The Global Land Project: an integrative research approach to human-environment systems

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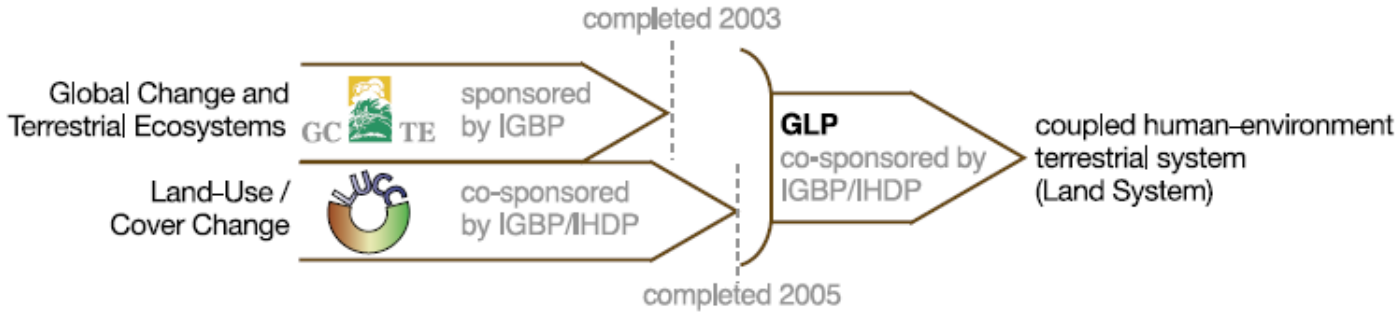
Introduction

Global Land Project (GLP) is a core project of the International Human Dimensions Program on Global Environmental Change (IHDP) and the International Geosphere Biosphere Program (IGBP)

GLP succeeds two environmental change programs: the Land Use and Land Cover Change (LUCC) of the IHDP and the Global Change of Terrestrial Ecosystems (GCTE) of the IGBP.

Figure 1. The genesis of GLP, emerging from previous global change projects.



LUCC helped in improving our understanding of natural dynamics of land-use change

But it also made us aware that knowledge of societal dynamics (e.g. collective action) is still limited

GCTE provided knowledge of the impact of GEC on natural and agro-ecosystems

Because GCTE research was implemented from a biophysical perspective, it did not permit the opportunity to explore the vulnerability of human populations to GEC.

Current challenge: Better integration of societal and natural systems

GLP studies the land system from an integrated perspective

The land system (land use, land cover and terrestrial ecosystems) is pivotal to understanding human-environment relationships

Land use connects humans to the biophysical environment

Characteristics and changes in the natural environment influence our land-use decision making

The continuum of states resulting from the interactions between natural and societal dynamics

Dynamic Land Transitions

Land cover
Biophysical control

Land use
Human control




Ecological systems
Biogeochemistry
Biodiversity
Water
Air
Soil

Decision making

Choices (knowledge, values, preferences) and their socio-economic, political and cultural milieu

Social systems
Population
Social/Economic Structure
Political/institution regimes
Culture
Technology

Ecosystems services

Food/fiber/fuel
Clean air
Clean water
Waste recycling
Recreation

Ecological challenges

Food/fiber/fuel shortages
Pollution
Diseases
Overcrowding

Social challenges

Poverty
Conflict
Social justice
Migration
Health

GLP aims to define the continuum more explicitly, quantify the rate of landscape change, and explain the underlying causes

GLP Management Structure

Representatives of IHDP and IGBP scientific communities.
Scientific guidance and oversight functions

GLP Scientific Steering Committee

Coordinative, organizational and communicative functions

GLP International Project Office
Denmark

Infrastructural and personnel support in research implementation
Thematic, not regional focus
Initiate project activities
Foster collaboration and networking amongst researchers
Inclusive and global scope

