wbcsd business ecosystems training

BET India Module 3

Introduction to Valuing Ecosystem Services

Facilitator Notes

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.

Facilitators' guide: how it works

This Facilitators' guide is set up to provide all the information needed to present the BET course – **Module 3: Introduction to Valuing Ecosystem Services** to a group of delegates

The contents of the guide are:

- Introduction to the course and course timetable
- Facilitator's notes

Within the facilitator's notes, there are three different types of information provided.

1) Session overview and timeline

Overview of each section and suggested times for delivering the session

2) Facilitators' notes

Facilitators' notes – shown on left hand side of each page, these include:

- Detailed notes as to how to run the session, including how long to spend on each slide
- Background notes
- Crib notes for the facilitator to present from

Facilitators' guide: how it works (cont.)

3) Media/activity/handout guidance

Media/activity/handout guidance – shown on the right hand side of each page, these include:

- A copy of the PowerPoint slide the delegates are seeing as you present
- Guidelines as to how to run group sessions and exercises

Further information

For more information about BET, please refer to the BET Implementation Guide

- A separate glossary document is provided for this module
- A separate Frequently Asked Questions (FAQs) document is also provided for this course

Introduction to the course

Audience

The maximum recommended number of delegates is 20. The audience is assumed to have some environmental and sustainability knowledge, but a background in environmental economics is not necessary. The course is relevant to:

- Sustainability managers
- CSR managers
- EHS managers
- Life cycle analysis professionals
- Operations managers
- Supply Chain professionals
- Procurement and R&D professionals

Please note this list is not exhaustive.

The module is suitable for those who have completed modules 1 and/or 2.

This module is an introduction to ecosystem valuation. Those with an environmental economics background may also attend. However, the module is not designed to teach environmental economics or to consider the associated technical issues.

Individuals wishing to understand environmental economics in further depth are referred to the guide to Corporate Ecosystem Valuation, and related documents available on WBCSD's website (*www.wbcsd.org/web/cev.htm*)

Introduction to the course (cont.)

Key topics

Key topics for module 3 include:

- An introduction to the concepts of environmental economics and environmental valuation;
- An introduction to Corporate Ecosystem Valuation (CEV); and
- Case study walkthroughs and the application of screening criteria to determine the need for valuation.

Learning Objectives

By the end of the module, trainers will be able to:

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

Introduction to the course (cont.)

Delegate binders distributed on arrival at the course

- All delegates should be given the links to course material and references for further research
- Additional handouts should be provided throughout the module and located in the annex of this document
- The Facilitators Notes should NOT be made available to the delegates in soft copy

Facilitators

- Two facilitators will be used throughout the training. These should include one specialist with a background in environment/sustainability and a member of the training department. The use of an environmental economist may help present this module more effectively.
- Presenting and facilitating will be shared between both facilitators

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

Time guidelines

Time guidelines	Time
Introduction	**15-40 mins**

Session objective

To establish delegates' level of knowledge, skills to be acquired, and identify learners' needs. To allow the delegates to be introduced to each other.

Session format

This session will be run by the two course facilitators – it is your opportunity to make the delegates feel welcome and at ease and to start interactions with other course delegates.

Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

A glossary of terms used during the module will also be available in the course material desk pack.

Session overview

The primary focus of this session should be giving delegates a warm welcome and ensuring that they feel at ease.

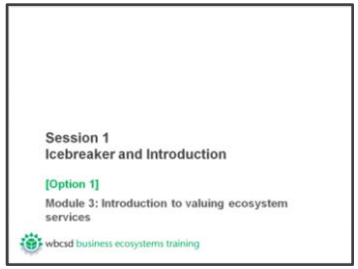
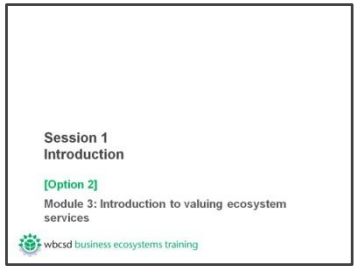
This session allows the course facilitators to introduce themselves and give delegates an overview of their career history.

Delegates can also introduce themselves to each other as part of an icebreaker exercise.

It also explains the structure, content and objectives of the course.

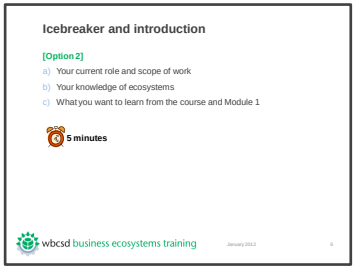
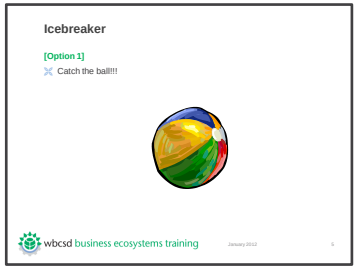
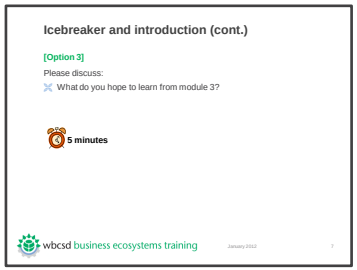
Session 1

Icebreaker and Introduction

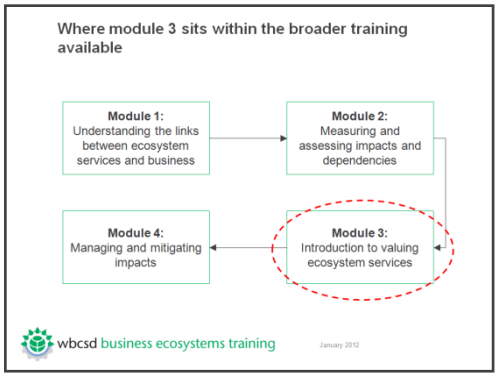
Facilitators' notes	Media/activity/handout guidance
Slide 1: <1 minute Welcome delegates to the BET course **Slide 2: 1 minute (instructions displayed during the exercise)** Tell delegates that the course has been developed by the WBCSD in collaboration with KPMG and an advisory committee made up of several WBCSD member companies, Regional Network partners, academic and UN institutions and NGOs. **Slide 3/4: <1 minute** **Instructions:** **[Optional, depending on training structure: if modules are being prepared in one block then no need for icebreaker and intro.]** Welcome delegates to the course. Tell delegates that, since you will be working together closely over the next few hours, you would like to start the course by providing them with an opportunity to quickly learn more about each other. This session is to be run by both facilitators, with both taking part in the icebreaker and introducing themselves.	   

