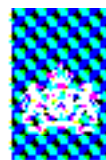# The Economics of Ecosystems & Biodiversity

Zoological Society London

Symposium April 28th 2010

Poverty Reduction and Biodiversity Conservation: An Economic Perspective

Pavan Sukhdev, UNEP

Study Leader, TEEB

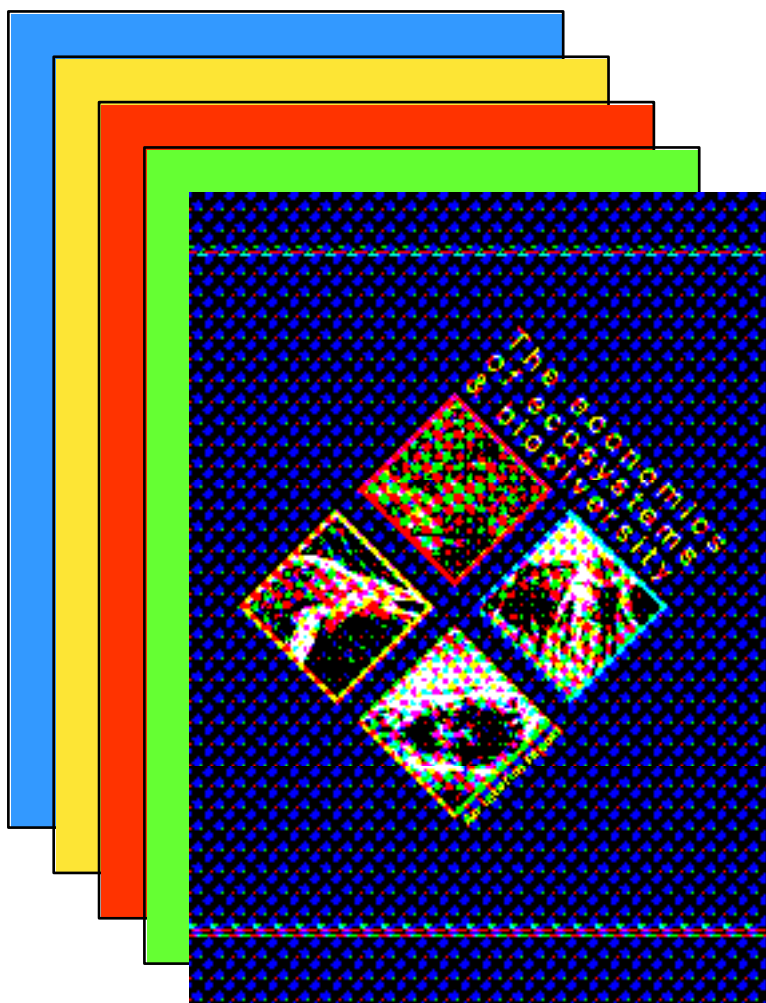UNEP | Federal Ministry for the Environment, Nature Conservation and Nuclear Safety | defra | Rijksoverheid | MINISTRY OF FOREIGN AFFAIRS

