

The Economics of Ecosystems & Biodiversity



LSE Public Lecture
21st March 2011

TEEB : Ending the Economic Invisibility of Nature

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United Nations Environment Programme





WHAT IS THE WORLD WORTH?

putting **nature** on the balance sheet

Pavan Sukhdev, UNEP

Study Leader, TEEB



Rijksoverheid



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

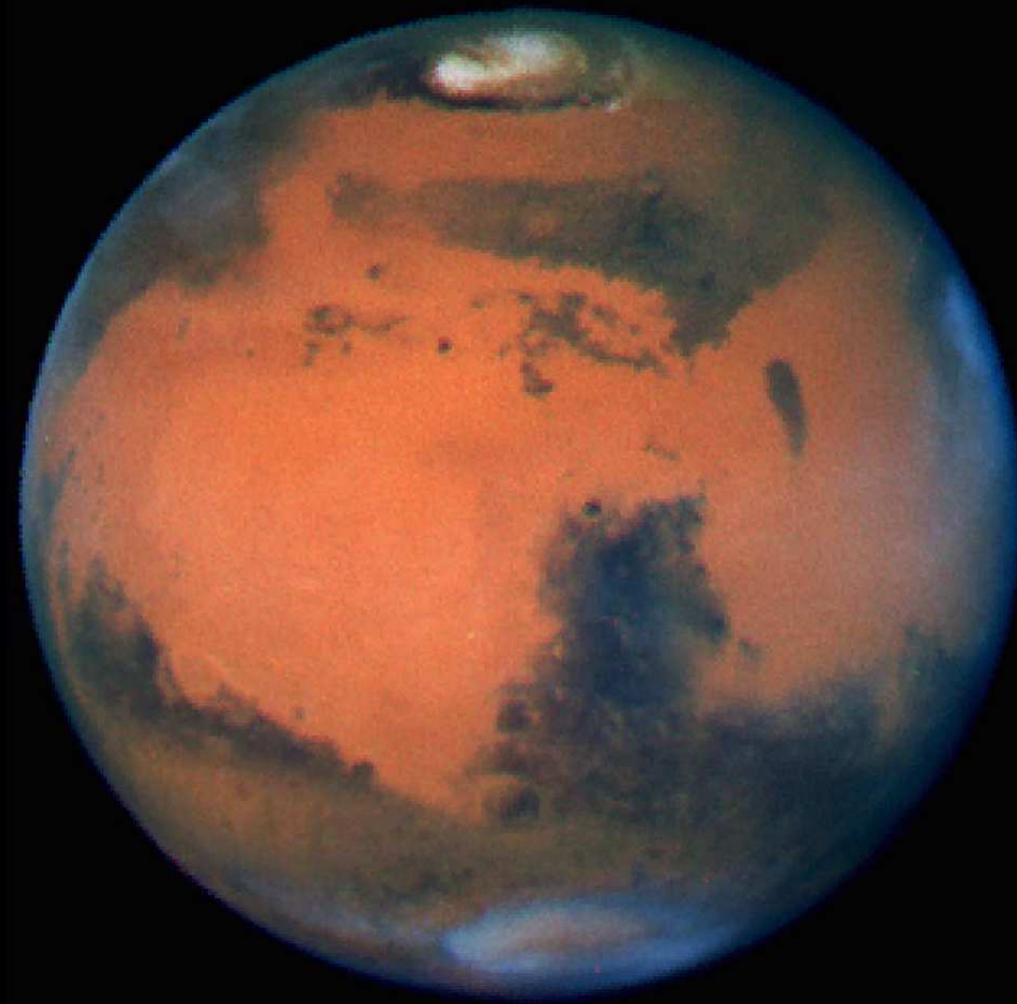


MINISTRY OF FOREIGN AFFAIRS





NO BIOSPHERE





BIOSPHERE





The Economics of Ecosystems and Biodiversity

Thank You!

for more information visit

www.teebweb.org



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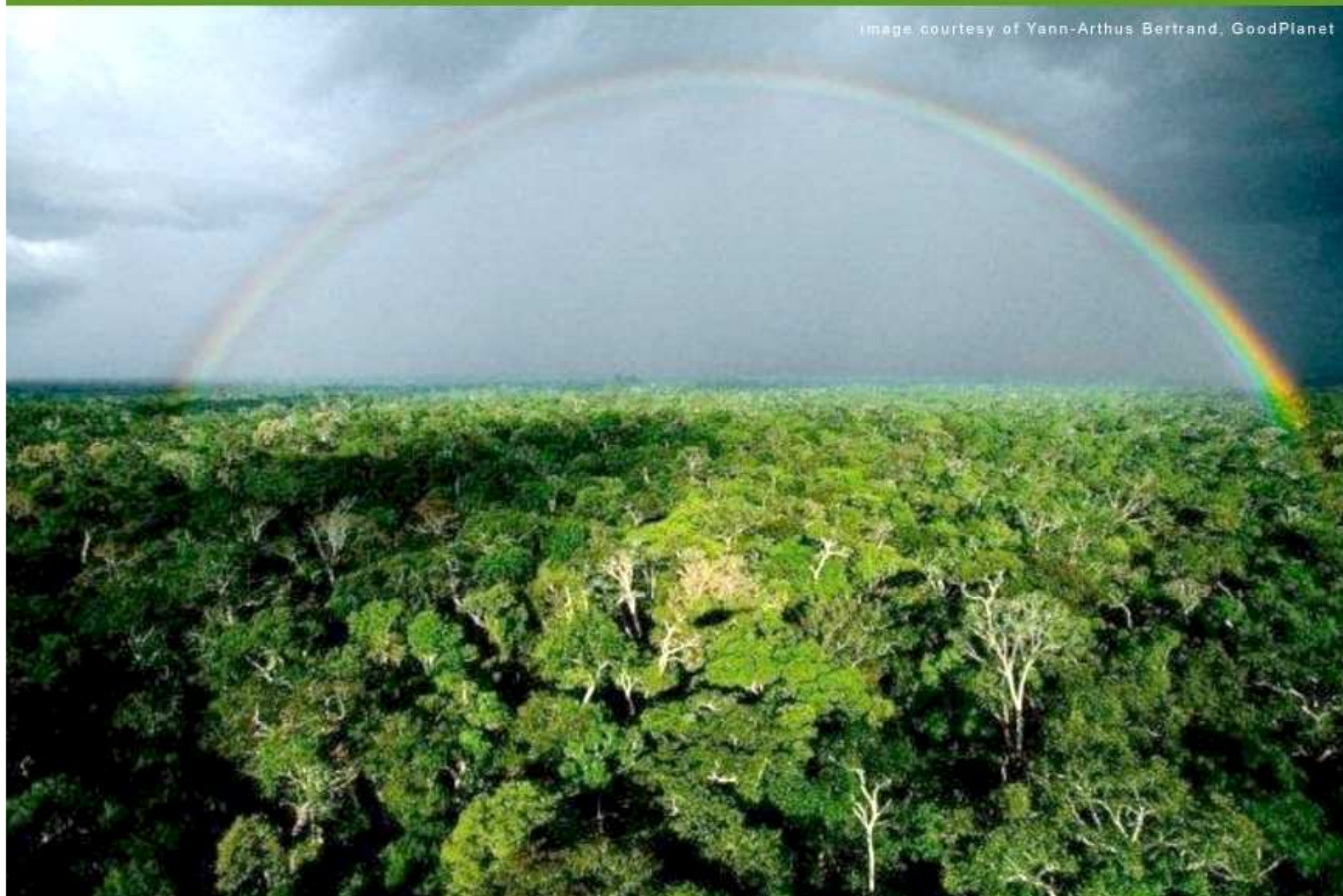


***Why* must we end the economic invisibility of Nature ?**



The Economics of Ecosystems and Biodiversity

Image courtesy of Yann-Arthus Bertrand, GoodPlanet





Tropical Forests provide significant “Climate Change Mitigation Services ”

