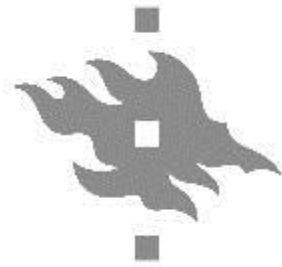




Climate, Energy and Forest Interlinkages in Green Growth,
Phnom Penh January 26, 2015



Green Economy Transitions in the Least Developed Countries (GET-LDC)

Multi-scale Analysis of Energy and Forest Use in Laos and Cambodia

Professor Markku Kanninen

Viikki Tropical Resources Institute (VITRI)

University of Helsinki

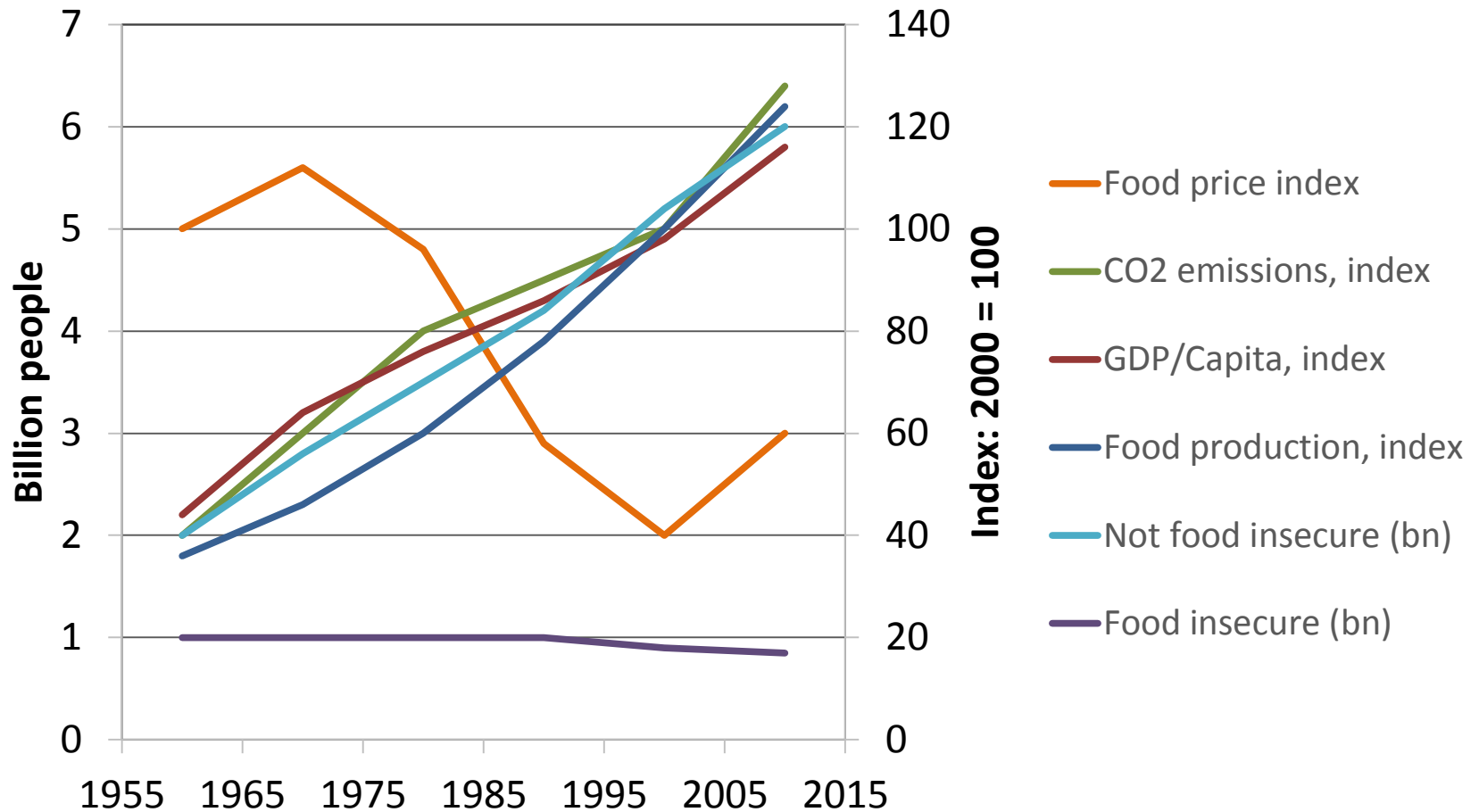


Green Economy and Development

- A green economy is
 - low-carbon
 - resource efficient
 - and socially inclusive
- In a green economy growth, income and employment are driven by public and private investments that
 - reduce carbon emissions and pollution
 - enhance energy and resource efficiency
 - prevent the loss of biodiversity and ecosystem services



Global developments 1960-2010





Land use sector - past and future

- During the past 40 years
 - Population from 4 to 7 billion
 - Global food production: 3-fold increase
 - Deforestation: 500 million hectares
- By 2050 - during the next 35 years
 - 9+ billion people in 2050
 - Changing consumption patterns
 - Continued economic growth
 - Increased climate variability and change



Sustainability agendas linked to land use and landscapes

MDG -> Post-2015 development agenda

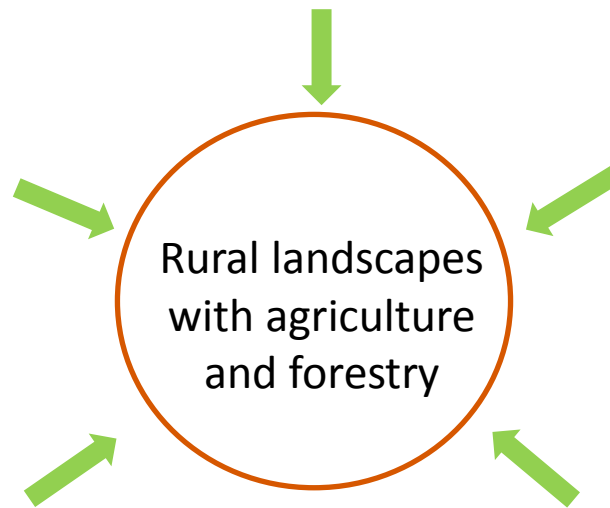
- Poverty reduction
- Sustainable Development Goals

