ASSESSING BIODIVERSITY IMPACTS OF LAND USE POLICIES IN BRAZIL AND CONGO BASIN
Shaenandhoa García-Rangel, Andy Arnell, Will Simonson and Val Kapos
MODELLING LAND USE CHANGE AND ITS EFFECTS

Future land use & cover

GLOBIOM: an economic land use model (IIASA)

Population Needs Preferences Income

Production & trade patterns

18 crops
5 forestry products
6 livestock commodities

Policy & Context (Moderators)

Brazil Measures to reduce deforestation including the Forest Code

Congo Basin Land use scenarios

Emissions
Production
Biodiversity
### Biodiversity Commitments

#### Brazil

- **CBD Aichi Biodiversity Targets through National Biodiversity Strategy and Action Plan:**
  - **National Target 5:** on reducing rate of loss of native habitats by at least 50% cf 2009
  - **National Target 12:** on reducing extinction risk and improving conservation status of threatened species
  - **National Target 15:** on enhancing ecosystem resilience and contribution of biodiversity to carbon stock through the conservation and restoration actions... as a contribution to climate change mitigation and adaptation

- Reducing ecosystem vulnerability – National Adaptation Plan
- National REDD+ Strategy & REDD+ Safeguards

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#### Congo Basin

- **CBD Aichi Biodiversity Targets through National Biodiversity Strategies**

- **Protect Great Apes in the Kinshasa declaration**

- **Managing Forests Sustainably – Regional Convergence Plan**

- **National REDD+ Strategy & REDD+ Safeguards**
BIODIVERSITY IMPACTS OF LAND USE POLICIES

- **Ecosystem types**
  - Broad categories
  - Transitions

- **Species**
  - Species groups
  - Individual species
  - Locations

- **Priority areas**
  - Protected areas
  - National importance
  - Regional/Global relevance

- **Biodiversity models**
  - Processes
  - Impacts
IMPACTS OF LAND USE POLICIES ON ECOSYSTEM TYPES

- Species vary between ecosystem types
- Even within broad categories
- An example from Brazil

Increase in total forest area can come as decrease in mature forest.

So options that lead to more forest restoration may not always be good for biodiversity.
IMPACTS OF LAND USE POLICIES ON SPECIES

- IUCN Red List species-ranges
- Spatial variability in the impact across Great Ape habitat
- Substantial habitat loss at the Western and Eastern edge of the distribution

Legend:
- Country boundaries
- Very large loss (>50%)
- Large loss (25-50%)
- Moderate loss (5-25%)
- Limited loss (<5%)
- No loss of habitat
IMPACTS OF LAND USE POLICIES ON SPECIES

BRAZIL

IUCN Red List species-ranges

Percentage of habitat lost (2010-2050)

Jaguar (Panthera onca)
Sun parakeet (Aratinga solstitialis)
Brazilian three-banded armadillo (Tolypeutes tricinctus)
Maned wolf (Chrysocyon brachyurus)
Golden-bellied capuchin (Cebus xanthosternos)
Chestnut-bellied guan (Penelope ochrogaster)

Business as usual  FC  FCnoCRA

*FC Full Forest  *FCnoCRA FC no Quotas
IMPACTS OF LAND USE POLICIES ON PRIORITY AREAS

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*ID Illegal Deforestation
*FC Forest Code
Impact Modelling

Projecting Responses of Ecological Diversity In Changing Terrestrial Systems

- A purpose-built database of biodiversity
- Information on human pressures
- Impact of land use change on biodiversity

Change in biodiversity indices:

- Abundance
- Species Richness
- Biodiversity Intactness Index

An entirely new approach to modelling ecosystems and biodiversity

- It is based on Net Primary Productivity and interactions between trophic levels
- Theoretically-based, high-resolution

It could help to inform about:

- Impacts of decisions on biodiversity and ecosystem services
- Trajectories of biodiversity change under scenarios of human development
CONCLUSIONS

Understanding the potential impacts of policy choices is crucial to meeting commitments on biodiversity.

Land use change modelling provides a useful way to approach this and shows a range of impacts – degradation and restoration are key pieces of this puzzle not yet well addressed.

Biodiversity impacts can be assessed in several ways:

- definitions are critical
- discussions with stakeholders are essential to pin these down and to identify the most useful and relevant assessment approaches.
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