DFID Department for International Development | Sida

The Economics of Ecosystems & Biodiversity

TEEB Phase 2 – Reports for different audiences

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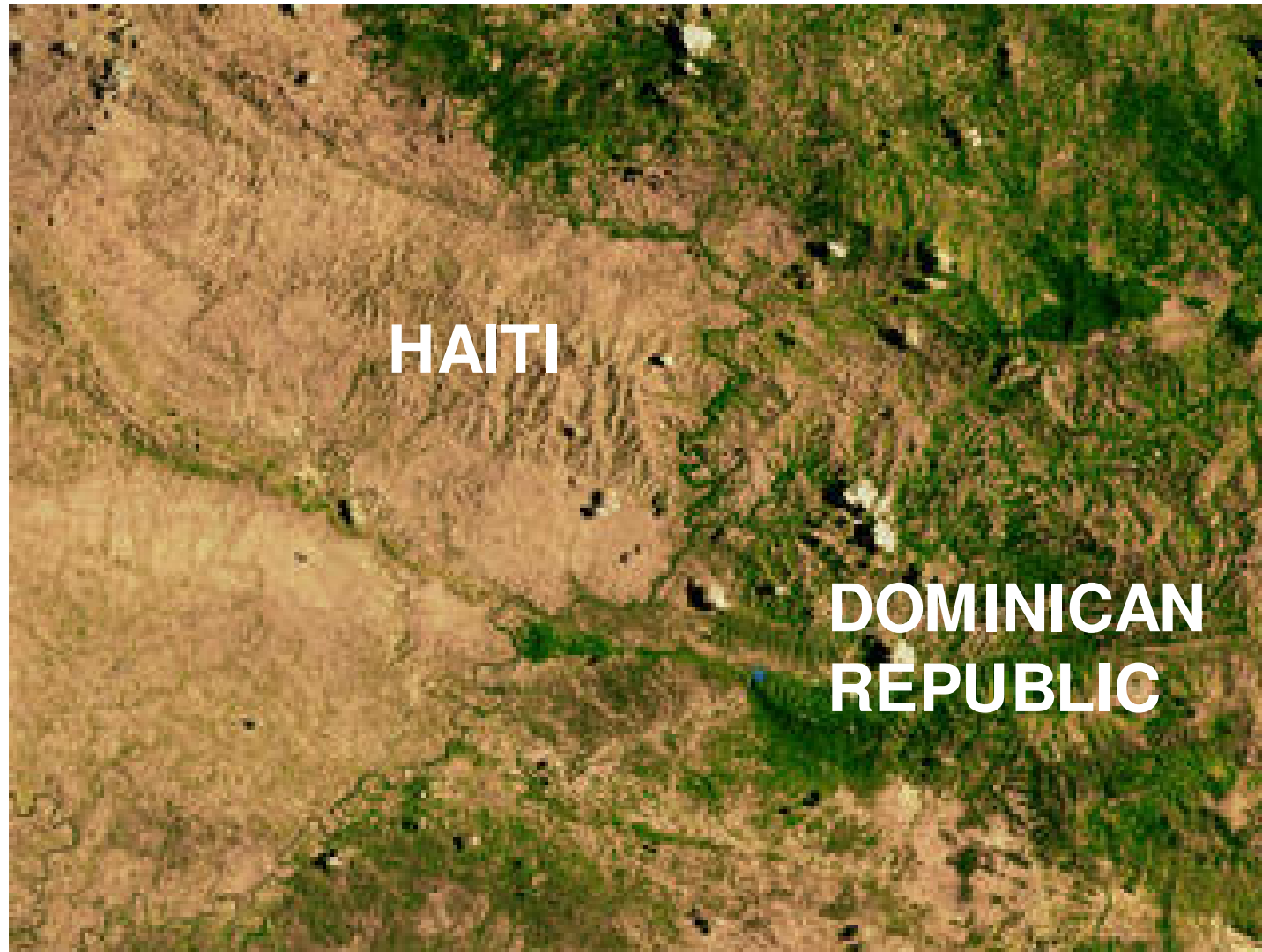Launch in late 2010

Ecosystem Losses & Links to MDG's
Haiti Example : MDG # 1, 4, 5, 8…

Haiti : Ecosystem Losses and Links to MDG's 1, 4, 5, 8…

- Haiti was originally fully forested, less than 3% cover still remains. Poorest country in the Western Hemisphere 65% of its people must survive on less than 1 $ a day.

 - Deforestation has diminished evaporation back to the atmosphere over Haiti ; rainfall in many locations has declined by as much as 40%, reducing stream flow and irrigation capacity

- 1950-1990, the amount of *arable land* almost halved due to soil erosion.

 - Avezac Irrigation System only supports half of the initially 9,500 acres it planned to cover.

- When it rains , hillsides no longer efficiently retain or filter water and even moderate rains cause devastating floods.

- Ground and stream waters are laden with sediment and pollution which has degraded estuarine and coastal ecosystems.

- about 90% of Haitian children are chronically infected with intestinal parasites that they acquire from the water they drink

MDG 1: Eradicate extreme poverty and hunger

MDG 8: Develop a Global Partnership for Development

MDG 5: Improve maternal health

MDG 4: Reduce child mortality

MDG-3

MDG 3 : Example from India

MDG 3:
Promote gender
equality and
empower women

Box 2.3: Gender, poverty and biodiversity in Orissa, India

The impact of the loss of biodiversity, often not very visible, has serious implications for poverty reduction and well-being for women as it severely affects the role of women as forest gatherers. Studies in the tribal regions of Orissa and Chattisgarh, states in India which were once heavily forested, have recorded how deforestation has resulted in loss of livelihoods, in women having to walk four times the distance to collect forest produce and in their inability to access medicinal herbs which have been depleted. This loss reduces income, increases drudgery and affects physical health. There is also evidence to show that the relative status of women within the family is higher in well-forested villages, where their contribution to the household income is greater than in villages that lack natural resources.