Food security

- Nutrition and health
- Climate-smart agriculture and food systems

Mitigating and adapting to climate change

- Land-based sectors
- Increasing resilience of rural communities



Rural landscapes with agriculture and forestry

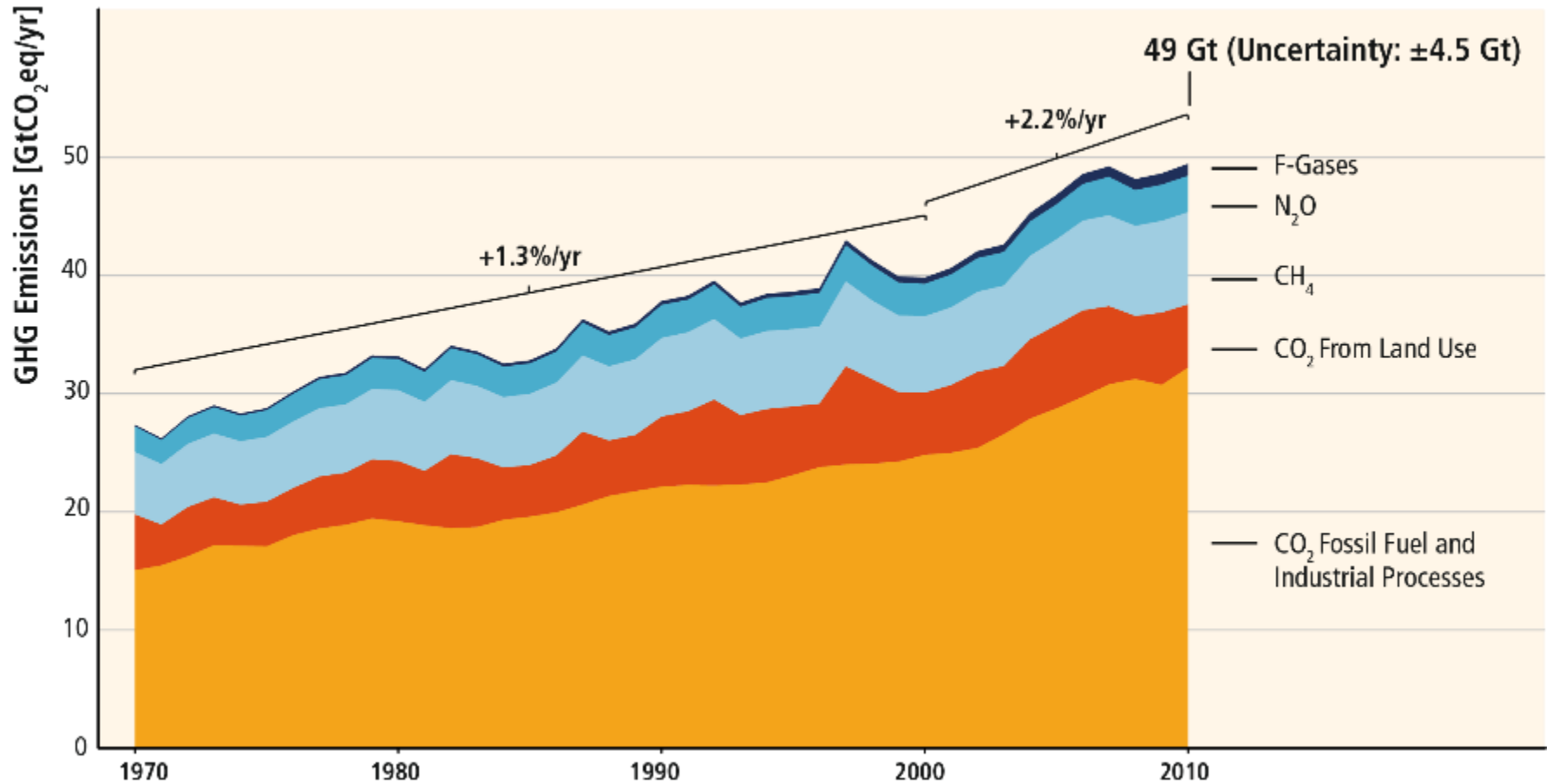
Maintaining biological diversity

- Conservation
- Sustainable use

Green economy

- Resource use efficiency
- Renewable energy solutions
- Improved livelihoods

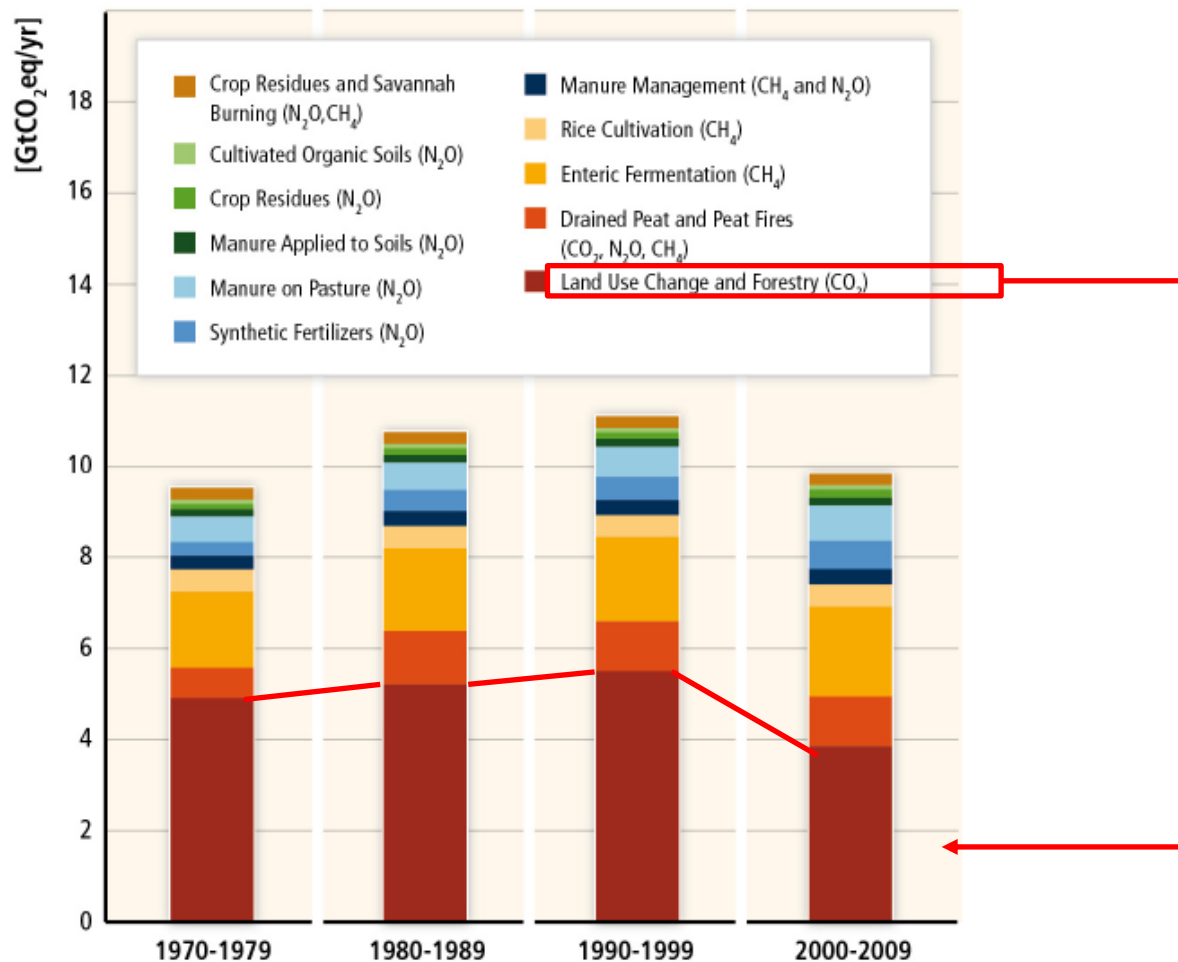
GHG emissions 1970-2010





Land-based emissions 1970-2010

Emissions from land use change and forestry are decreasing



During the last 20 years, emissions from land use change and forestry (LUCF) have creased to their levels in the 1970s

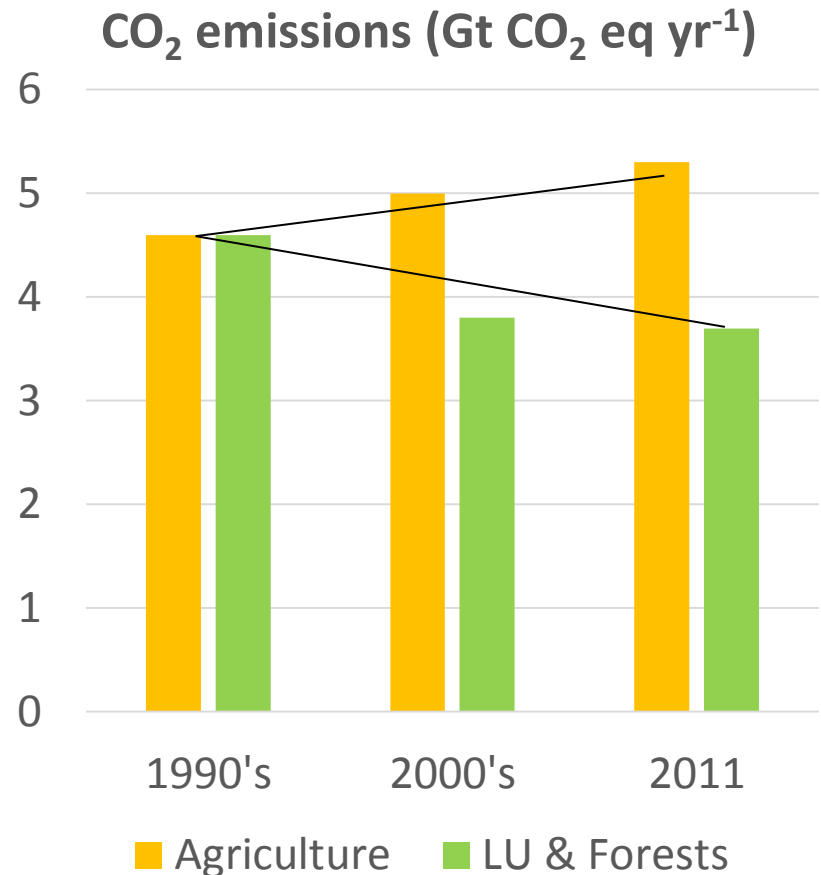


GHG emissions from AFOLU sector

AFOLU = Agriculture, Forestry & Land Use

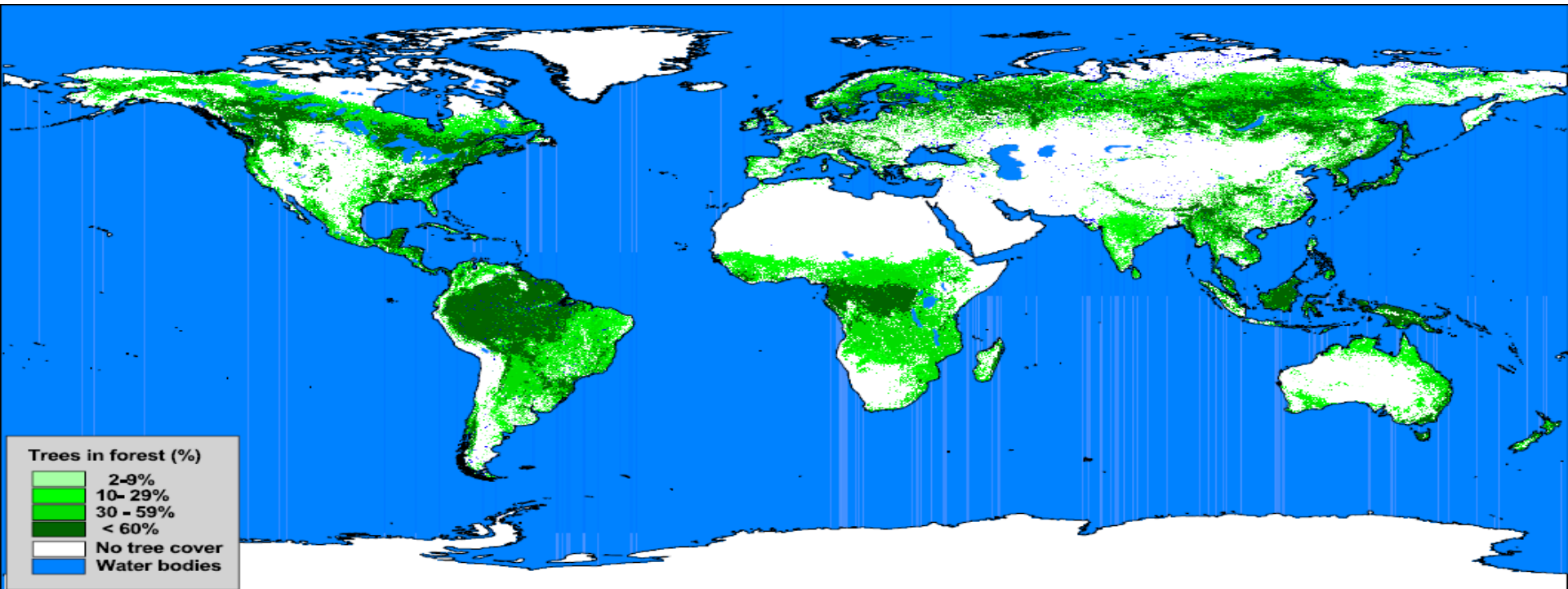
- AFOLU emissions = 24% of all the GHG emissions
 - Cf. transport sector 10%
- Recent trends
 - Emissions from land-use change and forestry have been decreasing
 - Emissions from agriculture have been increasing
 - In 2011: 1.4-fold difference