Session 1

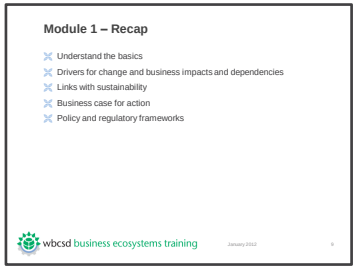
Icebreaker and Introduction

Facilitators' notes	Media/activity/handout guidance
Slides 5-7: 5-15 minutes (depending on number of delegates) Icebreaker (Facilitator to vary the use of these activities in accordance with the mix of delegates) **[Option 1 slide 5: Interactive]** Module facilitator will put delegates into pairs, who are then given 5 minutes to discuss the following three questions: - Current scope of work - Knowledge of how to measure ecosystem impact; and - What they want out of the course Delegates then report back to the group, introducing their partner using the information they have learned. **[Option 2 slide 6: Catch the Ball]** Throw a soft ball to one of the delegates who then introduces themselves by answering the three questions below: - Current scope of work - Knowledge of how to measure ecosystem impact; and - What they want out of the course The delegate then throws the ball to someone else (who has not yet answered). **[Option 3 slide 7: What would delegate like to get out of this module]** Ask delegates what they would like to get out of this course specifically.	   **Instructions:** The facilitator will take note of expectations and specific learning objectives, including indicators/measures on a flip chart. This will be referenced throughout the day and items checked off. It could also be referred back to at the end of the day ensuring that the training has addressed the expectations and needs of the delegates.

Icebreaker and Introduction (cont.)

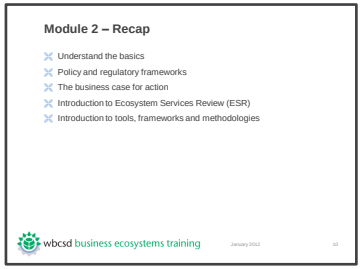
Facilitators' notes	Media/activity/handout guidance
Slide 8: 1 minute **Instructions:** Facilitator to explain where module 3 sits within the broader training course. Facilitator to talk through this slide, introducing the other topics, i.e., modules 1 & 2 and module 4. **Background:** Module 3 of this course is the third of four modules covering specific topics including: M1 Understanding the links between ecosystems and business, M2 Measuring and assessing impacts and dependencies (both of which you will have completed before attending this module) and M4 Managing and mitigating impacts which is the last module of the series. The modules are independent of each other and can be taken independently or in succession. This training is designed to be facilitator led but the material is available on the WBCSD's website, and is therefore accessible to individual learners. This module includes a re-cap of modules 1 and 2. This is not a course designed for environmental economists, as many of the concepts should be well known to them. Rather this module is a primer to help delegates understand how valuation can aid business decision making.	

Icebreaker and Introduction (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 9: 5 minutes Recap Module 1 **[Optional, depending on training structure: if modules are being prepared in one block then no need for recaps]** **Instructions:** **Module 1** Facilitator to recap specific concepts, including definitions of: - Biodiversity, - Ecosystems, and - Ecosystem services: re-cap main categories of ecosystem services, i.e., provisioning, regulating, cultural and supporting. - We will have another look at links between broader areas and regulatory frameworks in the next few slides, exploring a different example from that in module 1. Facilitator to ask delegates: The main challenges facing business were described in module 1: can anybody name them? - Water scarcity, climate change, habitat change, biodiversity loss and invasive species, overexploitation of the ocean, and nutrient overloading leading to pollution. Can anyone name the drivers of these changes? - Population growth, life style changes and governance issues.	 Finally, we looked at the business case for action, can anyone tell me some of the risks associated with ecosystem dependency? **Answers** - Operational (e.g. Increased scarcity and cost of raw materials) - Regulatory and legal (e.g. Public policies like taxes and moratoria on extractive activities) - Reputational (e.g. Relationships and image from media and NGOs) - Market and product (e.g. Consumer preferences) - Financing (e.g. Availability of capital)

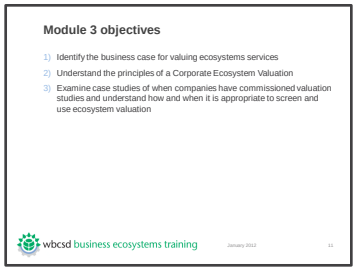
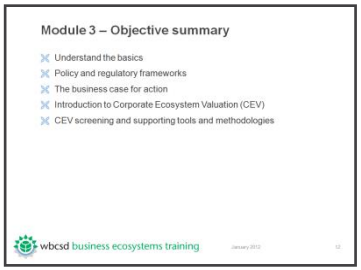
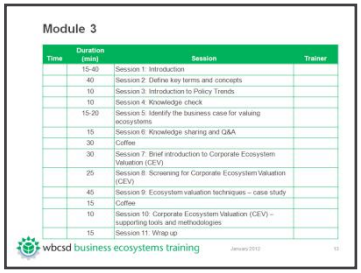
Session 1

Icebreaker and Introduction (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 10: 5 minutes + 5 minutes Q+A [optional] Recap Module 2 **[Optional, depending on training structure: if modules are being prepared in one block then no need for recaps]** **Instructions:** Facilitator to **recap specific concepts**, including: - Foot-printing concepts (carbon, water, environmental) - Ecological change versus changes of relevance to business - Drivers and impacts Facilitator to **ask delegates**: in Module 2, we looked at the business case for measuring and assessment, can anyone remember some of the main benefits for businesses? Answers include: - Effective communication of information - More informed decisions - Risk identification and management, resulting in decreased vulnerability to risk - Cost savings - Competitive advantage - Improved relationships with stakeholders, including regulators, investors, and shareholders - Streamlined permitting processes - Customer retention	 Facilitator to **remind delegates** of some of the relevant tools for measuring and assessing, including: - **Ecosystem Services Review (ESR):** a structured methodology that allows managers to proactively develop strategies to manage business risks and opportunities arising from their company's dependence and impact on ecosystems - Global Water Tool - GHG protocol - WBCSD Measuring Impact Framework - Other relevant tools from Module 2

