



**International  
Geosphere-Biosphere  
Programme**

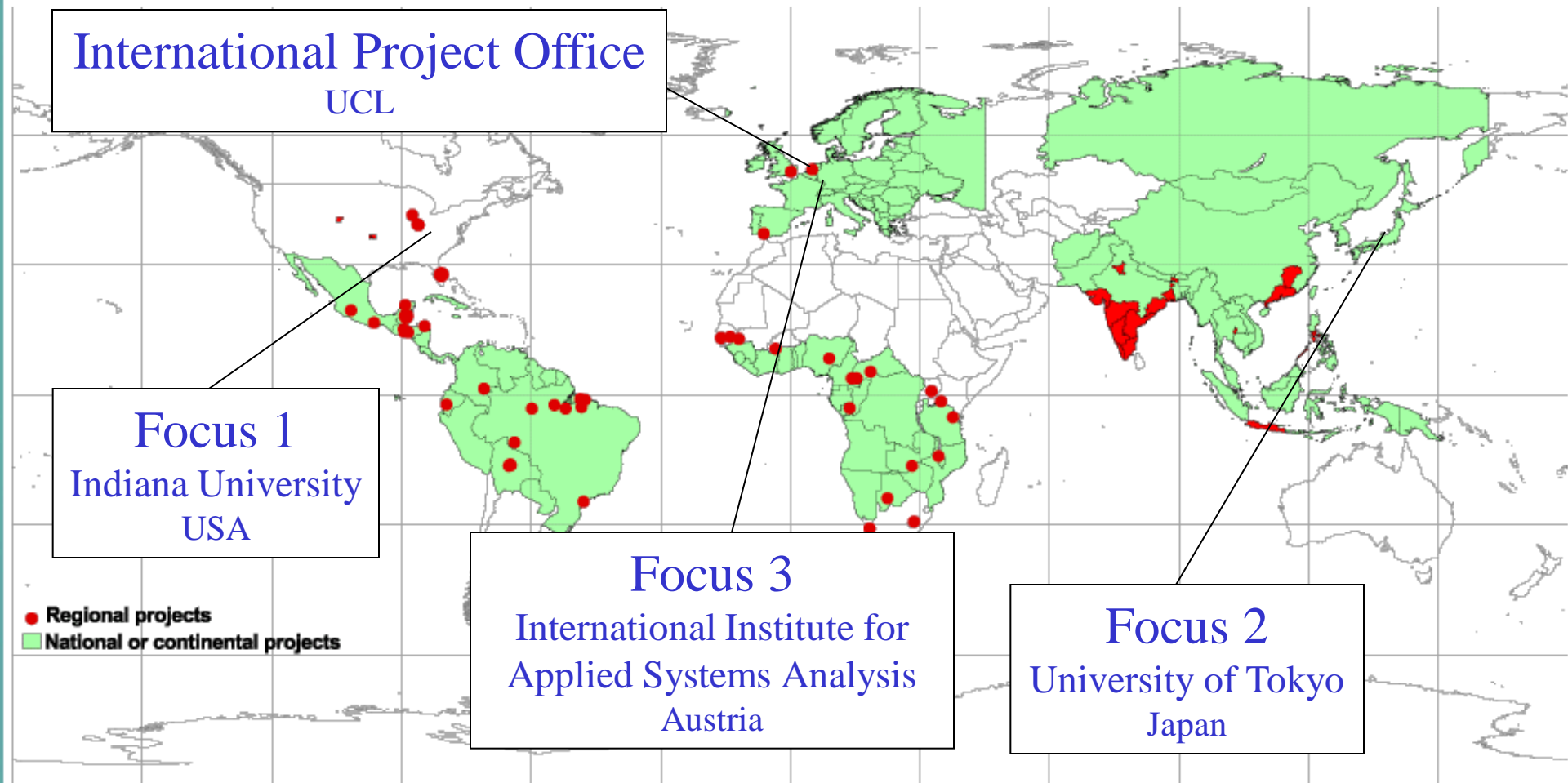


**International Human  
Dimensions Programme on  
Global Environmental Change**



**Land Use and  
Land Cover Change**

# Structure of the Lucc Project



- More than 30 Endorsed Projects
- A Dozen Regional Networks



## Implementation Strategy



### Focus 1

**Land Use Dynamics  
Comparative Case Studies**

### Focus 2

**Land Cover Dynamics  
Empirical Observations  
and Diagnostic Models**

### Focus 3

**Regional and Global  
Integrated Models**



## Land Use and Cover Change

Focus 1  
Land Use Dynamics

Home

About LUCC

Endorsed Projects

Activities

People

Resources

GLOBAL  
I G B P  
CHANGE



## Land Use and Cover Change



### Focus 1 - Land Use Dynamics

A core project of the  
**International Geosphere-Biosphere Programme**  
and the  
**International Human Dimensions Programme on Global Environmental Change**