-> Increased emphasis in high-productivity, low emission agriculture





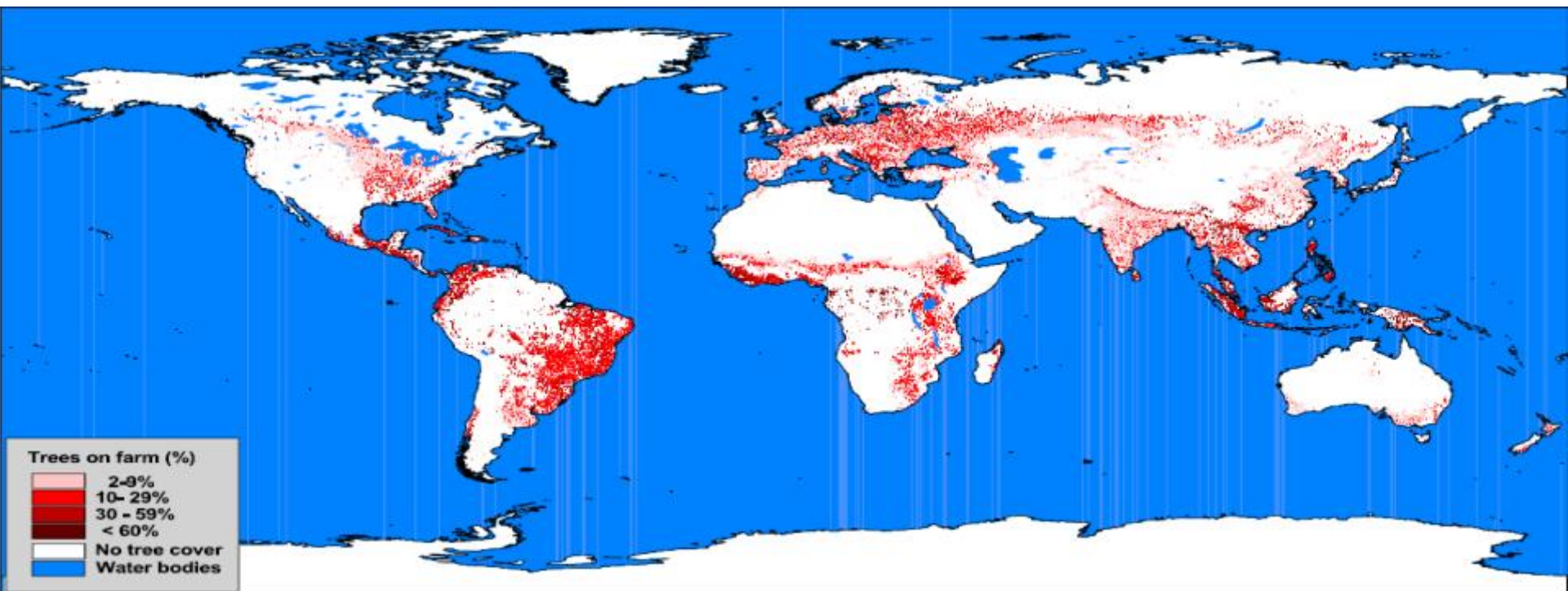
Tree cover in forest land



Source: ICRAF



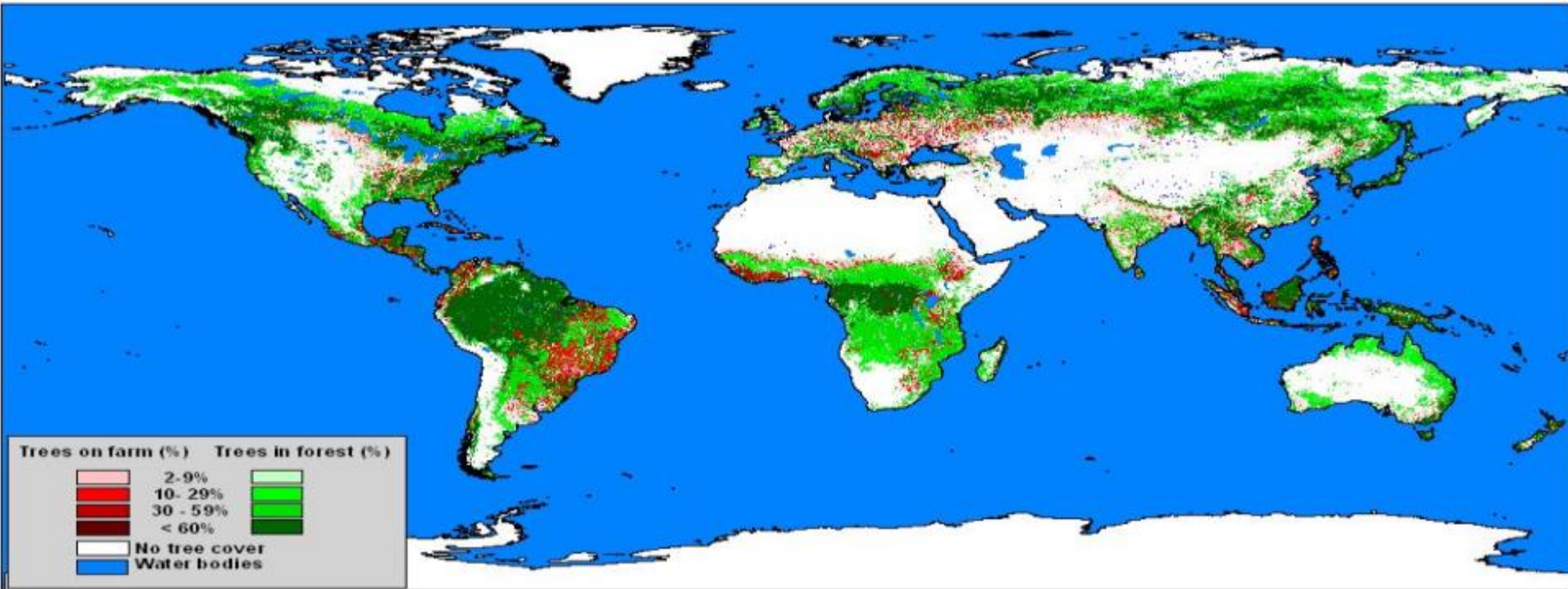