Session 1

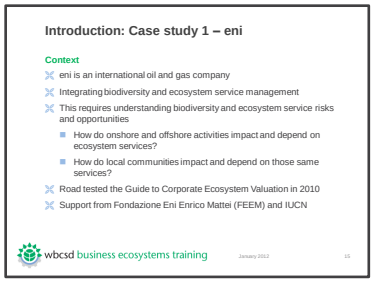
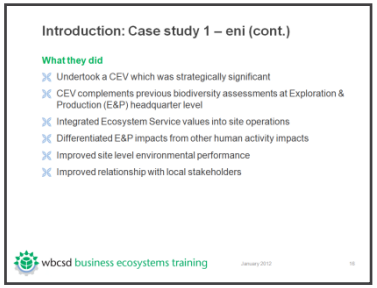
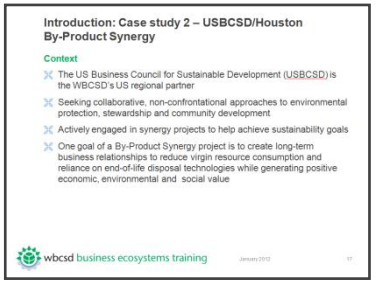
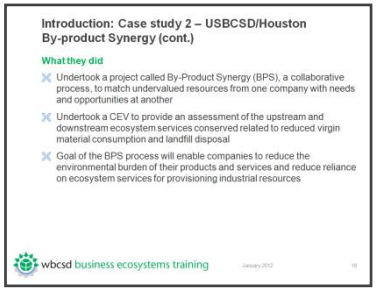
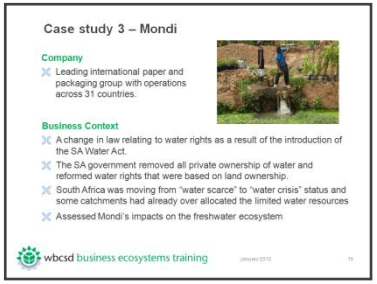
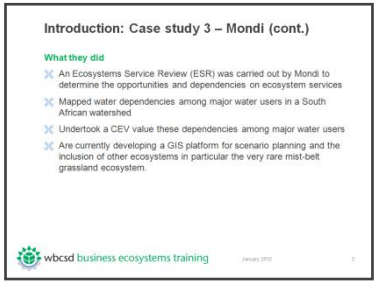
Icebreaker and Introduction (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 11-12: 2 minutes **Instructions:** The facilitator will briefly go through the objectives and the summary objectives for the session and the sections that will be covered in this training module. Facilitator to provide the linkage between the learning objectives (reported by the delegates in the icebreaker) and the objectives for the course. Facilitator to offer delegates opportunity to ask questions if they want to check whether a particular topic is covered. **Slide 13: 1 minute** The facilitator will briefly go through the agenda for the session and the sections that will be covered in this training module. The facilitator will leave the course timetable displayed throughout the course as a poster.	  

Icebreaker and Introduction (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 14: 3 minutes **Sources:** CEV Road Testers: *http://www.wbcsd.org/work-program/ecosystems/cev/roadtesters.aspx* Puma website: *http://about.puma.com/wp-content/themes/aboutPUMA_theme/financial-report/pdf/EPL080212final.pdf* **Instructions:** Facilitator to talk through examples of how companies are responding to biodiversity and ecosystem issues. These may be explored in more detail next. **Puma:** The PUMA Environmental P&L is promoting a shift towards full environmental accounting and integrated reporting. By reducing environmental impacts, operations and suppliers can reduce their exposure to rising costs in the event that governments strengthen taxes to discourage further damages to nature. Understanding these implications can help to mitigate risk in the supply chain and also potentially channel investments to better manage these challenges. This in turn can help PUMA develop a more sustainable and resilient business model. **Eni:** Eni evaluated the ecosystem services impacts and dependencies relating to an existing oil operation and to a new development in a sensitive area near a national park. **Mondi:** Mapped and valued water dependencies among major water users in a South African watershed. A wide range of ecosystem services were considered, including ecotourism.	 **US BCSD: Houston By-Products Synergy:** Quantified physical ecosystem benefits realized through the process of matching undervalued or waste materials from one company with the needs of another. Highlights the wide range of stakeholders that can create value from otherwise value-less waste streams. **[Customize – company to provide a quote of specific relevance to their company]**

Icebreaker and Introduction (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 15-20: Case Study anecdote: 5 minutes to talk though the case study **Awareness material** **Instructions** The facilitator should talk through an example of where ecosystem valuation has been used. The facilitator will have a choice of three case studies and will select one to present to the group verbally. **Source:** Three case studies are provided from the CEV road tester groups: eni, USBCSD/Houston By-Products Synergy and Mondi. Information on the road tests can be accessed at: *http://www.wbcsd.org/work-program/ecosystems/cev/roadtesters.aspx* **Interactive: 5 minute group discussion** *Discussion of the material, delegates will be asked the following question:* Identify the business risks and opportunities to the company from action/inaction. The facilitator will gather the main points from the discussion that will set the context of the training.	     

Time guidelines

Time guidelines	Time
Define key terms and concepts – presentation	**40 mins**

Session objective

Review theoretical concepts and key terminology, this session will set up the baseline language to be use for the rest of the module.

Session format

This session will be run by one course facilitator, who will talk through key concepts and definitions with delegates.

Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

A glossary of terms used during the module will also be available in the course material desk pack.

