The Geographical Overlap between Poverty and Biodiversity

A State of Knowledge Review

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- Poverty measures: state and trends
- Biodiversity measures: state and trends
- Are Poverty and Biodiversity co-occurring?
- Are Poverty and Conservation co-occurring?
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Introduction

Poverty: poverty is an unacceptable deprivation of multidimensional well-being. Individuals are poor in many different dimensions. The Millennium Ecosystem Assessment (MA, 2005) has defined the human well being dimensions as basic material for a good life, health, security, freedom of choice and action.

Biodiversity: "The variability among living organisms from all sources and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems". (CBD definition)

Conservation: set of objectives or management interventions designed to maintain biodiversity and to prevent its degradation or loss.

There are many dimensions of poverty and biodiversity,
therefore many ways of measuring

Introduction

The poverty- biodiversity relationship is complex - it is a multi-domain, multi-scale and multi- actor issue differing from case to case, depending on specific conditions. (Steele et al, 2004; Adam et al, 2004; Tekelenburg et al, 2009).

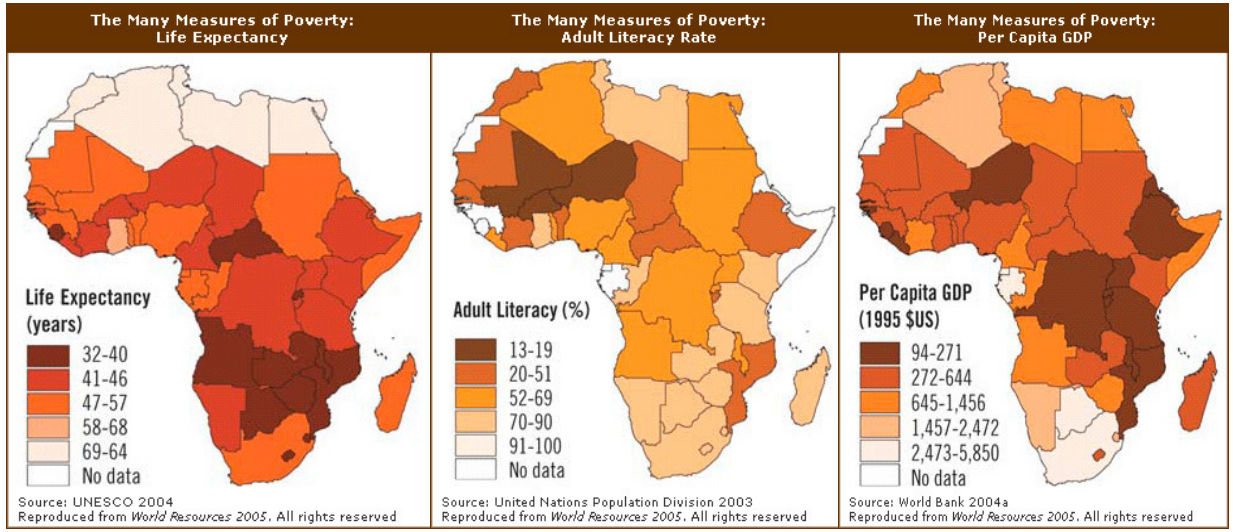
The geographical overlay between poverty and biodiversity will depend on what poverty and what biodiversity are we looking at

Poverty measures; state and trends

Descriptions of poverty have traditionally focused only on material wealth:

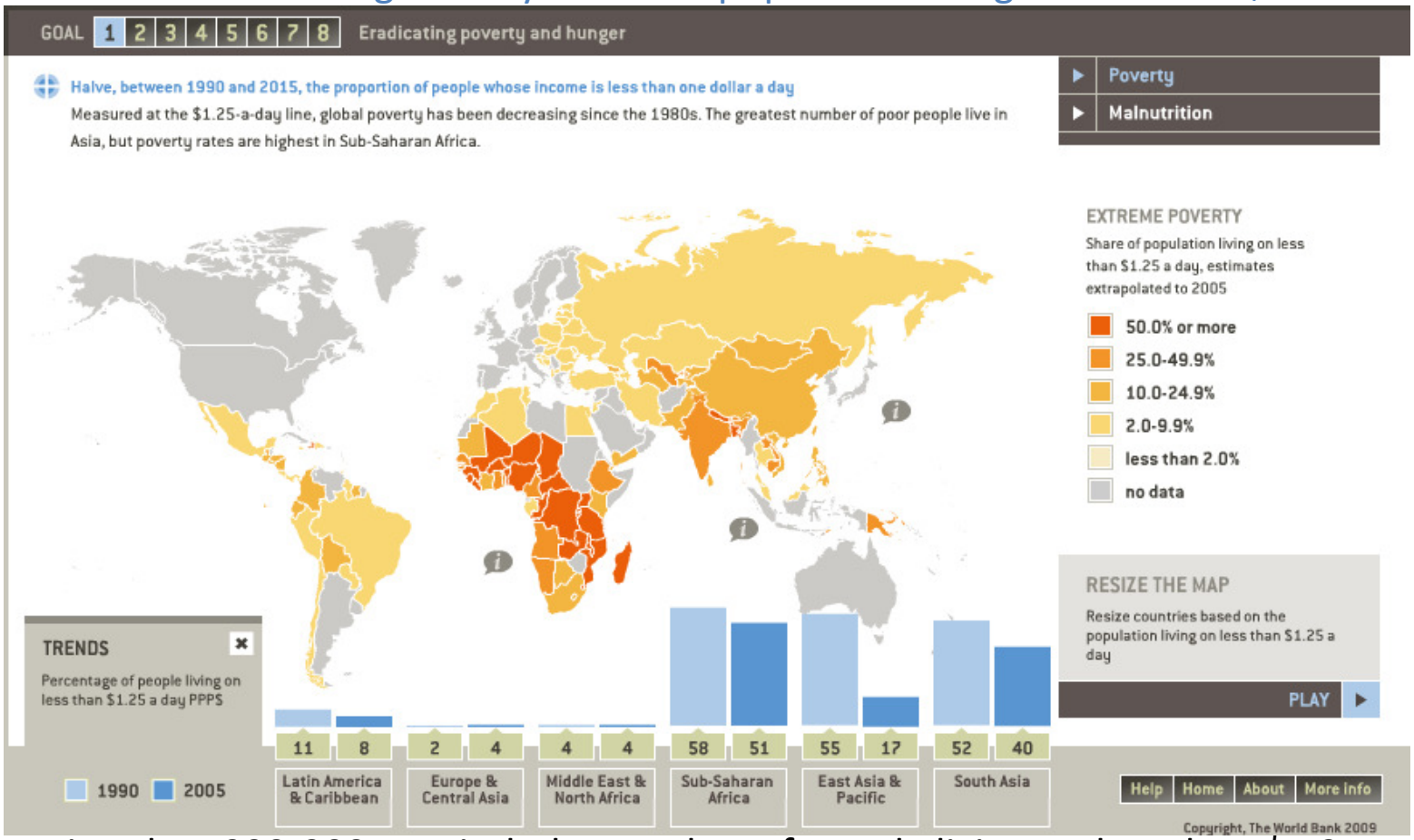
Gross Domestic Product (GDP), Gross National Product (GNP), Purchasing power parity (PPP)…