Nodal Offices
Japan, UK, China

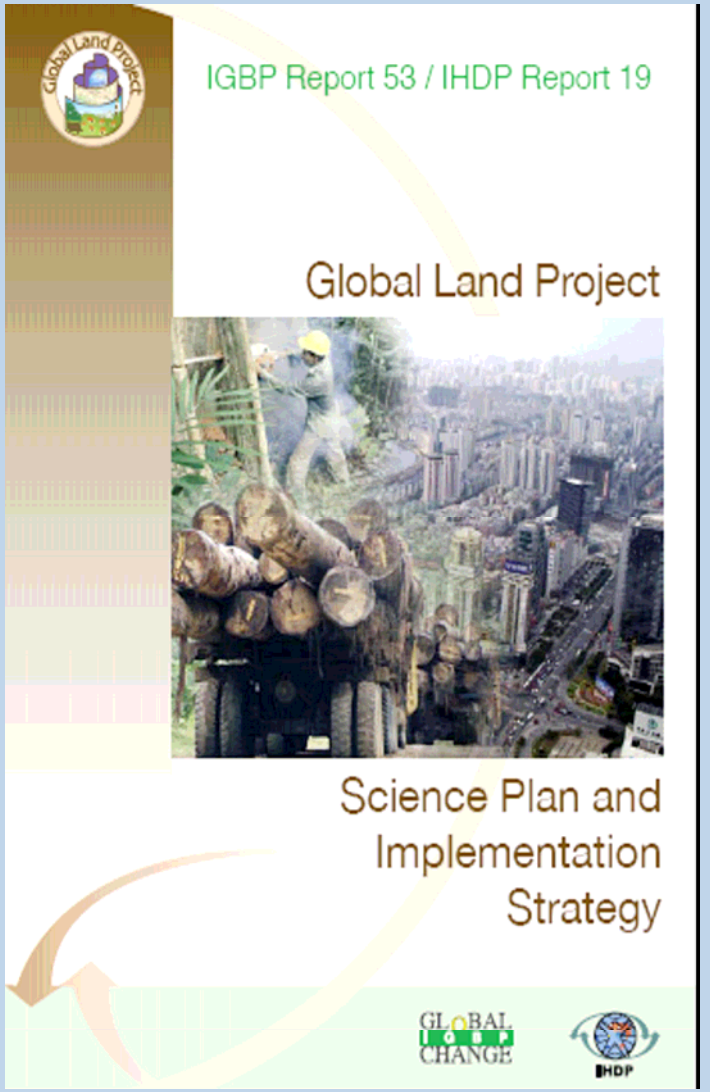
Research Agenda

GLP Science Plan developed based on consultations among several 100 global change scientists in 2001-2003.

GLP works with scientific community to build scientifically effective implementation strategies.

Central goal: *Measure, model and understand the coupled socio-environmental system*

