wbcsd business ecosystems training

BET India Module 3

Introduction to Valuing Ecosystem Services

Main presentation

December 2012

Business Ecosystems Training – Contributors

All content is based on WBCSD material and publically available reports.

BET curriculum and structure was designed by KPMG

The structure and content development of BET was governed by an Advisory Committee consisting of WBCSD member companies and Regional Network partners, NGOs, UN and academic institutions.

Session 1
Icebreaker and Introduction

[Option 1]

Module 3: Introduction to valuing ecosystem services

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Session 1
Introduction

[Option 2]

Module 3: Introduction to valuing ecosystem services

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Icebreaker and introduction

[Option 1]

a) Your current role and scope of work

b) Your knowledge of how to measure ecosystems impacts

c) What you want to learn from the course and Module 3

5 minutes

Icebreaker

[Option 2]

- Catch the ball!!!

Icebreaker and introduction (cont.)

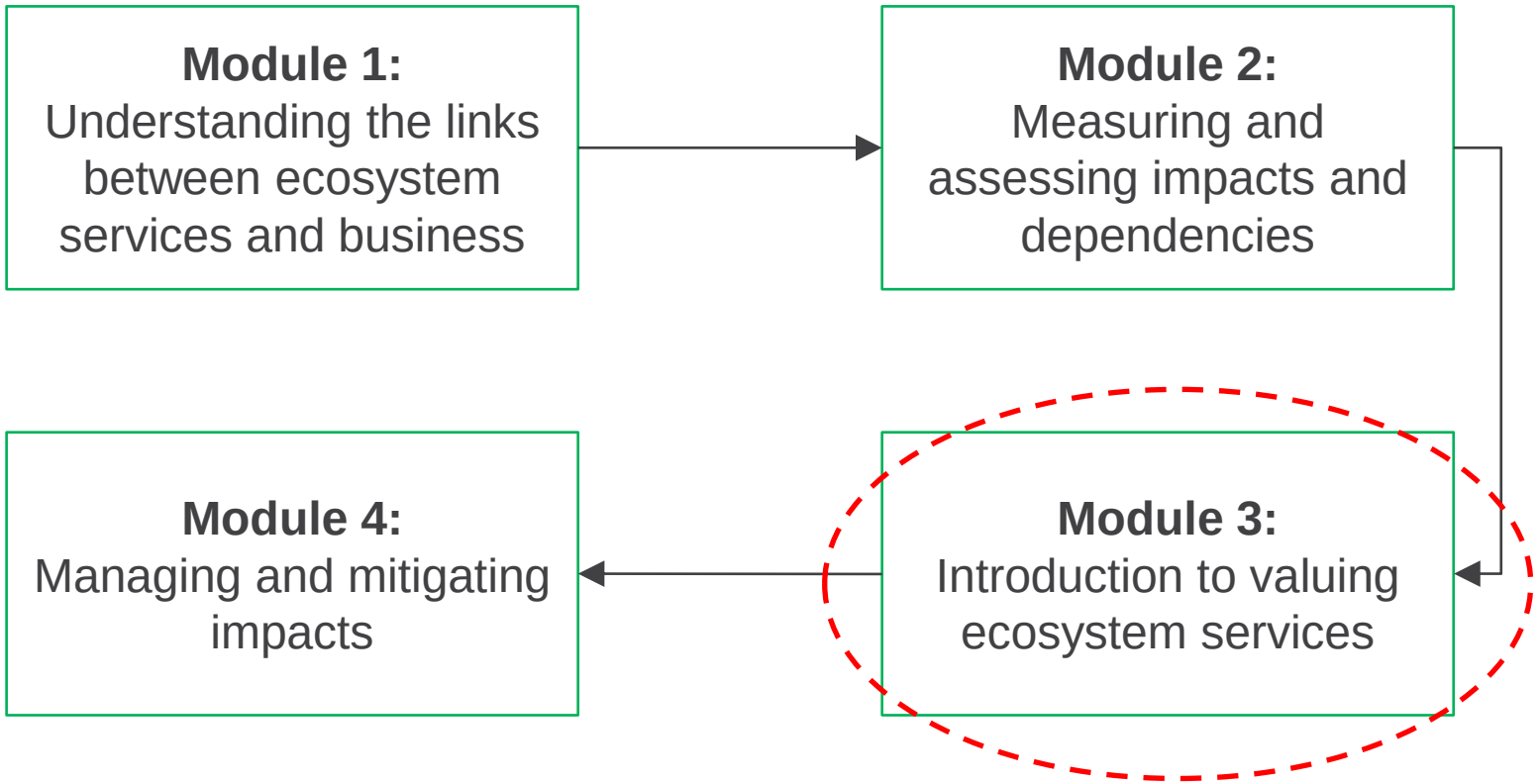
[Option 3]

Please discuss:

- What do you hope to learn from Module 3?

5 minutes

Where module 3 sits within the broader training available



Module 1 – Recap [optional module re-cap]

- Understand the basics
- Drivers for change and business impacts and dependencies
- Links with sustainability
- Business case for action
- Policy and regulatory frameworks

Module 2 – Recap [optional module re-cap]

- Understand the basics
- Policy and regulatory frameworks
- The business case for action
- Introduction to Ecosystem Services Review (ESR)
- Introduction to tools, frameworks and methodologies

Module 3 objectives

1) Identify the business case for valuing ecosystems services
2) Understand the principles and key stages of a Corporate Ecosystem Valuation
3) Examine case studies of when companies have commissioned valuation studies and understand how and when it is appropriate to screen and use ecosystem valuation

Module 3 – Objective summary

- Understand the basics
- Policy and regulatory frameworks
- The business case for action
- Introduction to Corporate Ecosystem Valuation (CEV)
- CEV screening and supporting tools and methodologies

BET Module 3: Introduction to valuing Ecosystem Services

Timetable

Time	Duration (mins)	Session	Facilitator
	15-40	Session 1: Icebreaker and introduction	
	40	Session 2: Define key terms and concepts	
	10	Session 3: Introduction to policy trends	
	10	Session 4: Knowledge check	
	15-20	Session 5: Identify the business case for valuing ecosystems	
	15-20	Session 6: Knowledge sharing and Q&A	
	30	Coffee break	
	30	Session 7: Brief introduction to Corporate Ecosystem Valuation (CEV)	
	25	Session 8: Screening for Corporate Ecosystem Valuation (CEV)	
	45	Session 9: Ecosystem valuation techniques – Exercise	
	15	Coffee break	
	10	Session 10: Supporting tools and methodologies	
	15	Session 11: Wrap up	

Key: Presentation
Exercise

How are companies addressing this issue?

Puma:

Implementation of ecosystem service valuation to generate environmental profit and loss statement.

Eni:

Assessment of impacts and dependencies of oil operation following ecosystem service valuation project.

Mondi:

Mapped and valued water dependencies among major water users in a South African watershed.

US BCSD: Houston By-Products Synergy:

Quantified physical ecosystem benefits realized through the process of matching undervalued or waste materials.

Introduction: Case study 1 – eni

Context

- eni is an international oil and gas company
- Integrating biodiversity and ecosystem service management
- This requires understanding biodiversity and ecosystem service risks and opportunities
  - How do onshore and offshore activities impact and depend on ecosystem services?
  - How do local communities impact and depend on those same services?
- Road tested the Guide to Corporate Ecosystem Valuation (CEV) in 2010
- Support from Fondazione Eni Enrico Mattei (FEEM) and IUCN

Introduction: Case study 1 – eni (cont.)

What they did

- Undertook a Corporate Ecosystem Valuation (CEV) which was strategically significant
- CEV complements previous biodiversity assessments at Exploration & Production (E&P) headquarter level
- Integrated Ecosystem Service values into site operations
- Differentiated E&P impacts from other human activity impacts
- Improved site level environmental performance
- Improved relationship with local stakeholders

Introduction: Case study 2 – USBCSD/Houston By-Product Synergy

Context

- The US Business Council for Sustainable Development (USBCSD) is the WBCSD's US regional partner
- Seeking collaborative, non-confrontational approaches to environmental protection, stewardship and community development
- Actively engaged in synergy projects to help achieve sustainability goals
- One goal of a By-Product Synergy project is to create long-term business relationships to reduce virgin resource consumption and reliance on end-of-life disposal technologies while generating positive economic, environmental and social value

Introduction: Case study 2 – USBCSD/Houston By-product Synergy (cont.)

What they did

- Undertook a project called By-Product Synergy (BPS), a collaborative process, to match undervalued resources from one company with needs and opportunities at another
- Undertook a CEV to provide an assessment of the upstream and downstream ecosystem services conserved related to reduced virgin material consumption and landfill/incineration disposal
- Utilized the BPS process to enable companies to reduce the environmental burden of their products and services and reduce reliance on ecosystem services for provisioning industrial resources

Case study 3 – Mondi

Company

- Leading international paper and packaging group with operations across 31 countries.

Business Context

- A change in law relating to water rights as a result of the introduction of the SA Water Act.
- The SA government removed all private ownership of water and reformed water rights that were based on land ownership.
- South Africa was moving from “water scarce” to “water crisis” status and some catchments had already over allocated the limited water resources
- Assessed Mondi’s impacts on the freshwater ecosystem

Introduction: Case study 3 – Mondi (cont.)

What they did

- An Ecosystems Service Review (ESR) was carried out by Mondi to determine the opportunities and dependencies on ecosystem services
- Mapped water dependencies among major water users in a South African watershed
- Undertook a CEV value these dependencies among major water users
- Are currently developing a GIS platform for scenario planning and the inclusion of other ecosystems in particular the very rare mist-belt grassland ecosystem.

Session 2
Define key terms and concepts

Module 3: Introduction to valuing ecosystem services

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Basic economic terms

Price

- The amount of money expected, required, or given in payment for something Some provisioning services (e.g. purchasing fish and timber) and some cultural services (e.g. entry fee to a protected area) have a market price. Most ecosystem services have no market price.

Cost

- The value that must be given up to acquire, obtain or achieve something. For example, in the case of water, a company may pay a ‘financial cost’ (i.e. price) to obtain water, but the ‘societal cost’ of using the water (e.g. environmental impacts) are excluded.

Value

- The importance, worth, or usefulness of something. For example, people place a ‘high value’ on protecting pristine habitats. Money is generally seen as the best universal measure of value, but it is not always possible or desirable to express all values in monetary terms.

Payment

- To give something (e.g. money or ‘in kind’) in exchange for goods or work done or to settle a debt. For example, the company paid farmers US$ 100/ha to stop cutting trees in the upper water catchment.

Basic economic terms (cont.)

Revenue

- Income before deductions for tax, cost etc.

Profit

- A financial gain, especially the difference between the amount earned and the amount spent in buying, operating, or producing something

Surplus

- An amount of something left over when requirements have been met; an excess of production or supply (e.g. *in the case of environmental economics a surplus might occur if someone is willing to pay more for say recreation, than they currently do)*

Economics

- The branch of knowledge concerned with the production, consumption, and transfer of wealth, it is about the allocation of scarce resources

Basic economic terms (cont.)

Public Good

- A product that one individual can consume without reducing its availability to another individual and from which no one is excluded.

Private Good

- A product that must be purchased in order to be consumed, and whose consumption by one individual prevents another individual from consuming it.

Externality

- A consequence of an action that affects someone other than the agent undertaking that action and for which the agent is neither compensated nor penalized through the markets. Externalities can be positive of negative

Sources: Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, 1997
Millennium Ecosystem Assessment (2005)

Basic economic terms (cont.)

Natural Capital

- The sum total of nature's resources and services that underpins human survival and economic activity.

  In contrast to financial capital, natural capital is the capital derived from ecosystems (i.e. the dynamic units that include plants, animals and the nonliving environment on which these depend, such as water and soils).

  It ranges from agricultural crops, vegetation and wildlife to the benefits that we gain from the many resources and processes supplied by nature.

  In short, natural capital is the value of nature to businesses and to the economy.

Source: Natural Capital Leaders Platform

Tragedy of the commons

Occurs when:

- There is unrestricted access to a limited shared (common) resource
- Multiple individuals seek to maximise their own benefits
- Individuals receive full benefit when exploiting the resource, whereas the cost of damage is shared
- Resource is therefore overexploited and depleted, even though it is in no one's long-term interest

Tragedy of the commons (cont.)

Parable of Hardin (1968)

http://www.youtube.com/watch?v=MLirNeu-A8I

"Freedom of the commons brings ruin to all"

- Can anyone name any other examples where tragedy of the commons leads to overexploitation of an ecosystem service?

Source: http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=27&NoSearchContextKey=true

Biodiversity, ecosystems and ecosystem services

Biodiversity	Quality	Quantity	Services (examples)
Ecosystems	Variety	Area/extent	Recreation Water regulation Biological control
Species	Diversity	Abundance	Food, fibre, medicine Design inspiration Pollination
Genes	Variability	Population	Bio-tech. inputs Disease resistance Adaptive capacity

Total Economic Value – TEV

Use

Non-use

Direct values
Outputs that can be consumed directly, such as fish, medicines, wild foods, recreation, etc.

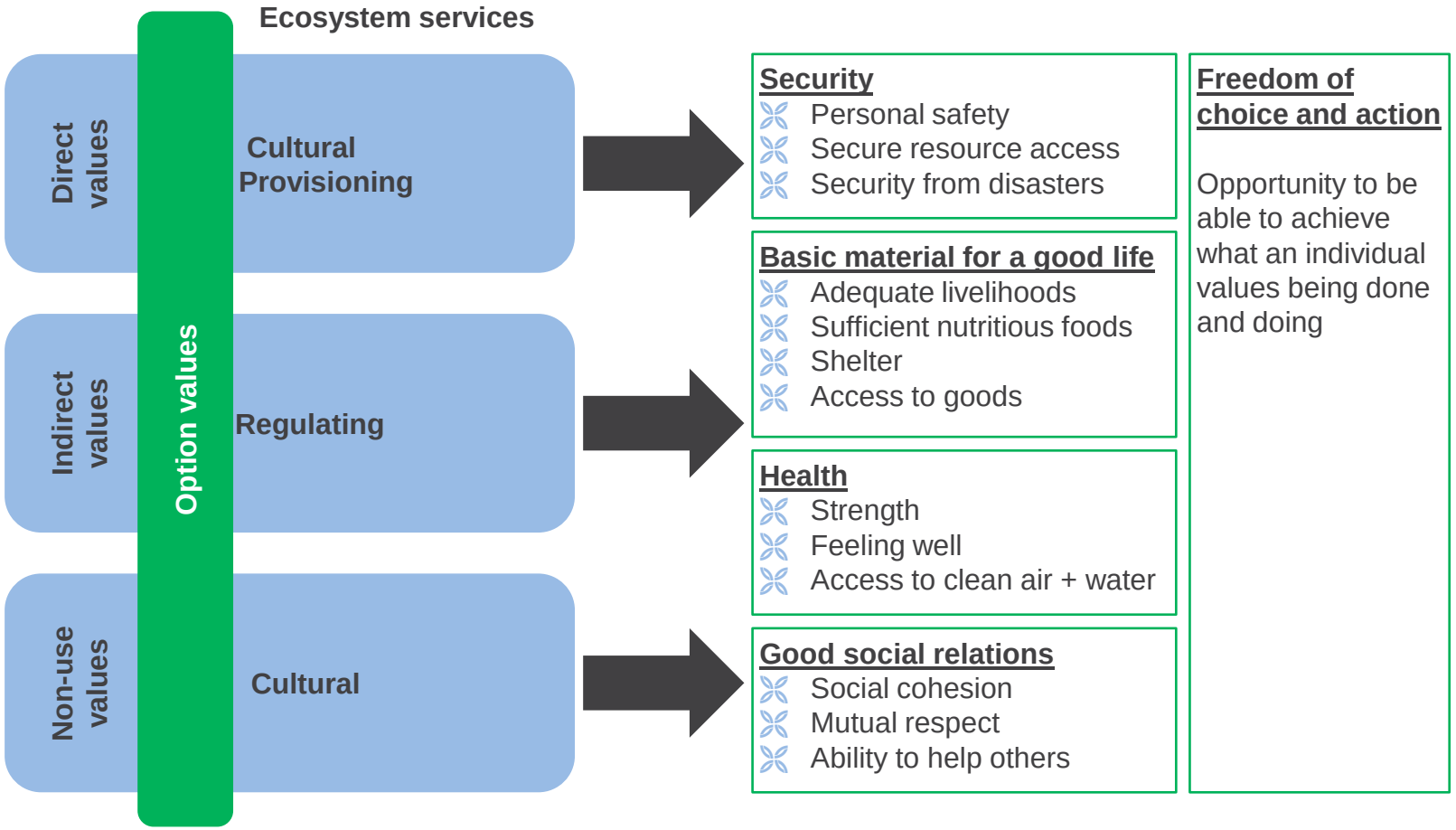
Indirect values
Ecological services, such as catchment protection, flood control, carbon sequestration, climatic control, aesthetics, etc.