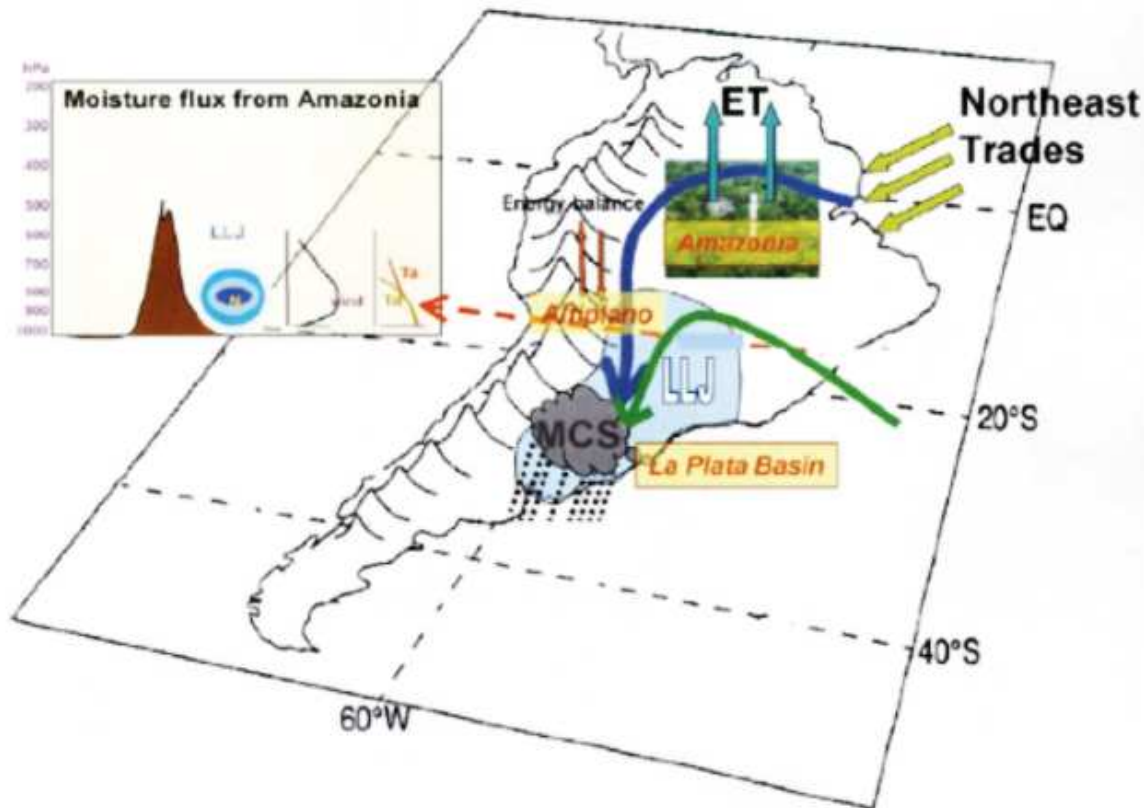


- **Tropical forests store a fourth of all terrestrial carbon**
 - **547 gigatonnes (Gt) out 2,052 Gt (Trumper et al. 2009)**
- **Tropical forest capture**
 - **up to 4.8 Gt CO₂ annually (Lewis & White 2009) (total emissions p.a. ~32Gt)**
- **Stopping deforestation holds an excellent cost-benefit ratio**
 - **Halving deforestation generates net benefits of about \$ 3.7 trillion (NPV) counting only the avoided damage costs of climate change (Eliasch Review 2008)**

... Does anyone pay for them ?



Does the Granary of Latin America pay for its Freshwater?



Marengo et al. 2004, Journal of Climate

Amazon Rainforest “Water Pump”

Evapo-transpiration puts 20 billion tonnes of water into the atmosphere daily, some of which falls as rain in the Rio Plata Basin...

(Global Canopy Programme & Canopy Capital Ltd, 2008)



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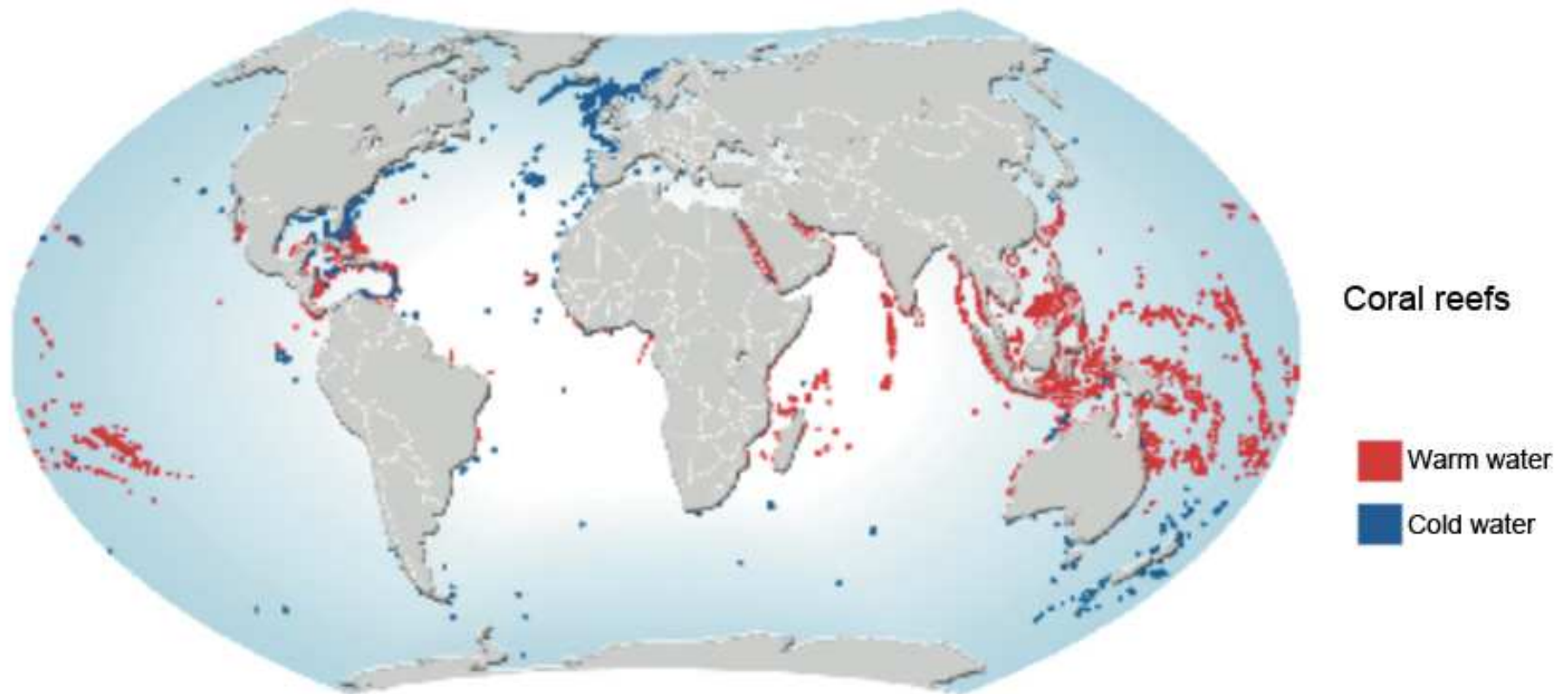


8th January 2010

image courtesy of Yann-Arthus Bertrand, GoodPlanet



Is there a problem with tropical coral reefs ?



500 million people rely on tropical coral reefs for food and livelihood



The Economics of Ecosystems and Biodiversity

- **Biodiversity is the living fabric of this planet**
- Biodiversity's economic reflection is Natural Capital
- The technical definition of biodiversity comprises all its strata, including ecosystems; but common usage differentiates ecosystems

BIODIVERSITY STRATA	QUALITY DIMENSIONS	QUANTITY DIMENSIONS	ECOSYSTEM SERVICES (some examples...)
Ecosystems	Variety	Extent	<ul style="list-style-type: none">- Recreation- Water regulation- Carbon Storage
Species	Diversity	Abundance	<ul style="list-style-type: none">- Food, fibre, fuelwood- Design inspiration- Pollination
Genes	Variability	Population	<ul style="list-style-type: none">- Medicine discovery- Disease resistance- Adaptive capacity

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TEEB and its Five Reports ...

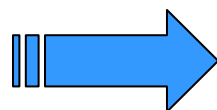


“Potsdam Initiative – Biological Diversity 2010”

.....the economic significance of the global loss of biological diversity....