Please send comments to: [focus1@indiana.edu](mailto:focus1@indiana.edu)

**FOCUS 1**

**ACT**

**Indiana University**

**Student Building 331**

**Bloomington, IN 47405-7100**

**Tel. +1 (812) 856-5721**

**Fax +1 (812) 855-3000**



GLOBAL  
I G B P  
CHANGE



**Land Use and  
Cover Change**

## **Focus 2 - Land Cover Dynamics**

A Core Project of the  
International Geosphere-Biosphere Programme  
and the  
International Human Dimensions Programme on Global Environmental Change



**International Symposium on LUCC Contribution to Asian Environmental Problems**

**Dec.13-14, 2001**

**Venue: Science Council of Japan**

**Land-Use and Land-Cover Change (LUCC)**  
**A Core Project of the International Geosphere-Biosphere Programme and the International Human Dimensions Programme on Global Environmental Change**



# LUCC Focus 3 Office

## Regional and global models

LUCC Focus 3  
Leader

— Günther Fischer: [fisher@iiasa.ac.at](mailto:fisher@iiasa.ac.at)

Administrative  
Assistant

— Cynthia  
Enzinger: [enzlber@iiasa.ac.at](mailto:enzlber@iiasa.ac.at)

Land Use Change project — IIASA



**International Institute for Applied Systems Analysis,**  
Schlossplatz 1, A-2361 Laxenburg, Austria. Phone: +43 2236 807; Fax: +43 2236 71313



**International Geosphere-Biosphere Programme**



**International Human Dimensions Programme on Global Environmental Change**



**Land-Use and Land-Cover Change Core Project**



Land Use and  
Land Cover Change

# LUCC's Challenges

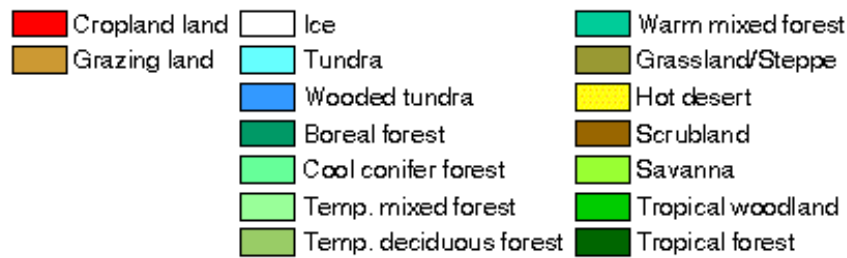
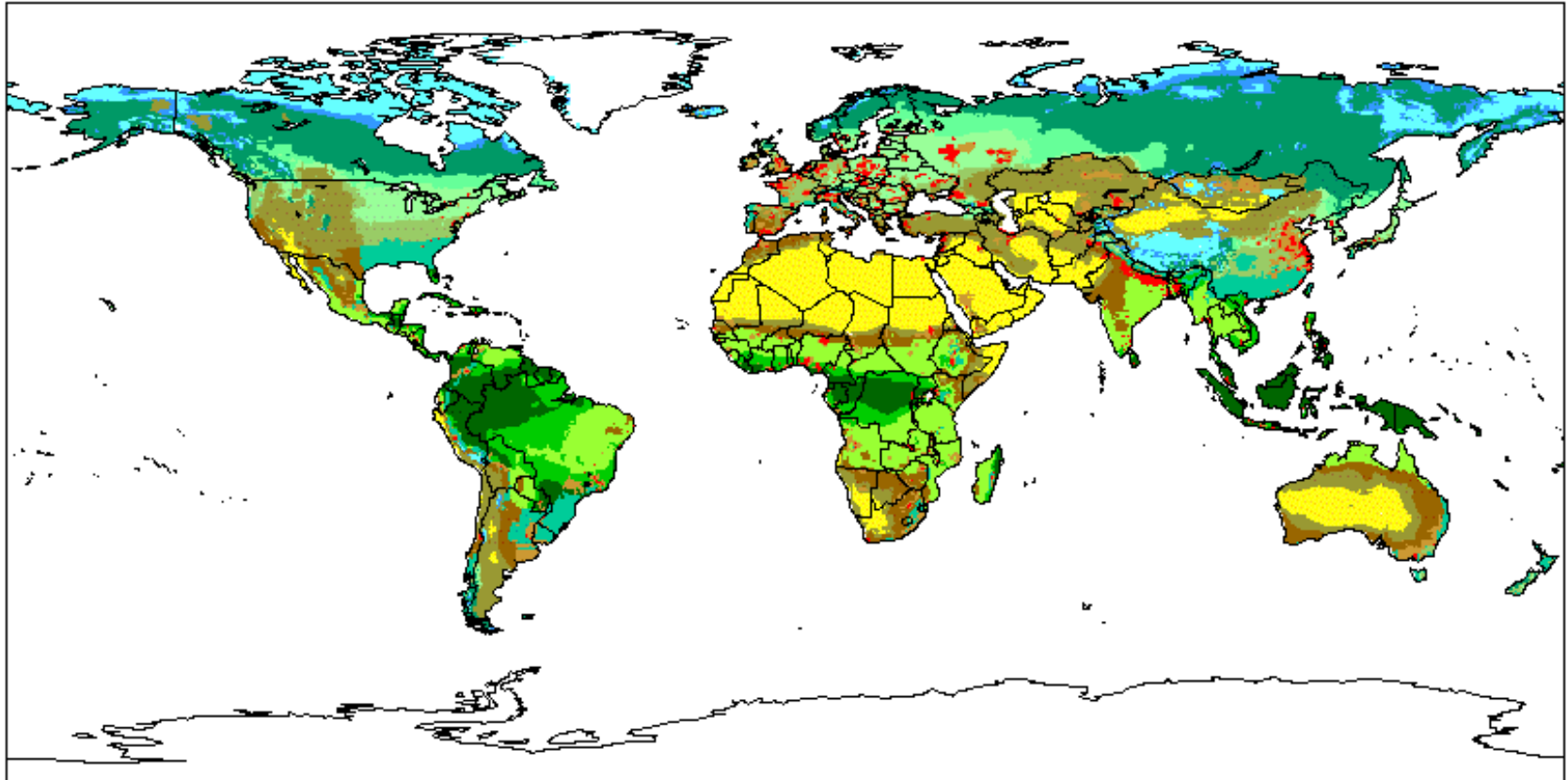
- Reconstructing past land cover changes
- Understanding land use dynamics
- Projecting land use/cover changes
- Identifying vulnerable and critical regions

