Symposium

PES and REDD+ for sustainable land management in developing countries – case studies from Latin America, South East Asia, and Africa

Udo Nehren, Cologne University of Applied Sciences
Higher Education Excellence in Development Cooperation – exceed

— The CNRD is one of five competence centers for development cooperation in Germany, funded by the German Ministry of Economic Cooperation and Development (BMZ)

— CNRD is coordinated by the Institute for Technology and Resources Management in the Tropics and Subtropics (ITT) at Cologne University of Applied Sciences
Orientation towards Millennium Development Goal 7 (MDG 7) in research, teaching, and training
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Catholic University of Valparaíso, Chile
University Eduardo Mondlane, Mozambique
"The ninth-century collapse and abandonment of the Central Maya Lowlands in the Yucatán peninsular region were the result of complex human-environment interactions"

(Cook et al. 2012)
Maya civilization, depended on agriculture, technological and cultural progress

Growing population

Deforestation for agricultural land, urban expansion, building materials, etc. = internal pressure

Longest dry spell of the last 2,000 years = external pressure

Cook et al. (2012):
- Reduced annual precipitation
- Regional climate change, severe droughts

Few centuries later:
Change of regional climate towards moister conditions
In many areas forests expanded

Collapse of Maya civilization
Population reduced to 10% if its maximum
Civilization...

...technical progress
POPULATION OF THE EARTH

Number of people living worldwide since 1700 in billions

Source: United Nations World Population Prospects, Deutsche Stiftung Weltbevölkerung
The global climate of the 21st century

Carbon Dioxide Emissions

Carbon Dioxide Concentrations

Sulfur Dioxide Emissions

Scenarios:
- A1B
- A2
- B1
- B2

Range in 2100
Bars show the range in 2100 produced by several models

Temperature Change

Several models all SRES envelope

Model ensemble all SRES envelope

Sea Level Rise

All SRES envelope including land-ice uncertainty

Several models all SRES envelope

Model average all SRES envelope

Based on Figure SPM-5 of the WG1

Climate Change Scenarios
Earth System under stress – people under stress

Source: UNEP
Hans Carl von Carlowitz: *Sylvicultura oeconomica. Anweisung zur wilden Baum-Zucht* (1713): Nachhaltigkeit (Sustainability)

Wood scarcity in Central Europe; reforestation, “forest romanticism”; Acc. to Radkau (2008) start of the modern environmental movement

US: *preservation* (= nature set aside for its own sake) versus *conservation* (= managing for human use)

Source: United Nations World Population Prospects, Deutsche Stiftung Weltbevölkerung
POPOPULATION OF THE EARTH
Number of people living worldwide since 1700 in billions

- Club of Rome (1972): Limits to growth
- Brundtland report (1987)
- UN Conference on Environment and Development (UNCED), 1992 Rio Summit

Source: United Nations World Population Prospects, Deutsche Stiftung Weltbevölkerung
POPULATION OF THE EARTH

Number of people living worldwide since 1700 in billions

- UN Conference on Environment and Development (UNCED), 2012 Rio+20
- 2002 World Summit on Sustainable Development (WSSD) in Johannesburg
- Kyoto Protocol 1997

Source: United Nations World Population Prospects, Deutsche Stiftung Weltbevölkerung
Action on all fronts and at all levels

Researchers

Ecosystem management

Global climate change

Kyoto Protocol

Food security

Soil erosion

Biodiversity loss

Sustainable development

Desertification

Millennium Ecosystem Assessment

Sea level rise

Natural disasters

ICZM

Policy makers

IPCC report

Water scarcity

Sustainable development

IWRM

UNEP

Greenpeace

NAPA

NAMA

People

United Nations Conference on Sustainable Development

United Nations

RIO+20

International Monetary Fund

UNDP

FAO

GIZ

UNFCCC

United Nations

World Bank

Agenda 21

Millennium Ecosystem Assessment

Conservation International
Markets and economic incentives?
Biodiversity loss

„We'll lose uncounted new benefits. These are what the economists call opportunity costs, and they are enormous because we haven't even identified the vast majority of species out there.“

The crucial role of tropical and subtropical ecosystems
Deforestation is responsible for an estimated release of 5.8 billion tons of CO$_2$ equivalents per year, of which 96% are emitted by developing countries of the tropics (Stern Report 2006, IPCC 2007)
Protection from natural hazards

Disaster areas of the world
- volcanoes
- earthquakes
- cyclones/hurricanes
- droughts
(Sub)tropical countries prone to disasters