Option values
The premium placed on maintaining resources and landscapes for future possible direct and indirect uses, some of which may not be known now.

Existence, altruistic and bequest values
The intrinsic value of resources and landscapes, irrespective of their use.

Source: Pearce, D.W., Markandya, A. and Barbier, E. (1989). Blueprint for a green economy. Earthscan, London WBCSD Connecting the dots

Ecosystem services and economic value



Source: WBCSD, Guide to Corporate Ecosystem Valuation (long and detailed)

The invisible economy - Video

Dr. Pavan Sukhdev on The Invisible Economy

Source: http://bankofnaturalcapital.com/2010/10/04/dr-pavan-sukhdev-on-the-invisible-economy/

Ecosystem service	Awareness of value
Provisioning services	
Food, fibre and fuel	Market Values – known and generally taken into account in decision making on land use decisions
Water provision	
Genetic resources	Value historically often overlooked; private sector exceptions
Regulating services	
Climate/climate change regulation	Value long ignored, now being understood
Water and waste purification	Value often overlooked
Air purification	
Erosion control	Value often appreciated only after service is gone
Natural hazards mitigation	
Pollination	
Biological Control	

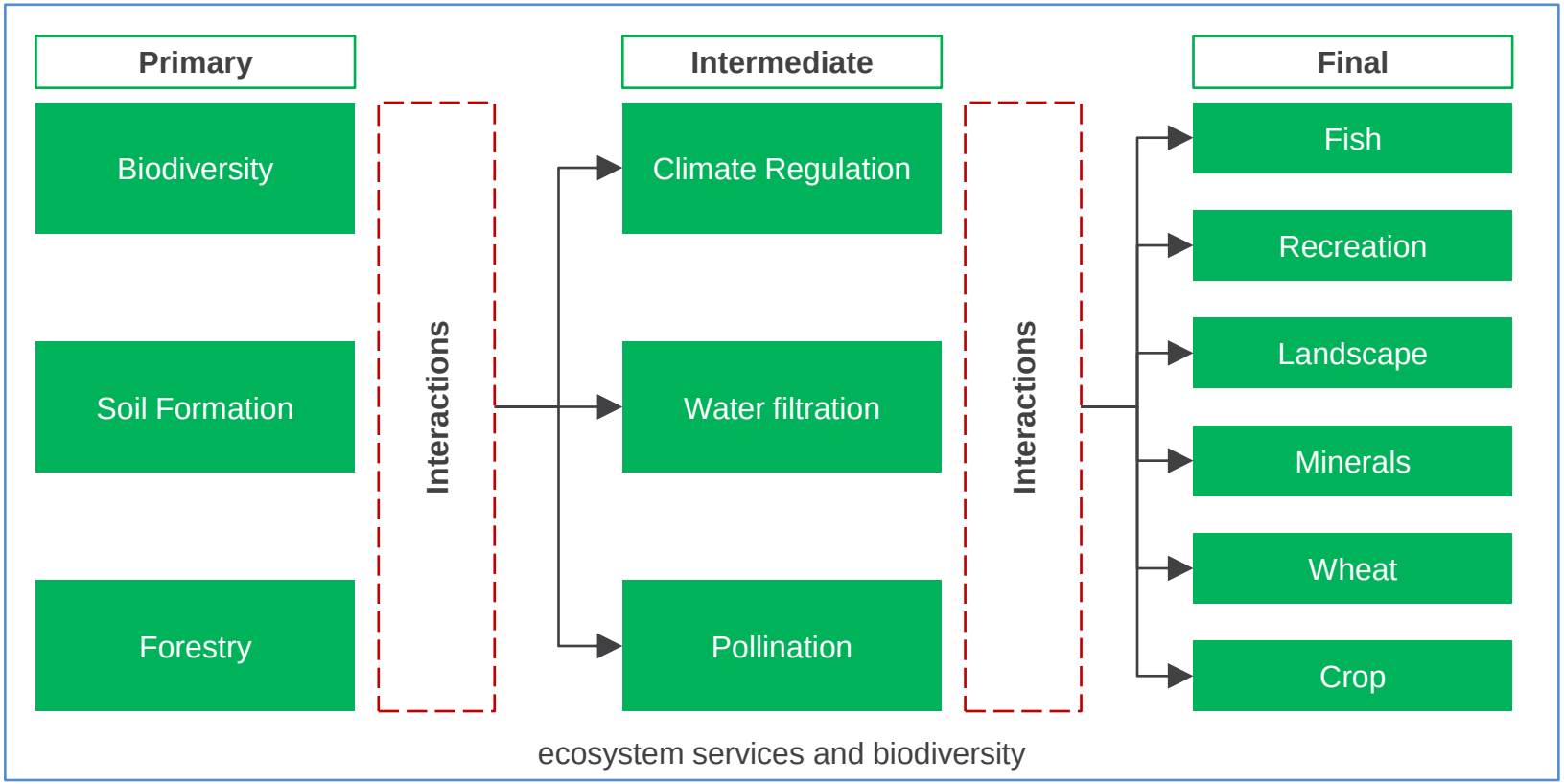
Source: Adapted from Patrick ten Brink, TEEB

Ecosystem service	Awareness of value
Cultural services	
Aesthetics, landscape value	Sometimes value implicit in markets
Recreation and tourism	
Cultural values and inspirational values	Values are rarely calculated
Supporting services	
Soil formation	

Decision making is biased towards short term economic benefits as the (long-term) value of ecosystem services is poorly understood

Source: Adapted from Patrick ten Brink, TEEB

Overview of evolving ecosystem service frameworks

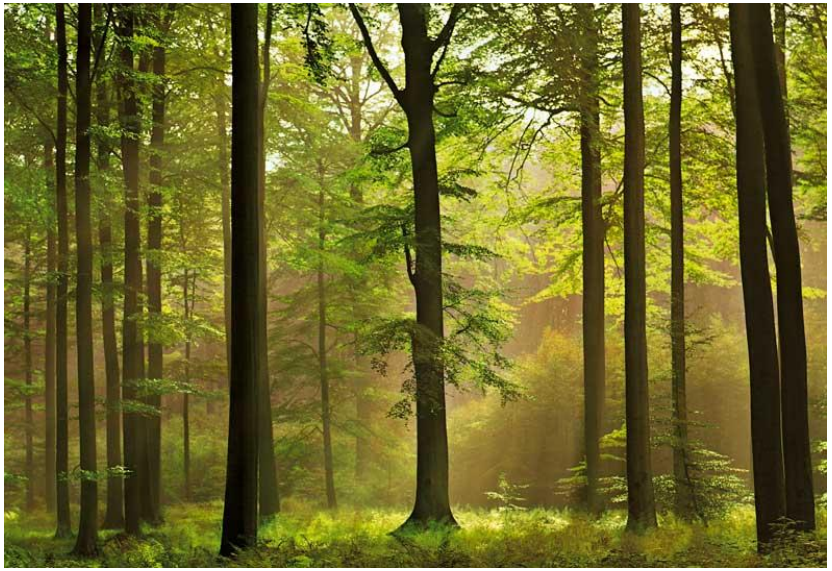


Source: Fisher B, Turner R, Costanza R, Morling P, forthcoming: A Systems Approach to Definitions and Principles for Ecosystem Services. Ecological Economics.
An Economic Assessment of UK Ecosystem Services. Available from: http://www.norfolkbiodiversity.org/news/Ian%20Bateman's%20Presentation%20edit%20(compressed).pdf

Interactive

Pricing…

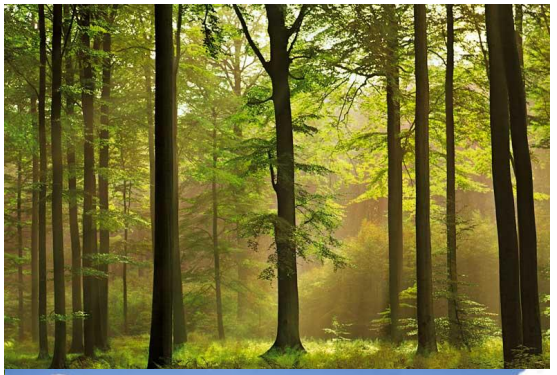
- Do you know…
- The ecosystem services delivered by forest?
- How much does 1 hectare of forest cost?



Interactive

Ecosystem services …

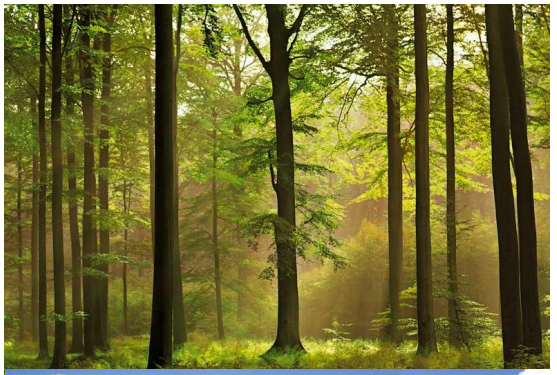
- United Kingdom forest -
- Brazilian eucalyptus farm -
- Brazilian rainforest -
- Brazilian cattle farm -



Interactive

Pricing…

- United Kingdom forest -
- Brazilian eucalyptus farm -
- Brazilian rainforest -
- Brazilian cattle farm -



Interactive

Pricing…

- United Kingdom forest - **[Insert price 1 £/$/€]**
- Brazilian eucalyptus farm -
- Brazilian rainforest -
- Brazilian cattle farm -

Interactive

Pricing…

- United Kingdom forest - **[Insert price 1 £/$/€]**
- Brazilian eucalyptus farm - **[Insert price 2 £/$/€]**
- Brazilian rainforest -
- Brazilian cattle farm -

Interactive

Pricing…

- United Kingdom forest - **[Insert price 1 £/$/€]**
- Brazilian eucalyptus farm - **[Insert price 2 £/$/€]**
- Brazilian rainforest - **[Insert price 3 £/$/€]**
- Brazilian cattle farm -

Interactive

Pricing…

- United Kingdom forest - **[Insert price 1 £/$/€]**
- Brazilian eucalyptus farm - **[Insert price 2 £/$/€]**
- Brazilian rainforest - **[Insert price 3 £/$/€]**
- Brazilian cattle farm - **[Insert price 4 £/$/€]**

Module 3 – Objective summary

- Understand the basics 
- Policy and regulatory frameworks
- The business case for action
- Introduction to Corporate Ecosystem Valuation (CEV)
- CEV screening and supporting tools and methodologies

Session 3
Introduction to Policy Trends

[Optional Session]

Module 3: Introduction to valuing ecosystem services

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Background to ecosystem policy

Long history of environmental regulation

a) 1388 UK water pollution measures

b) 1973 EU Action Programme on the Environment / Water

The limits to growth (1972)

- Modelled world population, industrialization, pollution, food production and resource depletion

Brundtland Report (1987)

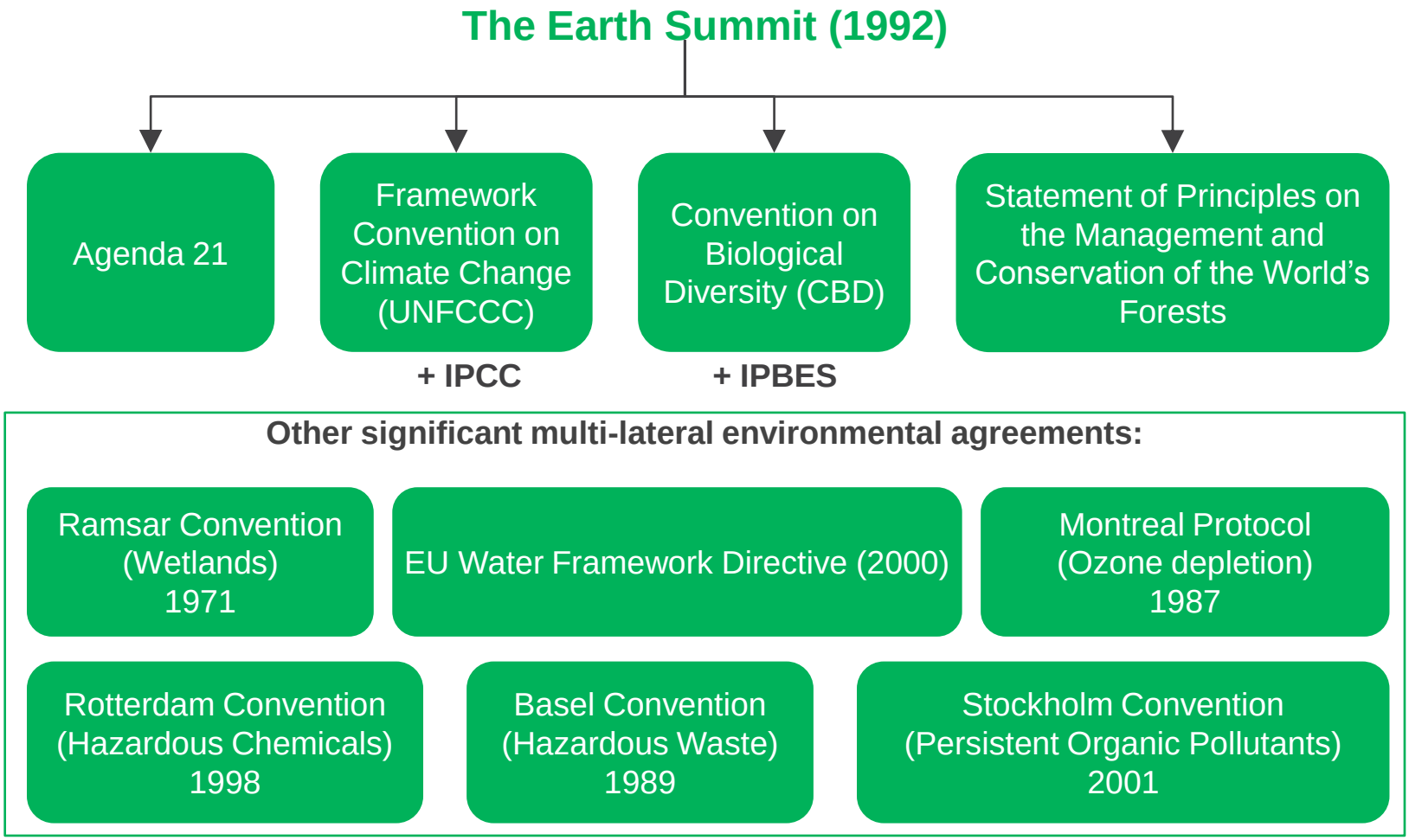
- Defined sustainable development
- Called for increased international cooperation

Conventions, treaties, protocols, agreements…

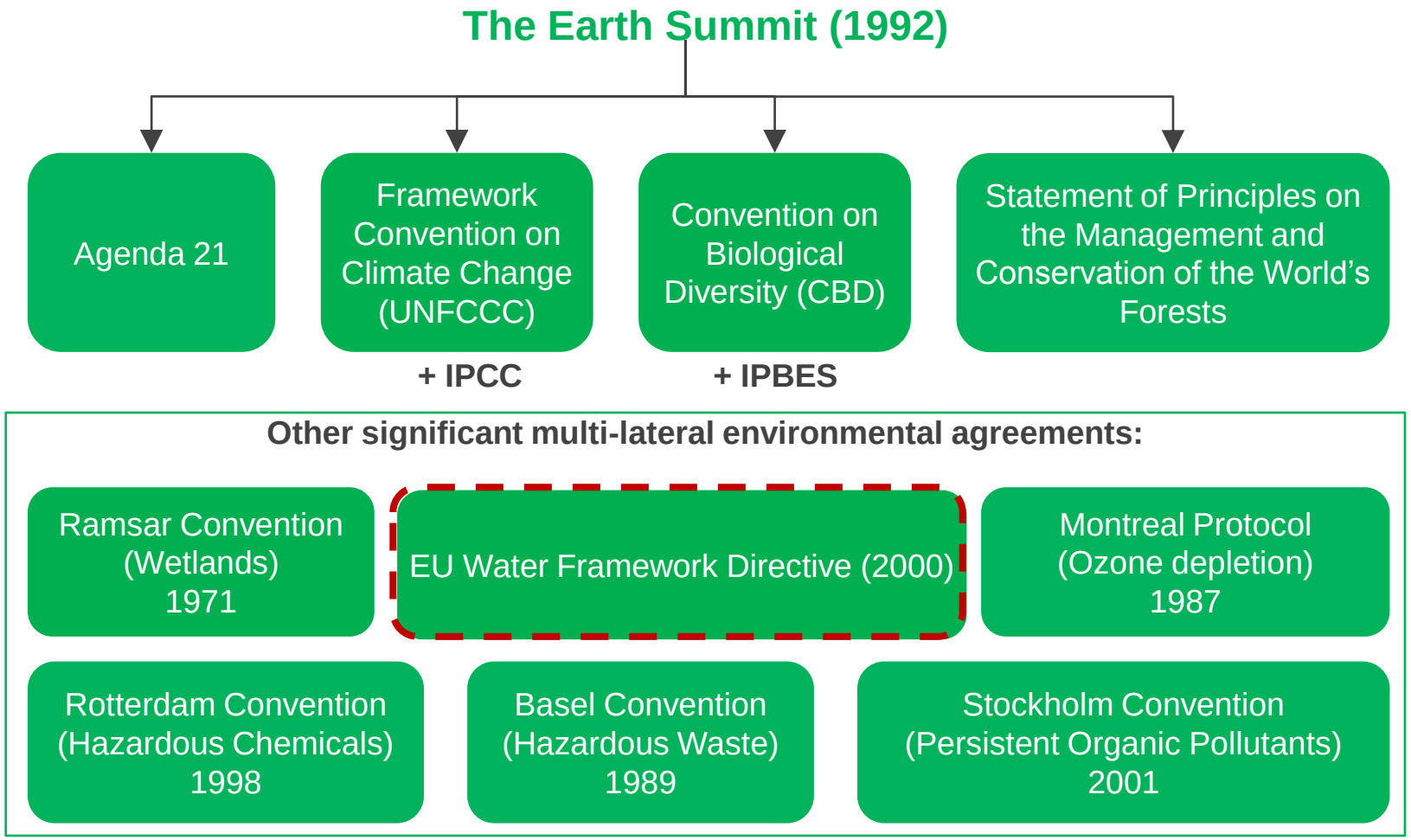
- Over 250 multilateral environmental agreements exist

