

# Policy demand and current debate surrounding valuation issues

Bonn, 24 April 2018



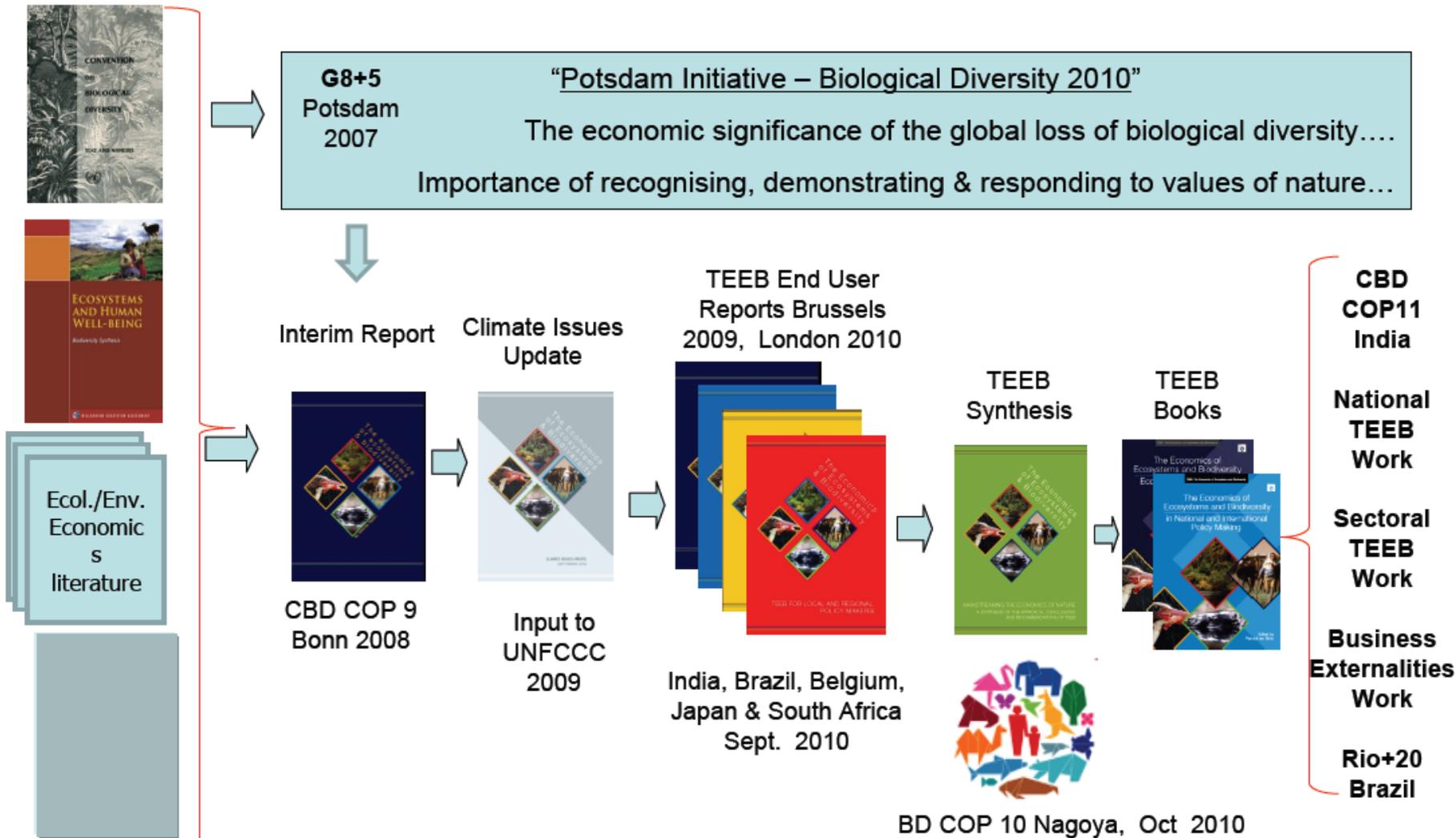
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**UNEP TEEB Office**