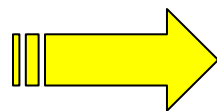
Science & Economics
Foundations



Policy Evaluation
for National Policy-Makers



Evaluation & Decision Support for
Local and Regional Policy



Business Risks
& Opportunities



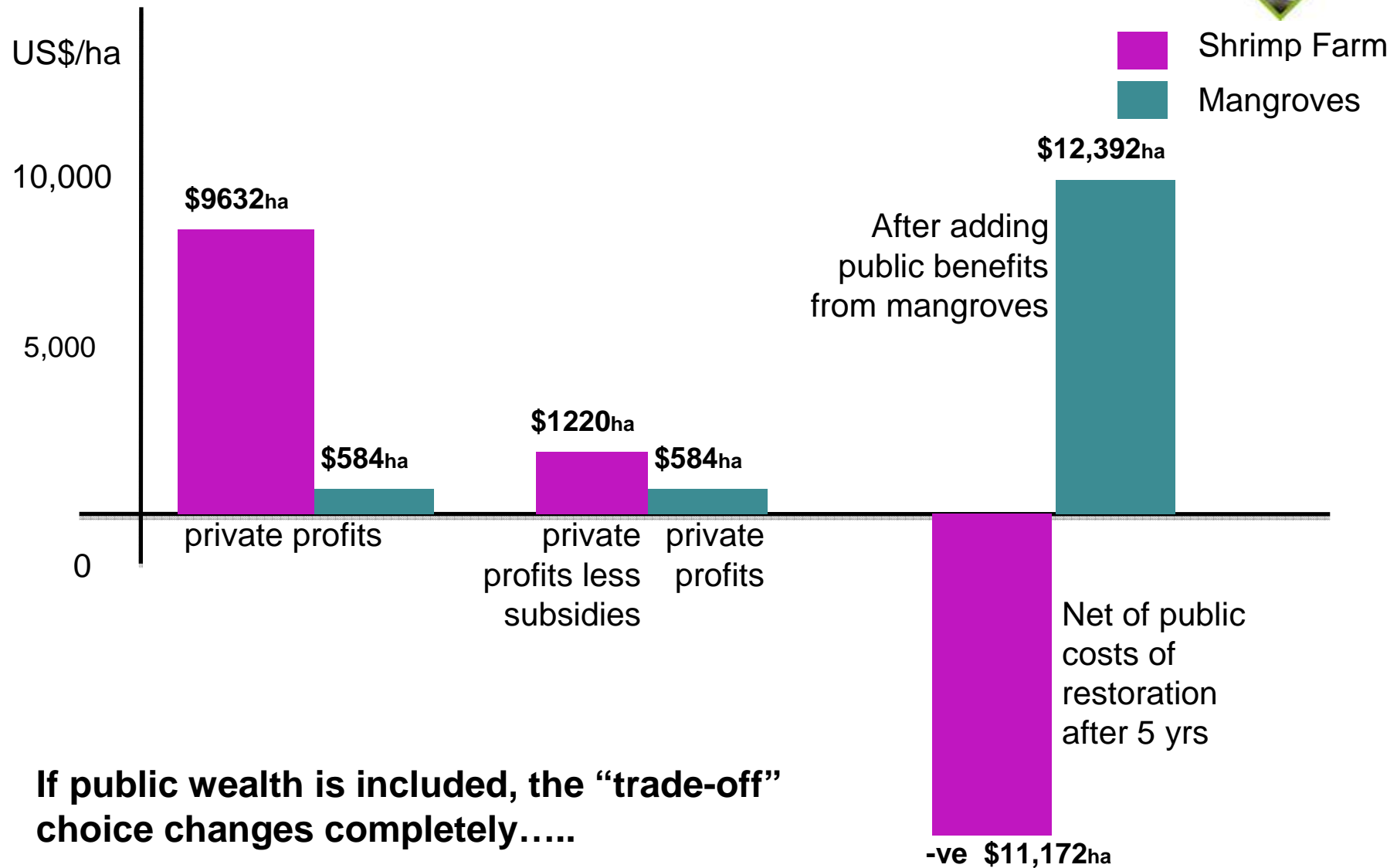
Synthesis



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PRIVATE PROFITS PUBLIC LOSSES



Source: Barbier 2007

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PRIVATE PROFITS **PUBLIC LOSSES**



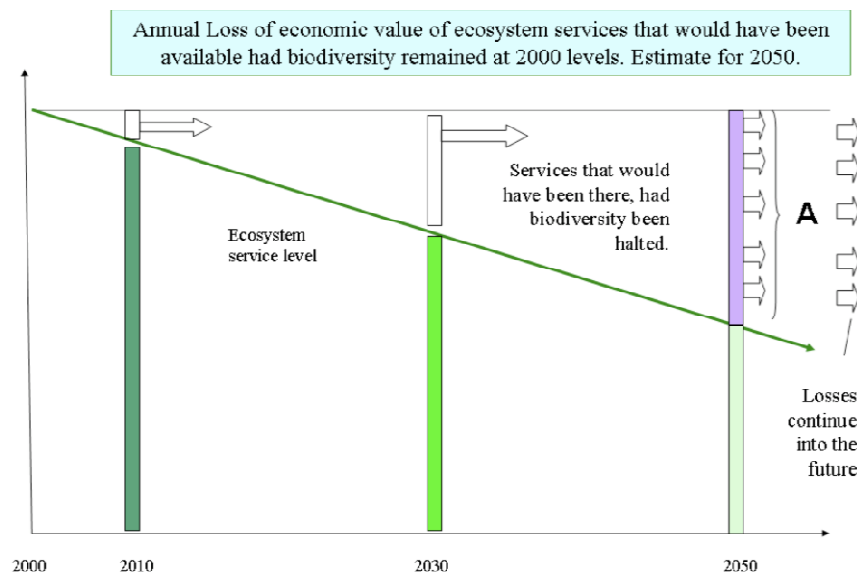
Top 3000 corporations (estimate by TRUCOST for UN-PRI)



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“Business-as-Usual” Human Welfare Losses (COPI study, May 2008, TEEB)

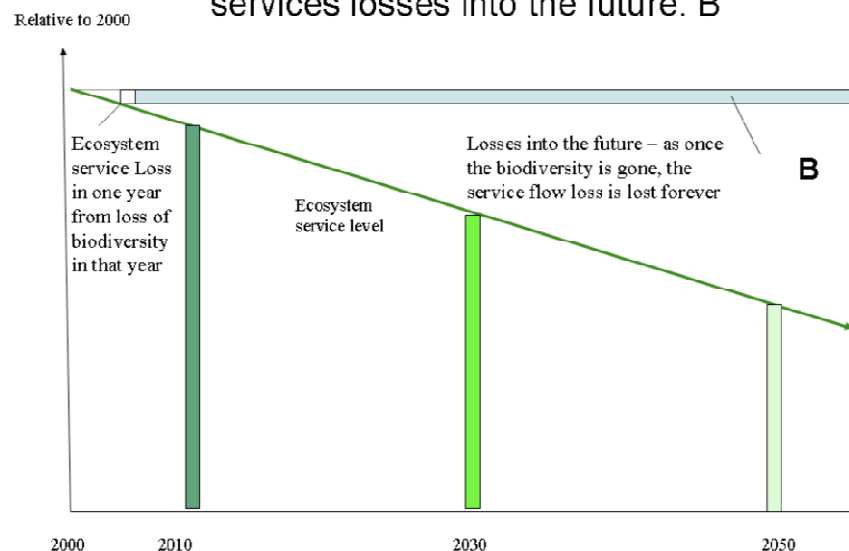
A : 50-year impact of inaction or ‘business as usual’



**Welfare losses building up to
7 % of GDP, horizon 2050**

B : Natural Capital Loss every year

Valuation and Ecosystem service losses
A year's biodiversity loss leads to ecosystem
services losses into the future: B



**Natural Capital Lost : Annually
EUR 1.35×10^{12} to 3.10×10^{12}**

(@ 4%
Discount Rate)

(@ 1%
Discount Rate)

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***Why* must we end the economic invisibility of Nature ?**