The Earth Summit (1992) – start of 'The Rio Process'

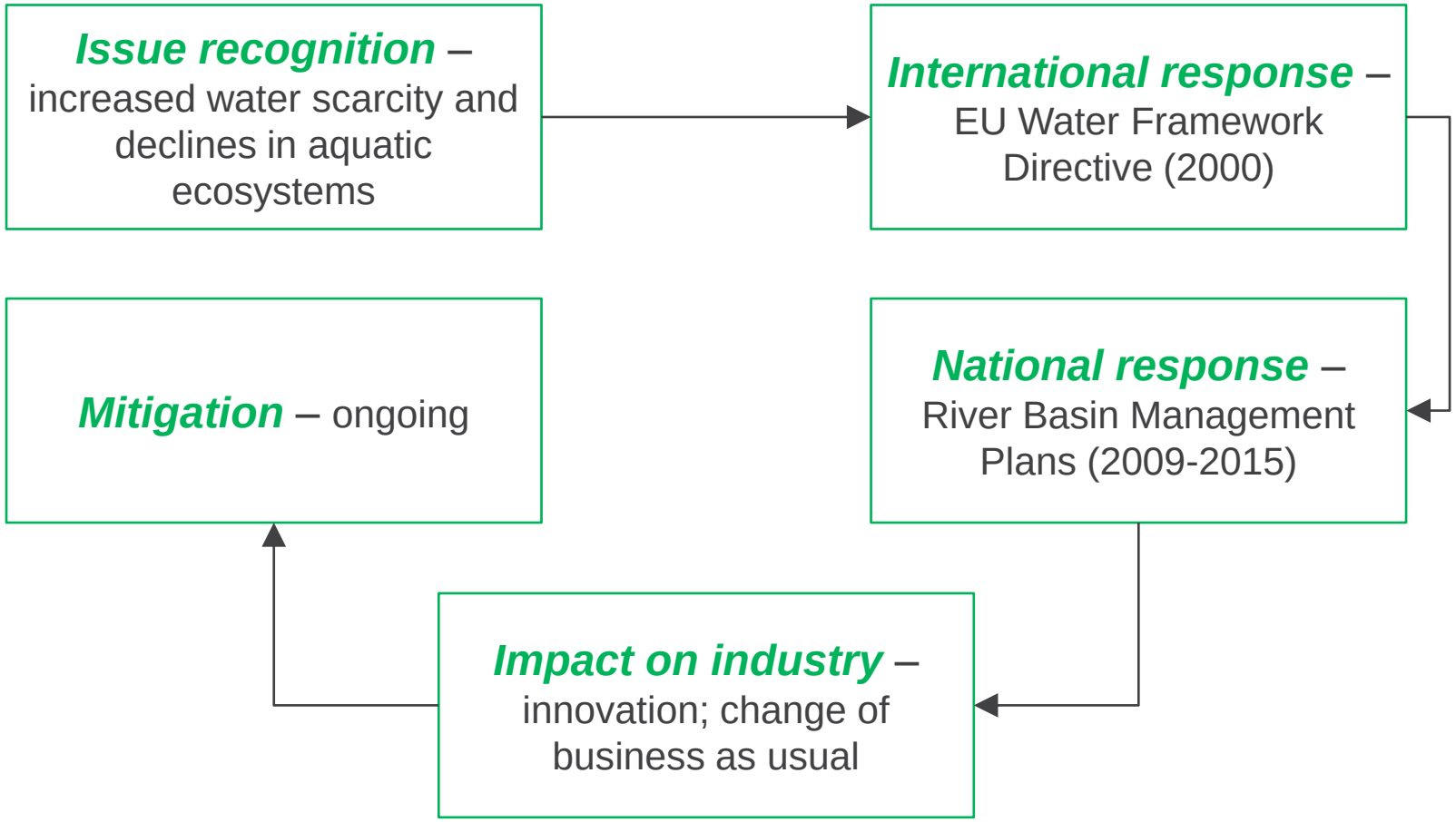
Background to ecosystem policy



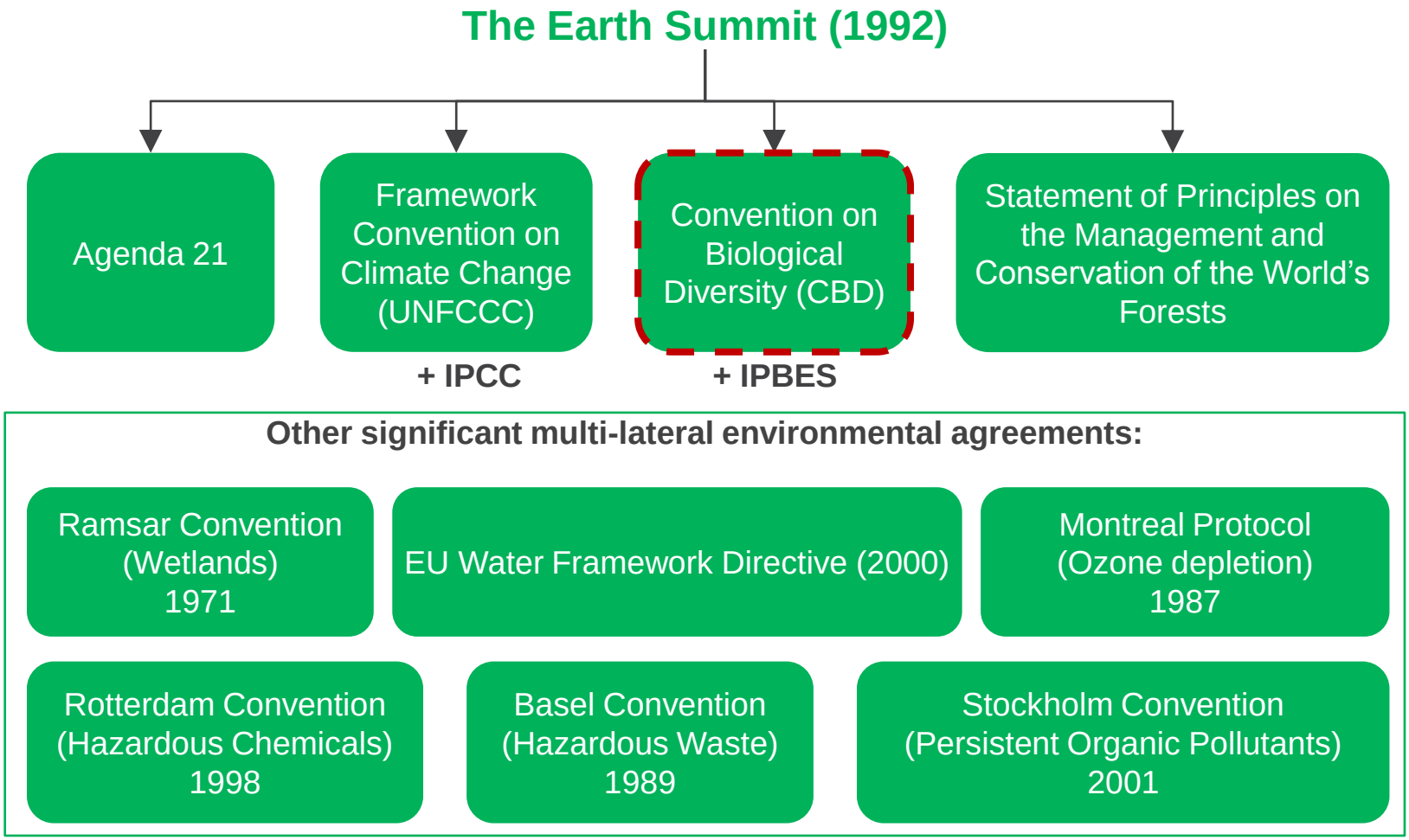
Background to ecosystem policy



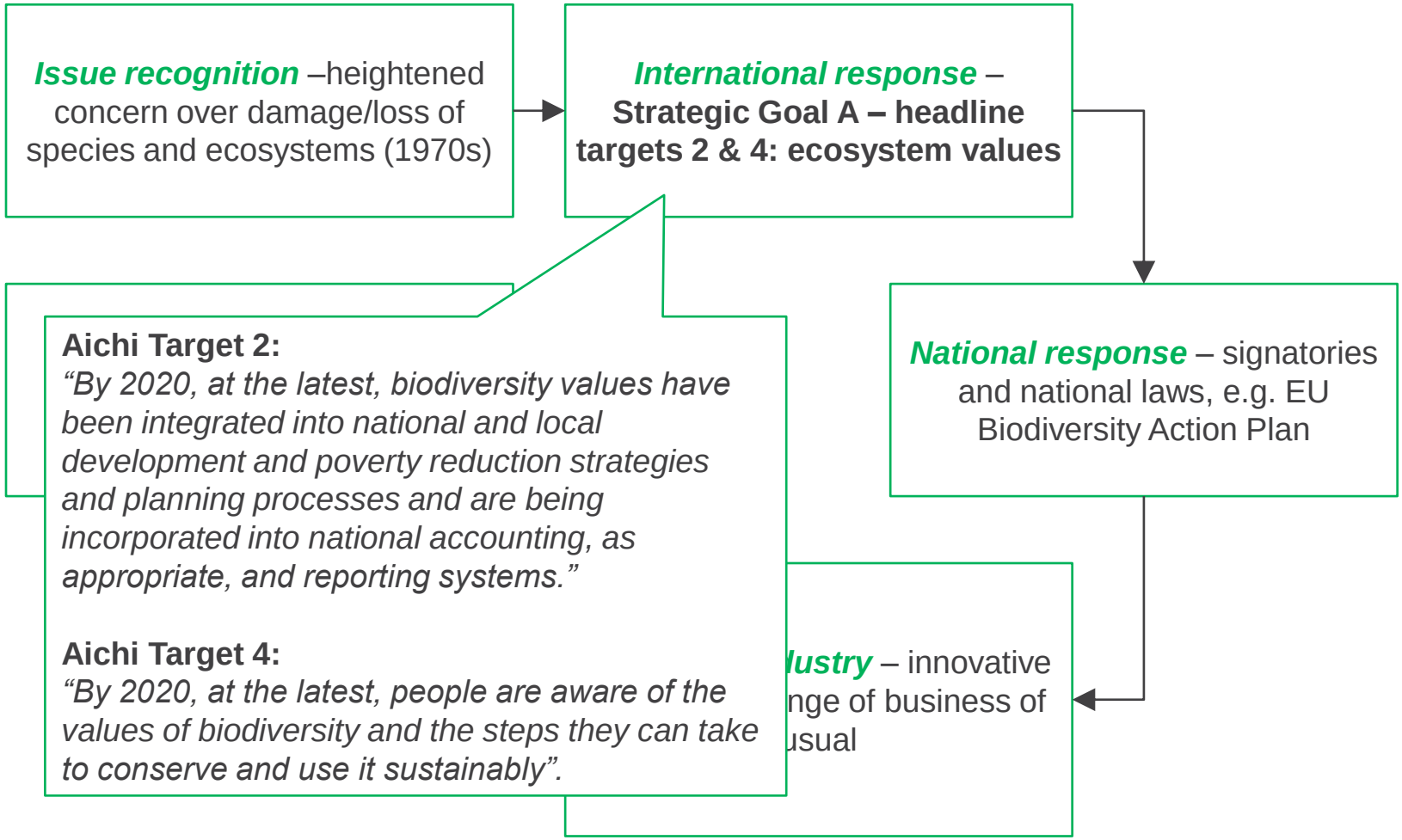
International policy trends – Water Framework Directive example



Background to ecosystem policy



International policy trends – Introduction to the CBD



Background to ecosystem policy in India

Towards valuation of goods and services provided by biodiversity, and use of economic instruments in decision making processes, Government of India in its National Biodiversity Action Plan has endorsed the following actions :

- Develop a system **of natural resource accounting** reflecting the **ecological** as well as **economic values** of **biodiversity**, with special attention to techniques of green accounting in national accounts and estimation of positive and negative externalities for use of various types of natural resources in the production processes as well as in household and government consumption.
- Develop **suitable valuation models** for adoption at national, state and local levels.
- Support projects and pilot studies aimed at **validating methods of valuation** of bioresources.
- Identify **key factors and indicators** to assess effectiveness of **valuation methods** and models, taking into consideration the UN guidelines on monitoring and evaluation of socio-economic projects.
- Assess the utility of traditional and innovative fiscal instruments for promoting conservation and sustainable utilization of biodiversity.
- Develop systems for partial ploughing back of the revenues generated in protected areas, zoological parks, botanical gardens, aquaria, etc., for improving their management.
- Mobilize additional resources based on project formulation for biodiversity conservation.

Source: National Biodiversity Action Plan

Background to ecosystem policy in India

The National Targets (in development in 2012) will provide a national framework for better management, use and sharing of benefits of the ecosystem goods and services for every citizen of India.

10 national targets currently being considered:

Target 1 By 2020, the national planning process of Government of India considers biodiversity as an integral part of national development that is reflected by biodiversity and ecosystem related issues as a part of implementation strategies across sectors, ministries and programmes with adequate and where possible specific financial allocations.

Target 2 Specific programmes linking economic and social well-being based on conservation and sustainable use action combined with equitable sharing of benefits developed by 2015 and implemented by government agencies as well as all relevant stakeholder groups, including private sector, thereafter.

Target 3 Ecosystems and biodiversity goods and services maintained, translated into local livelihood security programmes that results in revival of at least 7-10 per cent of representative ecosystems by 2020.

Target 4 By 2015, a coordinated and incrementally tested action programme on implementing the Biological Diversity Act (2002) and the Rules (2004) developed with a target that by 2020, policy, regulatory and enabling actions for conservation, sustainable use and benefit sharing are firmly in place.

Background to ecosystem policy in India

10 national targets currently being considered (cont.):

Target 5 By 2020, achieve at least 5% increase n agricultural production systems based on enhanced use of agro biodiversity, participatory actions, public private partnership and appropriate investments in inclusive development agenda besides developing better approaches for fisheries and livestock management.

Target 6 Develop integrated action frameworks, based on policy and regulatory reviews and implementation experiences, on forest conservation, protected areas management that include coastal and marine ecosystems in a manner that enhances local governance systems by 2017, resulting in at least 2 to5 per cent increase in their cover.

Target 7 By 2015, develop a comprehensive national programme on management of invasive alien species, rare, endangered, endemic and threatened species of flora and fauna, management of urban biodiversity and by 2020 achieve its effective implementation

Target 8 By 2015, establish national coordination mechanism(s) to deal with9 capacity building, sharing of information and knowledge, traditional knowledge, technology transfer and cooperation and access and benefit sharing (ABS) issues at State and National levels.

Target 9 Develop cooperative approaches for conservation that involves wider stakeholder groups based on commitments and awareness by 2015.

Target 10 Achieve, by 2015, institutional and programmatic synergies, including on issues of implementation of biodiversity related Multilateral Environmental Agreements (MEAs).

Source: National Targets for Biodiversity 2012-2020 (2012)

Session 4
Knowledge Check

Module 3: Introduction to valuing ecosystem services

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Module 3 – Objective summary

- Understand the basics ✓
- Policy and regulatory frameworks ✓
- The business case for action
- Introduction to Corporate Ecosystem Valuation (CEV)
- CEV screening and supporting tools and methodologies

Interactive

Key concepts

Do you know...