## I. The TEEB Initiative

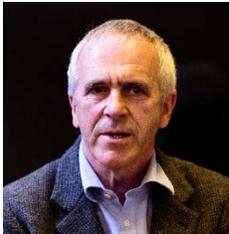


## TEEB initiative (2008-2012)





## TEEB ADVISORY BOARD





## II. *Purposeful valuation* under the TEEB Initiative



## TEEB: Three different levels of action

- 1. Recognizing value** – **identifying** the wide range of benefits in ecosystems, landscapes and biodiversity, such as provisioning, regulating, habitat/supporting and cultural services
- 2. Demonstrating value** – using economic tools and methods to make nature's services **economically visible** in order to support decision-makers wishing to assess the full costs and benefits of land-use change
- 3. Capturing value** – **incorporating** ecosystem and biodiversity benefits into decision-making through incentives and price signals



## TEEB 6 step approach

- STEP 1:** Refine the objectives of a TEEB Country Study by specifying and agreeing on the key policy issues with stakeholders
- STEP 2:** Identify the most relevant ecosystem services
- STEP 3:** Define information needs & select appropriate methods
- STEP 4:** Assess and value ecosystem services
- STEP 5:** Identify and outline the pros and cons of policy options, including distributional impacts
- STEP 6:** Review, refine and report – Theory of Change

## Guidance Manual for TEEB country studies

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The [Guidance Manual](#) for “The Economics of Ecosystems and Biodiversity” (TEEB) Country Studies was launched by UNEP and partners during the Trondheim Conference on Biodiversity, 28 May 2013. The [Guidance Manual](#) was developed following requests from countries interested in undertaking a TEEB country study, in order to achieve their development goals whilst at the same time sustainably managing their natural resources.

This [TEEB Manual](#) provides both technical and operational guidance on how countries may conduct a TEEB Country Study. It outlines the various steps that may be taken to initiate and implement a country study, communicate its findings, and implement the recommendations of the study.

The [Guidance Manual](#) is part of the TEEB implementation project “Reflecting the Values of Ecosystems and Biodiversity in Policy-making”, financed by the European Commission, which will support the implementation of TEEB in five developing countries over a period of three years. It will ensure the methodological coherence of the project. The [Guidance Manual](#) was developed by UNEP, the Helmholtz Centre for Environmental Research (UFZ), Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) and the Institute for European Environmental Policy (IEEP) among others.

Download the Guidance Manual TEEB Country Studies [here](#).

To contact us if you have further questions or comments, send an email to [teeb@unep.org](mailto:teeb@unep.org)



## Policy Identification: Over-arching questions

What policy issues are critical to the host country?

1. What will the policy act *upon*?
  - Single biome; multiple biomes; single sector; cross-sectoral
2. How *valuable* is/are the biome(s)/sector(s) to the economy?
3. What is the *incremental change* brought about by the policy?
4. Who are the *key stakeholders* and governance bodies (sub-national and national)?
5. On-going research



## What is the *incremental change* brought about by the policy?

- **Current policies (BAU):**
  - What is the current policy?
  - Is it enforced? Resourcing for monitoring and enforcement?
  - Is there adequate governance? Are roles and responsibilities well defined?
  - If BAU is extractive, contra-conservation, *might an assessment of ecosystem benefits change the policy landscape?*



## Who are the *key stakeholders* and governance bodies

### – Policy ‘on’ versus BAU

- National and sub-national **governance**
- **Affected stakeholder groups** – spatial location, gender issues
- Are the costs and benefits applying to the same stakeholders? **Distributional** issues



## Provisioning services



**Food:** Ecosystems provide the conditions for growing food. Food comes principally from managed agro-ecosystems but marine and freshwater systems or forests also provide food for human consumption. Wild foods from forests are often underestimated.



**Raw Materials:** Ecosystems provide a great diversity of materials for construction and fuel including wood, biofuels and plant oils that are directly derived from wild and cultivated plant species.



**Fresh water:** Ecosystems play a vital role in the global hydrological cycle, as they regulate the flow and purification of water. Vegetation and forests influence the quantity of water available locally.



**Medicinal resources:** Ecosystems and biodiversity provide many plants used as traditional medicines as well as providing the raw materials for the pharmaceutical industry. All ecosystems are a potential source of medicinal resources.