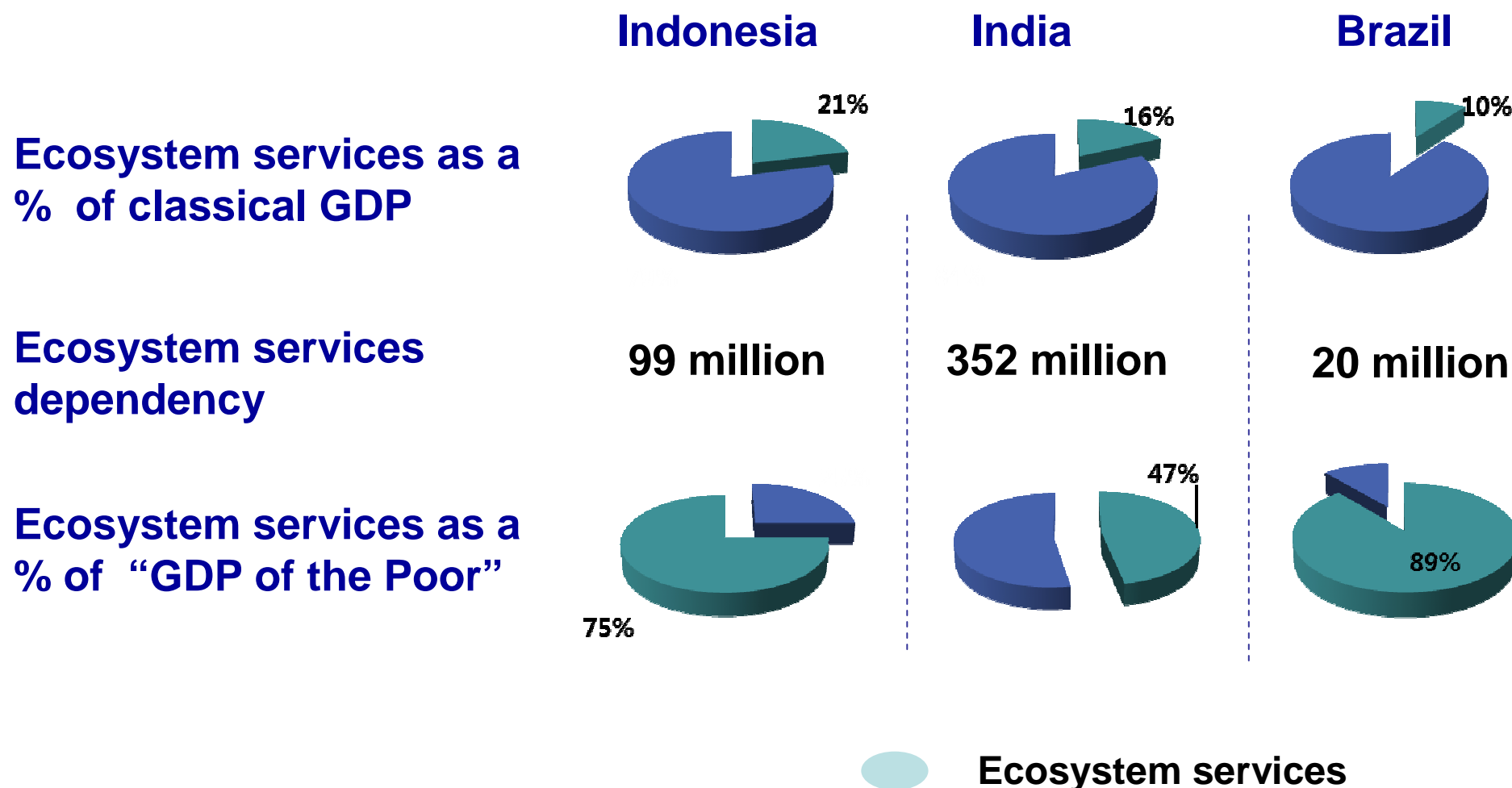
- ❑ Costs & Risks to Society of “BAU” are too large to ignore**

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A Key Finding of TEEB :

Ecosystem Services / “GDP of the Poor”



Source: Gundimeda and Sukhdev, D1 TEEB

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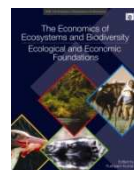
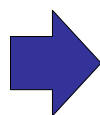
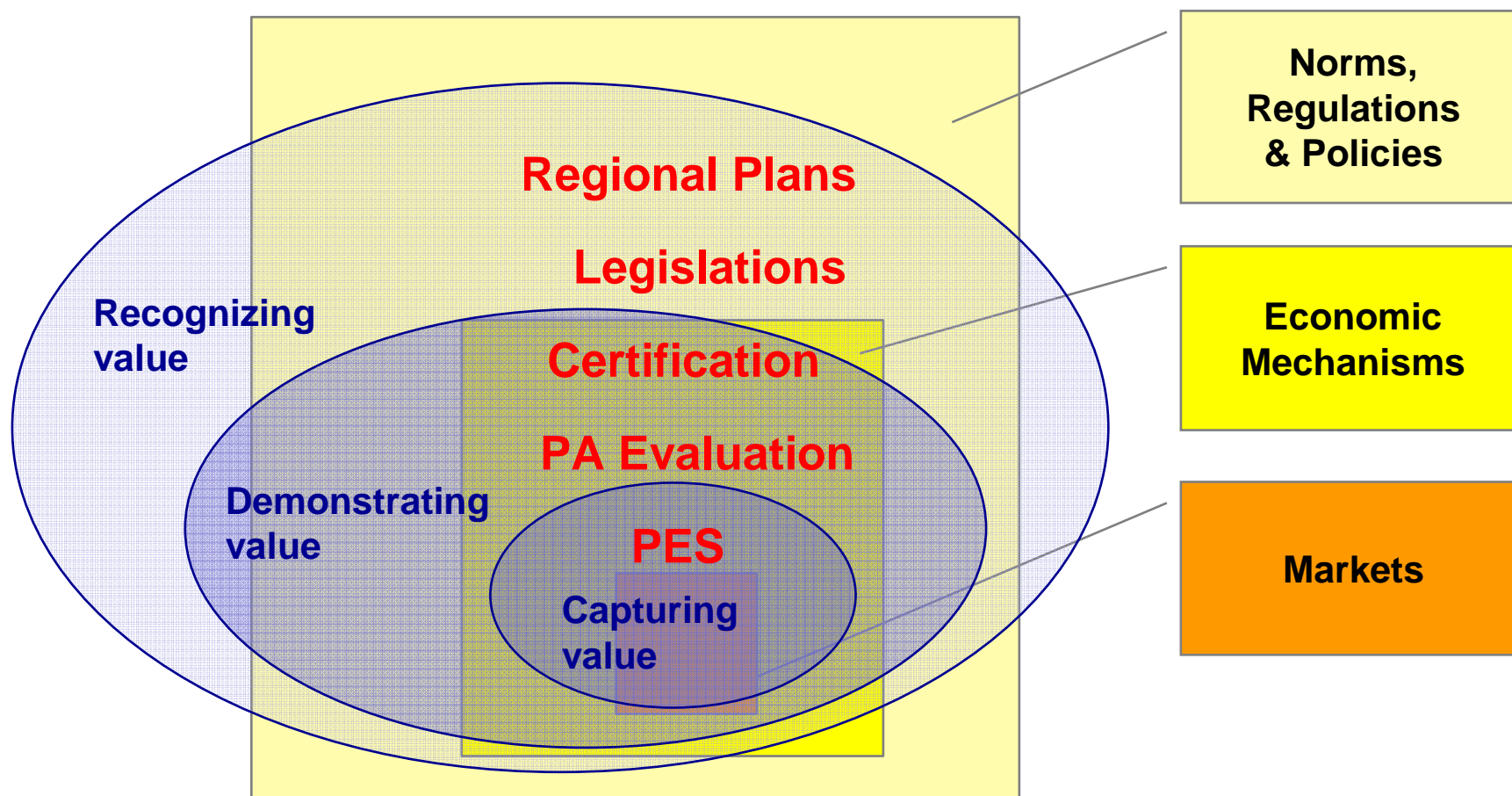


***Why* must we end the economic invisibility of Nature ?**

- ❑ Costs & Risks to Society of “BAU” are too large to ignore
- ❑ “BAU” nature losses will perpetuate poverty



TEEB's Approach and its Operative Spaces



Ch.5



Ch.4



Ch.3



Ch.3

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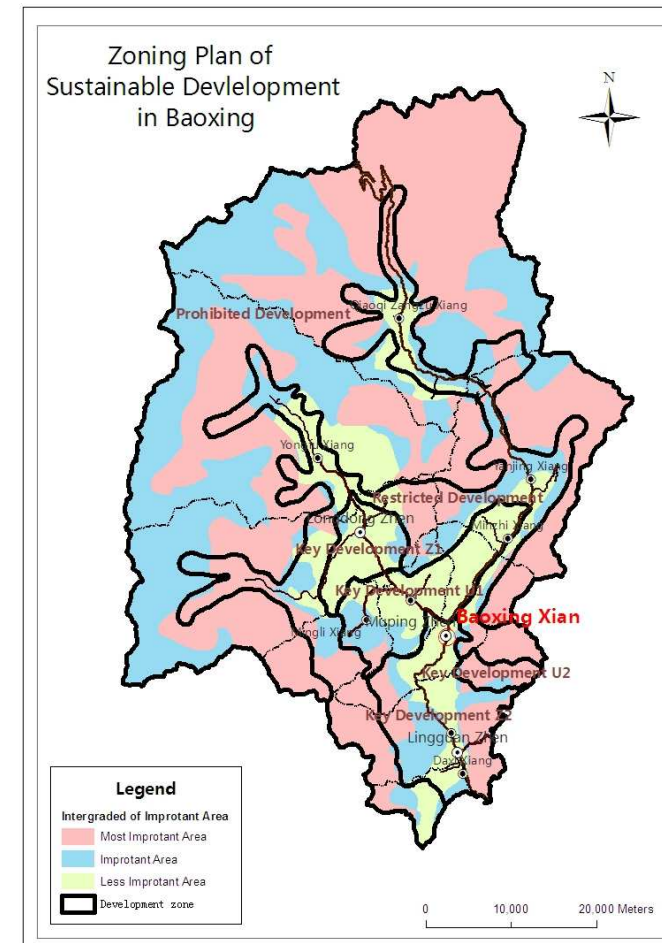