Sarojni Thakur, Head of Gender Section,
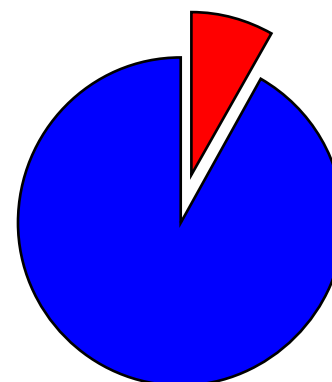Commonwealth Secretariat, personal communication, May 15th 2008.

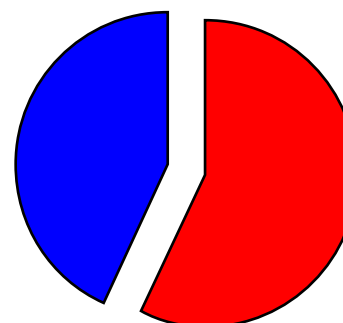## (a key message from TEEB's Interim Report)
Ecosystem Losses & Poverty

India Example: 480 Million people earn their livelihood mainly in small farming, animal husbandry, informal forestry, fisheries …

Ecosystem services / classical GDP

7.3 %

Ecosystem services/ "GDP of the Poor"

57 %

Source: GIST's Green Accounting for Indian States Project, 2002-03 data

UNEP ETB

How do we identify who are the rural poor ?

- Agriculture - Main workers
- Cultivators - 103 million - of which less than 1 ha holdings 60%

- Agricultural labourers- 63 million - all considered poor

- Agriculture - Marginal workers - all considered poor
- Cultivators - 24 million
- Agricultural labourers - 43 million

- Fishing, hunting, plantation and other activities - 10.3 million (as per census 2001) but studies vary in their estimates

- Forest dependent population (from FAO study) - 275 million

- Total - 477 million (approx)

Rethinking Agricultural Modernization : Looking at the full suite of ecosystem services for informed choices

(S. Vidanage, S. Perera and M. Kallesoe, 2005. In: Emerton 2005)

Analysis of local wetland benefits to justify traditional tank management in Sri Lankan river basin: value of rice is but a fraction of all benefits

The Value of Tank Water and Biological Resources in Rajangana and Angamauwa Sub-Catchments of the Kala Oya Basin (per tank)

Resource	% of households	Value per Household (US$/hh/yr)	Value per Unit Area* (US$/ha/yr)
Paddy cultivation	13%	177	161
Vegetable cultivation	7%	86	39
Banana cultivation	3%	1150	209
Coconut cultivation	13%	238	216
Domestic water	93%	226	1,469
Livestock water	13%	369	335
Commercial water	2%	132	12
Fishery	16%	309	351
Lotus flowers	10%	106	72
Lotus roots	7%	235	107
		Total	2,972

* Total inundated area

Leuser Ecosystem, Indonesia

Distribution of benefits to the different sectors (in million US$)

	Deforestation		Conservation	
	Value	Proportion (%)	Value	Proportion (%)
Biodiversity (WTP)	56	1	492	5
Provisioning Services				
Agriculture	2499	36	1642	17
Fisheries	557	8	659	7
NTFP	235	3	94	1
Timber	1184	17	0	0
Water supply	699	10	2419	25
Regulating Services				
Flood prevention	1223	18	1591	17
Fire prevention	30	0	715	7
Carbon sequestration	53	1	200	2
Cultural Services				
Tourism	171	2	828	9
Total	6958	100	9538	100

Note: for the period 2000–2030, at a discount rate of 4%.