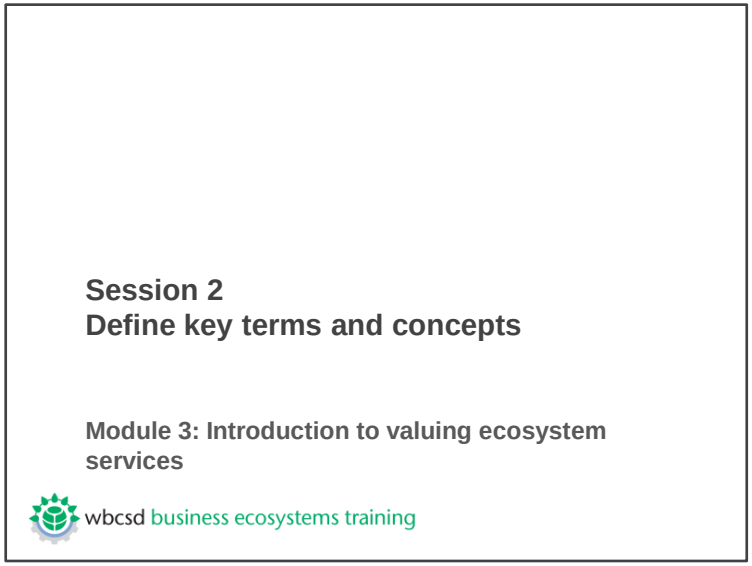
Session overview

The primary focus of this session should be to provide delegates with the base language and terminology they will use for the rest of the module.

It will allow delegates to clarify/strengthen any previous knowledge and will allow delegates that are new to the subject to learn the basic concepts.

Session 2

Define key terms and concepts

Facilitators' notes	Media/activity/handout guidance
Slide 21: <1 minute **Objective**: clarify key terms and concepts for the session. This will set up the base-language for the rest of the module and will be supported by the BET main glossary. **Total time for presentation:** 35 minutes **Instructions:** The Facilitator for this session must have deep understanding of key terms and concepts and clearly explain these with supporting examples. Detailed background notes are provided throughout this session document and should be reviewed thoroughly in advance, with additional reading from original sources if necessary. The facilitator should direct delegates to the BET glossary provided in their materials pack as reference throughout the session. **Background:** This session describes key concepts and also links the themes of ecosystem valuation.	

Session 2

Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 22-23: 3 minutes

Sources:

Oxford Dictionary, publicly available from: http://oxforddictionaries.com/

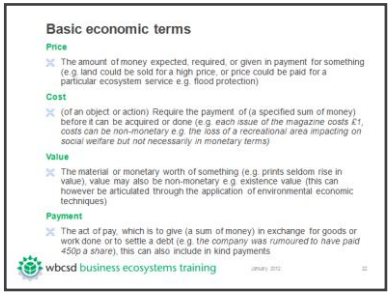
WBCSD, *Connecting the dots* (2005), Slide 40. http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=23&nosearchcontextkey=true

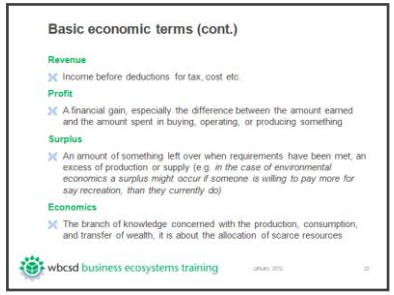
Instructions:

The facilitator should introduce basic economic terms, which should be based on the background notes provided. Choose the appropriate level of detail to provide based on the audience.

Background:

- **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.
- **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 (e.g. *record pre-tax profits)*
- **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

Economic value is a measure of how much something (e.g. an ecosystem service) improves the wellbeing of an individual or of society as a whole.

- Value is defined as the difference between the maximum amount that someone is willing to pay for something and the cost of providing it.
- Economic value includes the profit generated by producing something (i.e. revenue **minus** costs) plus the additional amount someone would have paid (i.e. how much was someone willing to pay **minus** how much was actually paid). These are often referred to as Producer Surplus and Consumer Surplus respectively (refer to section on TEV in the next session).

Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 24-25: 2 minutes **Source:** WBCSD, *Connecting the dots* (2005), Slide 37. http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=23&nosearchcontextkey=true **Instructions:** Facilitator to introduce the concept of public, private goods and externalities. **Background – Private versus Public good dilemma:** This slide is critical to understanding the underlying causes of ecosystem service degradation. Despite the fact that ecosystem services underpin markets everywhere, they are rarely traded. As a consequence, many ecosystems and the services they provide are undervalued making their use low or zero cost. The main underlying cause for the market failure is that many ecosystem services have the characteristics of public goods! This is what is commonly known as the 'tragedy of the commons', see next slide. **Public goods** A product that one individual can consume without reducing its availability to another individual and from which no one is excluded. Public goods have two distinct aspects: non-excludability and non-rivalrous consumption. "Non-excludability" means that the cost of keeping non-payers from enjoying the benefits of the good or service is prohibitive. The second aspect of public goods is what economists call "non-rivalrous consumption", meaning that a number of people can enjoy a resource at the same time (e.g. visiting a park without preventing another individual from visiting). An examples of this are shown in the facilitator notes for the next slide.	  **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. If there is competition between individuals to obtain the good and if consuming the good prevents someone else from consuming it, a good is considered a private good (e.g. growing crops on private land). **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)

Session 2

Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 24-25: 2 minutes **Instructions:** Facilitator to introduce the concept of natural capital **Natural Capital** 'Natural capital' is an economic metaphor for the limited stocks of physical and biological resources found on Earth, and the limited capacity of ecosystems to provide ecosystem services (i.e. the direct and indirect contributions of ecosystems to human wellbeing). 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 http://www.cpsl.cam.ac.uk/Business-Platforms/Natural-Capital-Leaders-Platform.aspx	 

Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 26-27: 3 minutes

Sources:

Hardin, G. 1968. The Tragedy of the Commons. Science 162(3859):1243-1248, Hardin, G. "Tragedy of the Commons." *The Concise Encyclopaedia of Economics.* 2008. Library of Economics and Liberty. 8 August 2011. http://www.econlib.org/library/Enc/TragedyoftheCommons.html, and Fung, K (ed.), 2011. *Opus: The journal of Undergraduate Research* [online]. University of Memphis. Available from: http://opus1journal.org/glossary.asp

Instructions:

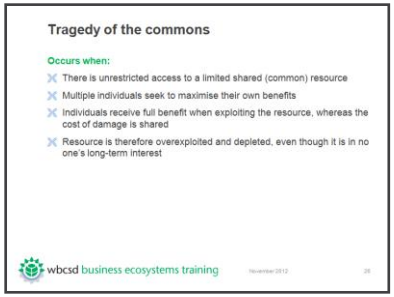
Facilitator to show the video on Tragedy of the Commons, starting from 0:45 minutes explaining Hardin's example of the pasture.