Session 5
Identify the business case for valuing ecosystems

Module 3: Introduction to valuing ecosystem services

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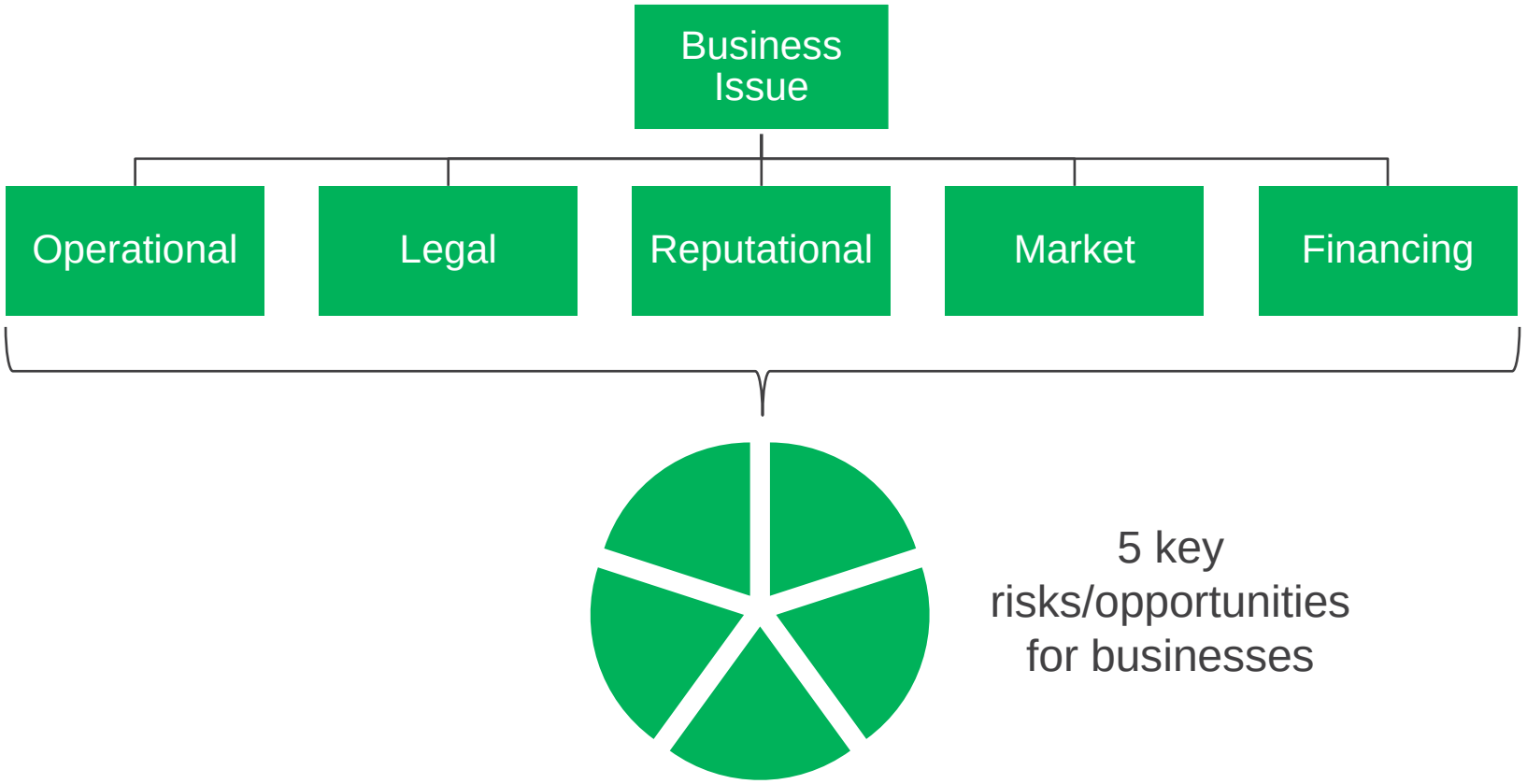
Different risks and opportunities – overview



5 key risks/opportunities for businesses

Re-cap: the business case for action

Can anyone describe the 5 key business risks/opportunities?

- **Operational**
  Relate to a company's day-to-day activities, expenditures and processes. Risks may be having to pay more for ecosystem dependencies such as water, and for environmental externalities.
- **Legal**
  Includes government policies and measures such as compliance laws, national targets, taxes and subsidies etc.
- **Reputational**
  Effects on a company's brand, image, "goodwill" and relationships with their customers and other stakeholders.
- **Market and product**
  Relate to product and service offerings, consumer preferences, and other market factors that affect corporate performance.
- **Financing**
  Affect the cost and availability of capital to companies.

Benefits from Biodiversity

Table 10.1: Market sectors dependent on genetic resources		
Sector	**Size of Market**	**Comment**
Pharmaceutical	US$ 640 bn. (2006)	25-50% derived from genetic resources
Biotechnology	US$ 70 bn. (2006) from public companies alone	Many products derived from genetic resources (enzymes, microorganisms)
Agricultural Seeds	US$ 30 bn. (2006)	All derived from genetic resources
Personal Care, Botanical and Food & Beverage Industries	US$ 22 bn. (2006) for herbal supplements US$ 12 bn. (2006) for personal care US$ 31 bn. (2006) for food products	Some products derived from genetic resources. Represents 'natural' component of the market.

Source: SCBD 2008

- In India, exports from the biodiversity-derived markets represented 8852.3 Rs Crore (US$2 billion) in 2010-2011 (incl. Biopharma, bioservices, bioagriculture, bioindustries, bioinformatics)

Source: www.indianbusiness.nic.in

Identify the business case for valuing ecosystems: The value of ecosystem services for business

What are ecosystems services worth?

- **€1.35 trillion/year:** minimum estimate of **natural capital loss**, just from deforestation
  - Approx. total GDP of UK or France in 2010
- **US$190 billion**/year: contribution of insect **pollination** to agriculture output
  - Approx. 8 times Walmart's 2010 total operating income
- Conserving forests avoids greenhouse gas emissions worth **US$3.7 trillion**
- Global fisheries underperform **by US$50 billion** annually
- Coral reef ecosystem services: one of the most valuable ecosystems

Sources: WBCSD, Corporate Ecosystems Valuation – Building the Business Case and Guide to Corporate Ecosystem Valuation – Detailed Presentation

The value of ecosystem services in India

Cost of resource degradation – water in India

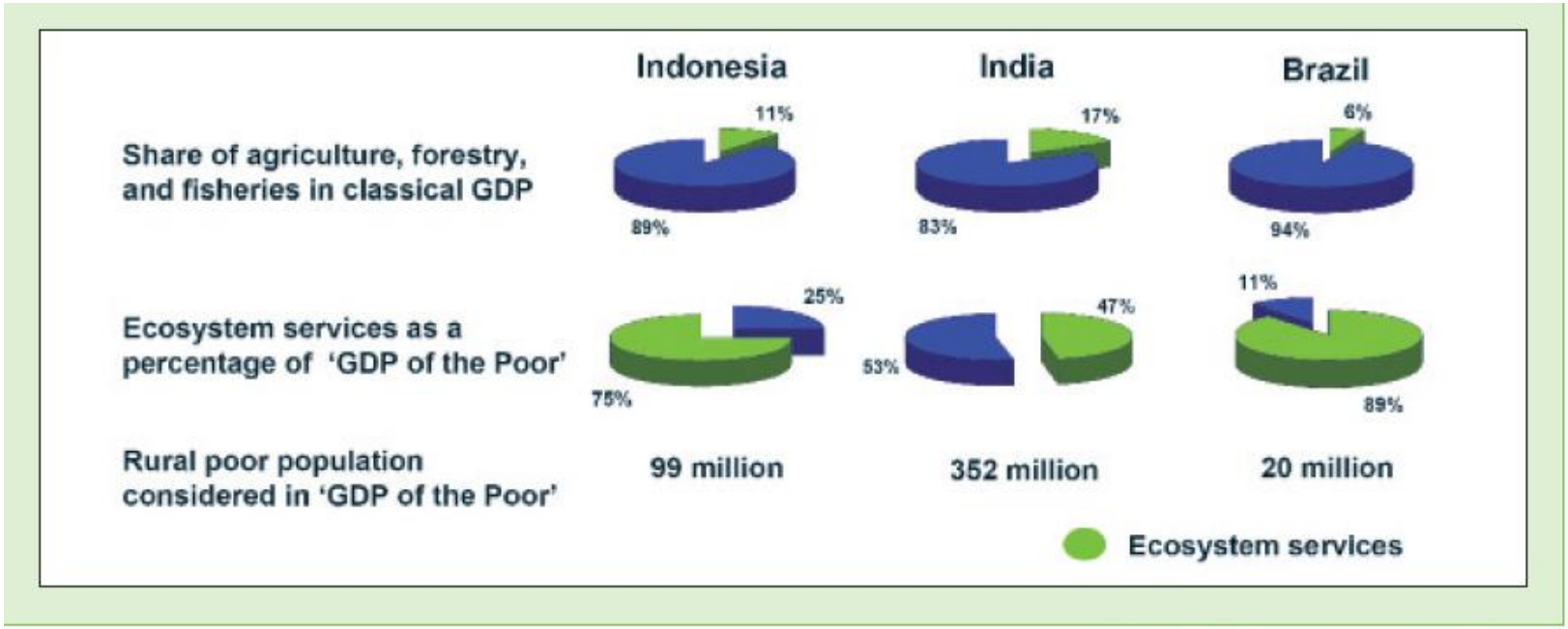
- Average annual loss due to degradation of fresh water in Uttar Pradesh: INR 275 billion (USD 5 billion)

What are ecosystems services worth in India?

- Flood avoidance benefit of forests estimated: INR 111 billion (USD 2 billion)
- Value of ecological services rendered by Indian forests, 2003 INR 225 billion (USD 4.1 billion)

Source: Green India States Trust http://www.gistindia.org/monograph.html

Ecosystems and poverty alleviation

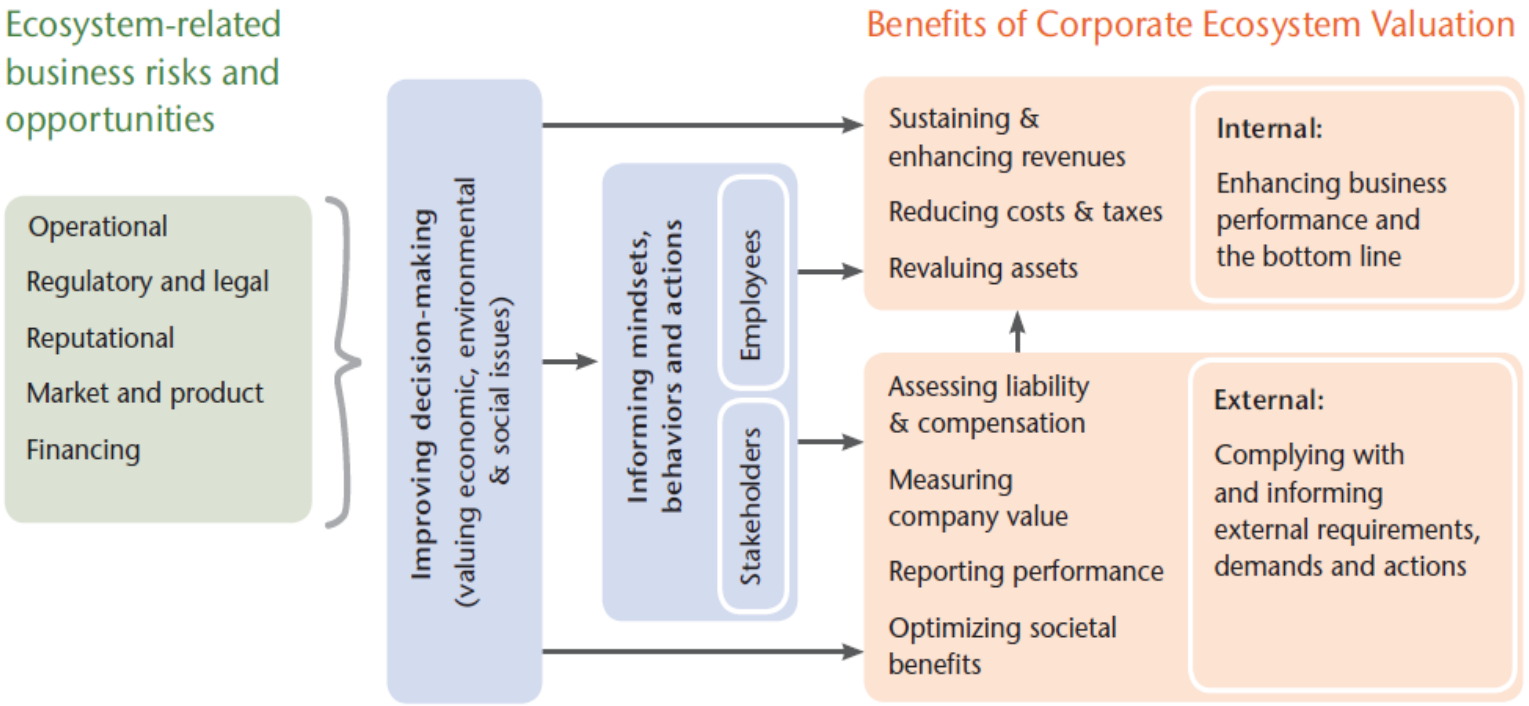


Source: TEEB for National Policy, Chapter 3 [N3]

Identify the business case for valuing ecosystems: Using CEV to improve business performance

Using CEV as a business

- Internal benefits: Enhancing business performance and the financial bottom line
- External benefits: Complying with external demands and requirements



Source: WBCSD Corporate Ecosystems Valuation – Building the Business Case

Identify the business case for valuing ecosystems: Using CEV to improve business performance (cont.)

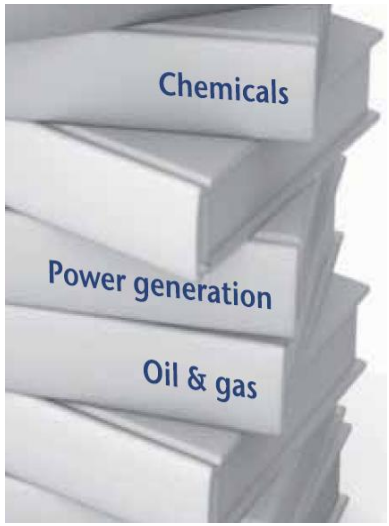
Examples of business applications of ecosystem valuation

	What valuation does	Business motivation	Outcome
Identifying new investments, markets, prices and products	Valuing ecosystems and ecosystem services that company owns or can sell	To reimburse land management costs and turn a profit for shareholders	Implementation of a fee-to-access program for recreation users of company lands
		To earn revenue from reclaimed mine lands	Identification of eco-assets that could generate income via mitigation credits that would be equal or greater to alternative users or sale values
Managing risks	Valuing costs or losses avoided by preventing ecosystem degradation	To improve the ability of investors to make sound choices	Identified that financial implications or future environmental risks to companies
		To minimize costs and maximize cost effectiveness of production by reducing ecosystem water service risks	Highlighted the financial, social and environmental rationale for investing in source protection

Source: WBCSD Corporate Ecosystems Valuation – Building the Business Case

Identify the business case for valuing ecosystems: Using CEV to improve business performance (cont.)

Examples of business applications of ecosystem valuation



	What valuation does	Business motivation	Outcome
Highlighting opportunities	Valuing benefits obtained by investing in ecosystems	To enhance regulatory compliance, profitability and shareholder returns	Highlighted cheaper and more effective waste management options
		To earn income from unused land	Gained deductions in federal taxes
		To prolong the lifetime and production of a hydropower facility	Operational cost savings and greater revenues
Assessing environmental liability and compliance	Valuing the ecosystem damages and costs that company activities may generate	To comply with natural environmental damage assessment and compensation requirements	Monetary estimate of environmental damage costs incurred which could be used in courts of law

Source: WBCSD Corporate Ecosystems Valuation – Building the Business Case

Identify the business case for valuing ecosystems: Using CEV to improve business performance (cont.)

Examples of business applications of ecosystem valuation

	What valuation does	Business motivation	Outcome
Articulating environmental performance and costing impacts	Valuing the broader ecosystem impacts (positive and negative generated by a company)	To generate information as an input into decision making and change management behavior	Recommendations leading to cost savings, revenue generation, waste reduction and improved image
Reassessing company value and share value	Valuing ecosystem benefits and cost-savings that company's activities generate	To reflect company's sustainable development metrics in financial valuation measures	Reassessed estimates of company and share value

Source: WBCSD Corporate Ecosystems Valuation – Building the Business Case

Session 6
Knowledge share – business case for valuing ecosystems

Module 3: Introduction to valuing ecosystem services

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Identify the business case for valuing ecosystems: Risks and opportunities related to biodiversity and ecosystems

Risks and opportunities – examples

Business risks and opportunities associated with ecosystem change

	Examples of Risk	Examples of opportunities
Operational The day-to-day activities, expenditures and processes of the company	Higher costs for freshwater due to scarcity Lower output for hydropower facilities due to siltation Disruptions to coastal business due to flooding	Increasing water-use efficiency Building an on-site wetland to circumvent the need for new water treatment infrastructure
Legal The laws, government policies and court actions that can affect corporate performance	New fines, new user fees, government regulations, or lawsuits by communities that lose ecosystem services due to corporate activities	Engaging governments to develop policies and incentives to protect or restore ecosystems that provide services a company needs

Identify the business case for valuing ecosystems: Risks and opportunities related to biodiversity and ecosystems (cont.)