Tree cover in non-forest land



Source: ICRAF



Combined tree cover

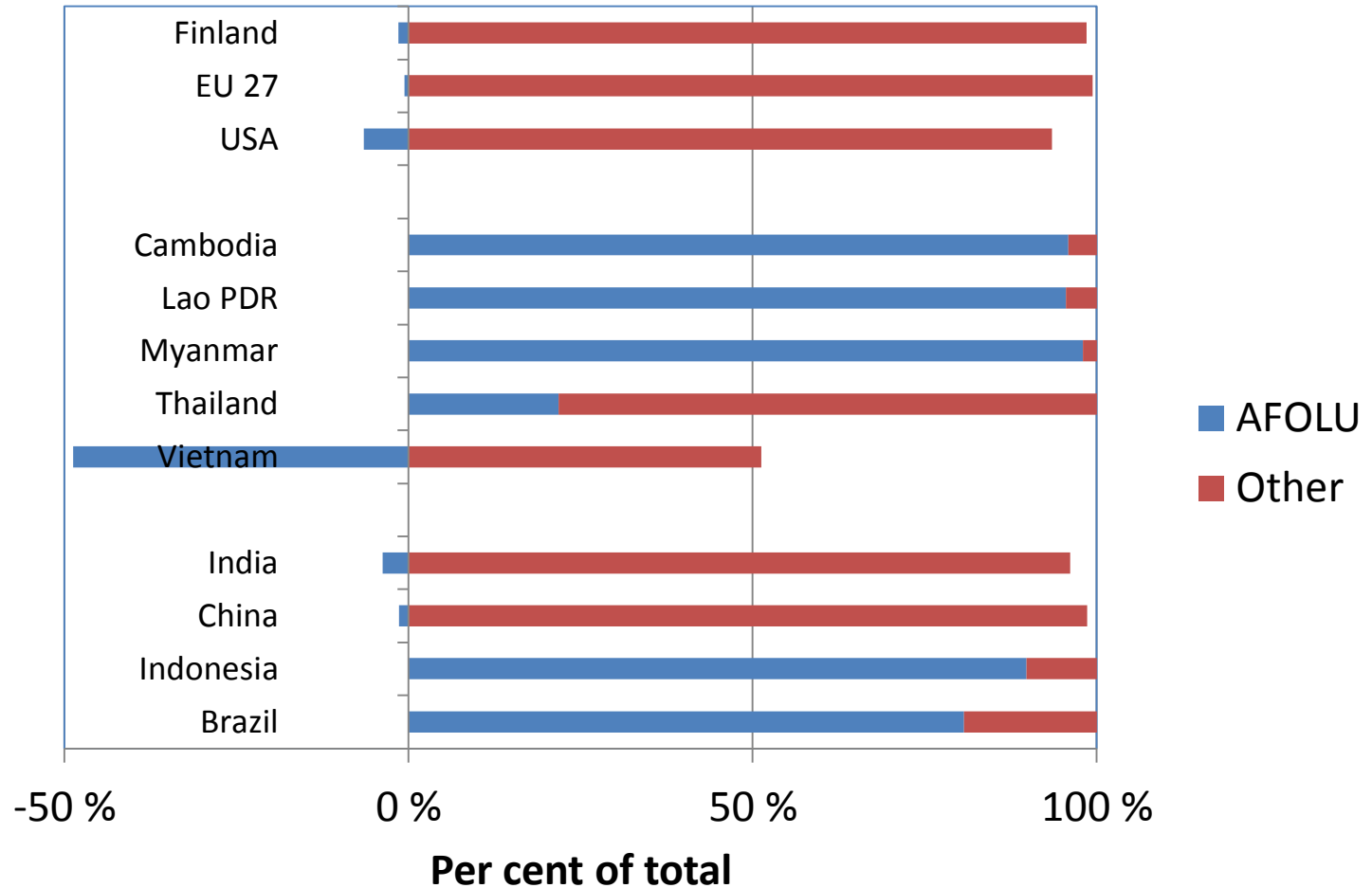


Source: ICRAF



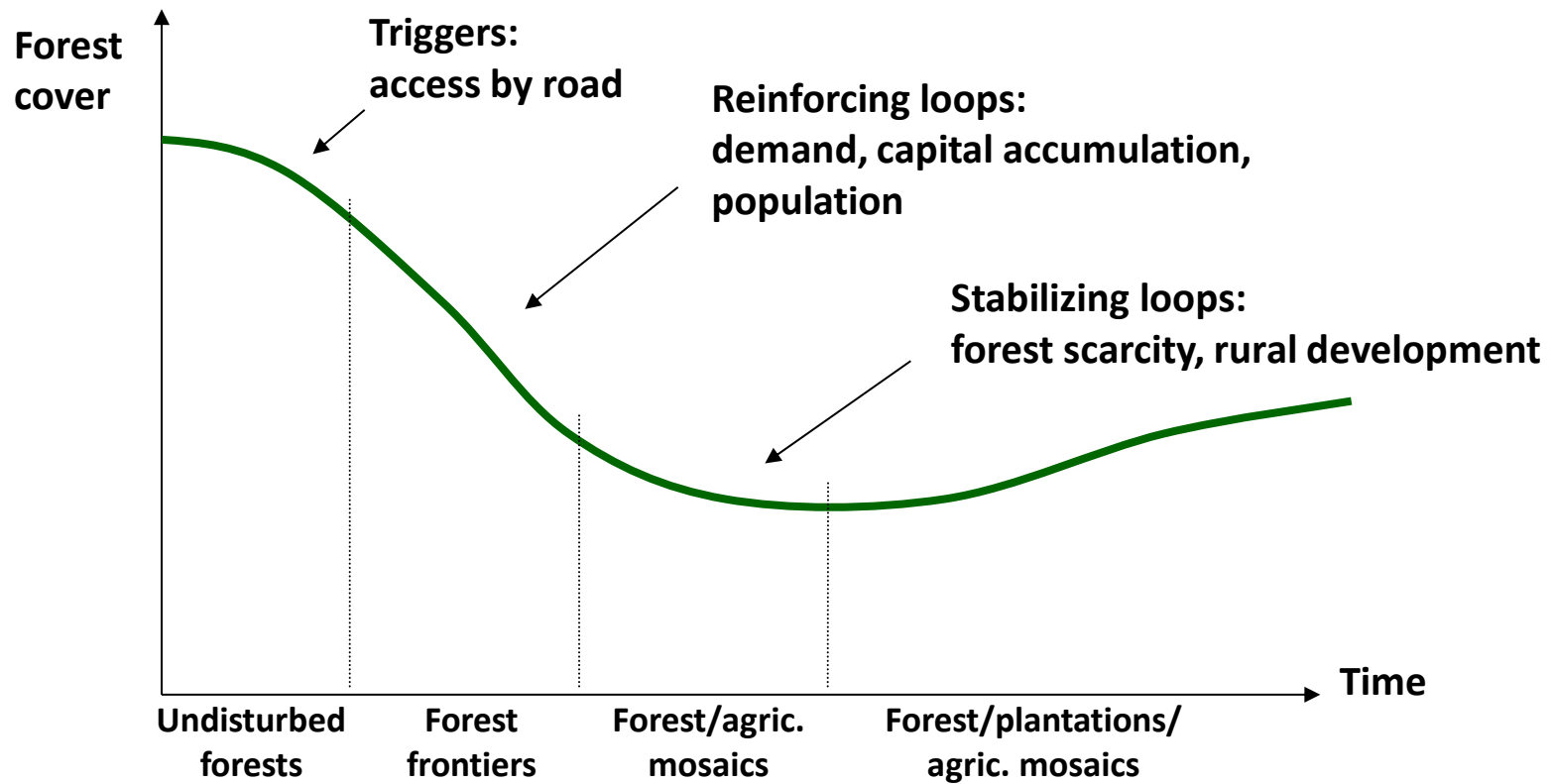
Total CO₂ emissions from AFOLU and other sectors (2000)