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

More information on the commons example:

In 1974 satellite photos of Northern Africa showed an irregular dark patch 390 square miles. Ground-level investigation revealed a fenced area inside of which there was plenty of grass. Outside, the land had been devastated.

- The fenced area was private property, subdivided into five portions. The owners had an incentive to take care of their land and ensure it was fertile in the long term. Each year they moved their animals to a new section, leaving fallow periods of four years for the pastures to recover from the grazing.



- No one owned the land outside the ranch so it was open to nomads and their herds. Their consumption was unregulated and grew with the herd size. However the supply of ecosystem services was limited by the local environment, decreasing drastically during the drought of the early 1970s. The herds exceeded the natural "carrying capacity" of their environment and as the soil was compacted and eroded "weedy" plants, unfit for cattle, replaced good plants. Many cattle died, along with people that depended upon them.
- **Examples of common resources**: international fish stocks, public land, public water supply, clean air etc.

[Interactive option: Facilitator to ask delegates what other examples they can think of where unrestricted access to a resources can lead or has led to overexploitation or collapse of a natural resources and the associated ecosystem services.]

Biodiversity, Ecosystems and Ecosystem Services – the basics (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 28-29: 2 minutes

Sources:

WBCSD, *Markets for Ecosystem Services: New Challenges and Opportunities for Business and the Environment*, (2007)
http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=27&nosearchcontextkey=true

TEEB (Detailed treatment in Economic and Ecological Foundations (D0))
http://www.teebweb.org/EcologicalandEconomicFoundations/tabid/1018/Default.aspx

Instructions:

Facilitator to talk through how biodiversity underpins ecosystem services.

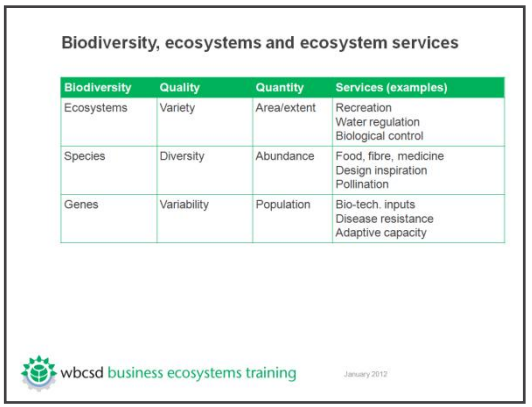
Facilitator to pick one from each category in the table from slide 28 and step through the links.

Examples:

An **ecosystem** is measured in both the **variety** it represents (qualitatively) and the **area/extent** that it covers (quantitatively). Ecosystem biodiversity provides many recreational ecosystem services, e.g. forest treks.

Species are measured in terms of **diversity** (qualitatively) and **abundance** (quantitatively). Species biodiversity provides ecosystem services such as ingredients in medicinal and pharmaceutical products.

Genes are measured in terms of **variability** (qualitatively) and **population** (quantitatively). Genetic biodiversity provides ecosystem services such as disease resistance.



Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance

Slide 30: 6 minutes

Sources:
Pearce, D.W., Markandya, A. and Barbier, E. (1989). Blueprint for a green economy. Earthscan, London.),
WBCSD, *Connecting the dots* (2005),,Slide 40.
http://www.wbcsd.org/pages/edocument/edocumentdetails.aspx?id=23&nosearchcontextkey=true

Instructions:

The facilitator should introduce the concept of total economic value (TEV) based on the background notes provided. Choose the appropriate level of detail to provide based on the audience.

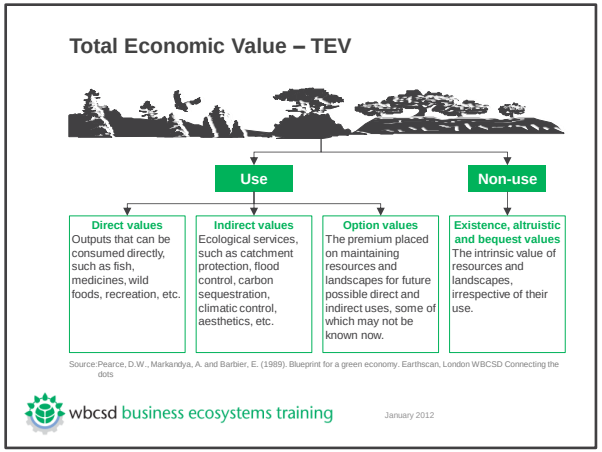
Background:

The concept of total economic value (TEV) has now become one of the most widely used frameworks for identifying, categorizing and valuing ecosystem benefits.

Economic value is a measure of how much something (e.g. an ecosystem service) improves the wellbeing of an individual or of society as a whole.

- Value is defined as the difference between the maximum amount that someone is willing to pay for something and the cost of providing it.
- Economic value includes the profit generated by producing something (i.e. revenue **minus** costs) plus the additional amount someone would have paid (i.e. how much was someone willing to pay **minus** how much was actually paid). These are often referred to as Producer Surplus and Consumer Surplus respectively.

Many of the services provided by ecosystems are not captured in existing markets, so are considered only in an assessment of total economic value.



Background (cont.)

Instead of focusing only on direct commercial values, TEV also considers subsistence and non-market values, ecological functions and non-use benefits.

The TEV also presents a more complete picture of the economic importance of ecosystems, this demonstrating the scale and range of economic costs associated with their degradation, beyond the loss of direct use values.

Looking at the total economic value of a ecosystem essentially involves considering its full range of characteristics as an integrated system − resource stocks or assets, flows of environmental services, and the attributes of the ecosystem as a whole.

Define key terms and concepts (cont.)

Facilitators' notes

Slide 30: (cont.)