	Examples of Risk	Examples of opportunities
Reputational The company's brand, image or relationship with customers, the general public and other stakeholders	• Retail companies being targeted by non-governmental organization campaigns for purchasing wood or paper from sensitive forests • Banks facing similar protests due to investments that degrade pristine ecosystems	• Implementing and communicating sustainable purchasing, operating or investment practices in order to differentiate corporate brands
Market and product Product and service offerings, customer preferences, and other market factors that can affect corporate performance	• Customers switching to other suppliers that offer products with lower ecosystem impacts • Governments implementing new sustainable procurement policies	• Launching new products and services that reduce customer impacts on ecosystems • Participating in emerging markets for carbon sequestration and watershed protection

Identify the business case for valuing ecosystems: Risks and opportunities related to biodiversity and ecosystems (cont.)

	Examples of Risk	Examples of opportunities
		Capturing new revenue streams from company-owned natural assets Offering eco-labeled wood, seafood, produce and other products
Financing Cost and availability of capital investors	Banks implementing more rigorous lending requirements for corporate loans	Banks offering more favorable loan terms Investors taking positions in companies supplying products and services that improve resource-use efficiency or restore degraded ecosystems

OPTION1: Group exercise: Building the business case

- Which category of risk/opportunity is most relevant to you in terms of your employers (hands up)
- Are ecosystem changes more of a risk or an opportunity (hands up)
- Consider how your company might be affected by specific risks and opportunities

[Customize: add or delete questions to get the knowledge share started]

OPTION 2: Group exercise: Building the business case – flipchart layout

Potential risks and opportunities (from Module 1)

- Operational
- Regulatory
- Reputational
- Market and product
- Financing

Business benefits from undertaking CEV

Scale of business benefits

Wider benefits

Coffee Break

30 min.

Module 3 – Objective summary

- Understand the basics ✓
- Policy and regulatory frameworks ✓
- The business case for action ✓
- Introduction to Corporate Ecosystem Valuation (CEV)
- CEV screening and supporting tools and methodologies

Session 7
Undertaking ecosystem valuation – a brief introduction to the CEV guide

Module 3: Introduction to valuing ecosystem services

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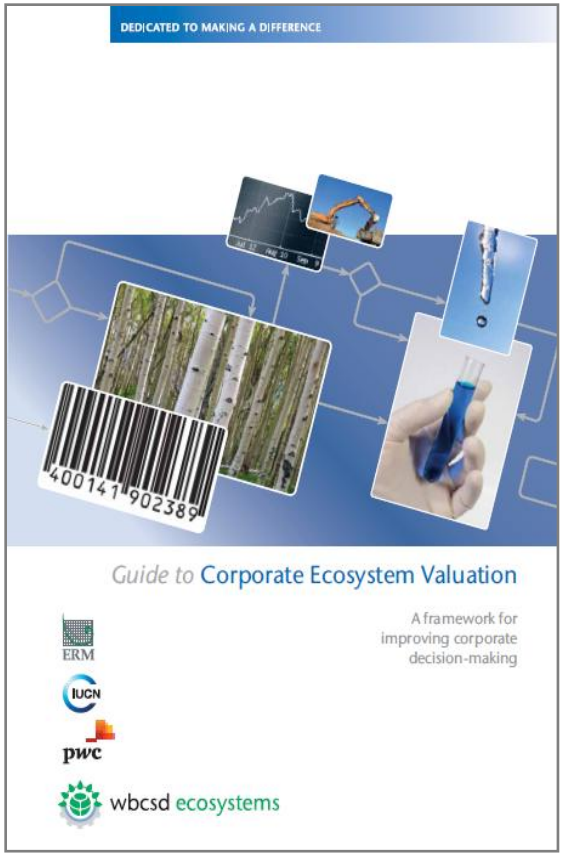
A brief introduction to the CEV guide: Contents

- Background to the CEV guide
- Hierarchy of valuation approaches
- Understanding the CEV Guide structure
- Part 1 – Screening
- Part 2 – Stage 1 Scoping
- Part 2 – Stage 2 Planning
- Part 2 – Stage 3 Valuation
- Part 2 – Stage 4 Application
- Part 2 – Stage 5 Embedding



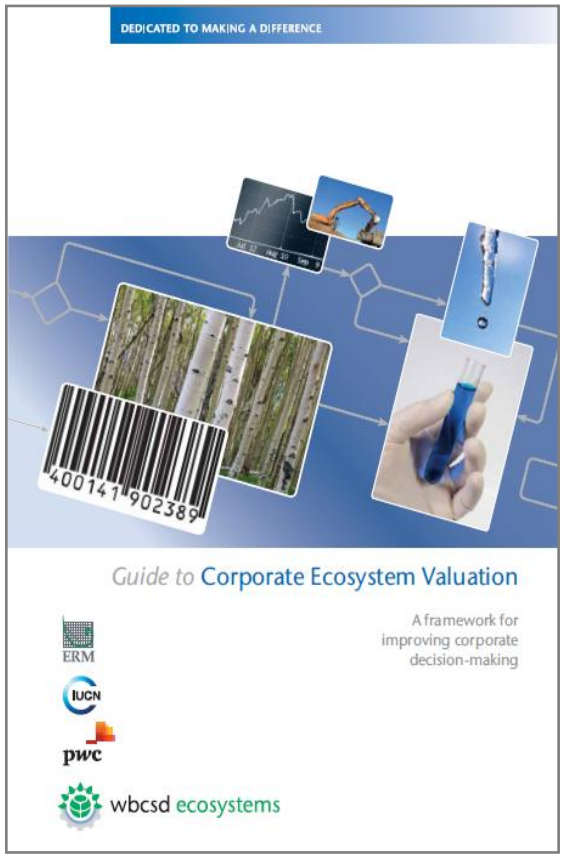
A brief introduction to the CEV guide: Background to the Guide to Corporate Ecosystem Valuation (CEV)

What the Guide is

- ✓ A framework for improving corporate decision-making by valuing ecosystem services
- ✓ A set of resources to navigate through related jargon and techniques

What the Guide is not

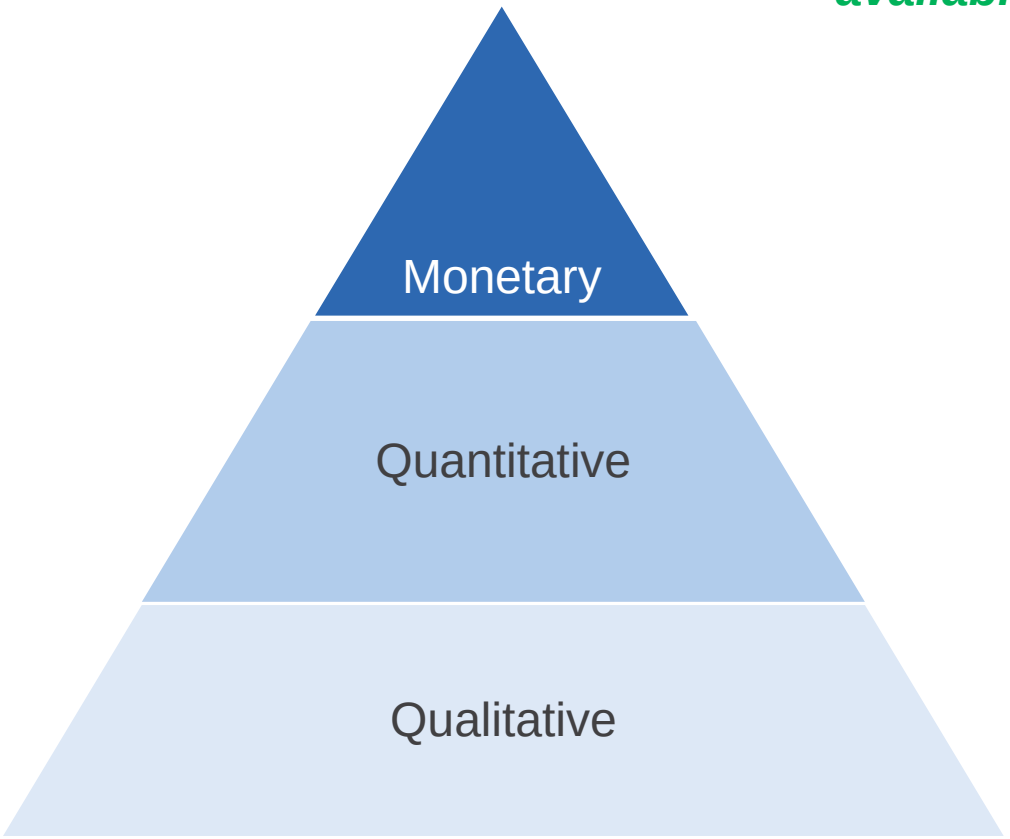
- ✘ A price list of biodiversity & ecosystem services
- ✘ A calculator to “crunch numbers”
- ✘ A stand-alone methodology



Source: WBCSD, Guide to Corporate Ecosystem Valuation – Detailed Presentation

A brief introduction to the CEV guide: Hierarchy of valuation approaches

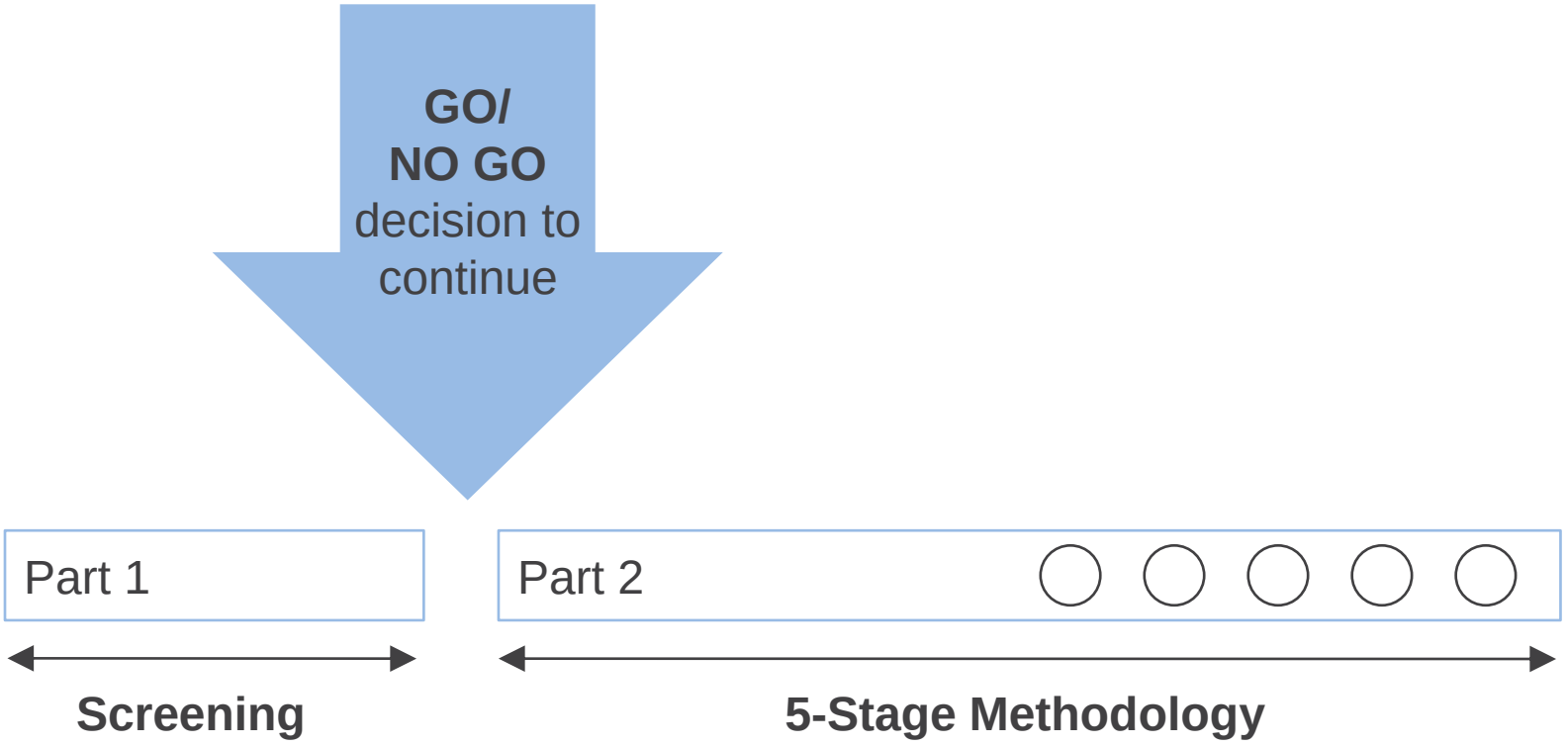
Monetary* values are not always *available* or *required



Source: P. ten Brink, as cited in TEEB – an interim report (2008)

A brief introduction to the CEV guide: Understanding the CEV Guide structure

Structure of the Guide



A brief introduction to the CEV guide: How can CEV help?

Trade-off analysis

- What is the best option from a range of alternatives?
- What is the full company and societal cost/benefit from a particular company aspect?

Sustainable financing and compensation analysis

- Which stakeholders could contribute to the ecosystem services they benefit from, and how much?
- Which stakeholders deserve compensation and how much?

Distributional analysis

- Which stakeholders are affected by different company impacts, and by how much?
- Which stakeholders depend and impact upon ecosystem services, and by how much?

Total valuation

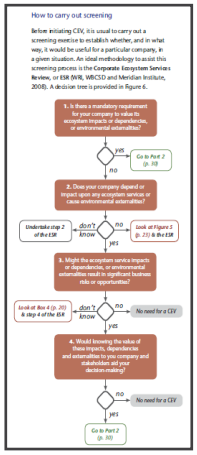
- What is the true total value of a landholding or natural asset?

A brief introduction to the CEV guide: Part 1 – Screening

Do you need to conduct a CEV at all?

Before using the 5-stage methodology, the Guide asks a number of questions to ensure there is a need for a CEV study, e.g.

- Are your impacts & dependence on ecosystem services "material"/significant?
- Is there a mandatory requirement to value them?
- How will valuation help make your decision?



