Recent Agricultural Transitions in the Amazon Basin and their Biogeochemical Consequences

An LBA Synthesis Activity

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Goal

The goal of this activity is to synthesize the results of LBA and related research that has considered the recent agricultural transitions in the Amazon Basin and their biogeochemical consequences.

Transitions of Interest

A. *Agriculture in the cerrado region - case studies of transitions*
   1. Cerrado to pasture
   2. Pastures in transition (reformation, row crops such as soy)
   3. Cerrado to row crops

B. *Agriculture in the forest region - case studies of transitions*
   1. Forest to pasture
   2. Pastures in transition (reformation, row crops, agroforests)
   3. Forest to row crops
   4. Small scale slash and burn and alternatives (chop and mulch without fire) in the eastern Amazon

Consequences of Interest

Changes in:

- within system stocks and fluxes
- land-atmosphere interactions
- land-water interactions, and
- climate feedbacks

Additional Issues

- Cattle and trace gas fluxes
- Fire and trace gas fluxes

Scaling Process-level Understanding to the Region

A. A general strategy - Coupling remote sensing and simulation modeling

B. Remote sensing to document changes in land cover and land use – Landsat and MODIS

C. Simulation models - CASA, TEM, Century and so on

D. Regional extrapolations – remote sensing and simulation modeling

Agriculture and the climate system – local to regional consequences

A. *The importance of landscape mosaics (topography, vegetation cover, road networks) on precipitation*
B. *The concept of thresholds in relation to mosaic structure*

Alternative futures – scenarios of future land cover and land use

- *The scenarios – for the next two decades (based on current trends in the economy, climate and so on).*
- *Coupling simulation models and scenarios*

Research challenges

- *Human dimensions*
- *Biodiversity*
- *Policy alternatives, including approaches such as alternatives to slash and burn with small landholders*

Timetable

- November 2003-June 2004
  - Identify possible author teams
  - Revise outline through an “on-line workshop”
- July 2004 (workshop in Brasilia)
  - Set outline
  - Hold working group meeting on remote sensing-modeling links
  - Hold preliminary discussions on scenario set
- August 2004-December 2004
  - Compile data sets for scaling
  - Develop chapter outlines
- January 2005 (workshop, location to be determined)
  - Review driving data sets for scaling
  - Review chapter outlines
- February 2005-November 2005
  - Simulations for scaling – past, present and future
  - Drafting chapters
- December 2005-January 2006
  - Chapters out for peer review within the group
- February 2006 (final workshop at Ubatuba – use SCOPE RAP format)
- December 2006 – synthesis volume published