3 Themes, 10 issues

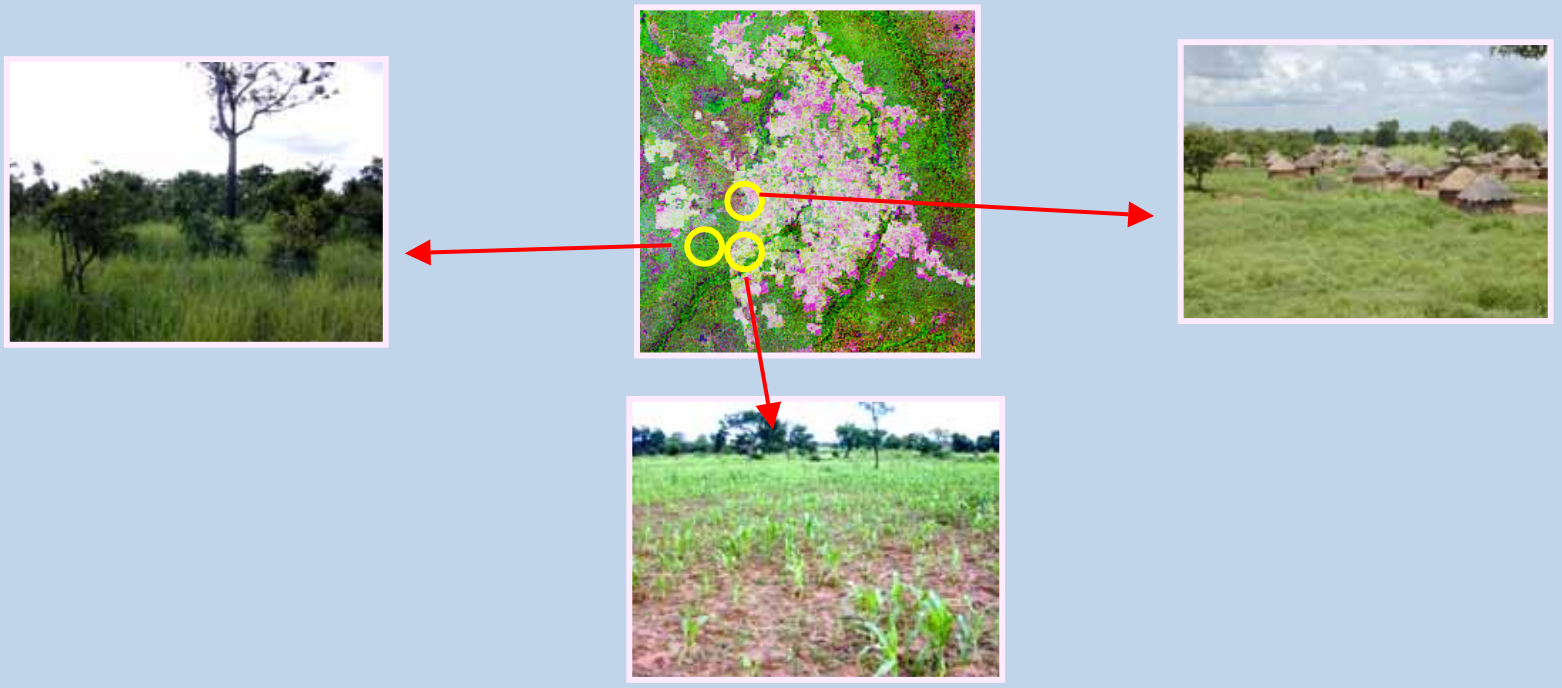


Theme 1: Land System Dynamics

Issue 1.1: Effects of globalization and population change on land-use decisions and practices

Issue 1.2: Effects of changes in land management decisions and practices on biogeochemistry, biodiversity and disturbance regimes of terrestrial and freshwater ecosystems

Issue 1.3: Effects of atmospheric, biogeochemical and biophysical dimensions of global change on ecosystem structure and function



Theme 2: Consequences of Land System Change

Issue 2.1: Feedbacks to the coupled Earth system from ecosystem changes

Issue 2.2: Effects of changes in ecosystem structure and function on the delivery of ecosystem services

Issue 2.3: Linkage between ecosystem services and human well-being

Issue 2.4: Response of agents at various scales and in different contexts to changes in ecosystem services provision

Theme 3: Integrating Analysis and Modeling for Land Sustainability

Issue 3.1: Critical pathways of change in land systems

Issue 3.2: Vulnerability and resilience of land systems to hazards and disturbances

Issue 3.3: Institutions and decision-making for the sustainability of land systems

Implementation strategies

- Synthesis of prior work
- Collection of new data
- Integrated regional studies
- Capacity building
- Clear and consistent message to inform policies

Focal areas at GLP, Japan

Cross cutting issues - Vulnerability, resilience and sustainability of land systems

- How do different (components of) land systems respond to biophysical and social changes?
- How can adaptive capacity of land systems be increased?
- Develop indicators of land systems sustainability
- Identify institutions that enhance decision making and sustainable governance of land systems.
- Enhance interaction between science and policy

Examples of activities

Capacity Building

Institutional Design Workshop

Braimoh (LS) newfront

Ecosystem Services Management in Asia (ECOSMAG) and Indicators

Ecosystem Management in Asia (ECOSMAG)

Project Objectives

1. Develop a framework for analyzing ES
2. Analyze governance structures vis-à-vis delivery of ES
3. Identify trade-offs, and incentives for ES conservation

Focal Services: Carbon Sequestration, Hydrological and Soil Fertility

Investigators

- **Global Land Project, Japan**
- **Unit for Social and Environmental Research, Thailand**
- **Yunnan University China,**
- **Institute of Sciences Indonesia**