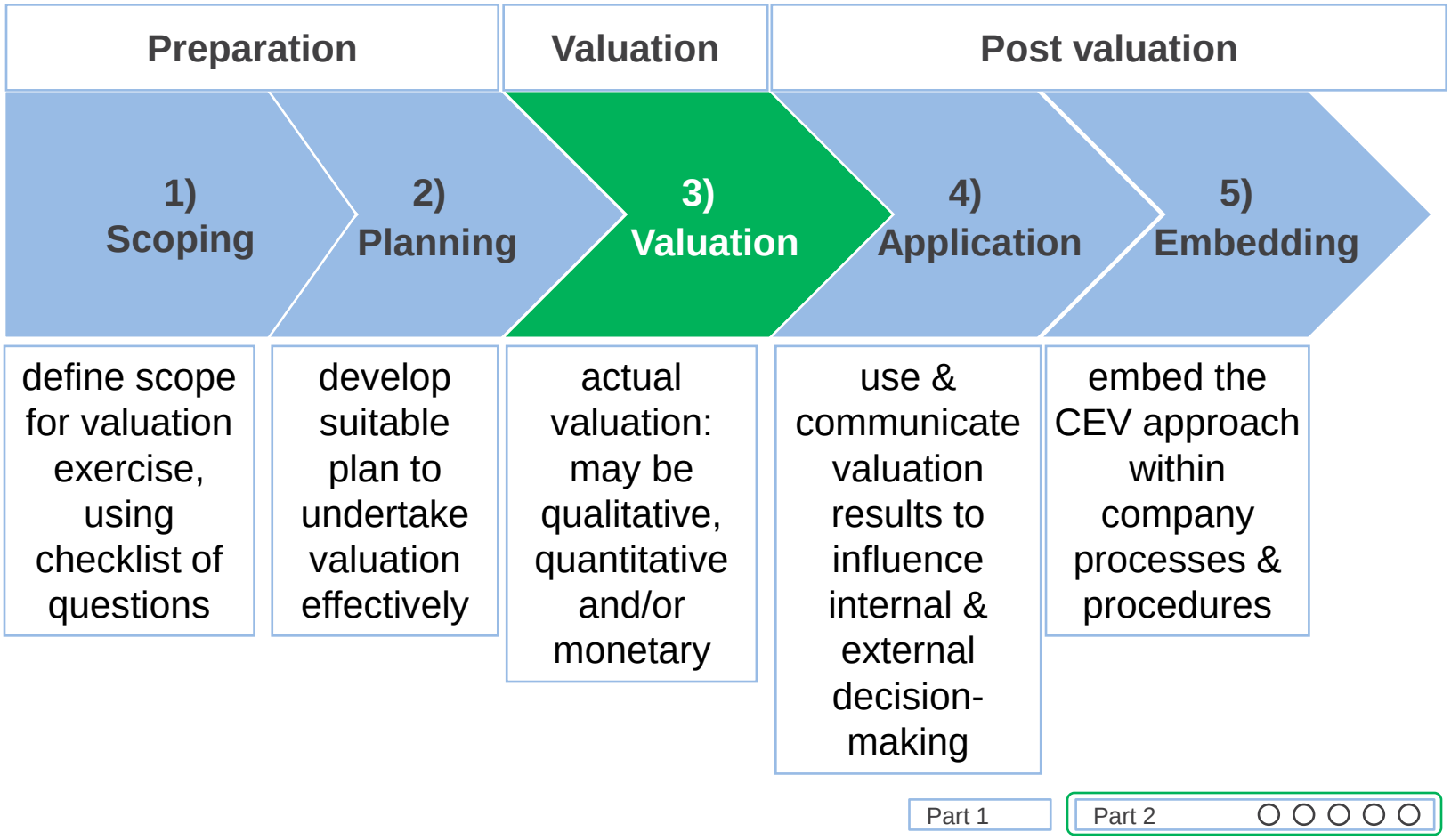
If there is a **business case** to continue – **GO to Part 2**

Part 1 | Part 2

A brief introduction to the CEV guide: 12 key principles of CEV

1. Relevance
2. Completeness
3. Consistency
4. Transparency
5. Accuracy
6. Conservativeness
7. Compliance
8. Verification
9. Avoid double-counting
10. Assess distributional aspect
11. Landscape-level assessment
12. Engage with stakeholders

A brief introduction to the CEV guide: Part 2: Stages to undertake a CEV exercise



A brief introduction to the CEV guide: Part 2: Stage 1 Scoping

Scoping checklist

Primary Questions
Establishing the CEV Objective
1. What are likely to be the main ecosystem service dependencies, impacts, and other environmental externalities?
2. What is the business case for doing a CEV?
3. What is the business 'aspect' to be assessed?
4. What is the overall objective of the CEV?

Secondary Questions
Refining the Scope
5. What geographic and temporal boundaries should be used?
6. What standards or processes should the CEV conform to?
7. What relevant information is available?
8. Who are the key stakeholders and how should they be engaged?
9. What ecosystem valuation techniques are likely to be necessary?
10. What might the key study implementation constraints be?

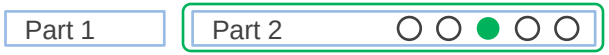
A brief introduction to the CEV guide: Part 2 – Stage 2 Planning

- Context
- Methodology
- Planned reporting outputs
- Team details
- Detailed timeline
- Detailed budget

Part 1 | Part 2

A brief introduction to the CEV guide: Part 2: Stage 3 Valuation

- 9-step process that adhere to best practice in ecosystem valuation, and also align with the ESIA process:
  1. Define the business “aspect”
  2. Establish the environmental baseline
  3. Determine the physico-chemical changes
  4. Determine the environmental changes
  5. Assess the relative significance of ecosystem services affected
  6. Monetize selected changes to ecosystem services
  7. Identify internal and external benefits and costs
  8. Compare benefits and/or costs
  9. Apply sensitivity analysis
- Guide focuses mainly on the ‘process’ required for ensuring an appropriate and valid CEV.



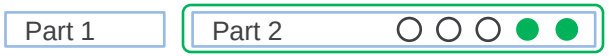
A brief introduction to the CEV guide: Part 2: Stage 4 (Application) and Stage 5 (Embedding)

Stage 4: Application

- Internal application
- External application
- Communicating the results
- Confidentiality
- Verification

Stage 5: Embedding

- Getting internal buy-in
- Linking CEV to existing business planning and financial control processes
- Capacity building



Session 8
Screening for Corporate Ecosystem Valuation (CEV)

Module 3: Introduction to valuing ecosystem services

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Introduction to Screening Exercise: Group Exercise

Materials available

- Each group has been given the following information:
  a) The business context, i.e., the issue faced by a particular company
  b) Screening template as defined in the CEV is available as a wall chart
  c) A note relating to other information on the project
     - **[optional hypothetical information to be added on time and resource constraints]**
  d) A completed ESR for the example that you are considering

Time: 25 minutes

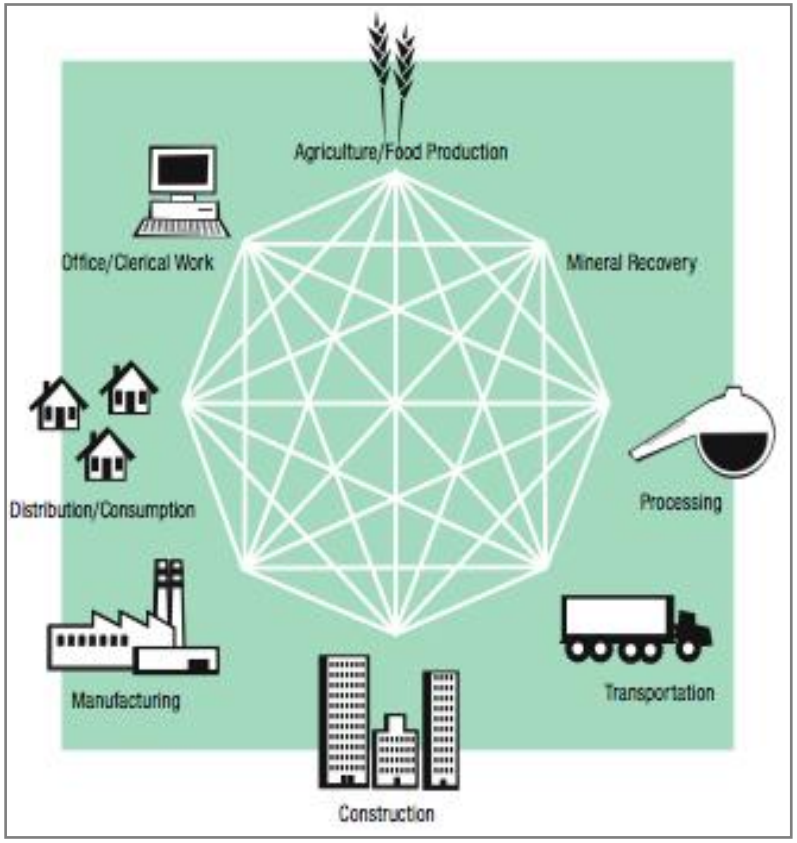
Case study 1 – U.S. BCSD and Houston By-Products Synergy

Company(s)

- U.S. Business Council for Sustainable Development (US BCSD), various public and private companies from a range of industries (e.g. oil & gas, chemical, consumer goods and others) and facility types (e.g. corporate offices to large industrial factories)

Business Context

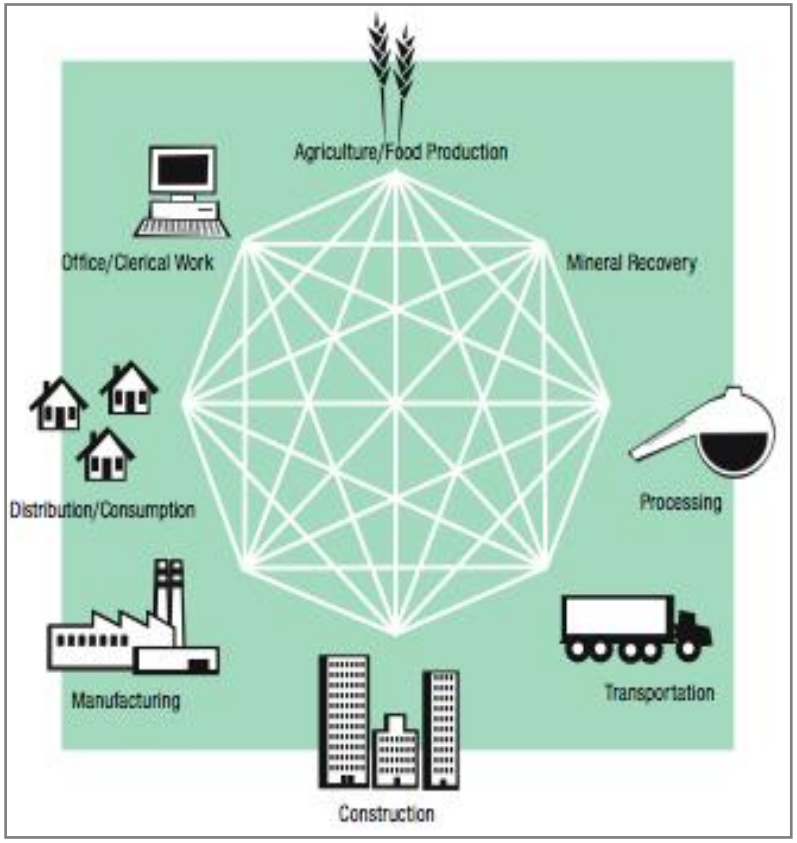
- The U.S. Business Council for Sustainable Development (US BCSD) set-up a collaborative business network to identify high value uses for waste/by-products from (private/public) facilities with potential users at other (private/public) facilities



Case study 1 – U.S. BCSD and Houston By-Products Synergy (cont.)

Objectives

- Determine whether new revenue streams could be identified for undervalued resources or wastes being landfilled and incinerated.
- Determine whether cost savings could be identified for companies who could replace virgin resources with BPS materials as inputs to their production.



Case study 2 – eni

Company

- eni – is an international oil and gas company operating in a wide range of natural environments with varying degrees of ecological and biodiversity sensitivity

Business Context

- Due to potential changes in operating license requirements eni is integrating biodiversity and ecosystem service management into its global onshore and offshore operations

Objective(s)

- To evaluate the ecosystem service (ES) impacts and dependencies relating to an existing oil operation and to a new development near a sensitive area due to the presence of a National Park

Case study 3 – Mondi

Company

- Leading international paper and packaging group with operations across 31 countries.

Business Context

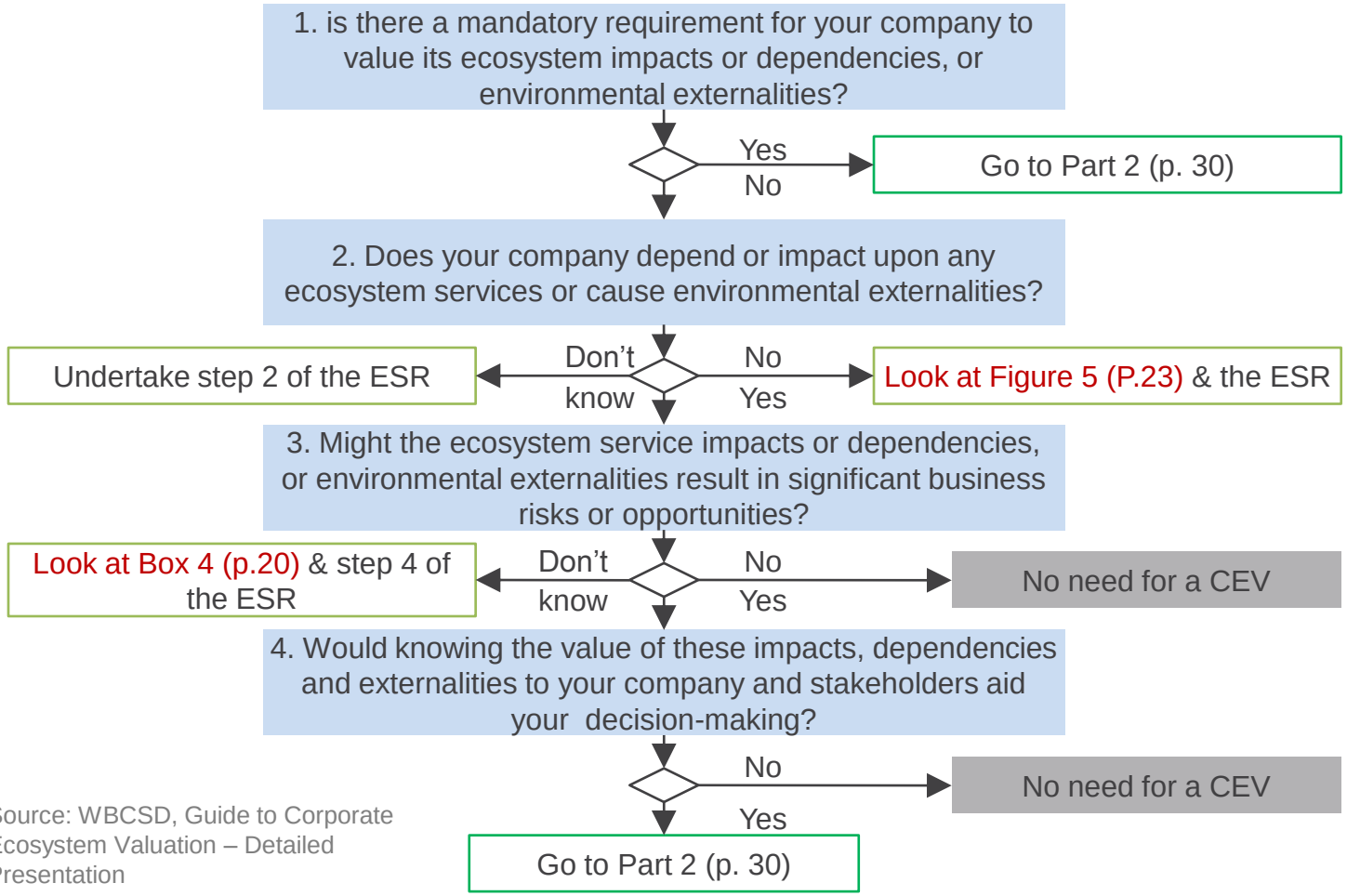
- A change in law relating to water rights as a result of the introduction of the SA Water Act.
- The SA government removed all private ownership of water and reformed water rights that were based on land ownership.
- South Africa was moving from “water scarce” to “water crisis” status and some catchments had already over allocated the limited water resources
- Assessed Mondi’s impacts on the freshwater ecosystem

Case study 3 – Mondi (cont.)

Objectives

- Make optimum use of scarce water resource and minimize impact on the resource
- Determine whether new revenue streams could be identified (eco-tourism, biofuels etc)
- Determine the dependency of specific plantations on water resources as part of a project to address water scarcity.
- Set up an interactive GIS based platform for ecosystem scenario planning

Screening for CEV



Source: WBCSD, Guide to Corporate Ecosystem Valuation – Detailed Presentation

Case Study 1 – U.S. BCSD and Houston By-Products Synergy

ESR

- An ecosystems service review was carried out by the US BCSD to determine the opportunities and dependencies on ecosystem services.

Other Project Information

- The materials identified as high priorities for the first phase of the Houston BPS project were vehicle tires, waste asphalt, acetic acid, off-specification polymers and diesel, spent tungsten catalysts, kiln dust and aluminium oxide. Modelling of synergy opportunities identified for these materials show significant reductions of dependency and impacts for the ecosystem services identified in the ESR exercise.

Case Study 1 – U.S. BCSD and Houston By-Products Synergy (cont.)

		Suppliers		Company operations		Customers	
		Dependence	Impact	Dependence	Impact	Dependence	Impact
Provisioning							
Food	Crops						
	Livestock						
	Capture fisheries						
	Aquaculture						
	Wild foods						
Raw materials	Timber and other wood fibers						
	Fibers and resins			● –	● –		
	Animal skins						
	Sand						
	Ornamental resources						
	Biomass fuel						
	Freshwater						
	Genetic resources						
	Biochemicals, natural medicines and pharmaceuticals						

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Case Study 1 – U.S. BCSD and Houston By-Products Synergy (cont.)

		Suppliers		Company operations		Customers	
		Dependence	Impact	Dependence	Impact	Dependence	Impact
Regulating							
	Maintenance of air quality						
	Global climate regulation						
	Regional/local climate regulation						
	Regulation of water timing and flows						
	Erosion control						
	Water purification and waste treatment				● –		
	Disease mitigation						
	Maintenance of soil quality				● –		
	Pest mitigation						
	Pollination						
	Natural hazard mitigation						
Cultural							
	Recreation and ecotourism				● –		
	Ethical and spiritual values						
	Educational and inspirational values						
Supporting							
	Habitat				○ –		

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Case study 2 – eni

ESR

- An ecosystems service review was carried out by eni to determine the opportunities and dependencies on ecosystem services.