# Global Land Cover Types 1700 to 1992



RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEU  
NATIONAL INSTITUTE OF PUBLIC HEALTH AND THE ENVIRONMENT

year 1700



BIOME 300

PAGES

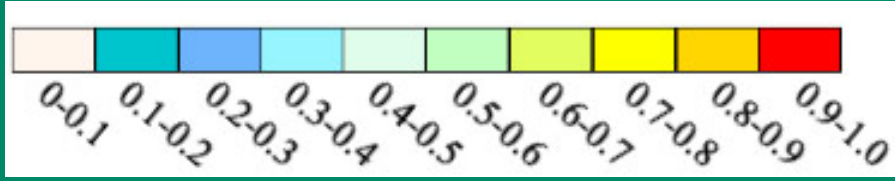
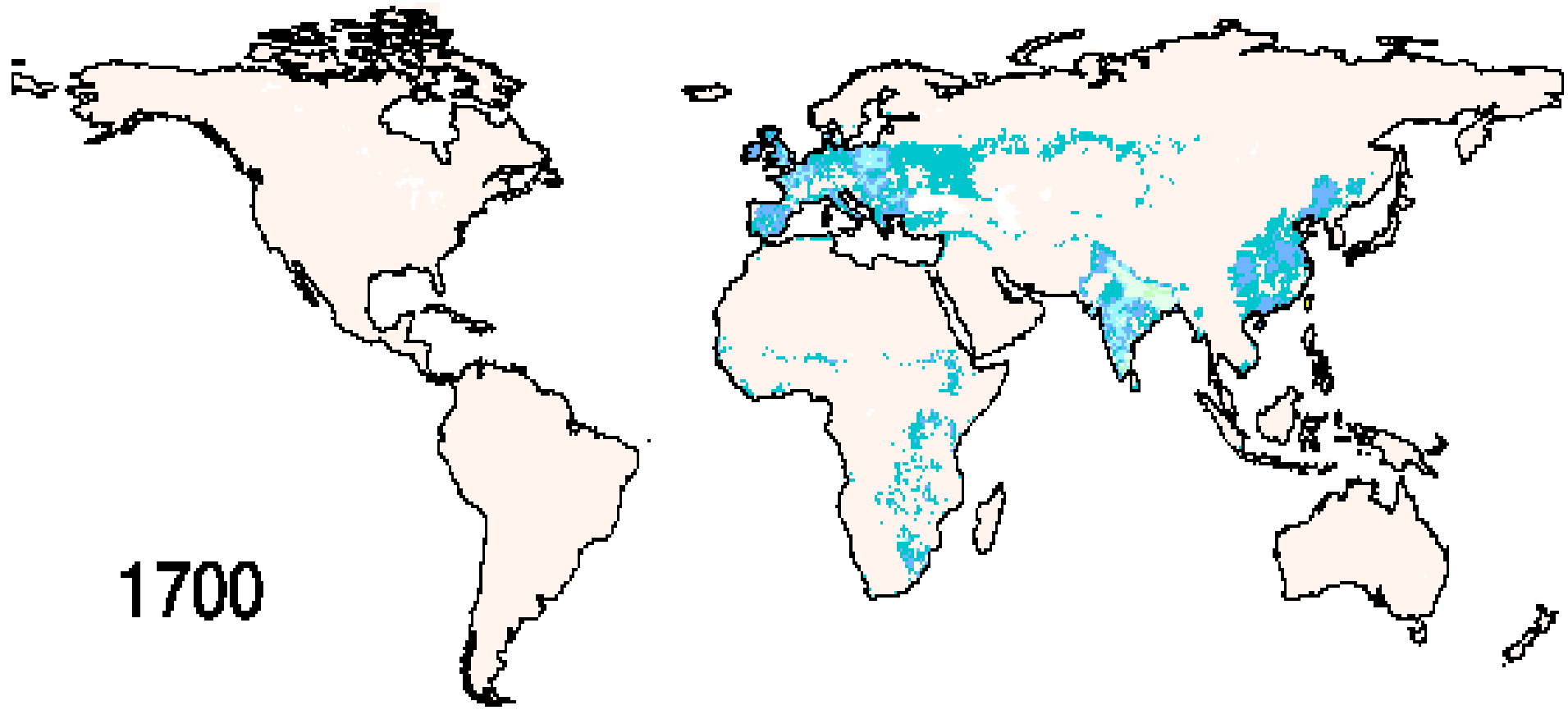