The understanding of poverty has evolved in recent decades and with it the methods employed for measuring its different dimensions. However, each measure of poverty will have a different spatial distribution.



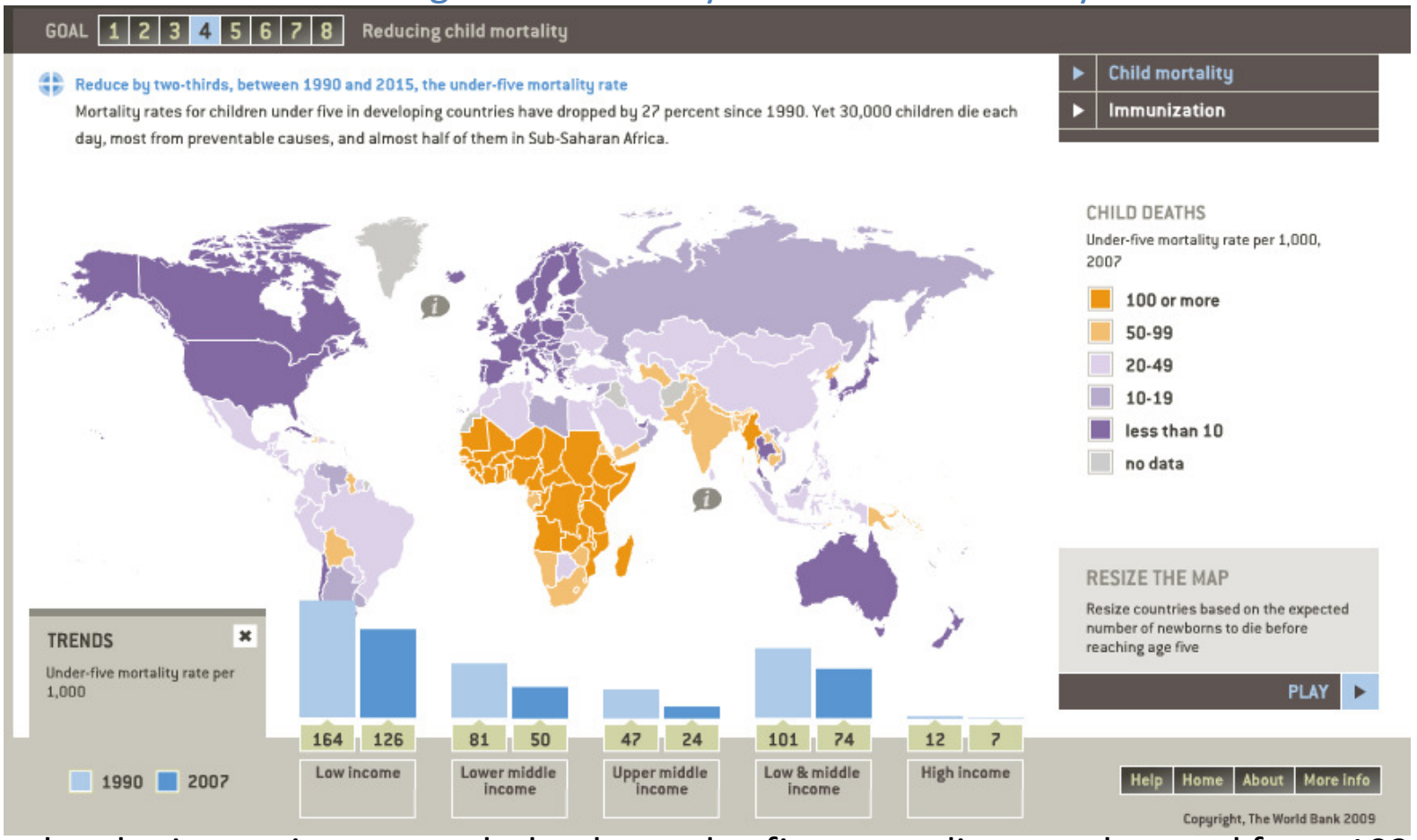
` Each poverty indicator will have a different geographical expression