AFOLU =
agriculture,
forestry and
land-use



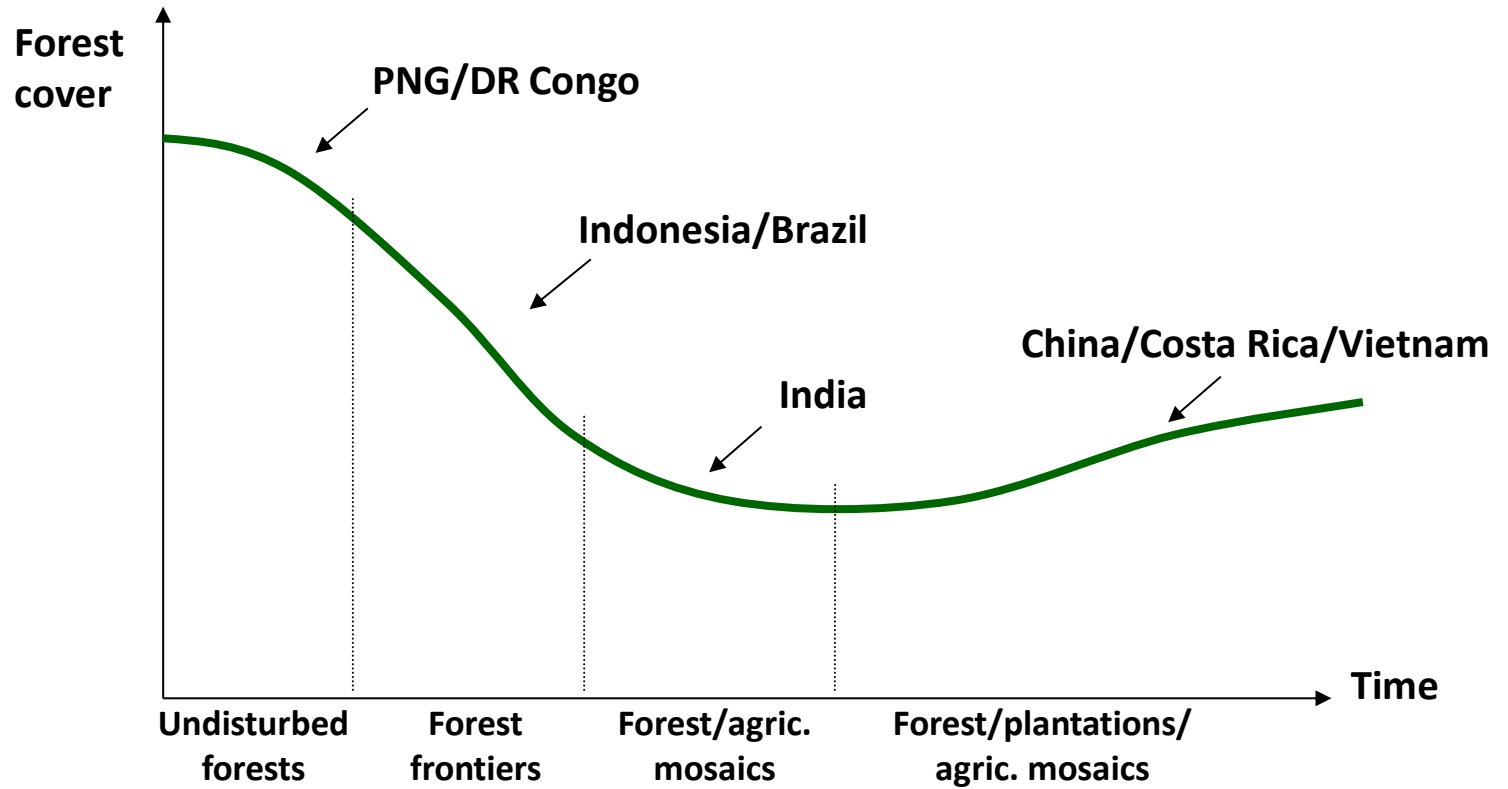
Data: WRI

Forest transition



Mather and Needle 1998

Forest transition

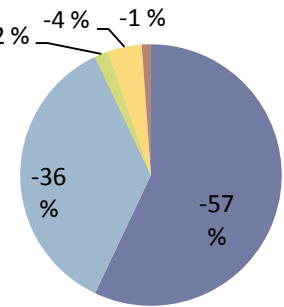




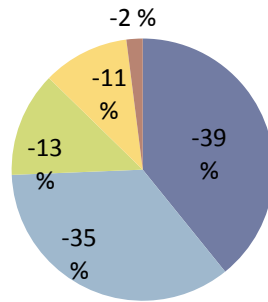
Forest transition in selected countries

	High Deforestation Rate (> 0.5% year)	Low Deforestation Rate (< 0.5% year)
High Forest Cover (> 40%)	Bolivia, Brazil, Cambodia , Indonesia, Lao PDR , Nicaragua, Papua New Guinea, Paraguay,	Democratic Republic of Congo, Colombia, Guyana, Panama, Peru, Costa Rica
Low Forest Cover (<40%)	Nepal, Ethiopia, Ghana, Liberia, Tanzania, Uganda	Vietnam, Kenya, Madagascar, Mozambique

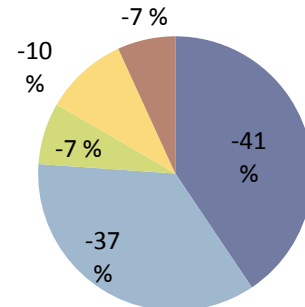
Drivers of deforestation and forest degradation



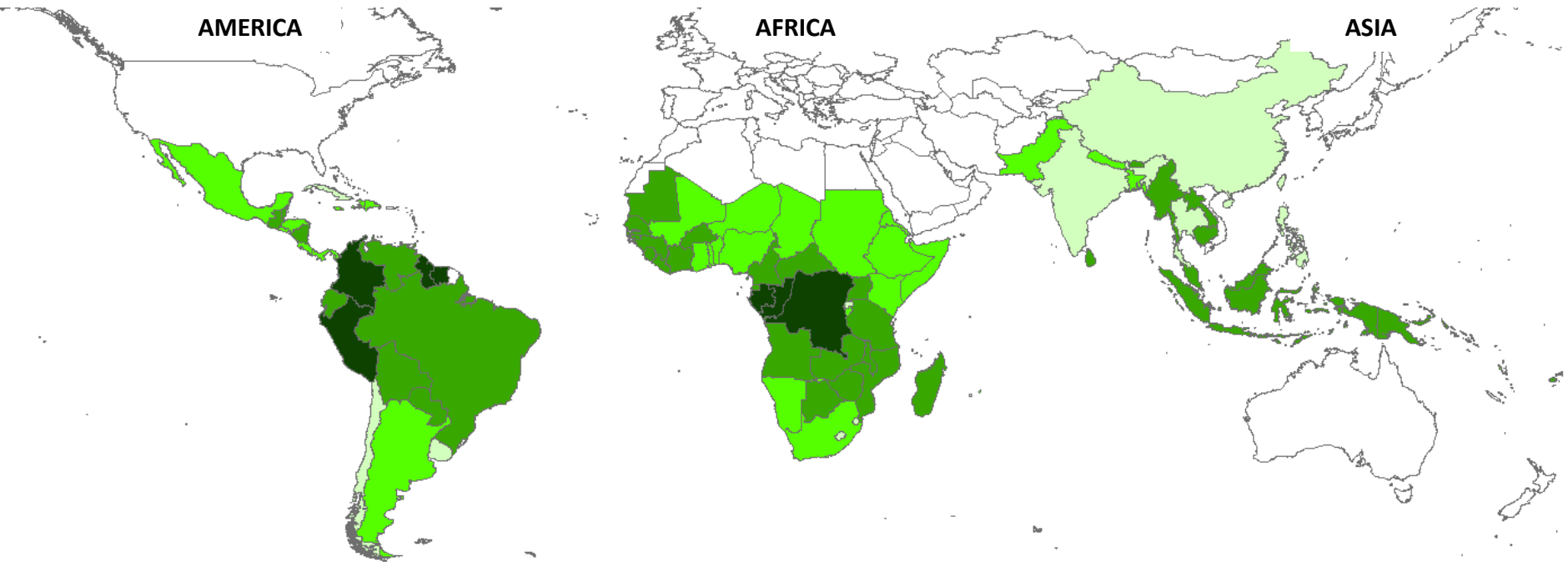
AMERICA



AFRICA



ASIA



Deforestation driver

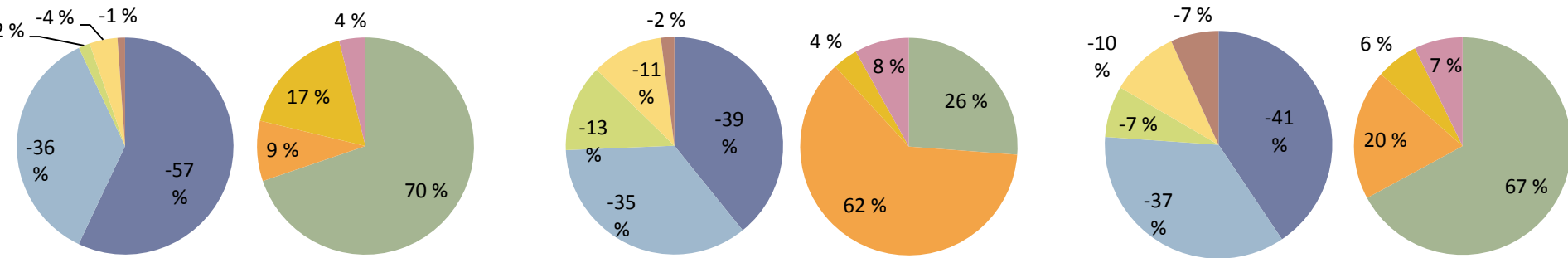


Forest transition phases



Hosonuma et al. (in press)

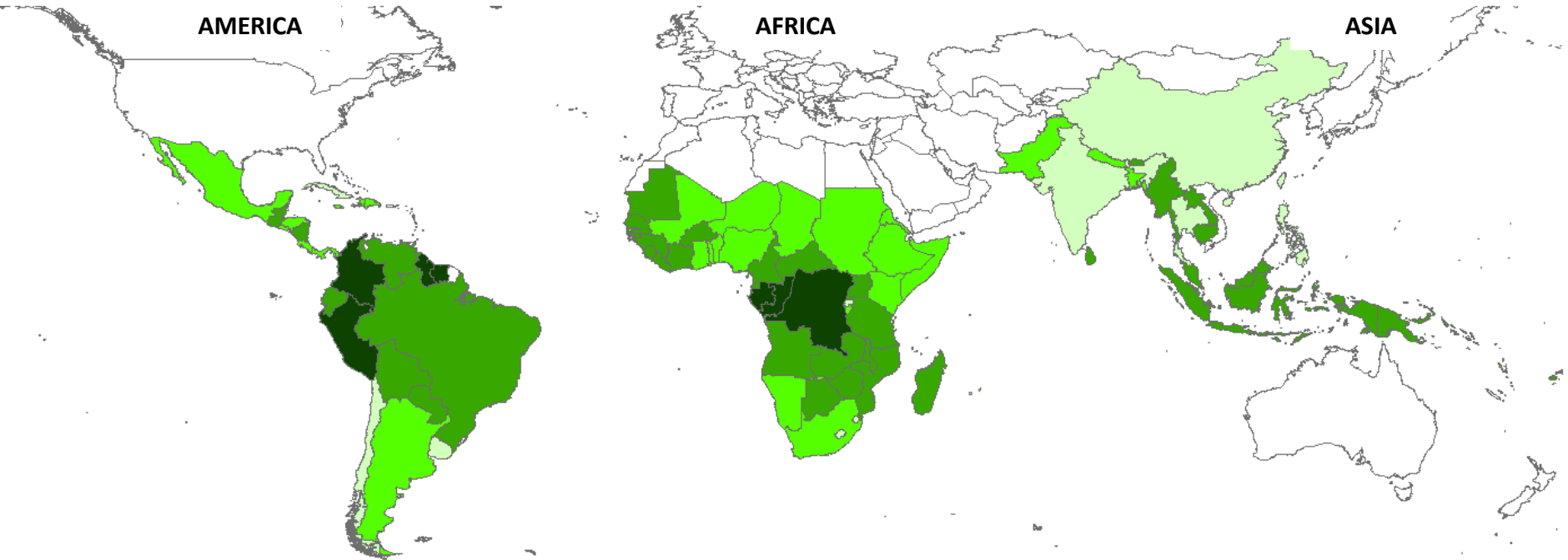
Drivers of deforestation and forest degradation