(Beukering et al. 2003)

Making the case: Unequal distribution of ecosystem benefits

Distributon of benefits under different land use scenarios in the Leuser National Park, Indonesia
(in million US$ over a period of 30 years, 4% discount rate)

Local community "best option"

Logging industry "best option"

- Deforestation
- Conservation
- Selective use

Local community

(Logging) industry
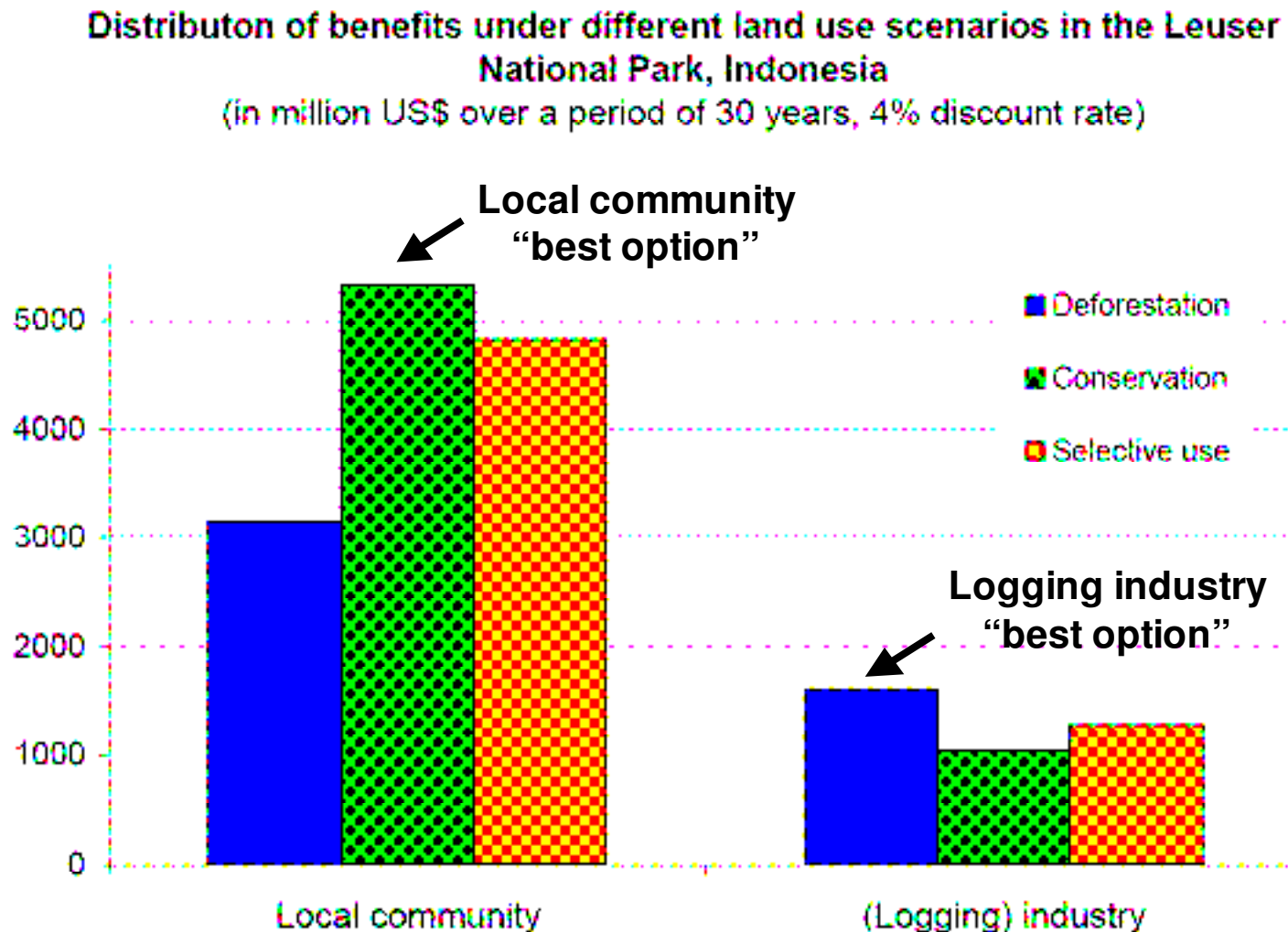
Source: adapted from van Beukering et al. 2003

Who benefits from Panda tourism in Wolong BR? (He et al 2008)

Wolong BR
- conserves global public goods (e.g. giant panda),
- ensures collective goods at national/local level (e.g. panda tourism)
- restricts access to other local collective and private goods (NTFPs,
        farmland inside the PA).