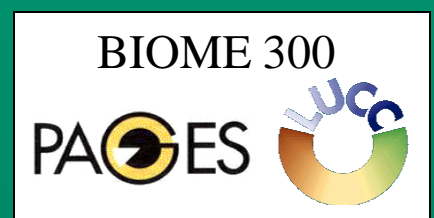
# Global Crop Cover Change 1700 to 1992



Center for  
Sustainability and  
the Global Environment  
Institute for Environmental Studies  
University of Wisconsin-Madison



Fraction of Grid Cell in Croplands





IGBP-PAGES Focus 5  
Past Ecosystem Processes and  
Human-Environment Interactions



# Human Impacts on Terrestrial Ecosystems (HITE)

## INTRODUCTION

The broad objective of the new HITE programme is to inform about the status, dynamics and sustainable management of terrestrial ecosystems now and in the future from the study of human-environment interactions in the past.

### Key questions include:

What have been the major human impacts that have influenced the ecosystems that we see at the present day?

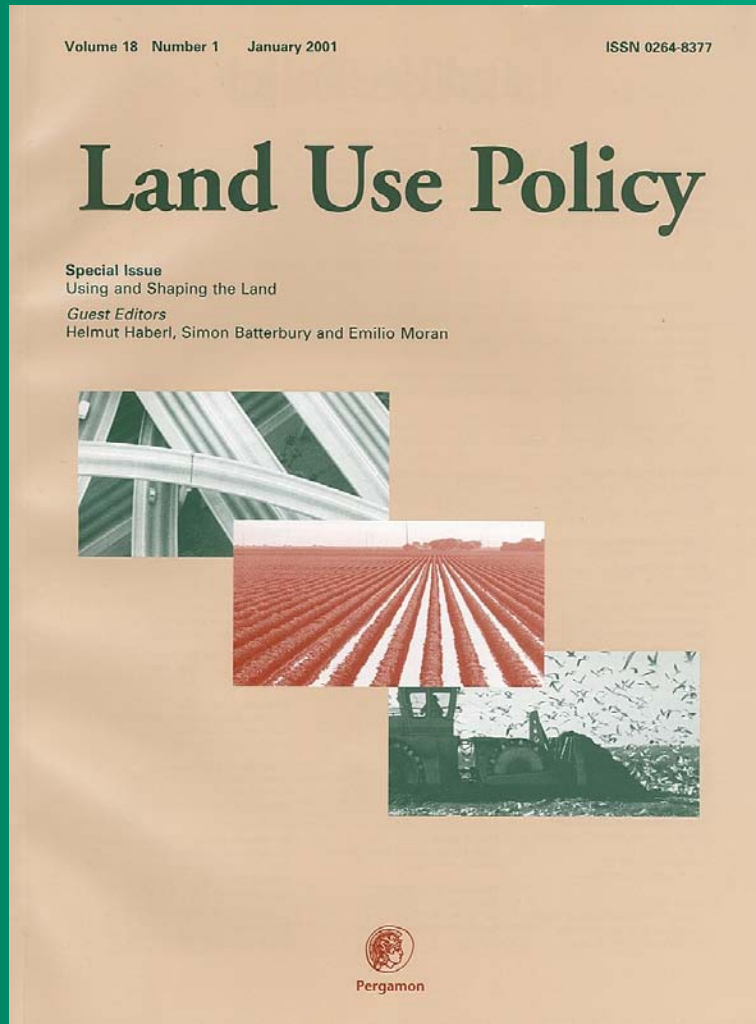
To what extent and in which ways are the changes brought about by the combination of human and natural influences threatening the future functioning of terrestrial ecosystems?