Goal1. Eradicating Poverty. Share of population living on less than $1.25



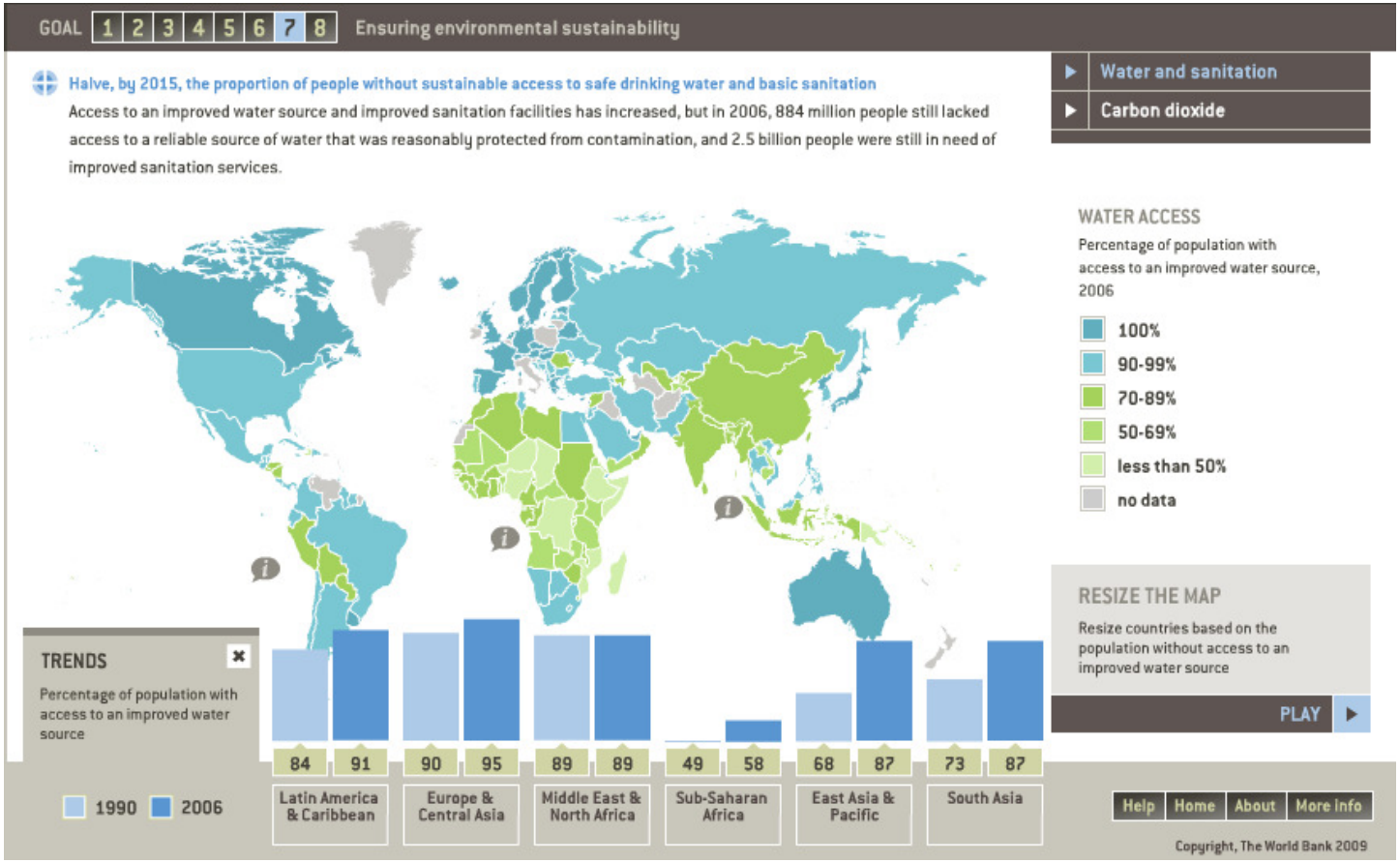
During the 1990-2005 period, the number of people living on less than $1.25 a day decreased from 1.8 billion to 1.4 billion. **The greatest number of poor people is in Asia, however the highest poverty rates are in sub-Saharan Africa.**

Goal4. Reducing Child Mortality. Under five mortality rate



For the developing regions as a whole, the under-five mortality rate dropped from 103 in 1990 to 74 in 2007. **Still, many countries, particularly in sub-Saharan Africa and Southern Asia, have made little or no progress at all**

Goal7. Environmental Sustainability. % population with access to safe water



Yet a number of countries face an uphill battle: **884 million people worldwide still rely on unimproved water sources for their drinking, cooking, bathing and other domestic activities.** Of these, 84 per cent (746 million people) live in rural areas.

Biodiversity measures: state and trends

Biodiversity can be measured in many different ways:

- ✓ **Ecosystem diversity.** Refers to the diversity of a place at the level of ecosystems.
- ✓ **Species diversity.** Taxonomic richness of a geographic area, with some reference to a temporal scale. Species Richness, Simpson Index, Shannon index, Mean Species Abundance....
- ✓ **Genetic diversity**. The total number of genetic characteristics in the genetic makeup of a species.