Other Project Information

- The area under investigation was onshore concession of strategic importance. The area was considered sensitive due to the presence of biodiversity-rich natural and managed woodlands with floral and faunal communities recognized at the European level

1. Baseline/Current Module
2. Ecosystem Service Module → GIS maps of likely provision of ES
3. Economic Valuation Module → Percent of change in ES economic value

- Time and resource constraints

Case study 2 – eni (cont.)

		Suppliers		Company operations		Customers	
		Dependence	Impact	Dependence	Impact	Dependence	Impact
Provisioning							
Food	Crops				● –		
	Livestock				● –		
	Capture fisheries						
	Aquaculture						
	Wild foods				● ?		
Raw materials	Timber and other wood fibers				● ?		
	Fibers and resins						
	Animal skins						
	Sand						
	Ornamental resources						
	Biomass fuel						
	Freshwater				● –		
	Genetic resources						
	Biochemicals, natural medicines and pharmaceuticals						

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Case study 2 – eni (cont.)

		Suppliers		Company operations		Customers	
		Dependence	Impact	Dependence	Impact	Dependence	Impact
Regulating							
	Maintenance of air quality						
	Global climate regulation				○ ?		
	Regional/local climate regulation				● –		
	Regulation of water timing and flows						
	Erosion control						
	Water purification and waste treatment				● –		
	Disease mitigation				○ ?		
	Maintenance of soil quality				○ ?		
	Pest mitigation				○ ?		
	Pollination						
	Natural hazard mitigation						
Cultural							
	Recreation and ecotourism				● –		
	Ethical and spiritual values						
	Educational and inspirational values						
Supporting							
	Habitat				○ –		

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Case study 3 – Mondi

ESR

- An ecosystems service review was carried out by Mondi to determine the opportunities and dependencies on ecosystem services

Other Project Information

- The study considered three plantations (a map is provided along with the study information) to include regional variations
- The Water Act was introduced in 1998

Time and resource constraints

- Freshwater and grassland ecosystems - scarcity
- Biodiversity concerns re habitat and rare/endangered species

Surprise Outcome from ESR

- Threat and opportunity related to alien invasive species
- Potential water resource availability from improved downstream water management

Case study 3 – Mondi (cont.)

Ecosystem services dependence and impact matrix

	Suppliers		Company operations		Customers	
Ecosystem service	**Dependence**	**Impact**	**Dependence**	**Impact**	**Dependence**	**Impact**
Provisioning						
Crops				○ –		
Livestock				● –		
Capture fisheries						
Aquaculture						
Wild foods				○ +		
Timber and other wood fibers				● +		
Other fibers (e.g., cotton, hemp, silk)						
Biomass fuel			○	● +		
Fresh water			●	● –		
Genetic resources			○	○ ?		
Biochemicals, natural medicines and pharmaceuticals				○ +		

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Case study 3 – Mondi (cont.)

Ecosystem services dependence and impact matrix

		Suppliers		Company operations		Customers	
Ecosystem service		**Dependence**	**Impact**	**Dependence**	**Impact**	**Dependence**	**Impact**
Regulating							
	Air quality regulation				? ?		
	Global climate regulation			○	● +		
	Regional/local climate regulation			○	○ +		
	Water regulation			●	● –		
	Erosion regulation			○	○ –		
	Water purification and waste treatment				○ –		
	Disease regulation						
	Pest regulation						
	Pollination						
	Natural hazard regulation						
Cultural							
	Recreation and ecotourism				● +		
	Ethical values				○ +		

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Feedback...

Module 3 – Objective summary

- Understand the basics
- Policy and regulatory frameworks
- The business case for action
- Introduction to Corporate Ecosystem Valuation (CEV)
- CEV screening and supporting tools and methodologies

Session 9
Ecosystem valuation techniques

Module 3: Introduction to valuing ecosystem services

wbcsd business ecosystems training

Case study & exercise: Overview of valuation techniques

Ecosystem valuation techniques				
Category	**Technique**	**Description**	**Information required**	**Time/budget (US$)**
Revealed preference approaches	**Market prices**	How much it costs to buy an ecosystem good or service, or what it is worth to sell.	Market price of ecosystem goods or services. The costs involved to process and bring the product to market (e.g. processed timber).	Days/Low budget ($100s – 1,000s)
	Effect on production	Relates changes in the output of a marketed good or service to a measurable change in ecosystem goods.	Data on changes in the output of a product. Data on cause and effect relationship (e.g. loss of fisheries due to loss of coral habitat).	Days/Low budget ($100s – 1,000s)

Case study & exercise: Overview of valuation techniques (cont.)

Ecosystem valuation techniques				
Category	**Technique**	**Description**	**Information required**	**Time/budget (US$)**
Revealed preference approaches	**Travel costs**	Using the amount of time and money people spend visiting an ecosystem for recreation purposes to elicit a value per visit.	The amount of time and money that people spend visiting an ecosystem for recreation or leisure purposes. Motivations for travel.	Weeks – months/High budget ($10,000s)
	Hedonic pricing	The difference in property prices or wage rates that can be ascribed to the different ecosystem qualities or values.	Usually data relating to differences in property prices or wage rates that can be ascribed to the different ecosystem qualities (e.g. a landscape view).	Weeks/Medium budget ($1,000s – 10,000s)

Case study & exercise: Overview of valuation techniques (cont.)

Ecosystem valuation techniques				
Category	**Technique**	**Description**	**Information required**	**Time/budget (US$)**
Cost based approach	**Replacement costs**	The cost of replacing an ecosystem good/service with artificial or man-made products etc., in terms of expenditures saved	The cost (market price) of replacing an ecosystem good or service with a man-made equivalent (e.g. replacing sea grasses as a juvenile fish nursery with fish farms).	Days – weeks/Low budget ($100s – 1,000s)
	Damage costs avoided	The costs incurred to property, infrastructure, etc. when ecosystem services which protect valuable assets are lost (i.e., expenditures saved).	Data on costs incurred to property, etc. as a result of loss of ecosystem services. Damages under different scenarios	Weeks/Low budget ($100s – 1,000s)

Case study & exercise: Overview of valuation techniques (cont.)

Ecosystem valuation techniques				
Category	**Technique**	**Description**	**Information required**	**Time/budget (US$)**
Stated preference approaches	**Contingent Valuation (CV)**	Infer ecosystem values by asking people directly what is their willingness to pay (WTP) for them or their willingness to accept (WTA) compensation for their loss saved.	Stated value that people place on an ecosystem good or service (e.g. existence of a species, cleanliness of a beach); demographic and biographical information on survey respondents. Obtained through survey questionnaires.	Weeks – months/High budget ($10,000s – 100,00s)

Case study & exercise: Overview of valuation techniques (cont.)

Ecosystem valuation techniques				
Category	**Technique**	**Description**	**Information required**	**Time/budget (US$)**
Stated preference approaches (cont.)	**Choice Experiments (CE)**	• Presents a series of alternative resource or ecosystem use options, each defined by various attributes set at different levels (including price), and asks respondents to select which option (i.e. sets of attributes at different levels) they prefer (e.g. numbers of species present and percentage coral cover).	• As for CV above, although CE contrasts several different scenarios. An appropriate set of "levels" are required for the different parameters (e.g. ranging from 0% coral cover to 100%).	• Weeks – months/High budget • ($10,000s – 100,000s)

Case study & exercise: Overview of valuation techniques (cont.)

Ecosystem valuation techniques				
Category	**Technique**	**Description**	**Information required**	**Time/budget (US$)**
Benefit transfer	**Benefit transfer**	• Involves transferring value estimates from existing economic valuation studies to the study site in question, making adjustments where appropriate.	• Valuations from similar studies elsewhere. • Data on key variables from different studies (e.g. GDP per person).	• Days/Low budget • ($100s – 1,000s)

Case study & exercise 1: Rio Tinto case study

Company

- Rio Tinto is one of the world's leading mining and exploration companies.
- The company has a policy goal of Net Positive Impact (NPI) on biodiversity in its operations. It aims to achieve NPI by combining state-of-the-art avoidance, mitigation and ecosystem restoration with biodiversity offsets and other conservation actions.

Case study & exercise 1: Rio Tinto case study (cont.)

Context

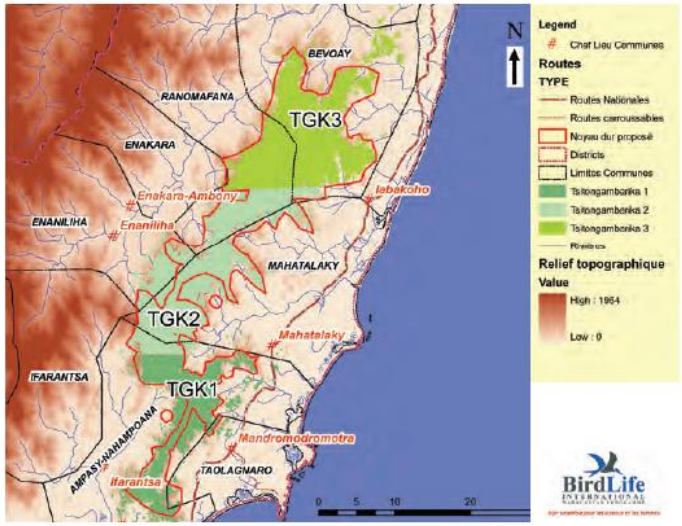
- In Madagascar, Rio Tinto mines ilmenite in the southeast via a subsidiary.
- As part of its offset strategy, the company is considering to support the conservation of 60,000 hectares of lowland rainforest, to compensate in part for the unavoidable residual impacts of its mining operations in the region.
- The area to be conserved and the resulting biodiversity benefits are expected to meet and possibly exceed the conservation gains required to compensate for the residual impact of the mining operation.

Sources: WBCSD, *Guide to Corporate Ecosystem Valuation – Rio Tinto case study summary* / N.Olsen, J. Bischop *et al*., *Exploring ecosystem valuation to move towards net positive impact on biodiversity in the mining sector*

Case study & exercise 1: Rio Tinto case study (cont.)

Context (cont.)

- The conservation actions will take place in Tsitongambarika, the largest expanse of lowland rainforest remaining in southern Madagascar.
- This forest is characterized by high levels of biodiversity, it provides important ecosystem services and is a key source of local livelihoods.



- However, over 10,000 ha of forest have been lost, and the forest is currently being cleared at roughly 1–2 percent per annum, mainly through land conversion driven by shifting cultivation.

  Degradation also occurs through unsustainable and often illegal logging and harvesting of forest products and fuel wood.

Sources: WBCSD, *Guide to Corporate Ecosystem Valuation – Rio Tinto case study summary* / N.Olsen, J. Bischop *et al*., *Exploring ecosystem valuation to move towards net positive impact on biodiversity in the mining sector*

Case study & exercise 1: Rio Tinto case study (cont.)

Objectives

- The valuation study looked at the **biodiversity and ecosystem services of a large part of Tsitongambarika (TGK)**, the largest expanse of lowland rainforest remaining in southern Madagascar.
- It examined the **cost of conserving**, and the **value of benefits associated with biodiversity** in the TGK forest.
- The objective was to **quantify** and **value** the **changes in ecosystem services** that result from interventions that deviate from “business as usual” in TGK, i.e. projected continued deforestation and ecosystem degradation, in favor of some form of conservation.

For the exercise, we will focus exclusively on the values of benefits associated with conservation actions

Case study & exercise 2: Energias de Portugal (EDP) case study

Company

- EDP electrical utility company
- Over 12,000 employees
- Operating in 11 countries (mainly in Portugal, Spain, Brazil and USA)
- Strategy supports clean energy (mainly wind and hydropower)
- Older hydropower facilities in Portugal later classified as built on protected areas
- One area inside Natural Park of Serra da Estrela
- 9 reservoirs and 6 hydropower plants were built here between 1923-2003
- Stations are connected through several open air water canals
- Most are certified by European Renewable Energy Certificate System

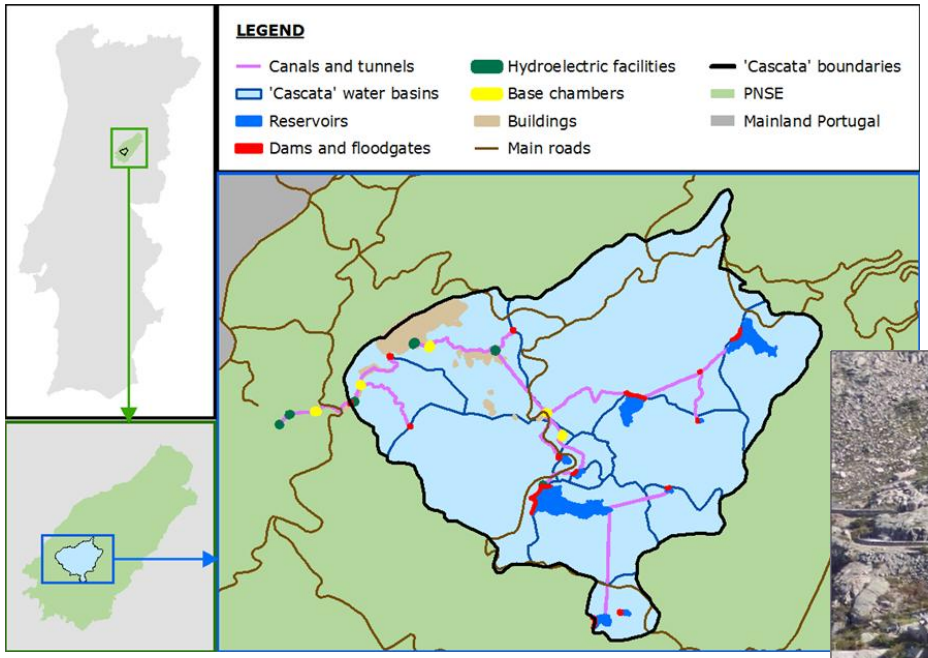
Case study & exercise 2: Energias de Portugal (EDP) case study (cont.)

Context

- EDP is responsible for managing reservoirs and canals
- Water resources shared with agriculture and public consumption
- EDP has received requests from the Natural Park and local Authorities to minimize biodiversity impacts
- Additionally, agreement has been reached about the appropriate water level in the reservoirs for recreational purposes
- EDP is therefore interested in understanding costs and benefits provided by the watershed to contribute to future hydropower decisions
- The study was aligned with the EU Eco-Management and Audit Scheme to improve environmental performance and stakeholder engagement

Case study & exercise 2: Energias de Portugal (EDP) case study (cont.)

Context



Case study & exercise 2: Energias de Portugal (EDP) case study – ESR results

Ecosystem Service Review

EDP - Energias de Portugal
Cascata da Serra da Estrela 2010

Ecosystem Services	Hydropower System in Serra da Estrela		Main uses of the watershed by local communities	Notes
	Dependences	Impacts	Dependences	
Provisioning				
Livestock			+	Local workshop
Wood			+	Local workshop
Capture fisheries		● +/-	+	Good access to lakes; measures to minimize impacts on fisheries in place.
Sand		?		Downstream not studied
Fresh water	●	● +	+	Electricity generation; Irrigation; water consumption. Improves access to water. Local workshop
Regulating				
Air quality regulation		● +		NOx and SOx Emissions avoidance
Global Climate regulation	○	● +		CO_2 emissions avoidance

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Case study & exercise 2: Energias de Portugal (EDP) case study – ESR results (cont.)

Ecosystem Service Review

EDP - Energias de Portugal
Cascata da Serra da Estrela 2010

Ecosystem Services	Hydropower System in Serra da Estrela		Main uses of the watershed by local communities	Notes
	Dependences	Impacts	Dependences	
Regulating				
Water regulation	●	● +/ -		Water storage. Local workshop
Erosion regulation (fire risk avoidance)	○	● +	+	Erosion increases operational costs; facilitates the good access to water; local workshop
Cultural				
Recreational		● +	+	Lakes used for summer recreation; local workshop
Others				
Biodiversity[(a)]		● -	+	Flodded areas and water cycle changes; local workshop

Key: ● High ○ Medium Low + Positive impact – Negative impact ? Don't know

Note: (a) studied as a non-use value

Case study & exercise 2: Energias de Portugal (EDP) case study (cont.)

Objectives

- Valuation study compares the total services provided by the watershed
- Comparison requires two scenarios: hydropower facilities installed vs. hypothetical dismantlement
- 7200 ha area identified as system boundaries for our purposes
- An ESR has been conducted and ‘priority’ ecosystem services identified

Case study & exercise 3: GHD/South Australia Water Corporation (SA Water) case study – context

Company

- SA Water is a government-owned water utility that supplies water and wastewater services across the state of South Australia.

Context

- As part of its operations SA Water sources water from catchments, treats it to potable standard and distributes it to customers.
- The majority of these catchments consist of privately owned land (i.e. not owned by SA Water) which supports a variety of uses such as agriculture and residential development.
- These land uses not only contribute contamination to the water supply in the form of increased nutrient, pathogenic microorganisms and sediment loads, they impede ecosystems' ability to undertake their natural water purification and regulation functions.