## **III. *Concrete examples* from TEEB**

**IIIa. TEEBAgriFood – AgroForestry**

**IIIb. TEEB Country Study - Bhutan**



# The Economics of Ecosystems & Biodiversity

## HUMAN SYSTEMS

## AGRICULTURE & FOOD SYSTEMS



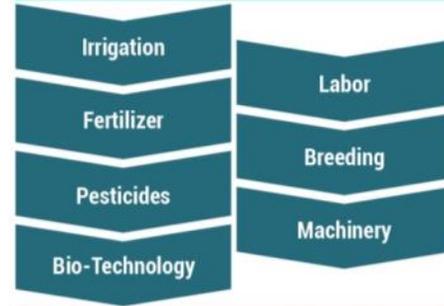
## BIODIVERSITY & ECOSYSTEMS

■ Inputs   ■ Outputs   ■ Invisible positive flows   ■ Invisible negative flows



# The Economics of Ecosystems & Biodiversity

## HUMAN SYSTEMS



## AGRICULTURE & FOOD SYSTEMS

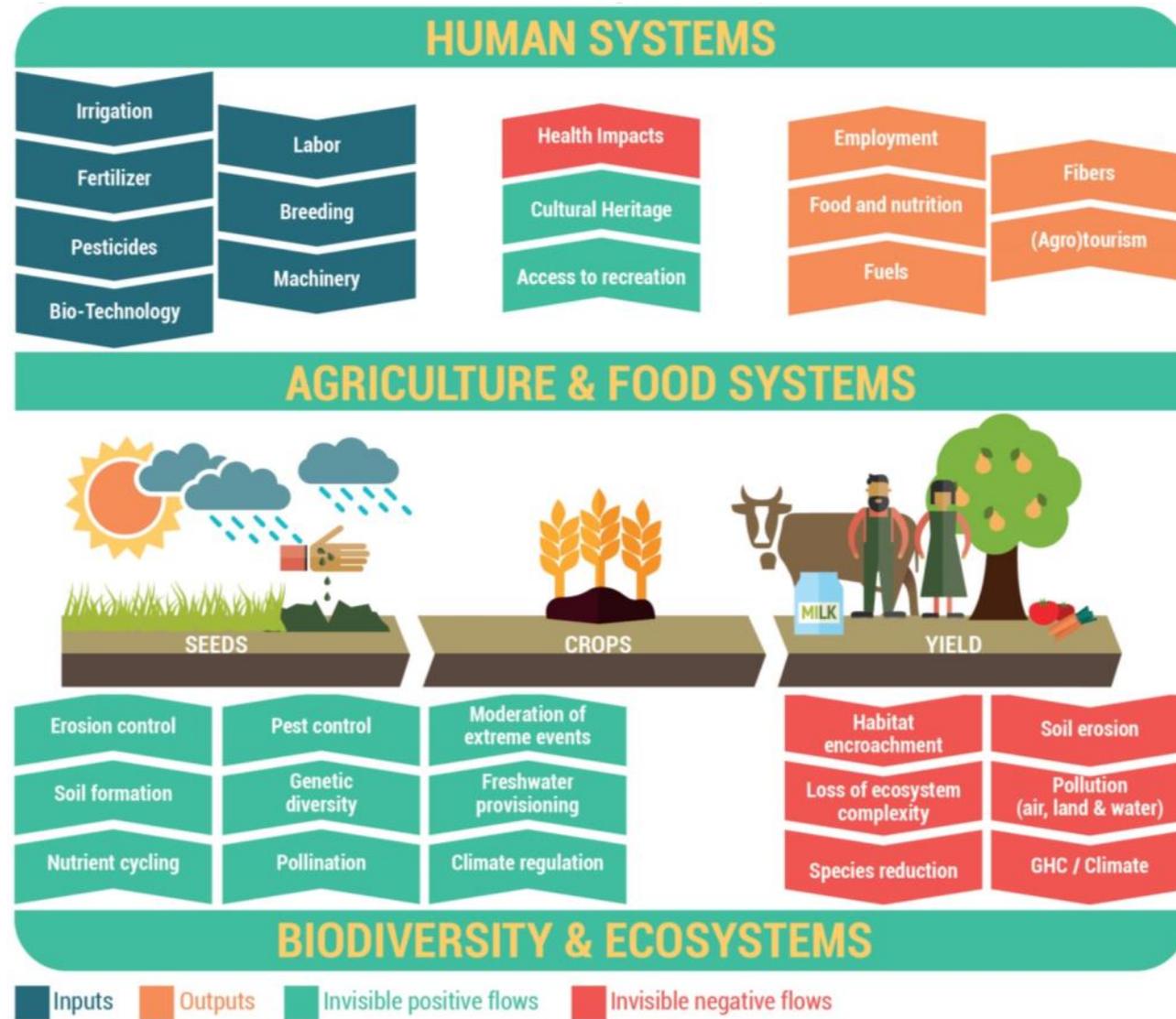


## BIODIVERSITY & ECOSYSTEMS

Inputs    Outputs    Invisible positive flows    Invisible negative flows



# The Economics of Ecosystems & Biodiversity





## Agro-forestry study

- Agroforestry is a practice involving the **deliberate integration of trees or shrubs in farming landscapes** involving crops or livestock in order to obtain benefits from the interactions between trees and/or shrubs the tree and crop or livestock component





## Agro-forestry: Scenarios and modelling

- The **WaterWorld model** was also used to model ecosystem services change
  - freshwater provision and runoff
  - increased water quality
  - above ground carbon stock
  - reduction of soil erosion





## Agro-forestry valuation methods

Ecosystem Service	Agroforestry System			Valuation Method
	Cocoa	Coffee	Ngitili	
<b>Provisioning</b>				
Cash Crops	***	***	N/A	Market price <sup>16</sup>
Food Crops	***	***	***	Market price
Tree Crop Products	***	***	N/A	Market price
Medicines	*	*	***	Shadow price <sup>17</sup> , replacement cost
Wild Food and all other NTFP	*	***	***	Shadow price
Timber and Poles	***	***	***	Market price
Energy (Wood fuel and Charcoal)	*	***	***	Market price, shadow price, replacement cost
<b>Regulating and Supporting</b>				
Soil and biomass C stocks	***	***	***	Market price, avoided cost
Erosion control	ND	***	ND	Contingent valuation, replacement cost
Soil fertility (Soil N also P and K where available)	** <sup>18</sup>	**	***	Replacement cost