Examples : Integrating ecosystem services into land use plans in Baoxing County, Sichuan, China

REGIONAL LAND PLANS

An ecosystem service mapping and modeling tool (**InVEST**) used to plan development zones that avoid areas of high ecosystem service provision and conservation importance

Developments were reconsidered by local government officials during the making of the next **Baoxing County Land Use Master Plan 2010** where mapping had highlighted that activities were planned in areas of several critical ecosystem services





Examples : Tubbataha Marine Park, Philippines

UNESCO World Heritage site, contains 396 species of corals & has higher species diversity per square metre than the Great Barrier Reef

LEGISLATION

After 1998 Bleaching –
Stakeholders meeting

“No-take” areas agreed, & later,
President passed the Tubbataha
Reefs Natural Park Act in 2010
(10 mile buffer zone around the
no-take marine reserve) thus
increasing Park by 200%

- ❑ 10% annual increase in live coral cover.
- ❑ fish biomass is four-folds better than the average healthy reef





Examples : Kampala Wetland

Services provided by the Nakivubo swamp include natural water purification and treatment & supporting small-scale income activities of slum dwellers

P A EVALUATION

Ecosystems services provided by the swamp equal USD 1 million -1.75 million / year

If the swamp is converted then additional investment into a sewage treatment plant would be required with running costs of over USD 2 million / year



(Nakivubo designated a part of the city' s greenbelt zone)

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Examples : 'Satoyama' Landscapes

75 - 100% reduction in pesticides, traditional winter flooding rice farming adopted, & White Stork rice & other certified products sold at a “premium”

Konotori no Mai / Flying Oriental White Stork

PES

2003 - 2007: farmers paid 40,000 JYen per 1,000m² of rice paddies .Currently granted 7,000 JYen per 1,000m² by Toyo-oka City

CERTIFICATION

Rice sold at 23 % higher rate for reduced pesticide use, and 54 % more for organic farming



- ❑ White Stork habitat increased from 0.7 ha in 2003 to 212.3 ha
- ❑ Extinct in 1971, now has over 40 breeding pairs
- ❑ 1 billion JPY annually in tourism, & municipal income raised by 1.4 %



Why must we end the economic invisibility of Nature ?

- ❑ Costs & Risks to Society of “BAU” are too large to ignore
- ❑ “BAU” nature losses will perpetuate poverty
- ❑ **Effective, economic, solutions exist across policy & business which begin by valuing nature**



Business impacts and dependence on “BES”

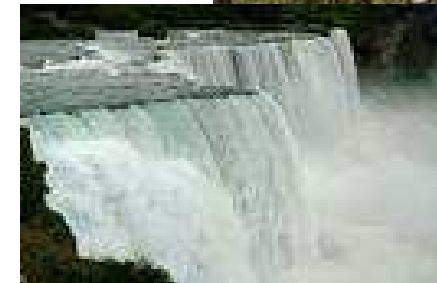
Business has direct and indirect impacts on biodiversity and ecosystems



Ecosystem change creates business **risks** and **opportunities**



Businesses depend upon biodiversity and ecosystem services

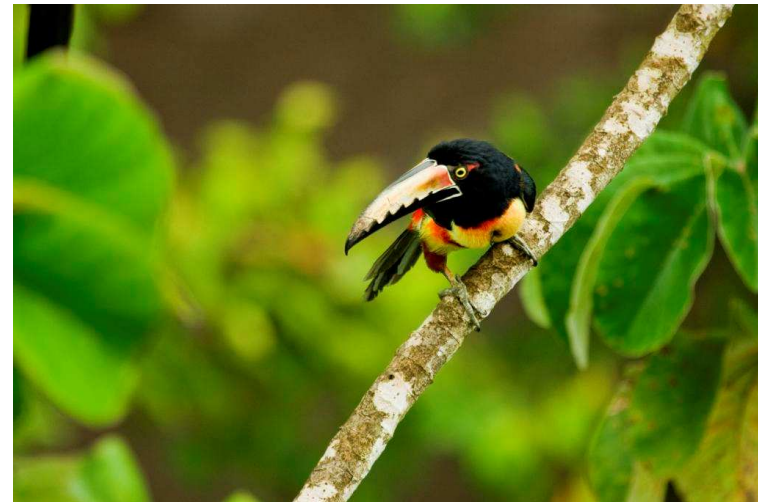




Biodiversity & Ecosystem Service ("BES") businesses

Adding BES to existing business

- Agriculture
- Biodiversity mgmt services
- Cosmetics
- Extractive industries
- Finance
- Fisheries
- Forestry
- Garments
- Handicrafts
- Pharmaceuticals
- Retail
- Tourism



New markets for BES

- Bio-carbon & REDD
- Biodiversity banking
- Enabling policy & tools



Growing consumer demand for eco-certified products and services

- Global sales of organic food and drink = US\$ 46 billion in 2007 (threefold increase since 1999)
- Sales of certified 'sustainable' forest products quadrupled between 2005 and 2007
- From April 2008 to March 2009, the global market for eco-labeled fish products grew by over 50%, to a retail value of US\$ 1.5 billion
- Major consumer brand owners and retailers added 'ecologically-friendly' attributes to their products:
 - Mars (Rainforest Alliance cocoa)
 - Cadbury (Fairtrade cocoa)
 - Kraft (Rainforest Alliance Kenco coffee)
 - Unilever (Rainforest Alliance PG Tips).



Growing investor interest in BES

- Sumitomo Trust & Banking Co., Ltd. (STB) launched a new “Biodiversity Fund” in July 2010.
- The fund will invest in listed companies that engage in biodiversity and sustainable development, focusing on:
 1. Companies with technologies that reduce negative impacts on biodiversity
 2. Companies with technologies that can secure biodiversity
 3. Companies with medium or longer term plans to secure biodiversity

Source: The Sumitomo Trust & Banking Co., Ltd. (2010).



BES risk assessment & mitigation

- **Integrated Biodiversity Assessment Tool**



- <http://www.biodiversityinfo.org/ibat/>
- GIS database for site-level risk assessment
- Based on World Database of Protected Areas, World Biodiversity Database, IUCN Red List of Threatened Species

- **Business and Biodiversity Offsets Program**



- <http://www.forest-trends.org/biodiversityoffsetprogram/>
- Guidance on designing and implementing biodiversity offsets to ensure “no net loss”
- Led by Forest Trends, Wildlife Conservation Society and Conservation International

- **Certification and labelling**



- <http://www.isealalliance.org/>
- Global hub for social and environmental standards
- Members represent fair trade, forest stewardship, organic agriculture, fisheries, etc.



What can business do TODAY?

- 1. Identify impacts and dependence** on biodiversity and ecosystem services (BES)
- 2. Assess business risks and opportunities** associated with these impacts and dependencies
- 3. Develop BES management** - information systems, setting targets, measure and value performance, report results
- 4. Go NPI** - Avoid, minimize and mitigate BES risks, using compensation ('offsets') where appropriate, based on concept of Net Positive Impact
- 5. Grasp opportunities** - emerging BES business opportunities, e.g. cost-efficiencies, new products, new markets
- 6. Integrate BES actions** - with Corporate Strategy, with wider CSR
- 7. Engage** - with business peers, govt, NGOs, the public, to improve BES understanding, guidance and policy



From carbon negative to biodiversity positive

- **BC Hydro:** "long-term goal of no net incremental environmental impact."
- **Coca Cola:** "Our goal is to safely return to communities and nature an amount of water equivalent to what we use in all of our beverages and their production."
- **Danone Group:** "Attain carbon neutrality for the major Danone brands, including Evian, by the end of 2011."
- **Marks & Spencer:** "Our goal is to become carbon neutral by 2012 in our UK and Republic of Ireland operations."
- **Rio Tinto:** "Our goal is to have a 'net positive impact' on biodiversity by 2015."
- **Sony:** "strive to achieve a zero environmental footprint throughout the lifecycle of our products and business activities : "Road to Zero"
- **Walmart:** "Committed ... to permanently conserve at least one acre of priority wildlife habitat for every developed acre."