CBD core set of Indicators to track progress to the **2010 Biodiversity Target**

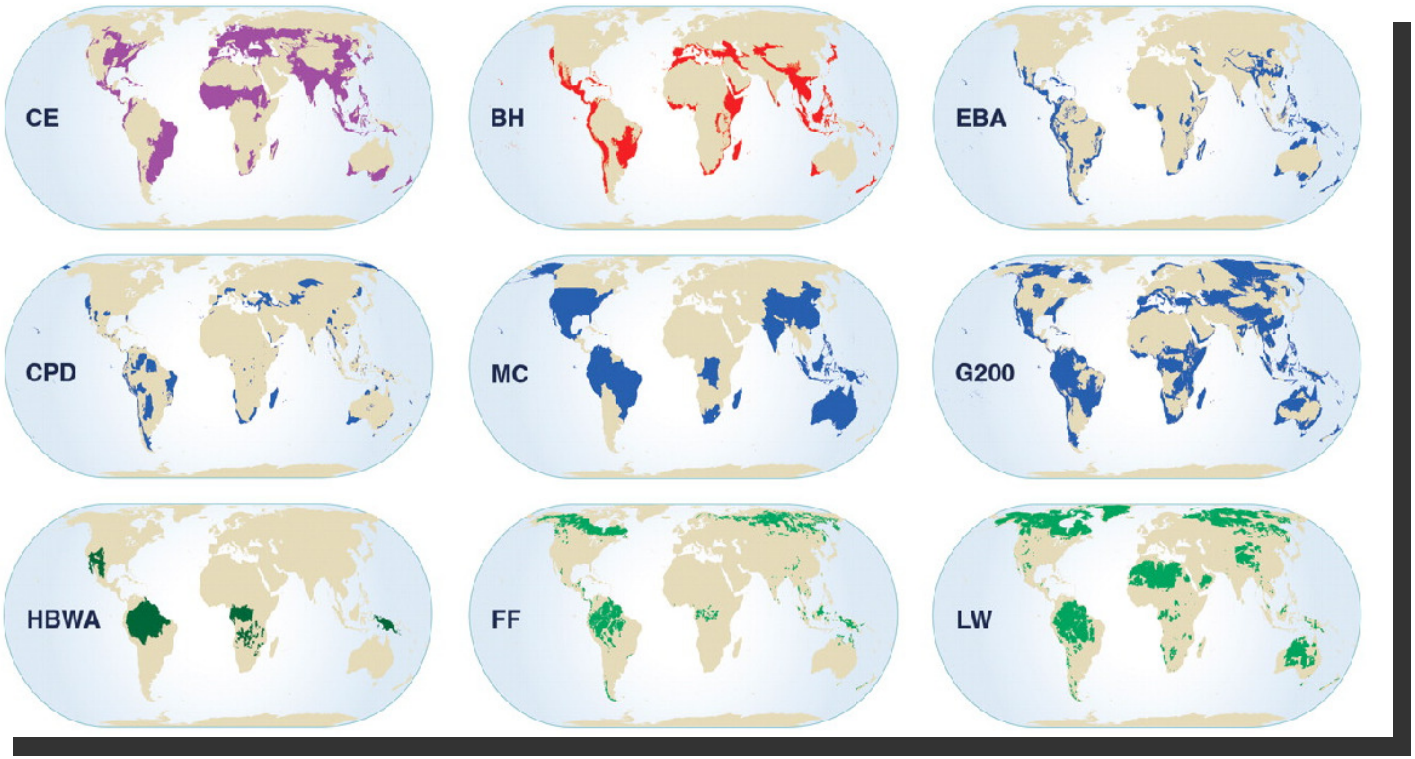
Headline Indicator¨: Status and trends of the components of Biodiversity

Living Planet Index **Red List Index** **Cover of Protected Areas**

Forest Cover **Marine Trophic Index**

Biodiversity Conservation measures: state and trends

A total of nine templates of global biodiversity priorities
have been proposed over the past decade



Source: T.M.Brooks, et al.2006

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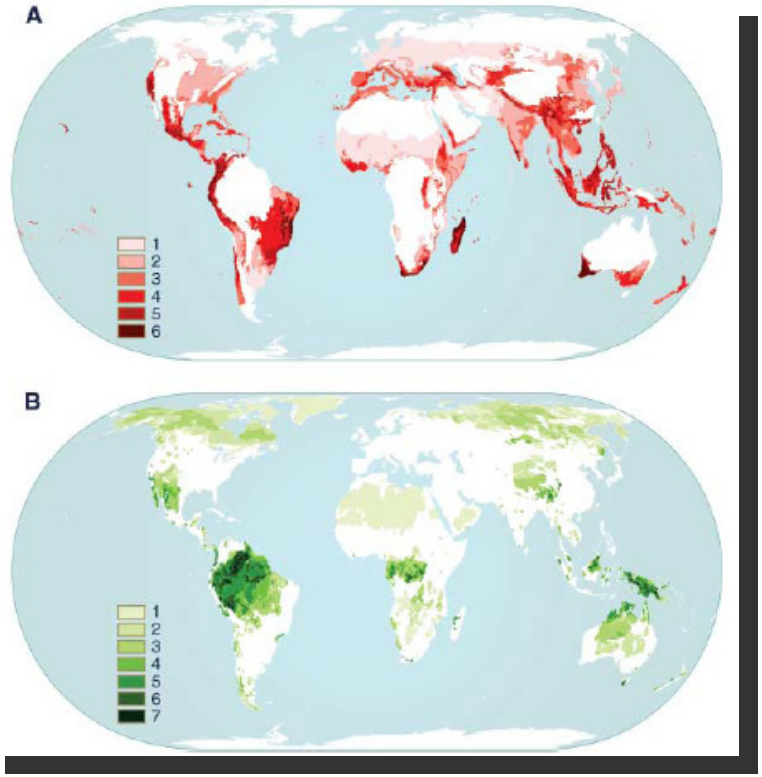
Biodiversity Conservation measures: state and trends

Mapping the overlay of approaches prioritizing reactive and proactive conservation. (A) Reactive approaches which prioritize regions of high threat (B) Proactive approaches, which prioritize regions of low threat.