How may information about past conditions help inform about suitable land use or management strategies in the present and future ecosystem?

Is it possible to use records of past ecosystems to develop generalizations regarding the nature of nonlinear ecosystem dynamics, such as thresholds, response time-lags and recovery timescales?

What insights do palaeo-data give on frequencies and magnitudes of ecological change, especially those perceived as extreme events?

How can paleo-records interact with ecosystem modelling?



# Environmental Histories and Key Driving Forces



Land Use and  
Land Cover Change

**Reconstructing  
Past Land Use**

"Nature, Society and History:  
Long-Term Dynamics of Social  
Metabolism" Conference

Symposium: "Using and Shaping  
the Land: A long-term perspective"

Haberl, Batterbury and Moran (eds.)

# Case Study Database



Land Use and  
Land Cover Change

Understanding  
Land Use Dynamics

Search deforestation 1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss

Address http://129.79.99.180/RIS/RISWEB.ISA Go

Reference Web Poster Quick Search for References

Welcome to FOCUS1 On-line Database. Please select a database or search all databases available.

Search: ACT.pdt 0 references marked

Text to Search for: deforestation

Start Search Advanced Search Show Marked List Clear Marked List Database Description Help

Your search on *deforestation* resulted in 138 references. [Enter a new search](#)

Displaying references 1 through 10 0 references marked

Previous Page Next Page Mark Page Mark All Save Mark Show Marked List Export

- Barbosa, L.C. *The Brazilian Amazon: Rainforest Global Ecopolitics, Development, and Democracy*(Lanham, MD: University Press of America, 2000).
- Mather, A.S. and Needle, C.L. "The Relationships of Population and Forest Trends." *The Geographical Journal* 166 (2000): 2-13.
- Mertens, B. and Lambin, E.F. "Land-Cover-Change Trajectories in Southern Cameroon." *Annals of the Association of American*

Internet

- On-line (www)
- >1,000 records
- Searchable
- Keyword index

# What Drives Tropical Deforestation?

*A meta-analysis of proximate and underlying causes  
of deforestation based on subnational case study evidence*

Helmut J. Geist & Eric F. Lambin

LUCC Report Series No. 4



## Comparative Examination of Case Studies



Land Use and  
Land Cover Change

**Understanding  
Land Use Dynamics**

LUCC International Project Office  
Tropical Deforestation

LUCC Focus 1 Office  
Agricultural Intensification

Potsdam Institute of Climate Impacts Research  
Desertification

IHDP Industrial Transformations Project  
Urbanization



# Process ↔ Pattern Linkages



Land Use and  
Land Cover Change

Process ↔ Pattern

Address <http://www.indiana.edu/~act/focus1/mnm/> Go

## Meeting in the Middle

**Meeting in the Middle:  
The challenge of meso-level integration**  
An International Workshop  
October 17-20, 2000  
Ispra, Italy

*Organized by:*

    
LAND USE AND COVER CHANGE

**Focus 1**



*Hosted by:*

*With support from:*

 **Africover**

[FAO Land Cover Classification System](#)

**Meeting in the Middle**

- [Home](#)
- [The Challenge](#)
- [Agenda](#)
- [Abstracts](#)
- [Participants](#)
- [Logistics](#)
- [References](#)
- [Contacts](#)
- [Report](#)  
(Password required until report finalized)