Instructions:

Facilitator to provide further detail by outlining the components of total economic value (TEV). These components are explained in the background notes below.

Background

Direct use values: Raw materials and physical products that are used directly for production, consumption and sale.

- For example, energy, shelter, food, agricultural production, water supply, transport and recreational facilities.
- Effectively includes all 'provisioning services' and some of the 'cultural services' that involve direct use of resources, such as recreation.

Indirect use values: These include the ecological functions that maintain and protect natural and human systems through services.

- For example, maintenance of water quality and flow, flood control and storm protection, and micro-climate stabilization, and the production and consumption activities they support.
- These values are equivalent to 'regulating services'.

Option values: This is the 'premium' placed on maintaining a pool of habitats, species and genetic resources for future possible uses, some of which may not be known now.

- Potential uses, may for example, include leisure, commercial, industrial, agricultural and pharmaceutical applications.
- This type of value potentially applies to each of the three main services (provisioning, regulating and cultural).

Non-use values: The value of ecosystems regardless of their current or future use, for cultural, spiritual, aesthetic, heritage and biodiversity reasons.

- They represent a complex, contentious and potentially highly significant type of value.
- They are real in that people do pay large sums of money to charities to protect whales and rainforests even though they will never use or see them in the wild themselves.
- The source of non-use value related to individuals deriving value from: simply knowing that things exist (existence value), knowing that others will benefit (altruistic value) and knowing that future generations will benefit (bequest value).

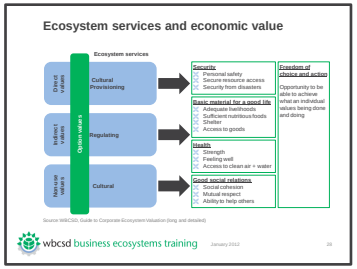
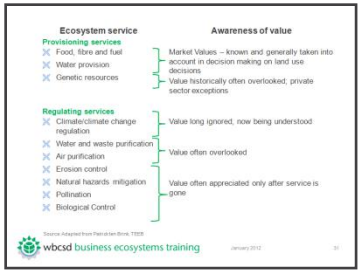
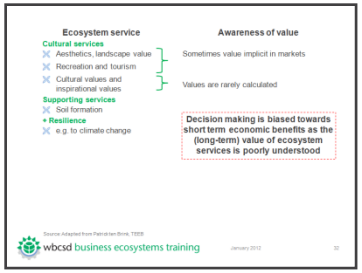
Economic impact. This is a measure of the economic activity generated through the use of an ecosystem service. Economic impact tends to be something that governments and businesses are accustomed to measuring – it would include, for example, total GDP contribution or jobs created.

Direct economic impacts include the capital investment, gross revenues, and jobs created through use of an ecosystem service – for instance, the annual jobs and revenues associated with dive tourism at a given site.

Indirect economic impacts include the flow-on effects on the wider economy from, for example, tourist expenditures on other items (e.g. food and accommodation) and through purchases from upstream domestic suppliers and employee expenditures. Economic impacts are seen as being extremely important for dealing with poverty alleviation, and an important aspect that companies can assist with (see the WBCSD's Measuring Impact Framework, 2008).

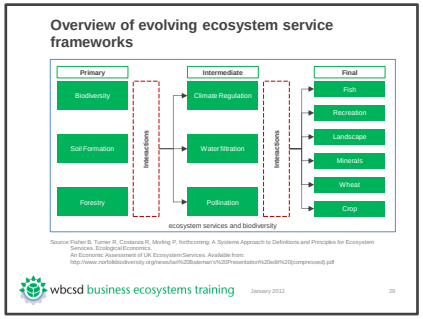
Session 2

Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 31-34: 5 minutes **Source:** WBCSD, G*uide to Corporate Ecosystem Valuation* (long and detailed) (slide 53) available from: http://www.wbcsd.org/pages/adm/download.aspx?id=5922&objecttypeid=7 **Instructions:** The Millennium Ecosystem Assessment (MA) and the concept of ecosystem services and ecosystem service frameworks were covered in modules 1 and 2. The facilitator should talk through the slide as recap of the material and link to human well-being considerations. - This slide presents an overview of how ecosystem services impact upon human well-being, building on the MA conceptual framework. - These impacts are what generates a "value" for ecosystem services and are explored in detail on the following slides. - Facilitator to show the video on "the invisible economy" that makes the case for valuation. - The facilitator should emphasize that considering the value of ecosystem services in terms of the impact on human well-being can help to frame the CEV guide. Not everything can (or should) be quantified in monetary terms. - The facilitator should also highlight the range of different constituents of well-being listed on this slide and emphasize those that are likely to be most important for the audience.	   

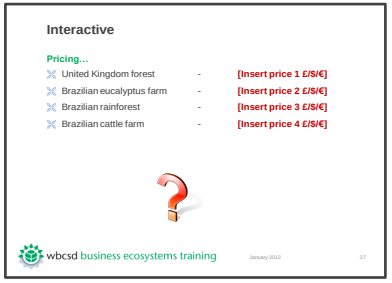
Session 2

Define key terms and concepts (cont.)

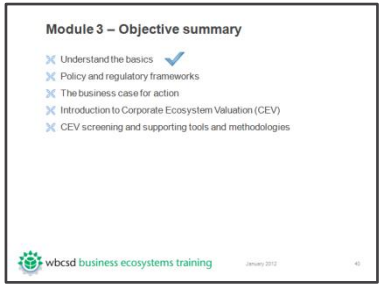
Facilitators' notes	Media/activity/handout guidance
Slide 35: 3 minutes **Source:** Fisher B, Turner R, Costanza R, Morling P, forthcoming: A Systems Approach to Definitions and Principles for Ecosystem Services. Ecological Economics. An Economic Assessment of UK Ecosystem Services. Available from: http://www.norfolkbiodiversity.org/pdf/news/Ian%20Bateman's%20Presentation%20edit%20(compressed).pdf **Instructions:** Facilitator to talk through the slide **Background:** The move toward the further classification of ecosystem services is illustrated by the framework shown in this slide. Ecosystem services can be further classified into the categories : 'primary'', 'intermediate' or 'final' depending on what economic end point is in question. For example, for angling, water quality is an intermediate service in the provision of fish. Those services that are classed as 'final' can be valued directly, while those classified as 'primary' or 'intermediate' are assumed to be included in the values calculated for 'final' services. This additional categorization, while complex, helps to simplify the different elements of ecosystems services that need to be valued within a given ecosystem. However, as with all frameworks, this is one particular approach, amongst a number of different alternatives available. The choice of which will depend on the business need and the resources available to conduct any sort of analysis.	 There are a number of examples of frameworks that have been developed through this methodology, such is the case of UK National Ecosystem Assessment (NEA), which demonstrate how sophisticated Ecosystem Frameworks can be. The Millennium Assessment categories for the ecosystem services are displayed as different colours within the diagram. It is also important to note that only the most final stage of each final ecosystem service is shown for simplicity.