But check benefit distribution:
Those living close to the roads had a larger share in tourism related income, whereas those living in the forest – in panda habitat – continued to largely rely on agriculture for their living.

ES perspective allows to target/fine tune conservation measures!

Way forward

Ecologically effective versus socially just conservation : Trade-Off ? Not necessarily.

We need to diversify conservation action in two ways:

- towards a mosaic of areas with different land use rules inside and outside protected areas

- towards recognised and strengthened in situ management capacities and institutional arrangements

- towards a mosaic of areas with different land use rules inside and outside protected areas:

Land use modelling by Polasky et al (2005):

" We combine the biological and economic models with optimization methods to find efficient land-use patterns ……

….. we find that a large fraction of conservation objectives can be achieved at little cost to the economic bottom line with thoughtful land-use planning…."

- towards recognized and strengthened in situ management capacities and institutional arrangements
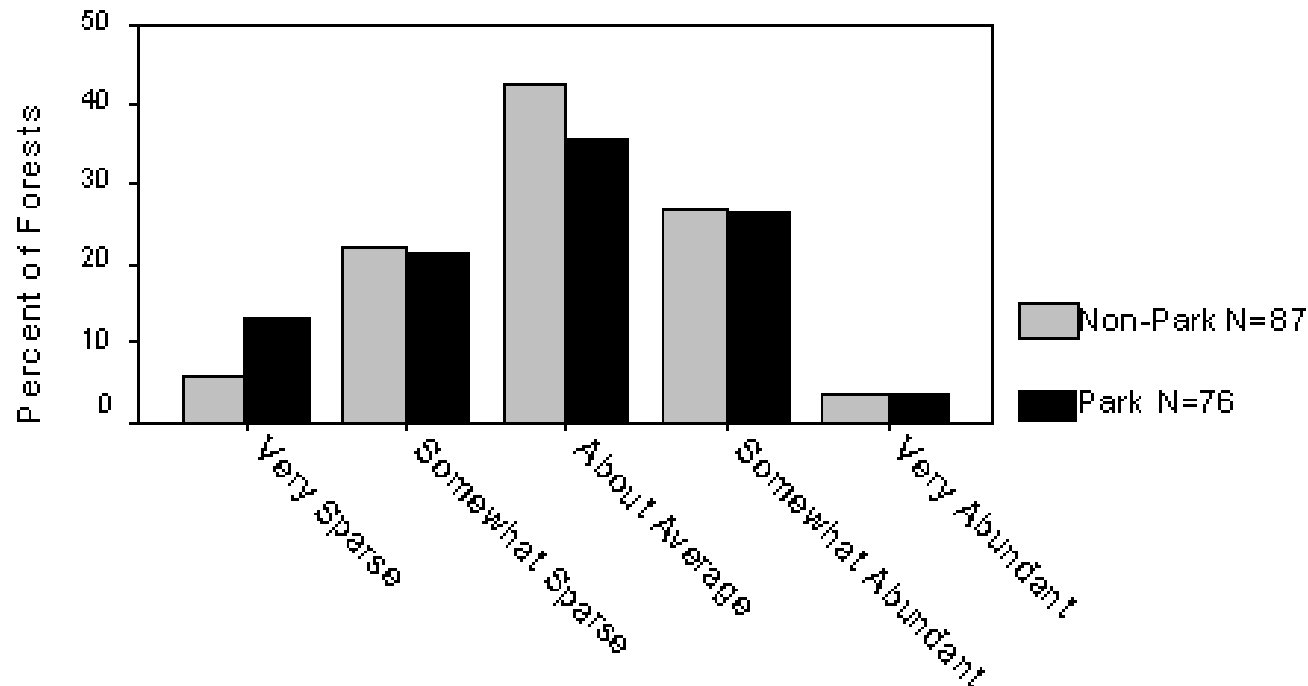
Hayes and Ostrom 2005, comparing state run PAs with other forest management regimes (p 607)

Hayes (2006):
".... rather than a legal definition of protection, it is the rules acknowledged and made by forest users that influence forest condition."

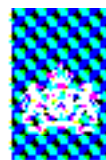# The Economics of Ecosystems & Biodiversity

Thank You!

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