Source: T.M.Brooks, et al.2006

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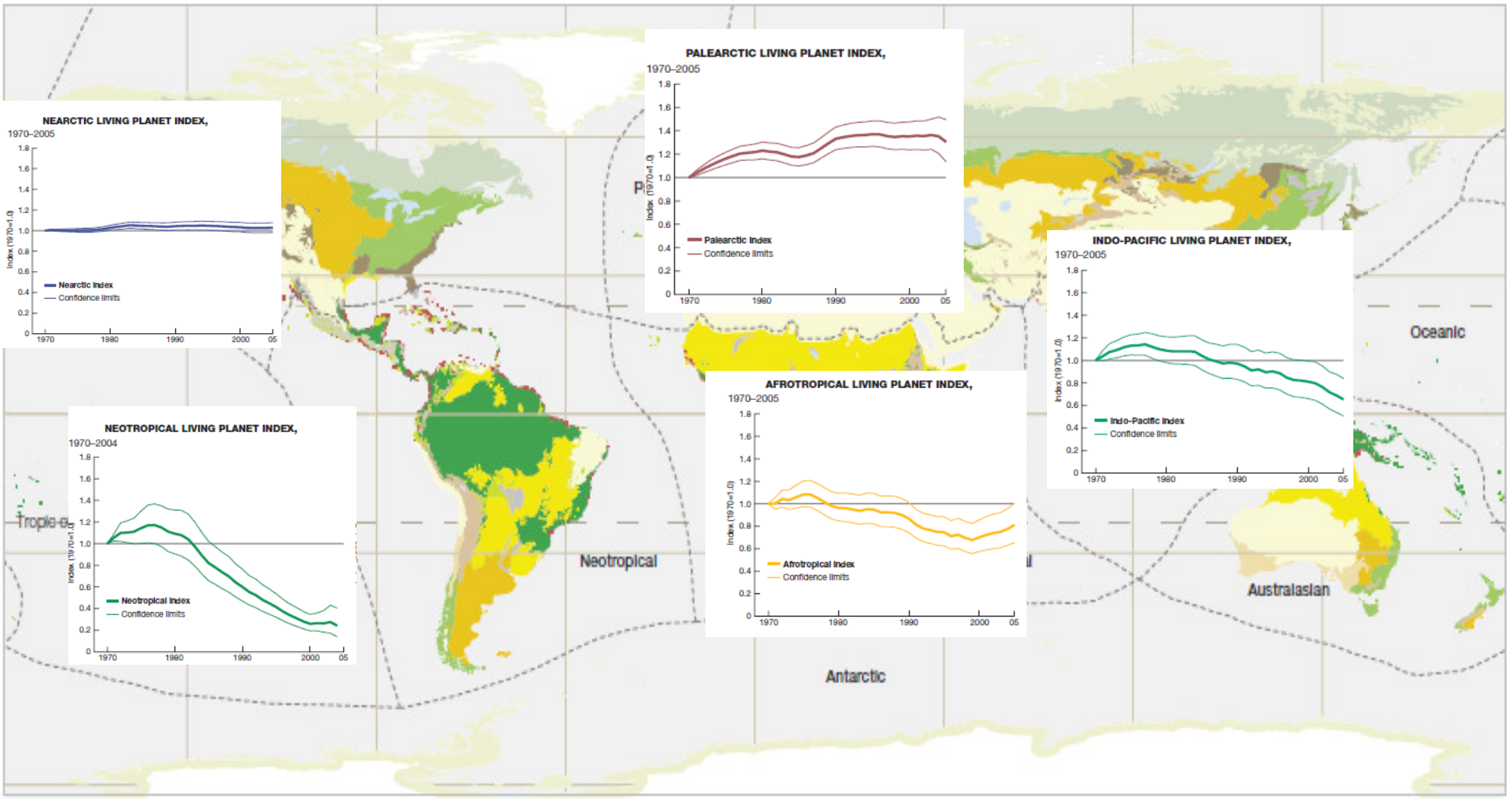


