monitoring the rate of leaf litter and wood decomposition across a multifunctional landscape in Mengsong, where we have detailed data on the distribution of biodiversity.

Preliminary results indicate tree cover has the single largest effect on decomposition rates. Decomposition rates were ~50% higher in forest plots, but only marginally higher in primary forest vs secondary forest plots.

These results will contribute to improved global climate models.

Shade-house / litter-bed experiment

Three levels of shade are used to mimic the effects of canopy openness

Six litter beds (soil and litter from plots) are used to manipulate biotic inputs.

This will enable us to separate the effects of abiotic and biotic factors.

Decomposition plot

Two species (high and low density) of wood and two species (soft and hard) of leaf litter with two mesh sizes. Surrounding vegetation has been surveyed.

Respiration measurement

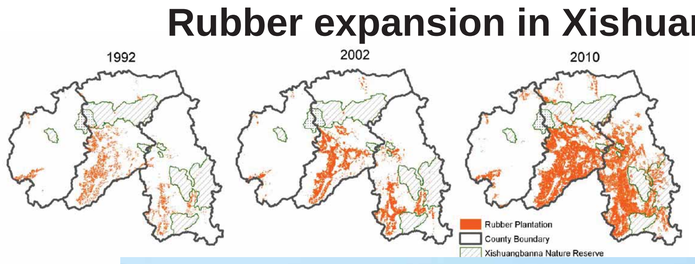
These measurements will enable us to correlate short-term variation in respiration with long-term differences in decomposition rates. These data will enable future studies to focus on shorter term responses.

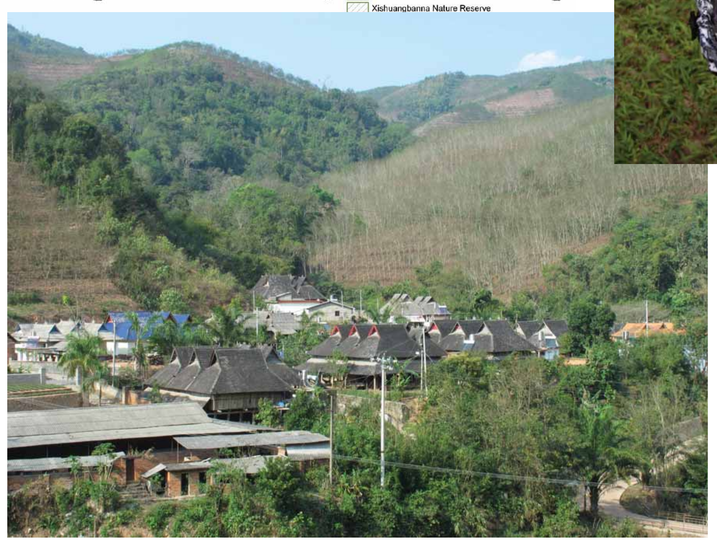
“Green rubber”: Enhancing ecosystem services in a monoculture landscape

Expansion of tropical plantation crops is simplifying formerly multifunctional landscapes. Often the economic benefits for the plantation owners are substantial, but monoculture landscapes are degrading ecosystem services and increasing poverty among marginalised groups.

We will investigate the socioeconomic consequences of rubber expansion in Xishuangbanna, N Laos, and Myanmar. In addition, using a paired plot approach we will investigate the effect of rubber on ecosystem functions, focusing on water, soil fertility, and biodiversity. The research will also include experimental manipulations, such as shade crops and understorey diversification.

Rubber expansion in Xishuangbanna





Magic sap

Increasing demand, mostly from China, is pushing rubber prices higher and higher, resulting in the planting of biophysically sub-optimal areas.

Climate-change driving increases in temperature could see an expansion of rubber uphill and northwards, resulting in a complete blanketing of the landscape.

A rubber landscape

Maintenance of forest fragments and corridors in the landscape may be essential to mitigating the impacts on ecosystem services. Modifying the matrix to improve nutrient cycling and water infiltration may improve sustainability as well as benefit other ecosystem services.

How effective are conservation interventions?

A large part of tropical conservation efforts focus on establishing protected areas – but how effective have these been in conserving biodiversity? Evidence from Asia suggests not very!

Hunting in PAs

Hunting threatens to undo conservation gains throughout Asia. Moreover, defaunated landscapes are deprived a various ecosystem services, including wild meat supply and seed dispersal.

We are initiating a region-wide project to assess hunting impacts and investigate the effectiveness of alternative policy interventions.

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