To enable business action on BES...

- **Subsidy reform** (agriculture, fisheries, water, transport, etc)
- **Tax credits and other incentives** for conservation
- **Certification and eco-labelling** (voluntary / mandatory)
- **Payment for Ecosystem Services** (national, international)
- **Environmental responsibility** (EU Environmental Liability Directive, damage assessment and compensation)
- **Environmental trading schemes** (REDD+, USA wetland and species mitigation, Australia biodiversity banking)
- **Public access to information** (Global Reporting Initiative, Carbon / Forest / Water footprint disclosure projects)



GLOBAL FISHERIES

a problem with many dimensions



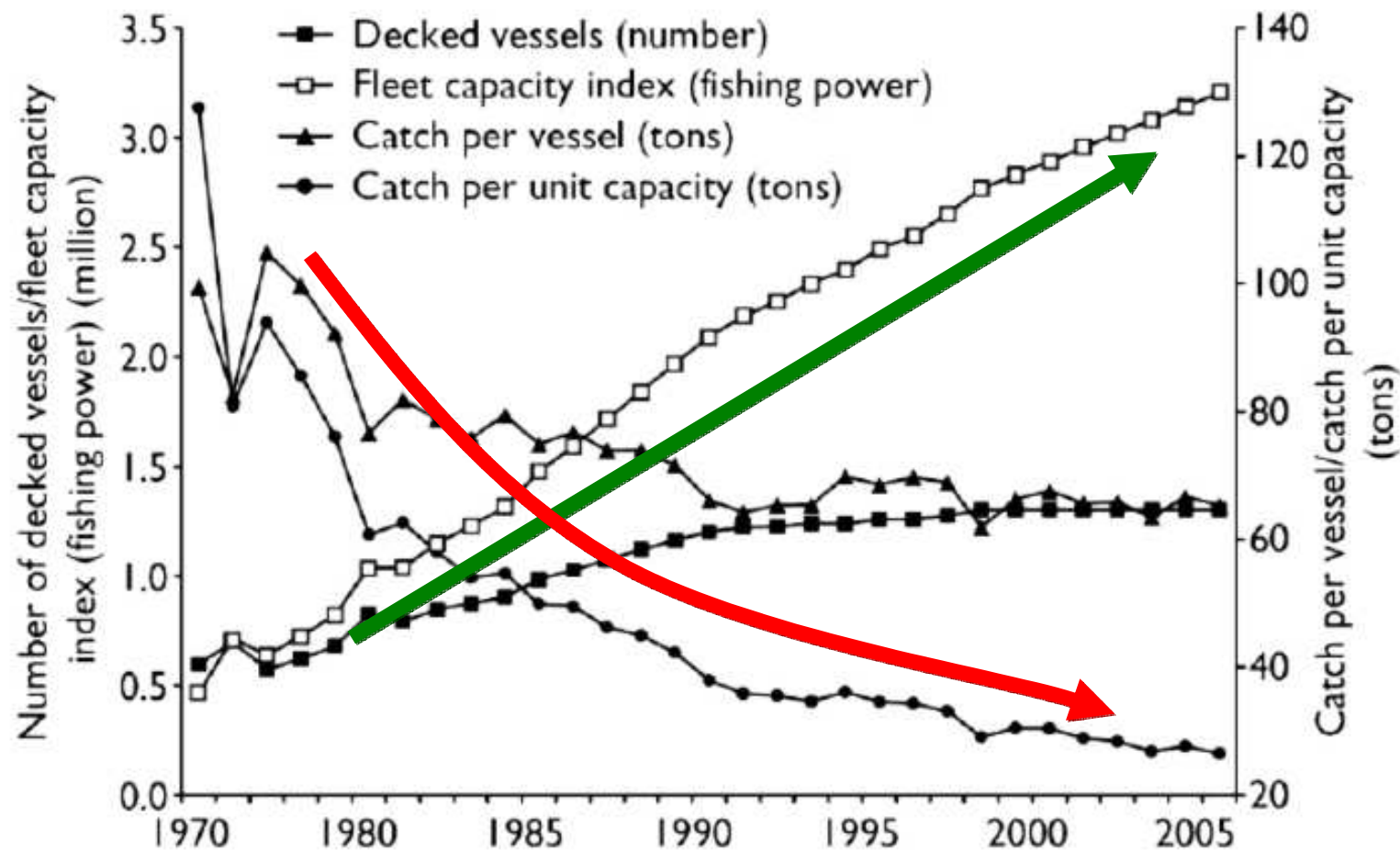
We are fishing down the food web
to ever smaller species

Source: Ben ten Brink (MNP) presentation at the Workshop: *The Economics of the Global Loss of Biological Diversity* 5-6 March 2008, Brussels, Belgium. Original source: Pauly

- Open Access system & perverse subsidies are key drivers of the loss of fisheries
- Half of wild marine fisheries are fully exploited, with a further quarter already over-exploited
- **lost productivity** : est. \$ 50 billion
- **at risk** : \$ 85 -100 billion landed catch from the sector
- **at risk** : est. 35 million jobs
- **at risk**: Health – over a billion rely on fish as their main/sole source of animal protein (especially in developing countries)



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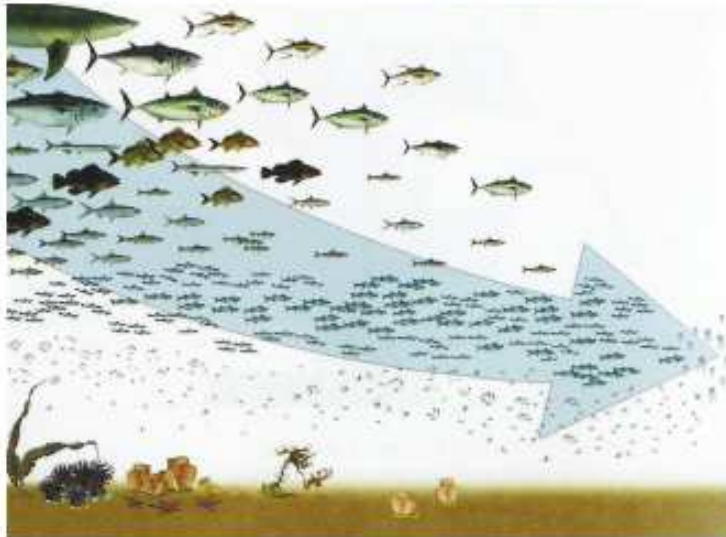


World Bank estimates that net benefit losses from fisheries are 50 billion US\$ per year