Population growth, economic growth

Population data for 2011 (CIA fact book 2012)
Economic data for 2011 (World Bank 2012)

Numbers = Average growth rate of real GDP 2007-2011
Consequences

Net change in forest area by country, 2005–2010 (ha/year)
Ecosystem Services for human well-being – The Millennium Ecosystem Assessment (2005)

Provisioning services (food, fiber, genetic resources, biochemicals, fresh water): demand of natural resources

Regulating services (climate, water, erosion, pest, disease regulation, and others): protection of natural resources
Paying people for sustainable forest and land use management?
Climate Change Mitigation

a) Reducing greenhouse gas emissions

b) Increasing their sinks: Optimizing forest and land use management

Deforestation and forest degradation in tropical rainforests: 12-20% of global GHG emissions (IPCC, 2007, van der Werf et al. 2009)

- Maintaining existing C pools
- Restoring lost C pools
- Creating new C pools

Low-cost GHG emission reduction

FAO 2010
Reducing Emissions from Deforestation and Forest Degradation (REDD)

Idea of REDD in the context of LULUCF

“Reducing Emissions from Deforestation in developing countries: approaches to stimulate action” requested by “Coalition of Rainforest Nations”

Bali Action Plan:
Sustainable forest management, participation of local communities and indigenous peoples

Copenhagen Accord:
Mobilization of financial resources from developed countries

Cancún Agreements:
Provide countries with guidance on REDD+ readiness

Kyoto Protocol 1997
Montreal (COP-11) 2005
Bali (COP-13) 2007
Copenhagen (COP-15) 2009
Cancún (COP-16) 2010

Concentration of REDD+ projects in rainforest countries of the Amazon Basin, Congo Basin, and South East Asia
REDD vs. PES

REDD

Financial compensation for C storage or emission reduction through forest management and reforestation

REDD+: sustainable use of forests and benefits for local communities

Monetary value for stored C; included in international carbon trade system

Projects financed by international funds and grants, such as UN-REDD or FCPC (Forest Carbon Partnership Fund)

Currently: Developing methodologies and implementation in national policies

PES

Payments for sustainable ecosystem management to protect natural resources

Usually four ecosystem services:
- Carbon sequestration
- Water quality and availability
- Biodiversity protection
- Landscape beauty and tourism

Funding particularly for small farmers and land owners

Mainly governmental payments, no trading system
Potentials and Risks of REDD+ implementation in indigenous community lands in the Ecuadorian Amazon

Toa Loaiza-Lange, Udo Nehren, Gerhard Gerold
How can indigenous groups participate in the REDD+ mechanism?
Kichwas
Pop 80,000

Agriculture, livestock production, forestry

Shuar
Pop 45,000

Fishing, hunting, gathering forests products

Peasants

Extended families

Clan arrangements

Nuclear Family
Nearly 900 petroleum companies are active in NE Amazon (80% of the surface) (Larrea et al. 2009)

Road opening, expansion of agricultural & pasture lands, illegal logging -> annual loss of virgin forest 2000-2010 = 1.8% (FAO, 2011)
Legal Framework Analysis

**de facto vs de jure rights**

- **Local**
  - Indigenous Territorial Circumscriptions
  - "use, usufruct, manage and conserve renewable resources"
  - "inalienable, indefeasible and indivisible"
  - Constitutions recognize Pachamama rights
- **Global**
  - REDD+ Global Agreements
  - UN-Declaration on the Rights of IPs, ILO Convention No. 169. Free, Prior and Inform Consent (FIPC)

- **Benefit Sharing**
  - Autonomous territorial government
  - Consulted but non-renewable resources belong to the government
- **Oil Concessions**
  - Ecosystem Services: government regulates the production, provision, use and exploitation
- **Carbon Rights ownership**
  - National Development Plan (def >30% until 2030)
• REDD+ is known in the indigenous communities
• Unclear land tenure and overlapping of properties
• Shape & Limits of properties changed to allow oil concessions
• Actual territories do not match ancestral lands
• Kichwas and Shuar also used legal mechanisms for land titling to gain properties in non-traditional territories
• Land speculation, carbon rights - **Who will benefit?**
Case study II: Atlantic Forest of Brazil

Potential natural forest area
~1.0-1.5 million km² *)

Percentage of original forest area
~ 8.0% *) / 11.4-16.0% **)

Highly fragmented
~ 232,000 forest fragments *)

One of 25 biodiversity hotspots ***)

*) Fundação SOS Mata Atlântica / INPE 2009
**) Ribeiro et al. 2009
***) Myers et al. 2000
Serra do Mar corridor