AMERICA

AFRICA

ASIA



Deforestation driver



Forest degradation driver



Forest transition phases



Hosonuma et al. (in press)



Forest transitions

Forest carbon (C) = Forest Area (ha) * Carbon Density (C/ha)

Changes in	Negative change	Positive change
Forest area	Deforestation	Forest expansion
Carbon density (carbon per hectare)	Forest degradation	Densification



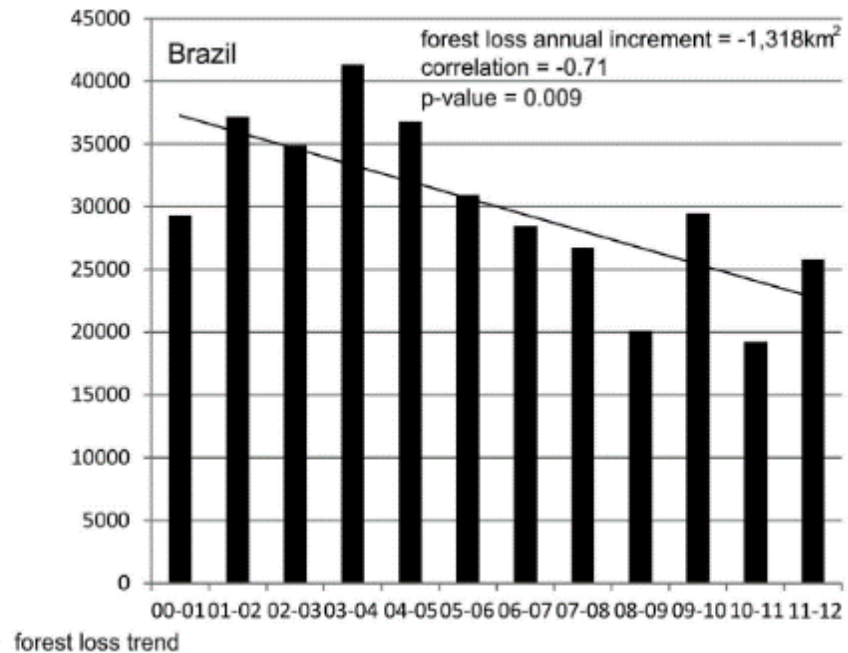
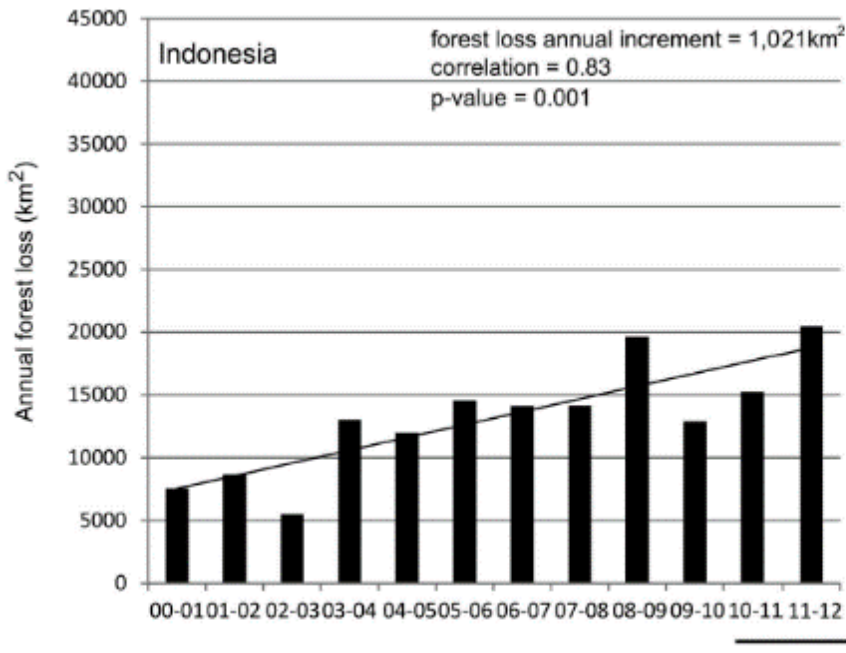
Initiatives

Forest carbon (C) = Forest Area (ha) * Carbon Density (C/ha)

Changes in	Avoiding negative change	Promoting positive change
Forest area	REDD+	Afforestation, Rehabilitation
Carbon density (carbon per hectare)	REDD+ Rehabilitation Restoration	Sustainable forest management, Agroforestry

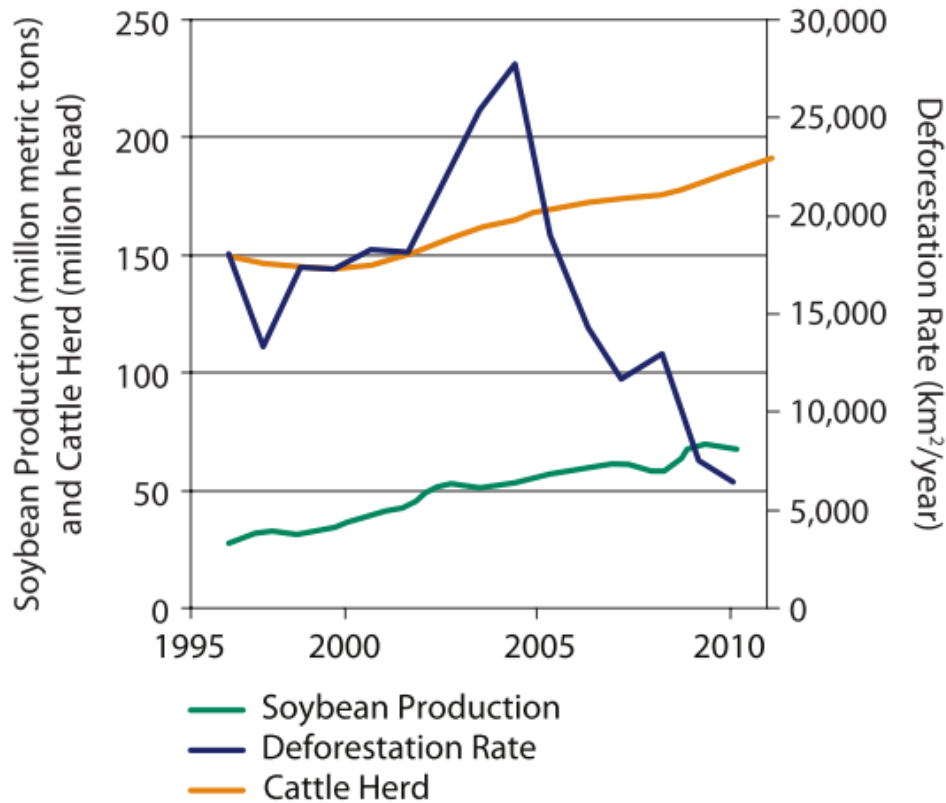


Annual deforestation rate in Indonesia and Brazil 2000-2012





Deforestation in Brazil is slowing down – a paradigm change?



Increased productivity:

- Decoupling agricultural productivity and deforestation

Enhanced government action:

- Increased tenure security
- Monitoring & law enforcement

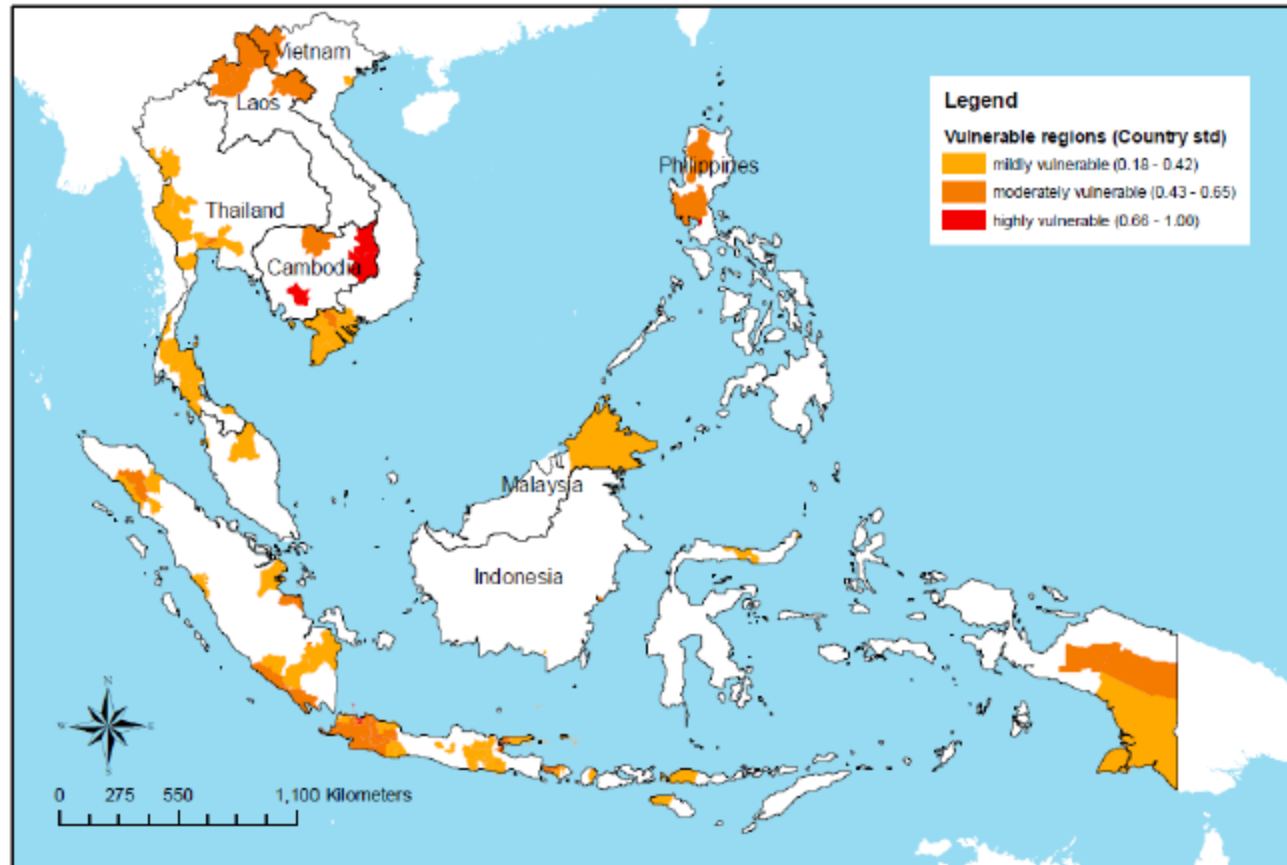
Value-chain action:

- Commodity certification

Figure after Boucher et al. 2011



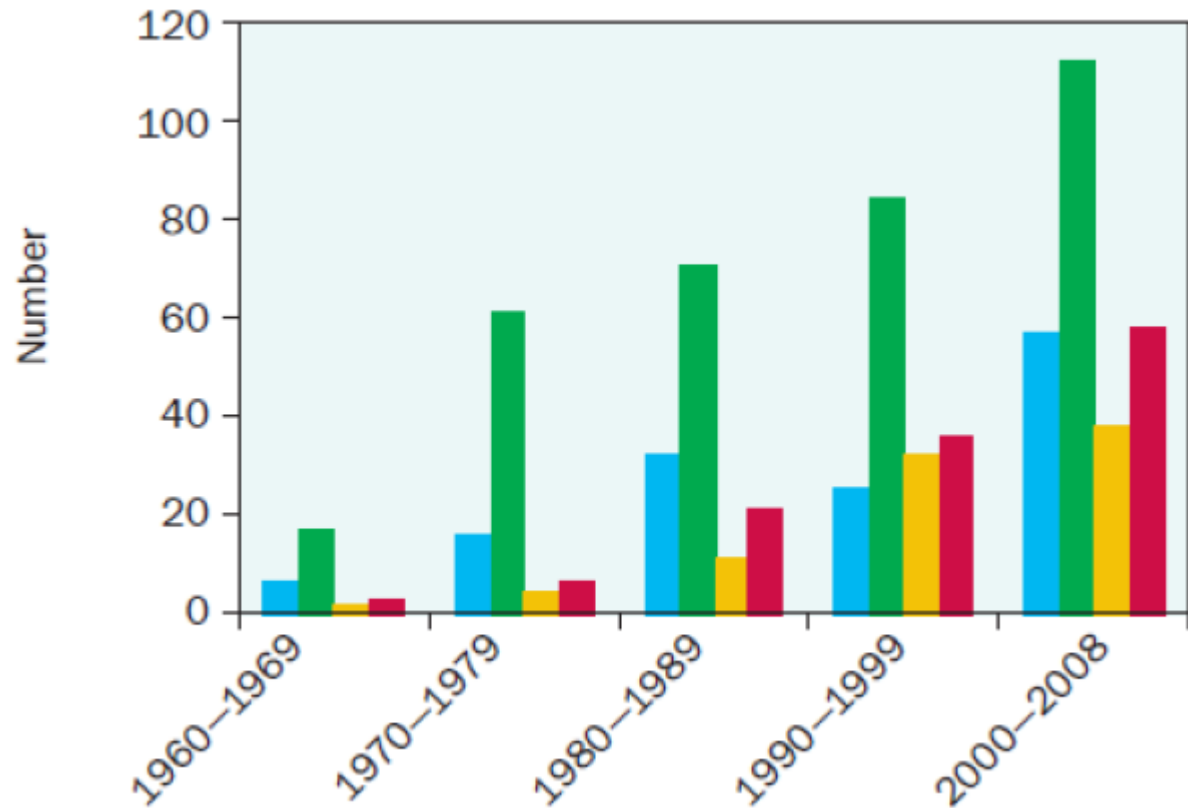
Map of the most vulnerable areas of South-east Asia





Increasing trend in floods/storms in four countries in South-east Asia

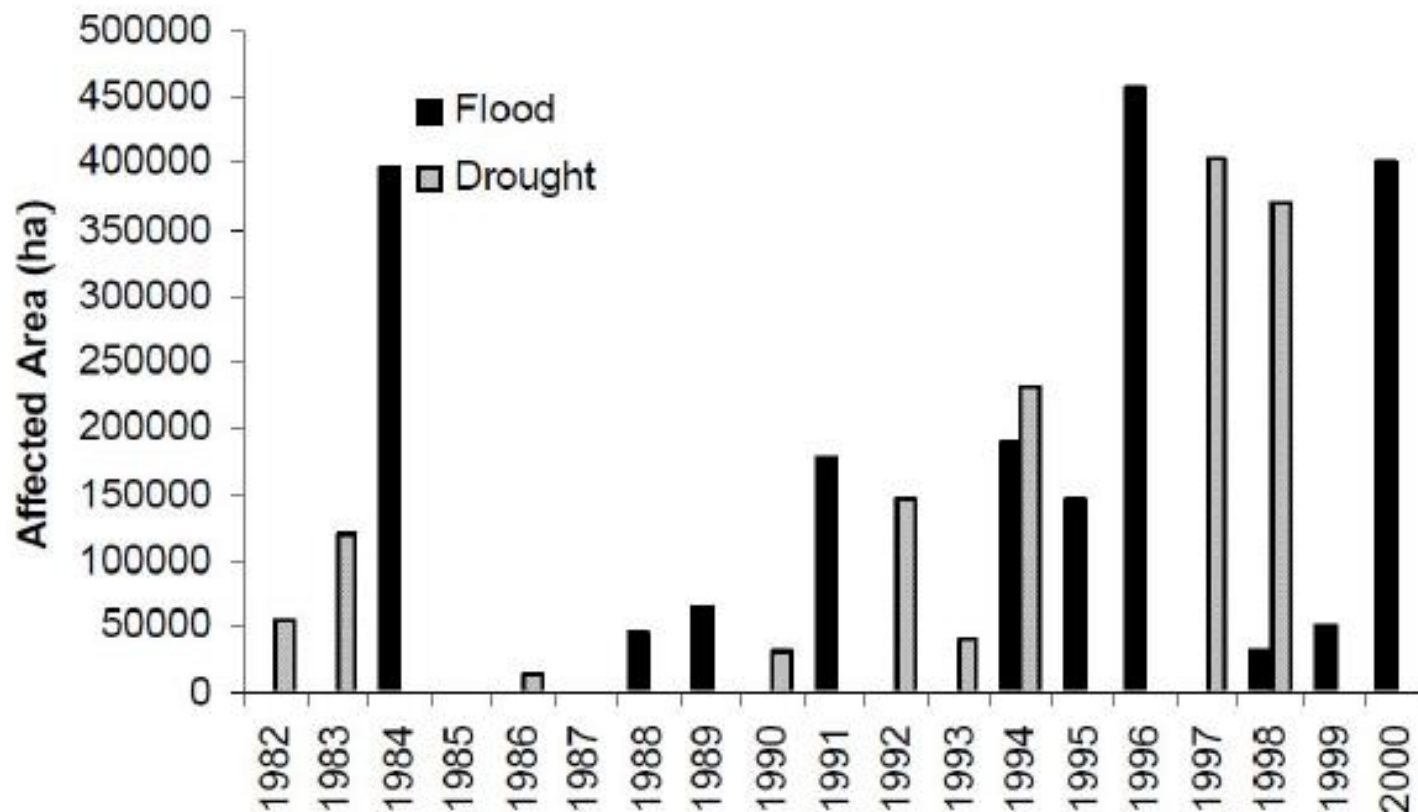
Blue = Indonesia
Green = Phillipines
Yellow = Thailand
Red = Vietnam