Collaborators from

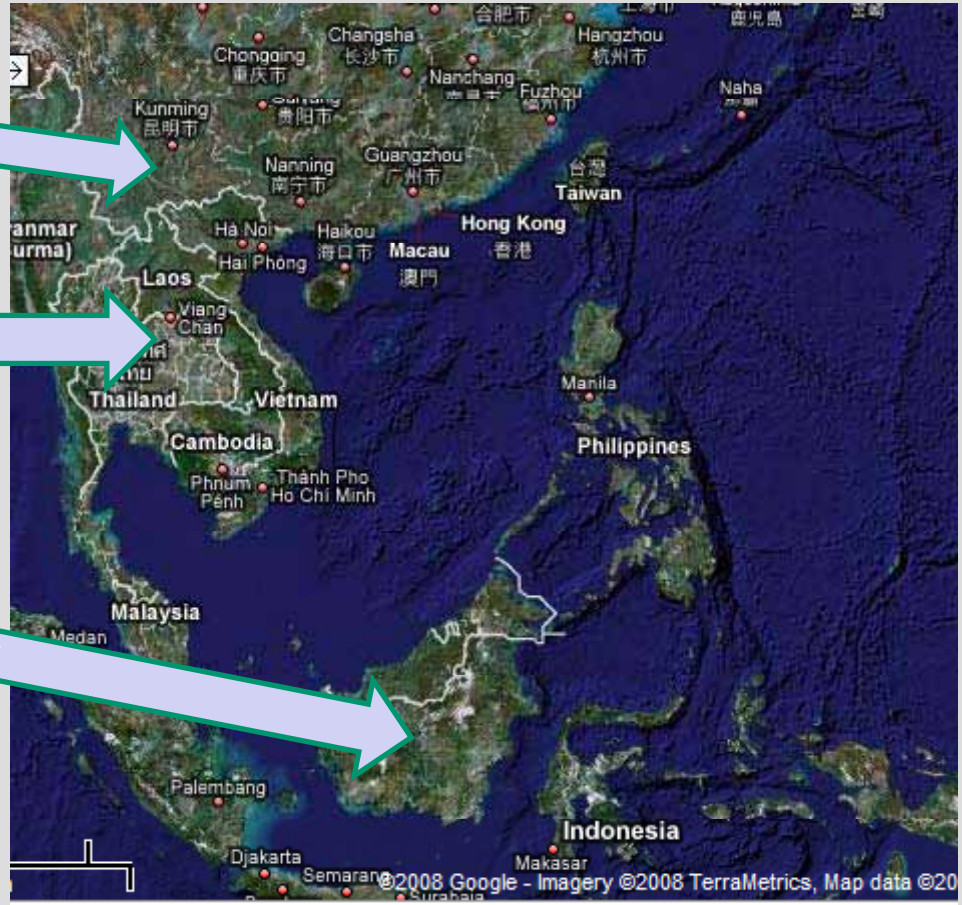
- **Hokkaido University**
- **GLP China**
- **CIFOR Indonesia**
- **NISTPASS Vietnam**
- **United Nations University**
- **IIM Bangalore, India**
- **University of Botswana**

Study Areas: 3 regions in the sub-montane ecosystems

Supa, Longling

Mae Hae

Sungai Kahayan



Focal ES

Location	Ecosystem
Supa Longling, Yunnan, China	**Water provision for agriculture, domestic, industrial and power generation**
Sunghai Kahayan catchment, Indonesia	**Carbon sequestration of swamp peatland, nutrient depletion**
Mae Hae Watershed, Thailand	**Landslide-erosion control, non-timber forest products at the local level, the provision of water for wet and dry season irrigation, carbon sequestration**

Challenge

Need to develop harmonized indicators that are:

- Relevant across regions
- Quantifiable
- Help to determine the status, and change in ES in relation to the society and the process of development
- Help to predict/evaluate the likely effects of policy and management decisions

What was helpful:

1. MA framework on ES (Provisioning, Regulating, Supporting, Cultural)
2. Extensive Knowledge of team leaders of their study regions

Parameters for Assessment and Valuation

- Biophysical
- Water provision
- Carbon sequestration
- Landslide and Erosion control
- Nutrient depletion
- NTFPs (incl. flora and fauna)

- Socio-economic
- Market data of goods and services (incl. domestic and international data)
- Socio-cultural data (incl. demography, income flows, expenses, from the region, supporting services, type of governance/power structures, institutions and norms)

Methodology

- Multi-stakeholder analysis

Through Stakeholder meetings

Using pre-tested questionnaire (Under development)

- Biophysical inventory

Land cover mapping, Soil analyses, Erosion measurement

- Analysis of historical datasets (rainfall, land use, demographic trend, etc)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Partners
Events
Getting Involved
Home
Ecosystem Services Management in Asia (ECOSMAG) is a project principally funded by the Asia-Pacific Network for Global Change Research (APN) to improve our understanding of the impacts of land management on ecosystem services provided by upper tributary watersheds. The scientifically integrative and policy-oriented research facilitates informed environmental policy and practice, and also provides insights to long-term sustainable use and conservation of these ecosystem services.
Objective 1:
Objective 2:
Objective 3:
Done
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100%

Thank you for your attention