Session 2

Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 36-42: 10 minutes **Instructions** Facilitator to introduce the activity by drawing on the earlier sessions, for how many ecosystem services remain un-priced in the market place. **Customize: the facilitator should choose a relevant resource for relevant countries and insert current market prices.** Delegates to be split into groups. Delegates to consider the following resource: - 1 ha area of forest **[or other relevant resource, e.g. wetland]** Facilitator to ask delegates to list all the ecosystem services associated with the forest. Facilitator to ask delegates to price the piece of forest by guessing the price on the open market. **(Facilitator to specify 2 country locations for different forest areas).** Facilitator to request delegate groups to call out some of their answers. Facilitator to go through the actual price of each piece of land currently in the **chosen countries,** and to display a list of the ecosystems services associated with each land type. Facilitator to challenge the delegates to consider the difference between price and value and to draw out the discrepancy between the market price and the number and types of ecosystem services actually supported in different forest types located in different areas.	    Please see the main presentation pack for all of the slides for this exercise

Define key terms and concepts (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 43: <1 minute Recap on what has been covered in the module so far.	

Time guidelines

Time guidelines	Time
Linking concepts and regulatory frameworks – presentation	**10 mins**

Session overview

This session will provide a brief look at the developments that have taken place in ecosystem services frameworks (this will be built on later in the module).

The session will also provide a few examples of current regulatory frameworks that account for ecosystem services.

Session objective

Provide delegates with a short overview of the background of valuation (TEEB, etc.) and relevant regulatory frameworks.

Session format

This session will be run by one course facilitator, who will talk through key concepts and definitions with delegates.

Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

A glossary of terms used during the module will also be available in the course material desk pack.

Session 3

Introduction to policy trends

Facilitators' notes	Media/activity/handout guidance
Slide 44: <1 minute In this session, trainees will be introduced to the policy background, general trends and processes by which issues are passed into legislation (and thus impact on businesses), with specific regard to biodiversity and ecosystem based policies. **Slide 45: 2 minutes** **Long history of environmental policy** A. **Option: ask delegates to guess the year the UK introduced their first water policy –** 1388 UK water pollution restrictions. This was one of the earliest environmental restrictions outlawing the dumping of animal waste, dung or litter in to rivers. Please refer to: *http://www.environmentlaw.org.uk/rte.asp?id=108* B. 1973 EU Action Programme on Environment. Please refer to: *http://www.environmentlaw.org.uk/rte.asp?id=108* **The limits to growth (1972)** Limits to Growth is a study about the future of our planet. It involved designing a computing model which took into account the relations between various global developments and produced computer simulations for alternative scenarios. Part of the modelling were different amounts of possibly available resources, different levels of agricultural productivity, birth control or environmental protection. **Source:** *http://www.clubofrome.org/?p=326* *http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED065302*	  **Option for India: Include slide from Module 1 Session 3 on "Background to ecosystem policy in India"**

Session 3

Introduction to policy trends

Facilitators' notes	Media/activity/handout guidance

Slide 45 (cont.) : 2 minutes

Brundtland Report (1987): original

Source:
United Nations,
http://www.un.org/esa/sustdev/csd/csd15/media/backgrounder_brundtland.pdf

Updated 20 years on, the Brundtland Report defined sustainable development and called for increased international cooperation.

Conventions, treaties, protocols, agreements…

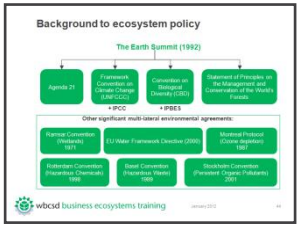
Over 250 multilateral environmental agreements exist – slide 3 shows just a few as examples.

The Earth Summit (1992) – start of 'The Rio Process'
http://www.un.org/geninfo/bp/enviro.html

Slide 46: <1 minute

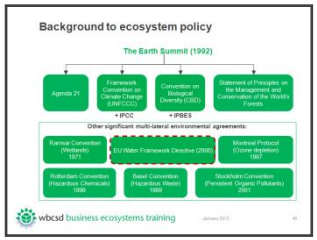
Instructions
Facilitator to show some of the policies that have been put in place since the Rio Earth Summit.

Facilitator to choose either the EU Water Framework Directive or the Convention on Biological Diversity as examples of a policy trend from issue recognition to mitigation, depending on audience.

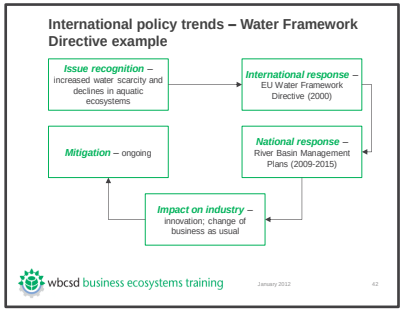


Session 3

Introduction to policy trends (cont.)