Case study & exercise 3: GHD/South Australia Water Corporation (SA Water) case study – context (cont.)

Study Areas

- The Cox Creek catchment was assessed.
- Catchment supports extensive agricultural and horticultural activities, which have led to impacts on the quality of the water in the downstream reservoir.
- Excessive sediment and nutrient loads have caused algae blooms in the Happy Valley Reservoir (located offstream below the Mount Bold Reservoir), which require treatment with copper sulphate and increased coagulation.

Case study & exercise 3: GHD/South Australia Water Corporation (SA Water) case study – context (cont.)

Objectives

- SA Water wanted to assess the benefits of reinstating ecosystem services to improve water quality compared to conventional water treatment methods
- SA Water's objective in undertaking CEV was to assess the benefits of reinstating ecosystem services to improve water quality and thereby reduce treatment costs
- Improved management of catchment areas to restore these ecosystems and reduces reliance on the treatment plant as a single 'barrier' and thus reduces the risk of water of unacceptable quality being supplied to customers

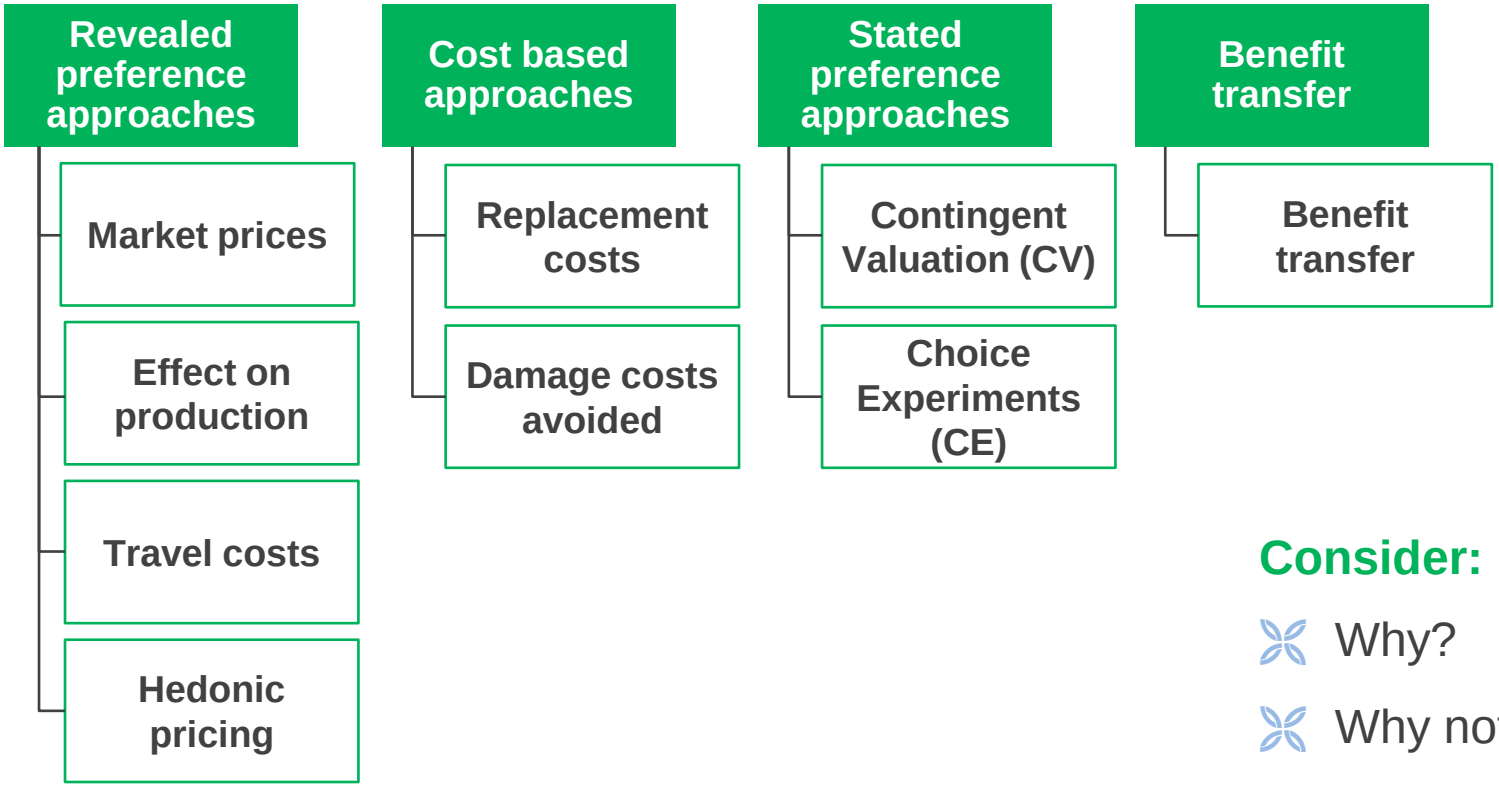
Case study & exercise: Group discussion – scoping

Scoping checklist

Secondary Questions
Refining the Scope
5. What geographic and temporal boundaries should be used?
6. What standards or processes should the CEV conform to?
7. What relevant information is available?
8. Who are the key stakeholders and how should they be engaged?
9. What ecosystem valuation techniques are likely to be necessary?
10. What might the key study implementation constraints be?

Case study & exercise: Group discussion – valuation methods

Which valuation methodologies would you apply?



Consider:

- Why?
- Why not?

Source: WBCSD, Corporate Ecosystem Valuation Additional Notes B Selection & Application of Ecosystem Valuation Techniques for CEV

Case study & exercise 1: Group discussion – valuation methods Rio Tinto

Ecosystem Service (ES)	ES Classification	TEV (use/non-use etc.)	Valuation method
Water supply			
Erosion control			
Carbon storage and sequestration			
Biodiversity (species abundance)			

Case study & exercise 2: Group discussion – valuation methods EDP

Ecosystem Service	MA	TEV (use/non-use etc.)	Valuation method
Water Supply (for power generation)			
Water Supply (for humans)			
Food			
Fire Risk Avoidance			
Biodiversity (species abundance)			

Case study & exercise 3: Group discussion – valuation methods – GHD / SA Water

Ecosystem Service	MA	TEV (use/non-use etc.)	Valuation method
Carbon sequestration			
Flooding			
Waste treatment			
Aesthetic value			
Recreational value			

Case study & exercise 1 debrief: Rio Tinto approach

Approach

- Two scenarios were compared:
  - Business as usual scenario – continuation of the current average annual rate of deforestation (1%)
  - Conservation scenario – assumes tat deforestation falls to zero immediately across the forest as a whole, as communities are prevented from (or given incentives to) converting forests into fields
- The analysis measures the **value of changes** in ecosystem services associated **with the area of forest conserved that would otherwise have been deforested**.
- In contrast, the **costs of conservation** are applied to the entire forest area of TGK, regardless of the level of threat, because protection incurs real financial costs and typically requires limiting the access of local people who rely on forest resources.

Case study & exercise 1 debrief : Rio Tinto approach (cont.)

Valuation techniques used by Rio Tinto				
TEV	**Type**	**Ecosystem service**	**Valuation approach**	**Methodology**
Direct use values	**Provision services**	Water supply	Contingent valuation	Additional willingness to pay for clean and reliable water **US$1.7 /ha forest**
Indirect use values	**Regulation services**	Erosion control	Effect on production	Value of lost rice production due to soil erosion, applied to the area of rice paddy fields that would be negatively affected by deforestation It is assumed that at an annual rate of deforestation of 1%, rice yield will decrease 1& each year as irrigation infrastructure servicing the rice perimeters become increasingly silted. **US$ 40 /ha /year**
		Carbon storage and sequestration	Benefit transfer (market prices were considered as too low)	Value of carbon storage taken from the area of deforestation each year (non cumulative values) Annual value of CO2e emissions for TGK at 1% deforestation rate (derived from estimates on the avoided damage costs of climate change): **US$ 1.745 million / TGK**

Case study & exercise 1 debrief: Rio Tinto approach (cont.)

Valuation techniques used by Rio Tinto				
TEV	**Type**	**Ecosystem service**	**Valuation approach**	**Methodology**
Non-use values	**Existence/ legacy value**	Biodiversity (species abundancy and habitat diversity)	Contingent valuation	✂ Mean willingness to pay per household per hectares in OECD countries (based on US household estimates) ✂ **US$ 20.2 /ha/year** *Source: Pearce (2007), based on Kramer and Mercer (1997)*

Case study & exercise 1 debrief: Rio Tinto approach (cont.)

Conclusions (cont.)

- The use of valuation methodologies in this work presents new opportunities to identify ecosystem values and potential income streams that can be used to:
  - provide long-term sustainable income streams for the TGK conservation programmes;
  - provide long-term sustainable income streams for local communities that live and work in and around TGK, who may be disadvantaged by conservation programmes; and
  - demonstrate that the company's investment in the TGK conservation programmes is transparent, equitable across stakeholders, and commensurate with the value of the biodiversity impacts that are being offset by the TGK programme.

Case study & exercise 2 debrief: Energias de Portugal (EDP) approach

Approach

- EDP established a partnership with research teams from Portuguese Universities
- The study included calculating the Total Economic Value (TEV) of the watershed
  - Baseline scenario of current use with a 20 years time horizon (concession period)
  - Calculated the variation of TEV (with hydropower facilities and without).
- An Ecosystem Service Review (ESR) identified the main ecosystem services (ES) provided by the watershed
  - Inventory supported by literature review, expert judgment and field data collection
  - Information included in a Geographical Information System (GIS) to map species and habitats of concern to conservation and dominant land uses

Case study & exercise 2 debrief: Energias de Portugal (EDP) approach (cont.)

Approach (cont.)

- To complement the available data, knowledge, perceptions, interests and expectations of stakeholders were collected during a one-day participatory workshop.
- Different valuation approaches have been used and a detailed overview of the valuation exercise is presented in the following table.

Case study & exercise 2 debrief: Energias de Portugal (EDP) approach (cont.)

Valuation techniques used by EDP				
TEV	**Type**	**Ecosystem service**	**Valuation approach**	**Methodology**
Direct use values	**Provision services**	Power generation	Market based	Average annual generation (MWh/year) X (price – operational costs) (€/MWh). Includes benefits of CO_2 emissions avoidance paid to the company
		Water supply for human consumption	Market based	Water (m^3) X water tariff – operational costs (€/m^3)
		Water supply for Irrigation	Opportunity cost	Irrigation water supply (€/year) (opportunity cost of non-produced electricity)
		Food	Market based	Lamb production x slaughter weight x price [€/year] – Production cost [€/year] + Sheep number x Cheese production x Cheese Price [€/year] – Production cost [€/year]
		Fibre (wood)	Market based	(Wood originated in thinning – Thinning costs) [€/five years]

Case study & exercise 2 debrief: Energias de Portugal (EDP) approach (cont.)

Valuation techniques used by EDP				
TEV	**Type**	**Ecosystem service**	**Valuation approach**	**Methodology**
Direct use values	**Cultural services**	Recreational fishing	Travel cost	Anglers number x (general fishing license value) [€/year] + Visits number for year x (Special daily licenses value + travel cost average) [€/year]
Indirect use values	**Regulation services**	Fire risk avoidance	Market based	Value of unburned area due to water reservoirs presence (fire occurrence reduction 15%)
Non-use values	**Existence/ legacy value**	Biodiversity (species abundancy and habitat diversity)	Shadow projects; Compensatory initiatives (Life + program); Benefits Transfer	Habitat area x habitat value (shadow project approach)

Case study & exercise 3 debrief: GHD/South Australia Water Corporation (SA Water) approach

Approach

- SA Water used previous evaluations as a basis for the study and constructed a series of scenarios for analysis.
- The scenarios included: on-farm management actions, construction of artificial wetlands, constructing or replacing a sewer system in a township, and re-vegetation activities.
- Modelling was undertaken to determine the reduction in nutrient and suspended sediments entering the system as a result of the scenario and the associated reduction in treatment costs.

Case study & exercise 3 debrief: SA Water case study – approach (cont.)

Valuation techniques used by EDP				
TEV	**Type**	**Ecosystem service**	**Valuation approach**	**Methodology**
Direct use values	**Regulating services**	Waste treatment	Market Price	Avoided cost of energy use and waste disposal
	Cultural services	Recreational	Travel cost	To assess the aesthetic and recreational values of the wetland developments
	Cultural services	Aesthetics	Travel cost	
Indirect use values	**Regulating services**	Flood damages	Hedonic pricing/avoided cost	Avoided cost or wetland flooding
	Regulating services	Carbon sequestration	Benefits transfer	Price for Carbon sequestered by vegetation

Coffee

15 min.

Session 10
Corporate Ecosystem Valuation (CEV) – supporting tools and methodologies

Module 3: Introduction to valuing ecosystem services

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Summary of business analytical approaches

Monetary approaches

- Financial accounting
- Management accounting
- Full (environmental) cost accounting
- Economic cost-benefit analysis
- Economic (socio-economic) impact assessments
- Natural resource damage assessments
- Share price valuation

Source: WBCSD, Guide to Corporate Ecosystem Valuation – Detailed Presentation

Summary of business analytical approaches (cont.)

Sustainability non-monetary approaches

- Company reporting
- Environmental Management Systems (EMS)
- Environmental and Social Impact Assessment (ESIA)
- Strategic Impact Assessment (SIA)
- Ecosystem Services Review (ESR)
- Multi-criteria analysis
- Sustainability appraisals
- Risk Assessment
- Life Cycle Analysis (LCA)
- Cost-effectiveness analysis
- INVEST (Integrated Valuation of Ecosystem Services and Tradeoffs)

Source: WBCSD, Guide to Corporate Ecosystem Valuation – Detailed Presentation

Summary of business analytical approaches (cont.)

Sustainability monetary approaches

- Corporate environmental accounting
- ARIES
- TruCost
- The sdEffectTM
- The Ecosystem Services Benchmark
- ENVEST
- InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs)
- NAIS (Natural Assets Information System)
- ESValue

Source: WBCSD, Guide to Corporate Ecosystem Valuation – Detailed Presentation

WBCSD – Reviewed ecosystem valuation tools

	CEV	ESR	Corporate Environmental Accounting	Biodiversity Acountability Framework	Trucost	sdEffectTM	Ecosystem Services Benchmark	ENVEST
Identifying new investments, markets, prices and products	✓		✓				✓	
Managing risks	✓	✓					✓	✓
Highlighting opportunities for saving costs, reducing taxes, sustaining revenues	✓	✓	✓				✓	
Assessing environmental liability and compliance	✓						✓	
Articulating environmental performance and costing environmental impacts	✓		✓	✓	✓			✓
Reassessing company and share value	✓				✓	✓		

Source: WBCSD, Corporate Ecosystem Valuation: A Scoping Report

Wrap up

Module 3: Introduction to valuing ecosystem services

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Module 3 objectives

1) Identify the business case for valuing ecosystems services.
2) Understand the principles of a Corporate Ecosystem Valuation.
3) Examine case studies of when companies have commissioned valuation studies and understand how and when it is appropriate to screen and use ecosystem valuation.

Module 3 – Objective summary

- Understand the basics
- Policy and regulatory frameworks
- The business case for action
- Introduction to Corporate Ecosystem Valuation (CEV)
- CEV screening and supporting tools and methodologies

Review…

Have we achieved our objectives?

Action planning

Identify how ecosystem services relate to your own company's situation.

Action Planning

- **Step 1: Build awareness**

Consider the use of BET either within your company or as an industry initiative in partnership with other companies

- **Step 2: Use other publicly available resources**

Review WBCSD case study examples and publications, which include:

- Case studies: more than 50 examples, from 16 different countries and 15 sectors complemented by specific Corporate Ecosystem Valuation Road testers
- Publications: *Guide to Corporate Ecosystem Valuation*, *Corporate Ecosystem Valuation: Building the Business Case*, *The Corporate ESR*, *Responding to the Biodiversity Challenge*, *Biodiversity and ecosystem services: scaling up business solutions*.

Other key resources: The Economics of Ecosystems and Biodiversity (TEEB) reports (specifically TEEB for business), The Millennium Ecosystem Assessment and the UK National Ecosystem Assessment

Action Planning

- **Step 3: Join networks and contact experts**

Consider joining the WBCSD Ecosystems Focus Area (http://www.wbcsd.org/work-program/ecosystems.aspx)

Make use of the WRI's Ecosystem Services Experts Directory (http://projects.wri.org/ecosystems/experts)

- **Step 4: Piloting**

Pilot biodiversity risk and opportunity assessments internally

Pilot the Corporate Ecosystem Valuation or Ecosystem Services Review for a selected project, site or stage of your supply chain

- **Step 5: Implementation**

Contact the WBCSD Ecosystem Focus Area team (overleaf) and plan a full implementation strategy with the assistance of international experts

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