Biological Pest Control	**	**	ND	Insufficient data for benefit transfer
Pollination	**	**	N/A	Insufficient data for benefit transfer
<b>Biodiversity</b>	**	**	**	Insufficient data for monetary valuation
<b>Avian Diversity</b>	**	**	**	Insufficient data for monetary valuation
<b>Vegetative Diversity</b>	**	**	**	Insufficient data for monetary valuation
<b>Other mammalian diversity</b>	**	ND	ND	Insufficient data for monetary valuation

\*\*\* Sufficient data for biophysical quantification and monetary valuation;

\*\* Quantitative biophysical data available, but insufficient data for monetary valuation;

\* Qualitative information available; ND No relevant data available; N/A No applicable



# Agro-forestry valuation outcomes

<b>Ecosystem service</b>	<b>Scenario 1:</b> Converting to Maize monoculture (million \$/y)	<b>Scenario 2:</b> Canopy cover ≥ 30% [due to REDD+ or certification incentive] (million \$/y)	<b>Scenario 3:</b> Canopy cover ≥ 30% & expansion of agroforestry to all areas bar: (I) urban; (II) priority land use such as forests; and (III) wildlife reserves (million \$/y)
Increase in system extent (ha)	-202,342	0	+286,852
<b>Provisioning</b>	<b>-38.4</b>	<b>No change</b>	<b>73.4</b>
Coffee	-115.9	No change	+143.9
Maize	+90.5	No change	-128.3
<b>Other ES (fuel wood, honey)</b>	<b>-13.0</b>	<b>No change</b>	<b>+57.9</b>
<b>Carbon regulation</b>	<b>-435</b>	<b>+292</b>	<b>+655</b>
<b>Other regulating</b>	<b>-19</b>	<b>+74.5</b>	<b>+54.3</b>
Water yield	-34.9	+58.6	+10.7
Soil erosion	+15.9	+15.9	+43.6



## Agro-forestry: not 'capturing' values as yet

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## Bhutan

1. TEEB Bhutan informs the **Sustainable Hydropower Development Policy** (2008) and the **Alternative Renewable Energy Policy** (2013), both of which call for a diversification of energy sources.
2. **Each scenario designed to meet Bhutan's 2020 energy goals (10,000 MW).**