# FAO-UNEP

## Land Cover Classification System




Land Use and  
Land Cover Change

Process ↔ Pattern

Land Cover Classification System

### Land Cover Classification System 1.0b7



Classification

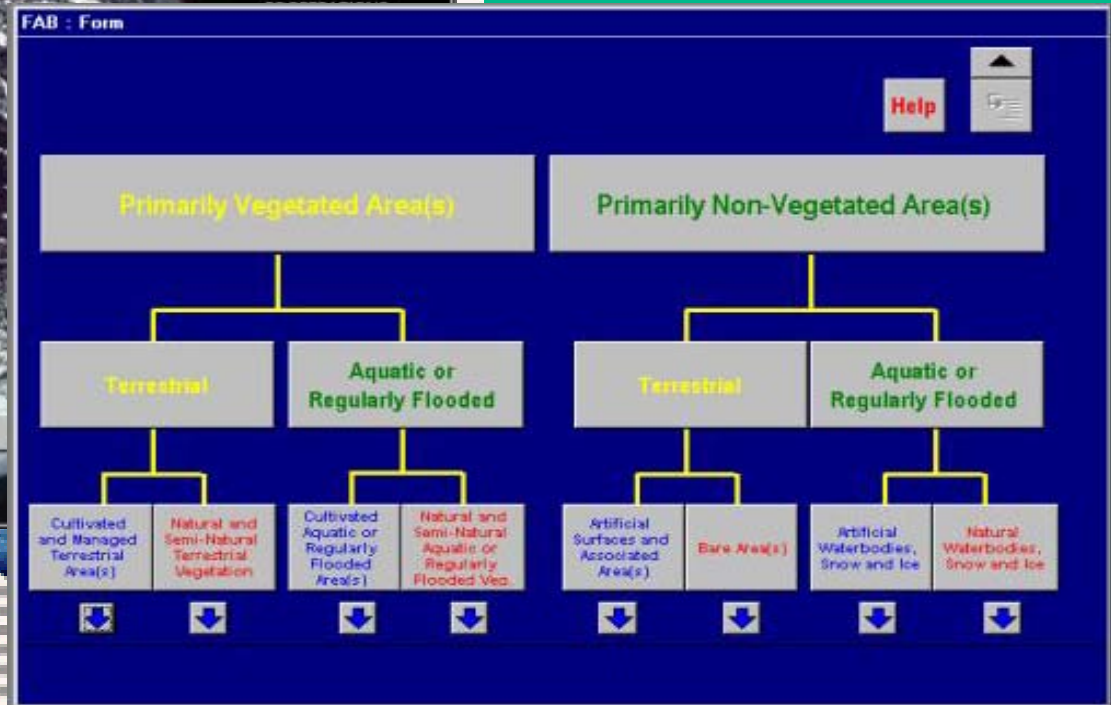
Legend

Field Data

Translator

Quit

Authors

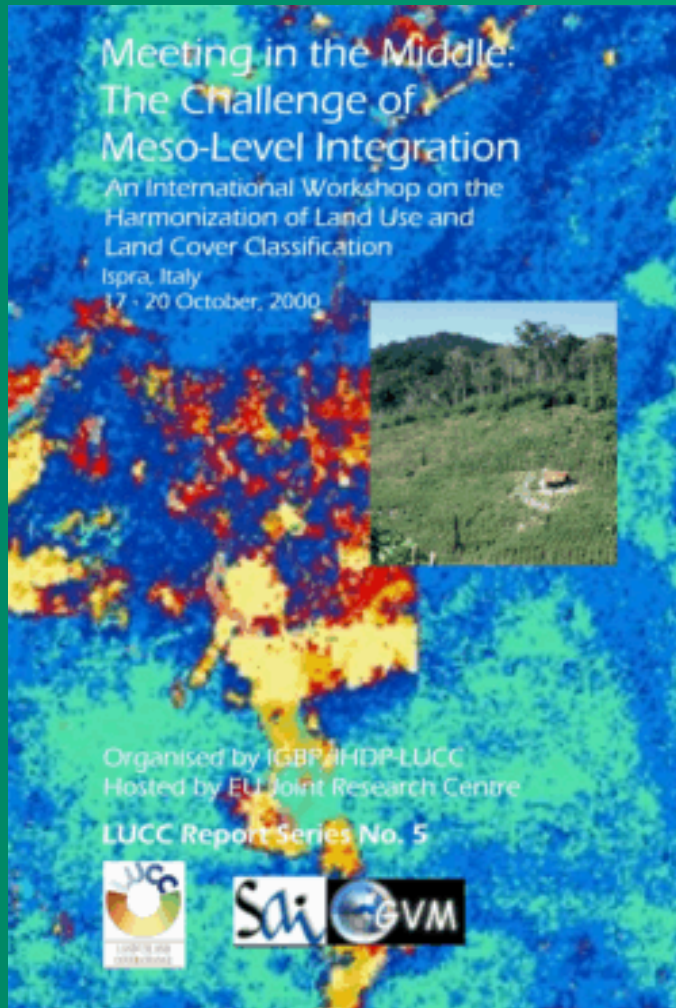


# Meeting in the Middle Workshop



Land Use and  
Land Cover Change

Process ↔ Pattern



## Conclusions Recommendations

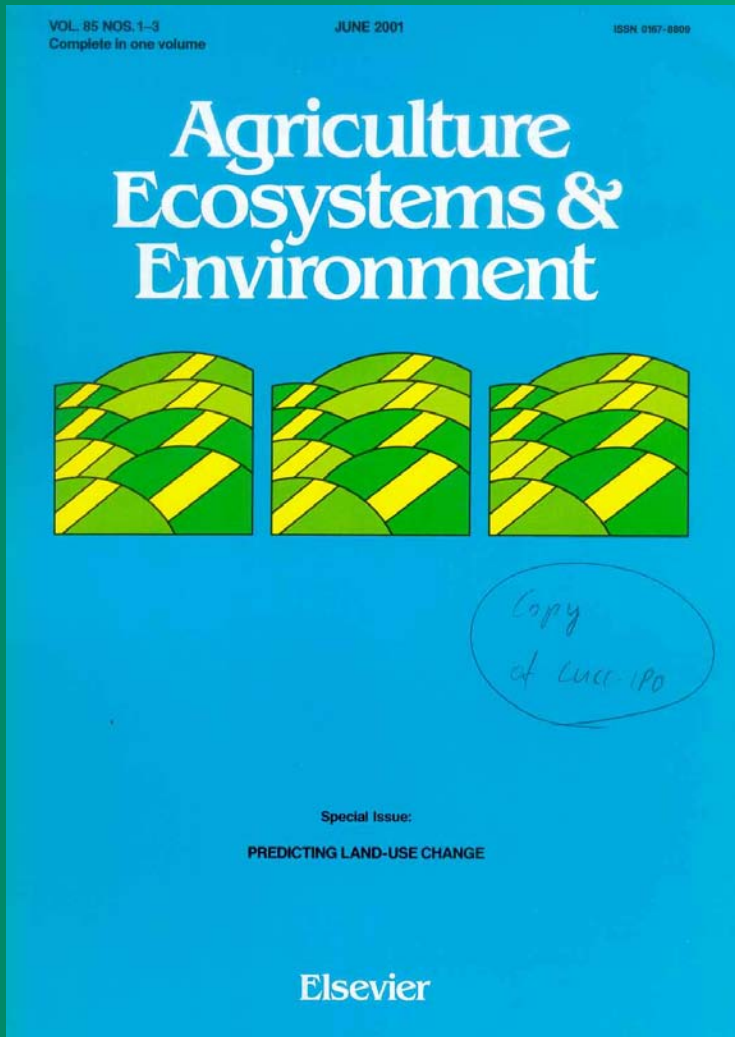
- LCCS useful for harmonizing land **cover**  
Should be widely tested by LUCC
- Preference for parallel land **use** system  
Mutually exclusive categories  
Classification criteria  
operations  
function/purpose  
drivers/contexts/triggers

# Special Issue: Predicting Land-Use Change



Land Use and  
Land Cover Change

**Projecting  
Land Use and Cover**



Mexico

Thailand

Kenya

Massachusetts

China

US Great Plains

Sudano-Sahelian Africa

Costa Rica

Ecuador

Southern Spain

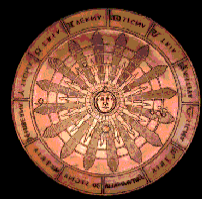


# Agent Based Modeling



Land Use and  
Land Cover Change

**Projecting  
Land Use and Cover**



**National Academy of Sciences**

Arthur M. Sackler Colloquium

Adaptive Agents, Intelligence and Emergent Human Organization:  
Capturing Complexity Through Agent-Based Modeling  
October 4-6, 2001; Irvine, CA