Study Area of the German-Brazilian Research Project DINARIO

Atlantic Ocean
Close to megacity Rio de Janeiro: suburbanization processes, fragmented landscape, many small farmers

Lack of information about REDD+

Potentials for REDD+?
## Legal framework

### Kyoto and COP/MOP decisions (REDD/REDD+ framework)

<table>
<thead>
<tr>
<th>Law 4771/65</th>
<th>Law 6938/81</th>
<th>Law 9433/97</th>
<th>Law 9985/00</th>
<th>Law 11284/06</th>
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<tr>
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<td>Environmental Policy</td>
<td>Policy WRM</td>
<td>Protected Areas SNUC</td>
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<td>Law 11428/06</td>
<td>Lei Mata Atlântica Use and</td>
<td>Law 12187/09</td>
<td>National Plan for the</td>
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<td>protection of Atlantic Forest</td>
<td>National Policy</td>
<td>Control of Deforestation</td>
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<td>Climate Change - NPCC</td>
<td>- NPCD</td>
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**State level**: Pacto Federativo, State laws; REDD+ Programs i.e. Pará, Amazonas, Mato Grosso, Acre

**Regional level**: Policy and planning framework on regional and municipal level, in the study area in Rio de Janeiro for example: Plano de Manejo da Bacia Guapi-Macacu, Plano Diretor Cachoeiras de Macacu

| Carbon funding mechanisms for forest projects | CDM Projects | REDD/REDD+ Projects | Voluntary C-Markets / PES |

REDDy?  

Nehren et al. 2012
Upper Guapi-Macacu watershed

No additionality

PES for reforestation and management of small forest fragments:
+ biodiversity
+ carbon storage
+ water quantity and quality
+ tourism
Case study III: Deforestation and degradation of dry forests due for wood fuel extraction, Mutomo district, Kenya

Geoffrey Ndegwa¹, Dieter Anhuf², Udo Nehren³, Sabine Schlüter⁴, Miyuki Iiyama⁵

¹ University Passau
² Cologne University of Applied Sciences
³ ICRAF – World Agroforestry Centre, Nairobi
### Key figures Mutomo District (GOK, 2011)

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<tr>
<th>Location</th>
<th>Eastern province of Kenya</th>
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<td>Population / land area</td>
<td>About 180,000 (2009), 33,000 households, 20,400 km²; high population growth rate</td>
</tr>
<tr>
<td>Main sources of income</td>
<td>Casual labour (41%), remittances (21%), petty trading (18%), formal employment (3%) charcoal production (9%)</td>
</tr>
<tr>
<td>Rainfall</td>
<td>500-1,050mm (with 30% reliability)</td>
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<tr>
<td>Population below poverty line</td>
<td>65%</td>
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</table>
How can a PES scheme support sustainable land management and reduce deforestation and forest degradation?

- biodiversity
- carbon storage
- tourism

Household distribution by main cooking fuel

- firewood
- paraffin
- electricity
- charcoal

ICRAF 2012
Case studies IV and V: Vietnam and Indonesia

Hazards and environmental problems
Ecosystems under pressure

Slash and burn

Acacia and rubber plantations

Dam construction

Illegal mining
Evolving technologies and community-based monitoring for effective REDD+ implementation

University of Wageningen (The Netherlands), Cologne University of Applied Sciences, Vietnam Academy for Water Resources, Hue University (Vietnam)

Ecosystem and community-based adaptation to climate related disasters

Cologne University of Applied Sciences, Hue University (Vietnam)
Indonesia, Karimunjawa Island

Mangrove forest carbon stock mapping in small islands using remote sensing: above and below ground carbon mapping on medium resolution satellite image

Gadjah Mada University (Indonesia), Cologne University of Applied Sciences

Focus:
Baseline for REDD+ implementation
Community-based ecosystem management
Lessons learned so far

Much attention paid to economic approaches for land and ecosystem management, such as REDD+ and PES

Success strongly depends on the political, socioeconomic, cultural and ecological circumstances

PES successfully implemented in (sub)tropical countries; relatively low risks

REDD+ bears risks of top-down governance, land speculation, violation of indigenous rights, apart from technical challenges

REDD+ requires strong involvement of communities to improve knowledge and acceptance; safeguards for communities and ecosystems needed
Thank you very much for your attention

And thanks to the PhD students:

Toa Loaiza Lange (Ecuador)
Vanesa Rodriguez (Bolivia, Brazil)
Geoffrey Ndegwa (Kenya)
Arun Pratihast (Nepal, Vietnam)
Pramaditya Wicaksono (Indonesia)