Asian Development Bank, 2009



Area of rice affected by droughts and floods in Cambodia 1982-2000



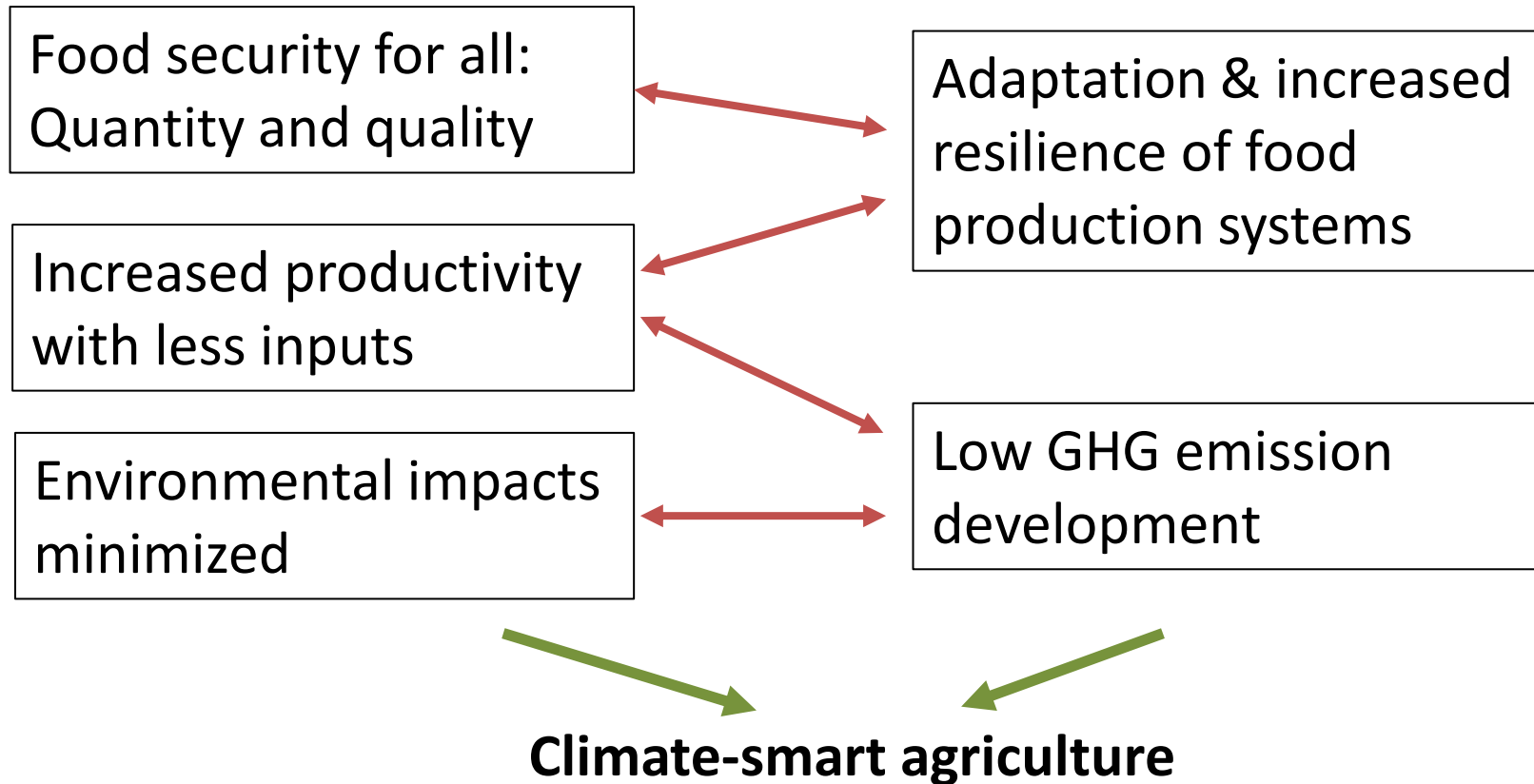
MoE. 2005. Analysis of Policies to Address Climate Change Impacts in Cambodia



Agriculture: major challenges

Sustainable human development

Climate change and variability



Forests for adaptation



- Forest can help reduce the vulnerability of poor people to impacts of climate change:
 - “safety net” function & livelihoods
 - local ecosystem services functions
- Forests can help reduce vulnerability of other economic sectors:
 - transport (fires and landslides)
 - water quantity and quality for hydropower, irrigation, drinking water

Rural landscape





**Green Economy Transitions in the Least
Developed Countries:
Multi-Scale Analysis of Energy and Forest Use
in Laos and Cambodia (GET-LDC)**

Research project 2014-2018



The objectives of the project

New, integrative research methods

- To develop a **research framework** to analyse the **nexus** of green economy and natural resources management taking into account the climate policy objectives
- To apply this **framework** to study **Laos** and **Cambodia** which are under pressure of intensifying their resource extraction

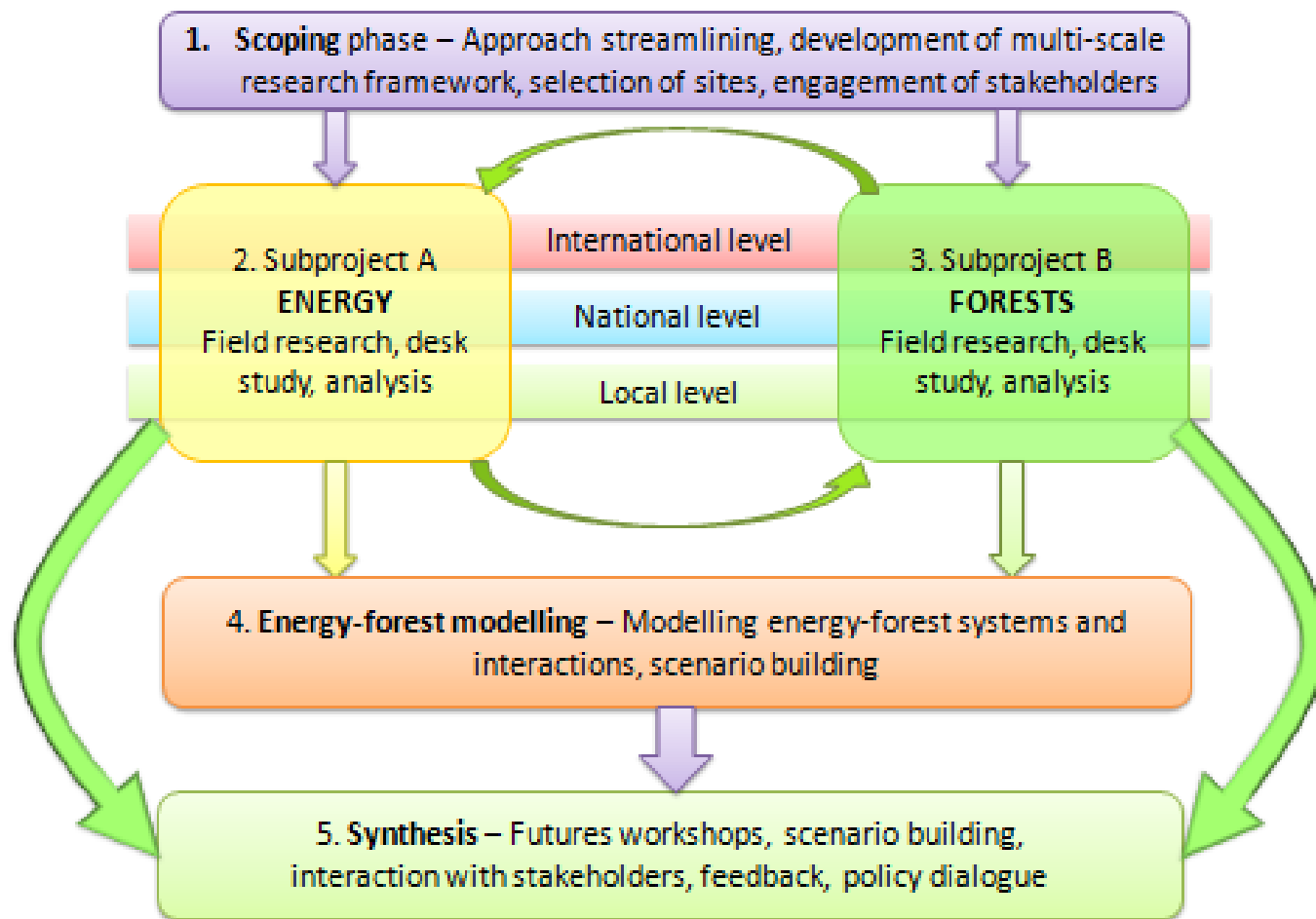


The objectives of the project

Multi-scale analysis

- To analyse what kind of implications **green economy** agendas have on **forest** and **energy sectors** through a multi-scale analysis:
 - International scale
 - National scale
 - Local scale
- To assess how forest and energy sector policies **intersect** in the context of **inclusive** green economy **objectives**

Project components and phases





The objectives of the project

Analysis through future scenarios

- To develop and evaluate **future scenarios** for green economy in energy and natural resources management for Laos and Cambodia

Climate change as a cross-cutting issue

- To address **climate change** and climate change policies as a **cross-cutting issue** in the energy and forest sectors



The objectives of the project

- Learn from two countries – Cambodia and Laos
- **Compare** experiences of Laos and Cambodia and analyse in what ways they are relevant for other developing countries
 - Evaluate the relevance of the results for **Finland's development policy** and the relevance for other development actors



The objectives of the project

Strengthen capacity and collaboration

- Strengthen the local **research capacity** and international academic **collaboration**
 - Royal University of Phnom Penh
 - National University of Laos



Thank you very much
for your attention

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