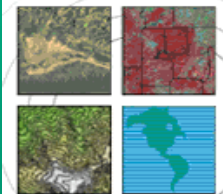
NATIONAL SCIENCE FOUNDATION

**Biocomplexity in the Environment**

ENVIRONMENTAL RESEARCH AT NSF



Center for Spatially Integrated Social Science



**cipec**

center for the study of institutions,  
population, and environmental change

Companion Workshop

Multi-Agent Systems for the Simulation of Land Use and Cover Change



# Vulnerability and Global Environmental Change

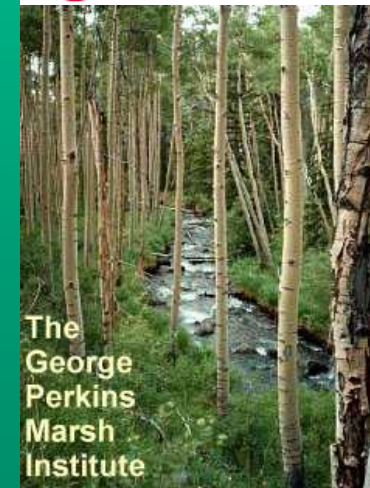
## An International Workshop

May 2001



Land Use and  
Land Cover Change

**Critical and  
Vulnerable Regions**



# Vulnerability and Global Environmental Change

## An International Workshop



Land Use and  
Land Cover Change

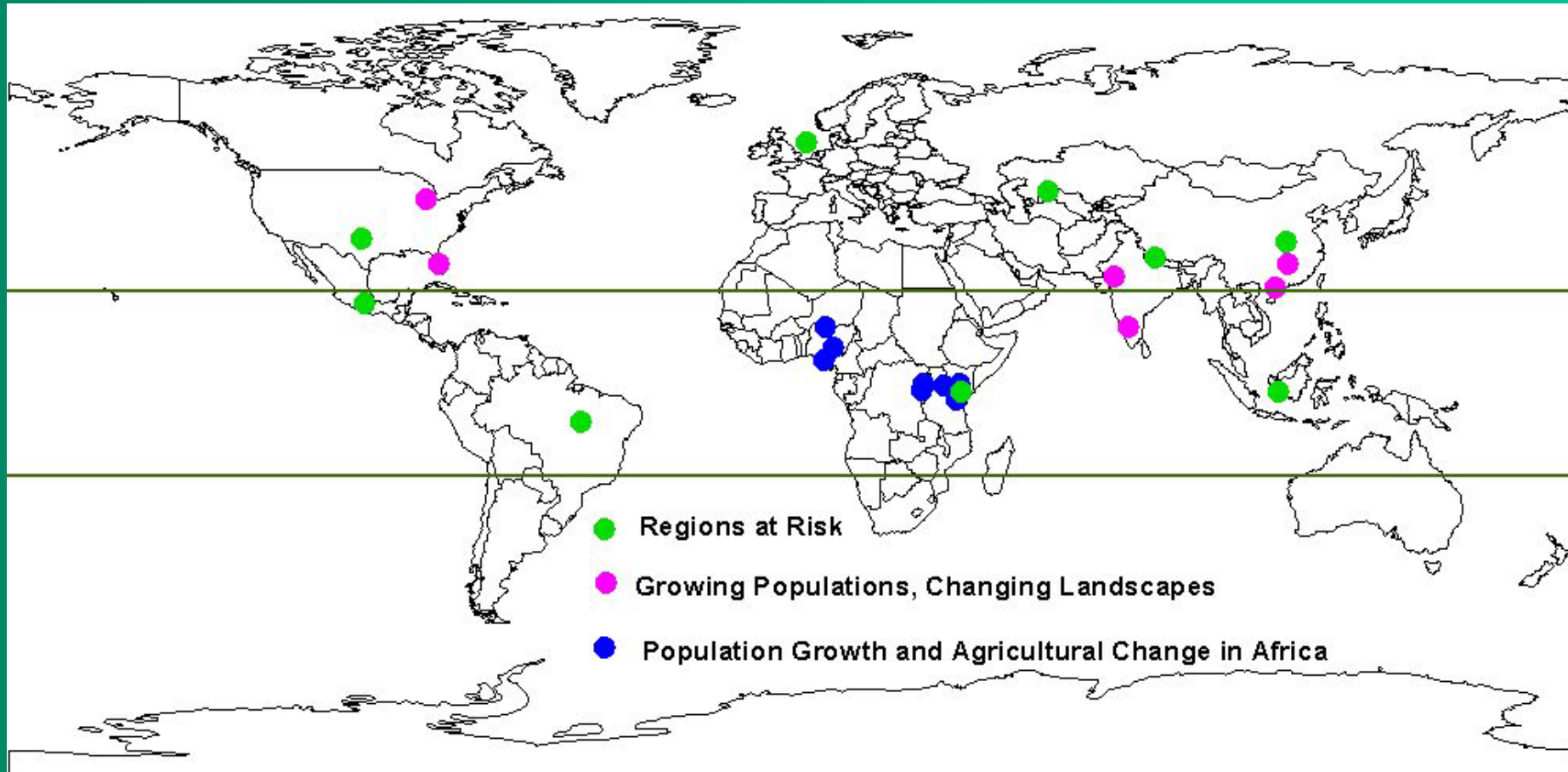
**Critical and  
Vulnerable Regions**

- Various definitions of vulnerability coalesce, but fail to achieve needed specificity
- Rigorous comparative studies not yet undertaken to demonstrate similarities and differences among concepts, models and exposure units
- Vulnerability has thus far paid scant attention to “endogenous” perturbations (i.e., arising w/in a coupled human-environment system)
- The disconnect between conceptual models and the metrics and indicators of vulnerability has constrained greater progress in the latter
- Vulnerability needs to be assessed within the context of multiple and cumulative stresses and perturbations
- The tendency of existing models to be linear limits their capability to deal with uncertainty, discontinuities and dynamic feedbacks
- Comparative studies, including retrospective studies, should be matched against theoretical models to provide a better understanding of conceptual strength, weaknesses and compatibility

# Land Use Trajectories in the Tropics



Land Use and  
Land Cover Change







# LUCC Symposium 2001



[Scope](#) | [Abstract/Full-Paper](#) | [Program](#) | [Registration](#) | [Logistics](#) | [Committee](#) | [Secretariat](#) |

## International Symposium on LUCC Contribution to Asian Environmental Problems

**Dec.13-14, 2001**

**Venue:**

Science Council of Japan

**Organized by:**

LUCC-Japan Committee,  
Science Council of Japan

**Supported by:**

IGU-LUCC (International Geographical Union)  
CIGR International Commission on Agricultural Engineering, Section I  
Center for Spatial Information Science, The University of Tokyo



**International  
Geosphere-Biosphere  
Programme**



**International Human  
Dimensions Programme on  
Global Environmental Change**



**Land Use and  
Land Cover Change**