Source: MA 2005 and Living Planet Index Report 2008

Fig. 8: **TERRESTRIAL BIOGEOGRAPHIC REALMS AND BIOMES**

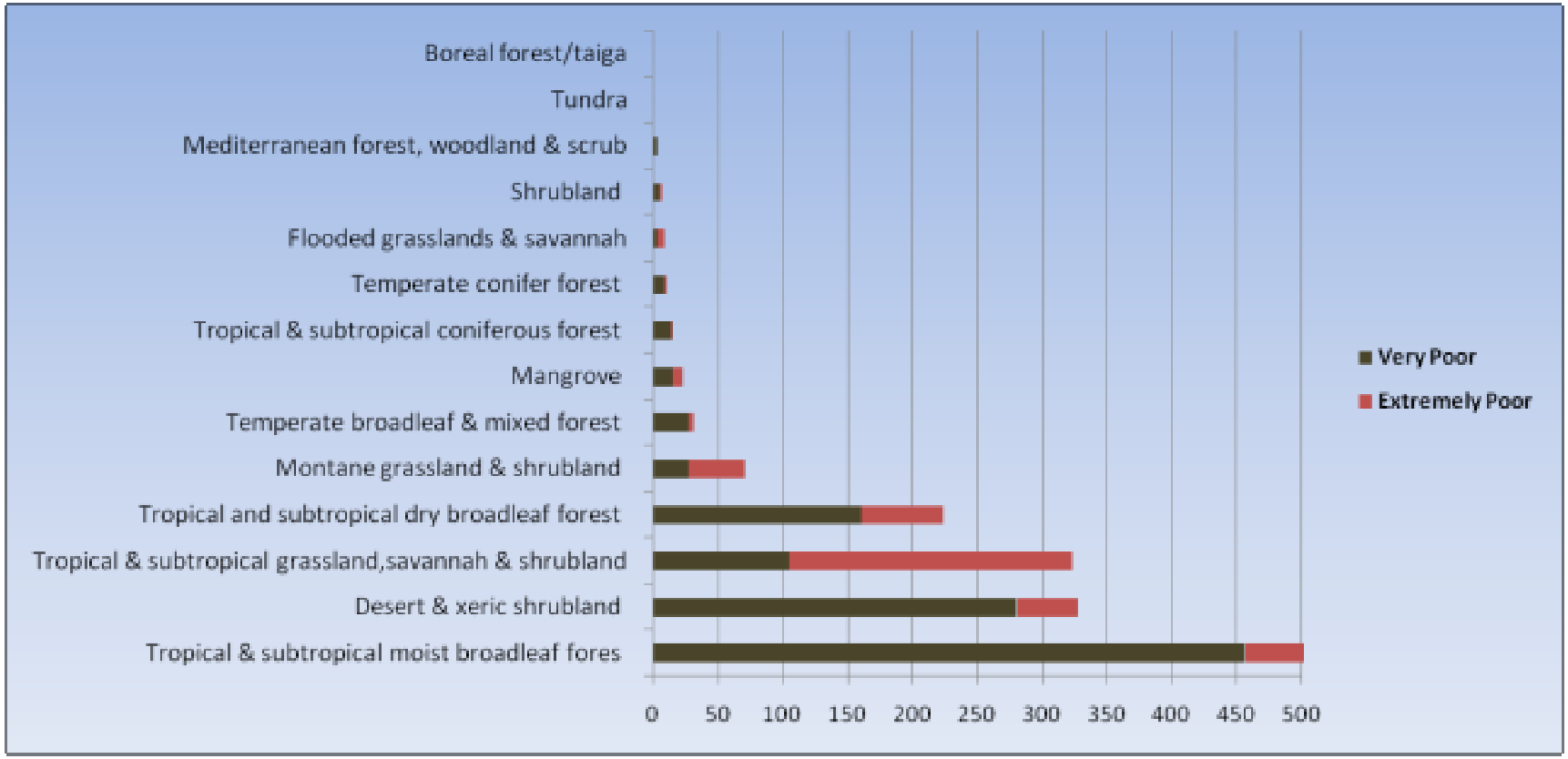
- Tropical and subtropical moist broadleaf forests
- Tropical and subtropical dry broadleaf forests
- Tropical and subtropical coniferous forests
- Temperate broadleaf and mixed forests
- Temperate coniferous forests
- Boreal forests/taiga
- Tropical and subtropical grasslands, savannahs and shrublands
- Temperate grasslands, savannahs and shrublands
- Flooded grasslands and savannahs
- Montane grasslands and shrublands
- Tundra
- Mediterranean forests, woodlands and scrub
- Deserts and xeric shrublands
- Mangroves
- Water bodies
- Rock and ice

Are Poverty and Biodiversity co-occurring?

The **highest density of poor people** is found in highly human **transformed areas**, however the **strongest poverty** occurs in **remote forest or wild areas** where biodiversity is outstanding. There is a positive relationship between extreme poverty , low human density and wild areas with high forest cover. Moreover, **many of these poor belong to ethnic minorities** which tend to live in less accessible areas.

The 90% of the world's extremely poor populations are found in the tropical grassland and forest biomes of sub-Saharan Africa and Asia.

(K. H. Redford, *et al*. 2008)

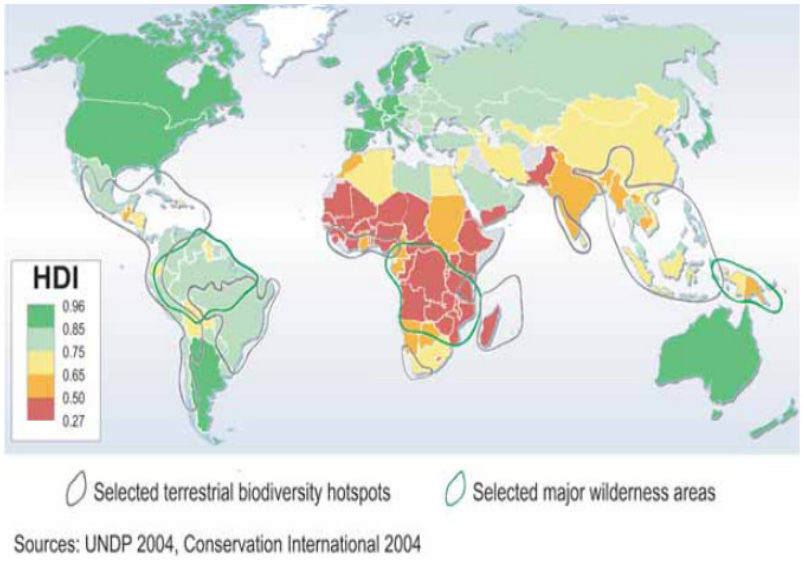


Are Poverty and Conservation co-occurring?

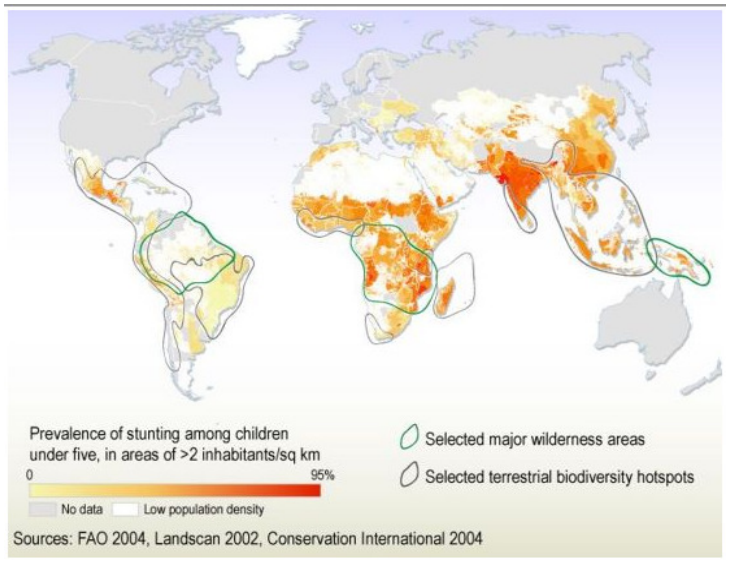
Rich countries have a **larger number of protected areas** but with smaller size than poorer countries. Meanwhile, **poorer countries** tend to have fewer, **larger protected areas**, often dominated by the more **restrictive** categories (Upton, *et al.* 2008).

