Intensive Agriculture –

- San Francisco Meeting – 2002

1. The group proposed a synthetic book in a LBA series
2. Several workshops to involve also non-LBA scientists in the synthesis process
3. Tentative time-line for synthetic book on intensive agriculture

First Workshop – Brasilia 2003

- According to this timeline → Workshop 1 was held in Brasilia from 2-4 November 2003
- Different LBA and non-LBA groups attended this workshop including biogeochemical, climatic and remote sensing aspects
- Approximately 30 participants including four Embrapa's centers (Environment, CPATU, CPAA and Cerrados)
- Product of the workshop – book outline

2nd Workshop – Brasilia 2004

- Revise book outline
- Revise timetable
- Hold working group meeting on remote sensing-modeling-scenarios links

Recent Agricultural Transitions in the Amazon Basin and their Biogeochemical Consequences

An LBA Synthesis Activity

Coordinators: Mercedes Bustamante and Jerry Melillo

Goal

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

Transitions of Interest

A. *Introduction (Melillo, Bustamante, Alves and Morton)*

1. Review the history of agriculture in the Brazilian Amazon including the role of remote sensing in documenting the changes in agricultural expansion
2. Consider socioeconomic drivers

B. *Agriculture in the cerrado region - case studies of transitions including biodiversity and land-water interactions*

1. Cerrado to pasture
2. Pastures in transition (reformation, row crops such as soybean)
3. Cerrado to row crops
4. Livestock and trace gas fluxes

C. Agriculture in the forest region - case studies of transitions including biodiversity and land-water interactions

1. Forest to pasture
   - Eastern Amazon
   - Central Amazon
   - Western Amazon
2. Pastures in transition (reformation, row crops, agroforests, pasture abandonment)
3. Forest to row crops
4. Small scale slash and burn and alternatives (chop and mulch without fire) in the eastern Amazon
5. Small scale no slash and burn
6. Livestock and trace gas fluxes

D. Fire and trace gas fluxes

E. Comparative analyses - General lessons learned

Consequences of Interest

Changes in:

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

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 (regional extrapolations

C. Simulation models – CASA, TEM, Century, DNDC and others - How global models will work for regional analyses? Data set needed by modelers? Are the parameters correct?

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*
- *Scenarios for climate and demography feedbacks – larger time scale- 50 and 100 years*
- *Coupling simulation models and scenarios*
- *Policy implications?*

Conclusions and Perspectives (Research needs)

- *State of current knowledge and future needs*
- *Biogeochemical unknowns and scenarios unknowns*