GLOBAL LOSS OF FISHERIES **IS THERE A SOLUTION?**

Open access & perverse
subsidies drive fisheries losses



We are fishing down the food web to
ever smaller species

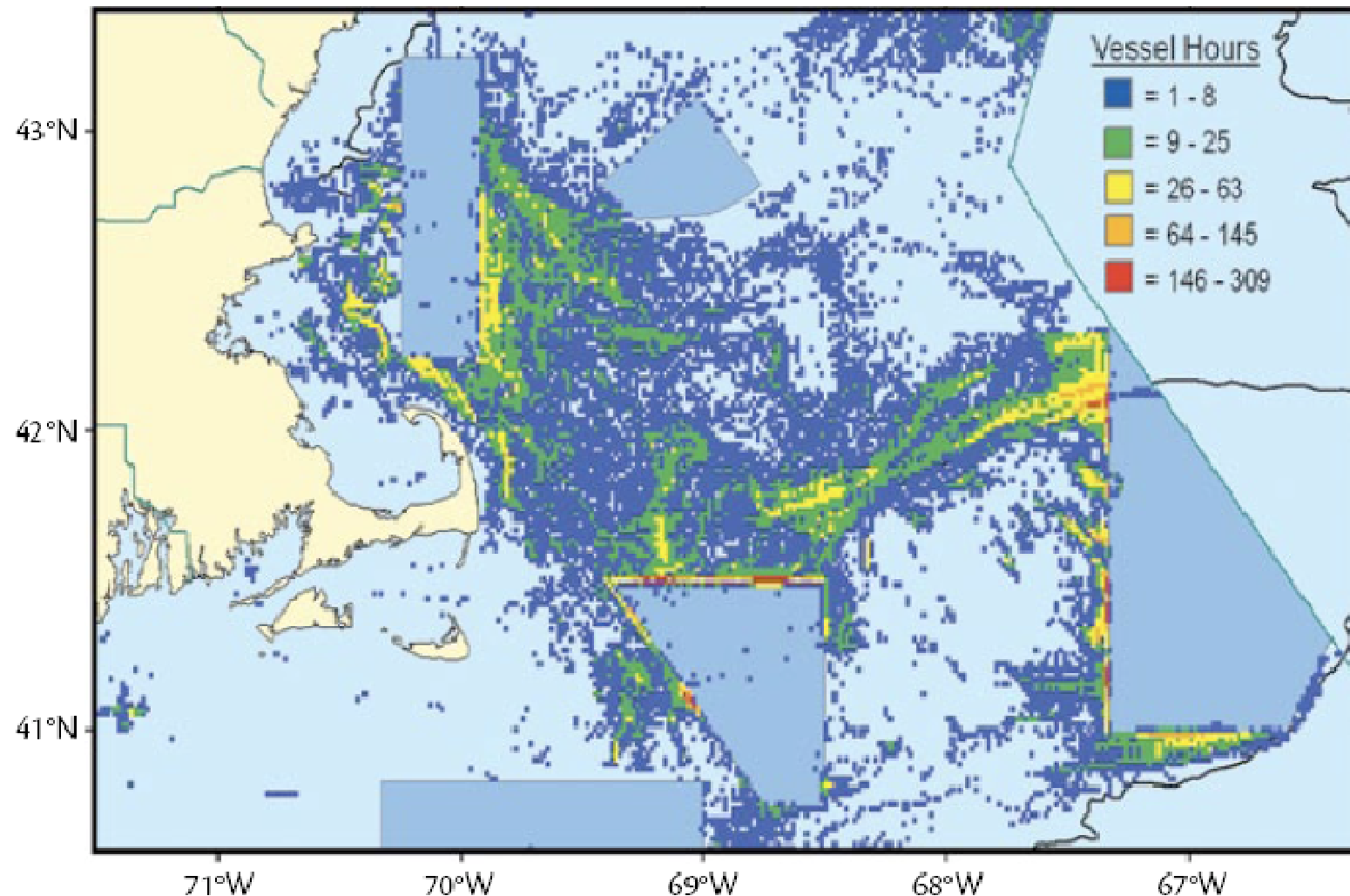
And do reserves work ?



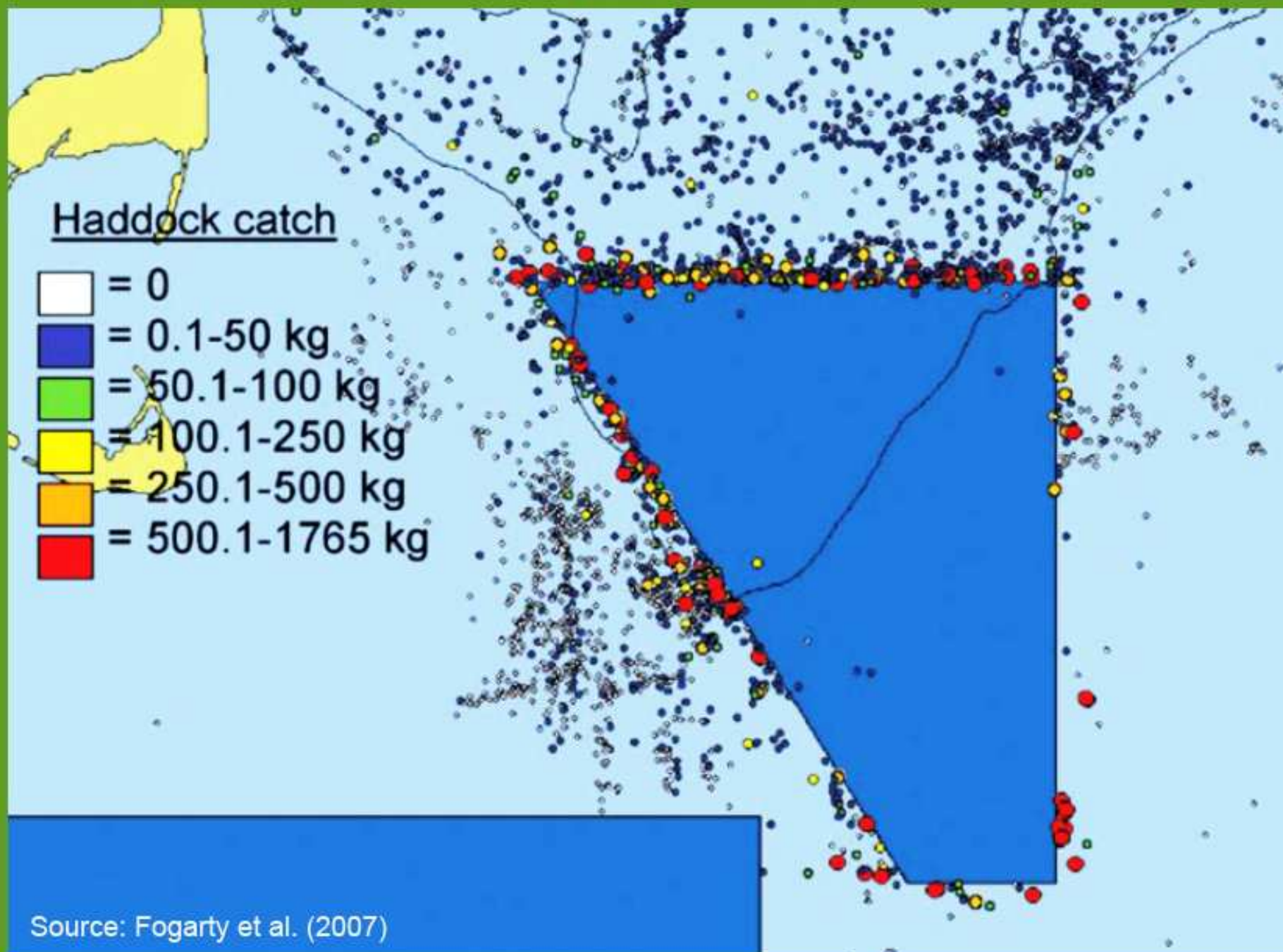
Reserves all over the world show
large increases in spawning stocks



Distribution of fishing effort around Georges Bank closed areas



Source: Fogarty et al. (2007)





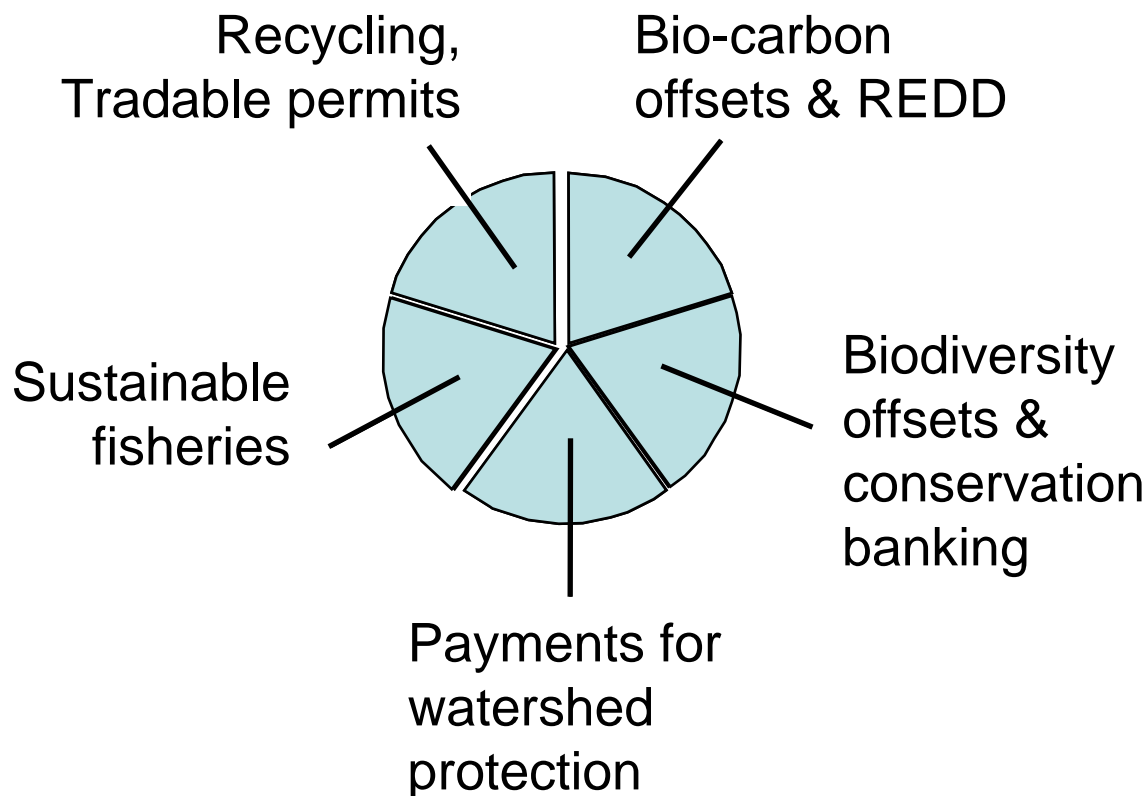
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- ❑ Costs & Risks to Society of “BAU” are too large to ignore
- ❑ “BAU” nature losses will perpetuate poverty
- ❑ **Effective, economic, solutions exist across policy & business which begin by valuing nature**