Moreover **poverty surrounding protected areas** is **not** significantly **different** from **national** poverty rates.(De Sebinin, 2008)

The **relationships** between **poverty** and **conservation** are **dynamic** and often locally specific (Adams et al., 2004). Therefore the **geographical patterns** will be also **dynamic** and change from place to place.



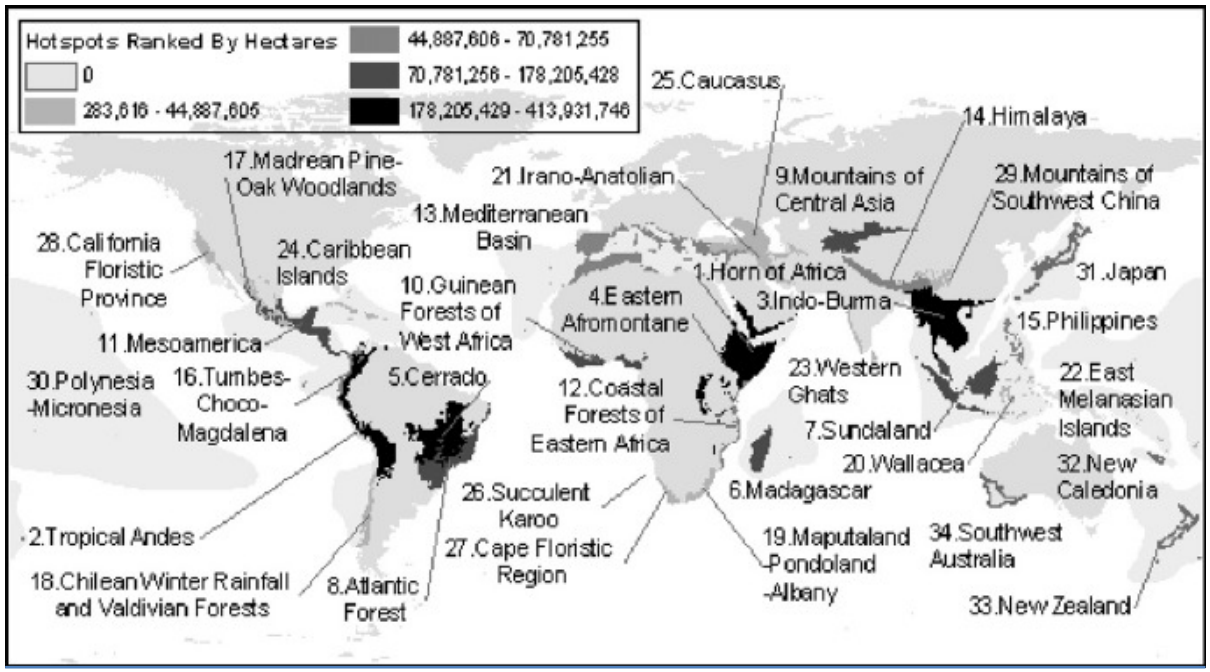
Author:	**UNEP-GRID Arendal**
Poverty Indicator:	**National Human Development Index**
Biodiversity Indicators:	**Major tropical wilderness and Biodiversity Hotpots**



Author:	**UNEP-GRID Arendal**
Poverty Indicator:	**Stunting Growth among children under five years old**
Biodiversity Indicators:	**Major tropical wilderness and Biodiversity Hotpots**

Findings:	Both maps exhibit similar results showing that some of the World's least developed countries are located in tropical hotspots and wilderness areas, especially in Africa, the Caribbean, and South Asia.

The Hottest Hotspots

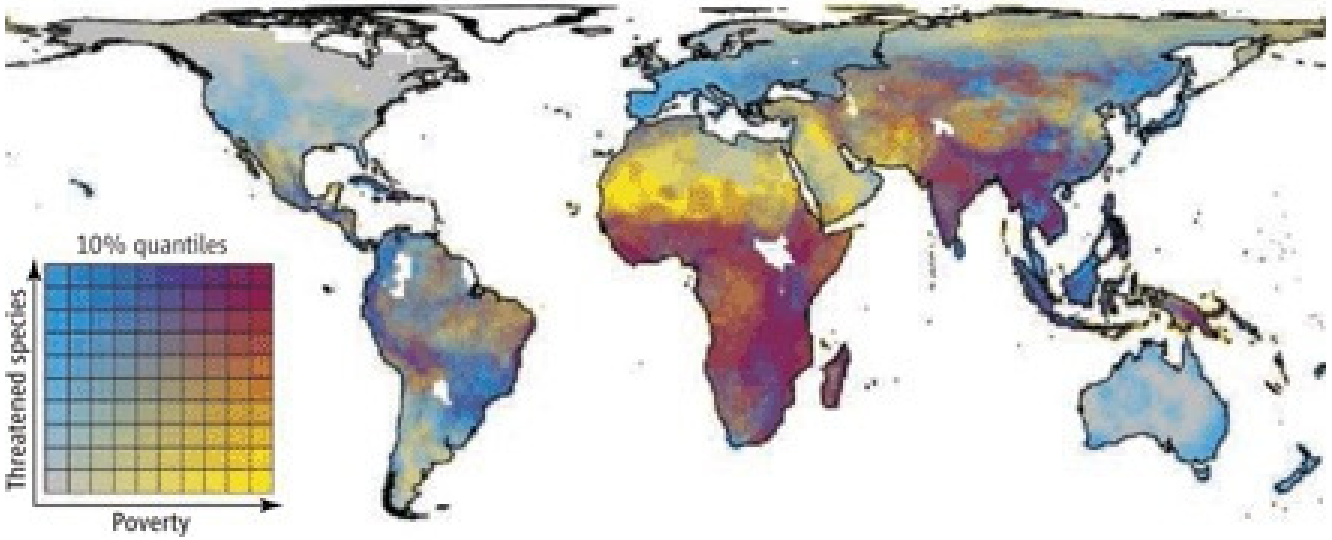


Author : Fisher and Christopher (2006)