## Bhutan

- Business as Usual versus Scenario 1, Scenario 2
- **Scenario 1** simulates the construction of five hydropower dams across the country
  - information on the size and capacity of the hydropower dam to estimate its expected electricity generation.
  - projects construction costs, as well revenues and operation and management costs.
  - assumes the creation of new infrastructure (e.g. roads, as part of the commissioning of the hydropower dam) and transmissions lines (especially concerning the potential to export electricity to India).
  - Outcomes of hydropower dam construction are also projected on land use and population growth



## Bhutan

- **Scenario 2** simulates the construction of five hydropower dams and the reinvestment of part of the proceeds (20% of 1% of electricity sales revenue) into reforestation and forest conservation at the watershed level.
  - This intervention is assumed to lead to the expansion of the forest stock, with measurable outcomes on carbon sequestration, nutrient loadings and export as well as on water availability.





# The Economics of Ecosystems & Biodiversity



ES	Estimation			Biophysical change (2010-2030): BAU	Hydro vs. BAU	ES vs. BAU	Economic value per unit	Economic valuation (year 2030)		Comments
	InVEST	SD	Benefit transfer					Hydro vs. BAU	ES vs. BAU	
Provision of food		X		9,581 ton	-752	-768	542.81 US\$/ton	-\$407,898	-\$416,954	Systemic approach, with endogenous changes to population and land use
					3,215	3,142		\$2,259,158	\$2,207,937	Sectoral approach with no change to land use, only yield
Sedimentation	X			0.21 mm <sup>3</sup> /km <sup>2</sup>	188.5%	-2.9%	12,484 \$/hour of hydropower dam operation	-\$18,211,679	\$281,590	Only considers impact on sedimentation from land use
Provision of freshwater (quality) - nitrogen		X		0.0008 mg/l	-3.27%	-3.16%	-	Below health threshold	Below health threshold	Assumes that all the land-related N loadings take place in 20% of the area (concerning the estimation of concentration)
Provision of freshwater (quality) - phosphorus		X		0.0008 mg/l	-2.97%	-2.86%	-	Below health threshold	Below health threshold	Assumes that all the land-related N loadings take place in 20% of the area (concerning the estimation of concentration)
Habitat for species			X	2,348 ha	-1,537	1,413	5,192 US\$/Ha	-\$7,981,483	\$7,334,511	Economic value per unit obtained from Kubiszewski et al. (2010)
		X		2,780 persons	-156	-153	17,732 US\$/person	-\$2,760,841	-\$2,719,680	Assumes that a reduction in habitat quality has a proportional impact on tourism visits (it could also be assumed that expenditure per visit might change)
Regulation of carbon sequestration and storage	X	X		-81,954 ton	-71,216	65,435	43 US\$/ton	-\$3,062,288	\$2,813,705	Upper values of carbon coefficients from IPCC Report 2006
	X	X		-4,933 ton	-15,767	14,489	43 US\$/ton	-\$677,981	\$623,027	Lower values of carbon coefficients from IPCC Report 2006



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## Multimedia

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Reflecting the Value of Ecosystems and Biodiversity in Policy-Making

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TEEB National Studies Final Workshops



Tarsicio Granizo Tamayo  
Minister of Environment - Ecuador

## Multimedia



TEEB National Studies Final Workshops



# The Economics of Ecosystems & Biodiversity



Teresa Mundita Lim  
Director Biodiversity Management Bureau - Philippines

## Multimedia



TEEB National Studies Final Workshops



## TEEB: Three different levels of action

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## IV. Valuation, policy mainstreaming and SEEA-EEA



## How to *better capture* values via SEEA-EEA?

1. Datasets on ecosystem extent, ecosystem condition, ecosystem service provisioning as an **input to Business as Usual** for scenario analysis
  - ❖ Data held by *disparate sources*/line ministries
  - ❖ Data validated by National Statistical Office – *credibility* of outcomes
2. Multi-year datasets
  - ❖ **Trends** that point to the need for policy intervention
3. International comparability
  - ❖ *The statistical standard*



## SEEA-EEA: Concerns

1. **Commoditization** of nature
  - ❖ Valuation is not just monetary
2. **Sub-set of Ecosystem Services** in SEEA-EEA
  - ❖ <total aggregate values (from welfare economics)
3. Exchange values versus **welfare values**
  - ❖ Exchange values lower



## Thanks!



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