From risks to business opportunity

Source: Adapted from Kapila (2009)



The Economics of Ecosystems & Biodiversity



Conservation and Employment

Measures Sectors	Revenues (USD Bio)	Capital Employed (USD Bio)	People Employed
Automobiles⁴	\$ 1,882 Bio	\$2,217 Bio	4.4 Mio
Steel⁴	\$ 530 Bio	\$ 588 Bio	4.5 Mio
IT Services & Software⁴	\$ 942 Bio	\$ 179 Bio	5.7 Mio
Protected Area Conservation	\$ 5,000 Bio¹	\$ 125,000 Bio²	1.5 Mio³

1. Balmford et al, 2002, "Economic Reasons for Conserving Wild Nature", Science 297, estimates Protected Areas could produce goods and services valued at between \$ 4,400 billion - \$ 5,200 billion per annum
2. Natural Capital : Present Value (PV) of a constant service annuity of \$ 5,000 billion per annum, discounted @ 4% per annum
3. Estimate of the number employed directly in the maintenance, protection, and oversight of Protected Areas globally
4. Global Business Sector estimates from Global Markets Centre ("GMC"), Deutsche Bank, 2008



***Why* must we end the economic invisibility of Nature ?**

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- ❑ “BAU” nature losses will perpetuate poverty
- ❑ Economic solutions exist, across policy & business, which begin by valuing nature
- ❑ **To realize the productive and employment potential of Natural Capital stewardship**

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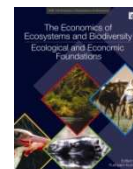


A Key 'TEEB' Recommendation : Measuring better to manage better

Natural resources are economic assets, whether or not they enter the marketplace

Conventional measures of national economic performance (eg : GDP Growth) fail to reflect these stocks and their benefits flows.

- **Rapidly upgrade the System of National Accounts (SNA) to include changes in natural capital stocks and ecosystem service flows (CBD Strategic Plan – Target 2 ... in [..])**
- **URGENT : physical accounts for forest stocks / carbon storage need to be in place (e.g. for orderly development of REDD+)**



Ch.3



Ch.3,5

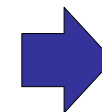




A Key 'TEEB' Recommendation : Financial Disclosure and "Net Positive Impact"

Corporate financial reporting standards & purchasing policies do not generally require attention to environmental externalities

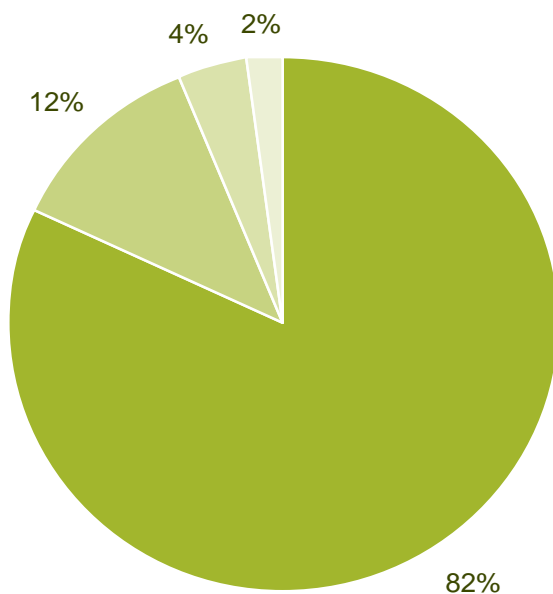
- **Disclose all major externalities in the annual reports and accounts of business and other organizations**
- **Reflect all environmental liabilities and changes in natural assets of the Corporation in its statutory accounts**
- **Principles of 'No Net Loss' or 'Net Positive Impact' (avoidance, mitigation, restoration, compensation, etc) should be integrated into normal business practice**



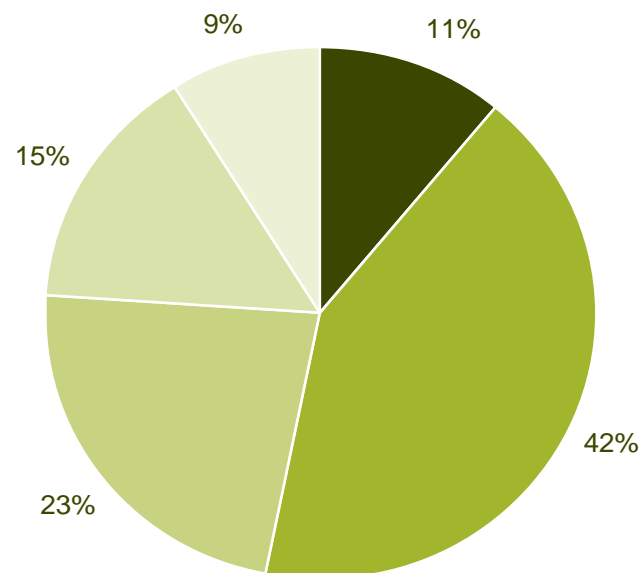


Gaps in business reporting on BES

Top 100 companies
Annual reports



Top 100 companies
Sustainability reports

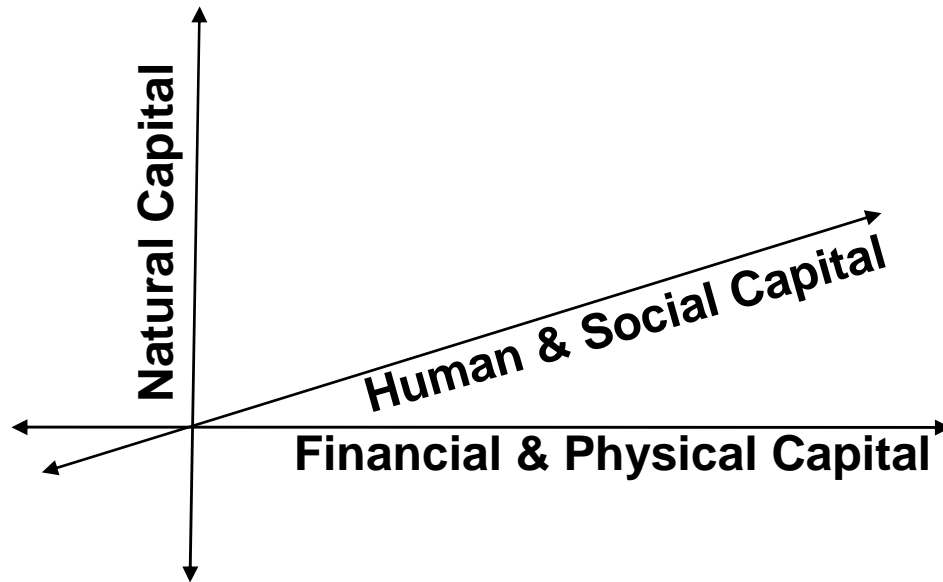


- Don't produce sustainability report
- No mention of biodiversity or ecosystems
- Passing mention of biodiversity or ecosystems
- Discuss approach to reduce impact on biodiversity
- Identify biodiversity as a key strategic issue

Source: PwC input to TEEB Report for Business



Recognizing Reality : **Natural Capital**



Can economies navigate a complex, “3-D capital” space with a simple economic compass?

Can companies keep “being profitable” and countries keep “growing GDP” whilst not measuring their impacts on **Natural Capital**?



***Why* must we end the economic invisibility of Nature ?**

- ☐ Costs & Risks to Society of “BAU” are too large to ignore
- ☐ “BAU” nature losses will perpetuate poverty
- ☐ Economic solutions exist, across policy & business, which begin by valuing nature
- ☐ To realize the productive and employment potential of Natural Capital stewardship
- ☐ **To replace our ancient economic compass before it is too late...**

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Thank You !

www.teebweb.org

www.teeb4me.com