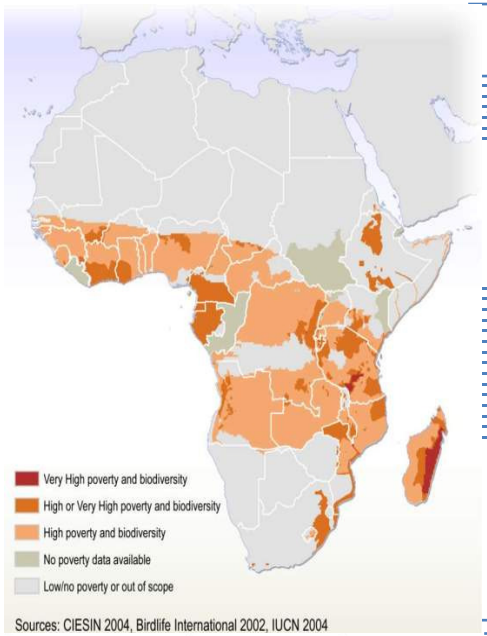
Poverty Indicators: % Undernourished population, % Population without access to water, % Population below poverty line, Debt service as a % exports and potential population pressure

Biodiversity Indicators: Biodiversity Hotspots

Findings: The overlap between severe multifaceted poverty and key areas of global biodiversity is great and needs to be acknowledged. Eastern Afromontane Guinean Forest of West Africa and the Himalaya rank as the 'hottest hotspots' for the poverty measures used.

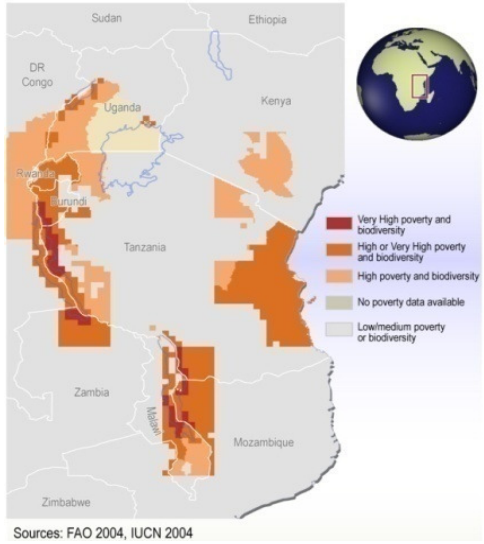


Author:	**J. D. Sachs et al., Science 325, 1502-1503 (2009)**
Poverty Indicators:	**log rate of human infant mortality**
Biodiversity Indicators:	**log number of threatened species of mammals, birds, and amphibians per one-degree grid square**
Findings:	**Yellow=Places with high poverty but no threatened species. Blue=Places with high threatened species but no poverty Fuchsia= Places with high poverty and high biodiversity**



Poverty and Biodiversity in Africa

Author:	**UNEP-GRID Arendal**
Poverty Indicators:	**High percentage of underweight children**
Biodiversity Indicators:	**Occurrence of amphibian species and endemic bird areas**
Findings:	**East cost of Madagascar and south east of Tanzania have high biodiversity and poverty rates**



Freshwater biodiversity and poverty in eastern Africa

Author:	**UNEP-GRID Arendal**
Poverty Indicators:	**Children with stunted growth**
Biodiversity Indicators:	**High freshwater biodiversity index**
Findings:	**Very high and high poverty appears next to the rivers with high freshwater biodiversity, and on the coast of Tanzania.**

Conclusions

- ✓ The World's least developed countries are in places with high biodiversity, especially **in Sub-Saharan Africa, the Caribbean, and South Asia**, where the current trends of poverty are increasing due to the economic crisis and where the transformation of ecosystems is more dramatic, leading to a more pronounced decline in the abundance of species.

- ✓ There is an **important overlap** between **extreme poverty** and key areas of **global biodiversity**.

- ✓ There is a **positive relationship** between **extreme poverty** but **low density of poor people** in **wild areas** and **high forest cover**.

What if poverty and biodiversity or conservation priorities co-occur?

Conclusions

- ✓ Whether the poor and biodiversity or conservation coincide geographically or not provides little further information on the nature and consequences of this link.

- ✓ What is **more important** is to **understand the multidimensional interactions** and dependencies between biodiversity and poverty, which cannot be easily captured in a two-dimensional map.

- ✓ Emerging efforts to **map** the distribution and flows of **ecosystem services** could be a valuable way of **identifying where** (and when?) the connection between **biodiversity** (that in part underpins the supply of ecosystem services) and the **poor** (who in part depend on such services) **are most acute**.

Future Paths

UNEP-WCMC is hoping to explore further the relationships between poverty and biodiversity using different indicators at different spatial-temporal scales. We are also working with others to assess ecosystem services indicators and emerging mapping approaches.

We are keen to collaborate with other institutions and researchers to help improve the understanding of the mutual interactions between poverty and biodiversity

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Thank You!

A world where biodiversity counts

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