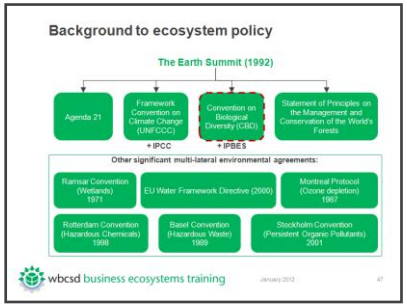
Facilitators' notes	Media/activity/handout guidance
Slide 47: 3 minutes **Facilitator to discuss the EU Water Framework Directive as an example of how issues are mitigated on an international policy level.** **Sources:** European Union Law: *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF* European Commission: *http://ec.europa.eu/environment/water/water-framework/info/intro_en.htm* **Issue recognition:** At the start of the 21st century, it became increasingly clear that water, a crucial natural resource that underlies all living systems, is in decline in terms of quality and quantity of usable, renewable sources. Some projections estimate that over half of the world's population will be living in Water Scarcity by 2025, and that the health of essential aquatic ecosystems is in much faster decline than had previously been thought. (*http://earthtrends.wri.org/text/water-resources/feature-17.html)* In the EU: "Waters in the [European Union] Community are under increasing pressure from the continuous growth in demand for sufficient quantities of good quality water for all purposes. On 10 November 1995, the European Environment Agency in its report 'Environment in the European Union 1995' presented an updated state of the environment report, confirming the need for action to protect Community waters in qualitative as well as in quantitative terms". (*http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF)*	 **International response:** "On 18 December 1995, the Council [responsible for evaluating the findings of the Environment in the EU 1995 paper] adopted conclusions requiring, inter alia, the drawing up of a new framework Directive establishing the basic principles of sustainable water policy in the European Union and inviting the Commission to come forward with a proposal". The EU Water Framework Directive was established in October 2000, and binds all European Union member states to improve the quality and quantity of all bodies of water (including marine waters up to 1 nautical mile off shore). It establishes the need for "economic analysis of water services based on long-term forecasts of supply and demand for water", and the valuation of the services provided by healthy water resources.

Introduction to policy trends (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 48: 2 minutes **Instructions:** **Facilitator to describe the process by which issues are mitigated on an international policy basis, using the EU WFD as an example.** **National response:** As a key requirement of the Water Framework Directive, all EU member states were obligated to disclose River Basin Management Plans by 2009. There have been significant delays in this process, so some are still in development. These plans set out strategic implementation plans for effective and sustainable management of water resources on a national basis. **Impact on industry:** Impacts on industries will be twofold: (i) companies that **impact** on the ecosystem services provided by freshwater bodies and coastal marine waters will be required to develop strategies to lower negative impacts; and (ii) companies that **depend** on the ecosystem services provided by freshwater bodies and coastal marine waters will be required to develop strategies for sustainable use. **Mitigation:** Mitigation of issues such as water scarcity require long-term solutions and policies such as the Water Framework Directive are in ongoing development.	

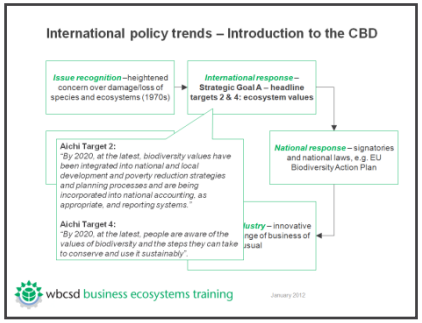
Session 3

Introduction to policy trends (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 49: 1 minute **Sources:** *United Nations: http://www.un.org/geninfo/bp/envirp2.html* WBCSD, *Responding to the Biodiversity Challenge* (2010), *http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=22&NoSearchContextKey=true* **Instructions: Introduction to the Convention on Biological Diversity** Facilitator to refer to source and present the Convention on Biological Diversity and its three objectives, briefly mentioning the headline and Aichi targets [see next slide]. The Convention on Biological Diversity (CBD) states that the ecosystem approach is a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way. This approach recognizes that humans, with their cultural diversity, are an integral component of many ecosystems. In order to implement the ecosystem approach, decision-makers need to understand the multiple effects on an ecosystem of any management or policy change. By way of analogy, decision-makers would not make a decision about financial policy in a country without examining the condition of the economic system, since information on the economy of a single sector such as manufacturing would be insufficient. The same need to examine the consequences of changes for multiple sectors applies to ecosystems. For instance, subsidies for fertilizer use may increase food production, but sound decisions also require information on whether the potential reduction in the harvests of downstream fisheries as a result of water quality degradation from the fertilizer runoff might outweigh those benefits.	

Session 3

Introduction to policy trends (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 50: 2 minutes **Source**: WBCSD, *CEV Helpdesk presentation* (2011), (WBCSD Members only: http://www.wbcsd.org/work-program/focus-areas/ecosystems/members-pages/conf-call-archives.aspx) **Instructions:** Facilitator to talk about the Nagoya protocol **Issue recognition:** heightened concern over damage/loss of species and ecosystems (1970s) **International response:** Convention on Biological Diversity established at UN 'Earth Summit' (Rio 1992); the 10th Conference of the Parties (COP 10) in **Nagoya 2010** set out the key objectives: 1. The conservation of biological diversity 2. The sustainable use of the components of biological diversity 3. The fair and equitable sharing of the benefits arising from the utilization of genetic resources Underlying these objectives are the 5 strategic goals, which dictate the 20 headline targets (Aichi targets for 2020). The protocol is open for signature between Feb 2011 and Feb 2012. **National response:** signatories translate these targets into national laws, e.g. EU Biodiversity Action Plan, Brazilian National Targets for Biodiversity, India National Biodiversity Action Plan, etc. Facilitator to briefly discuss one national response not used in previous modules. Full list available at: https://www.cbd.int/nbsap/about/targets/ **Example: Brazil** *"Brazil launched a national consultation to develop National Targets for Biodiversity on 8 April 2011. The initiative entitled "Dialogues on Biodiversity: building the Brazilian strategy for 2020" is meant to engage Brazilian society in a process to strengthen the implementation of the agreements reached at the 10th Conference of the Parties on Biological Diversity (CBD COP-10) which took place in October 2010 in Nagoya, Japan. "* **Source:** CBD, https://www.cbd.int/nbsap/about/targets/	 **Impact on Industry:** innovative solutions; change of business of usual. **Mitigation**: management and conservation of the impact of human activity on damage or loss of ecosystems/biodiversity is an ongoing issue. Facilitator to discuss strategic goal A and headline targets as examples of how the Nagoya Protocol introduces biodiversity/ecosystem valuation. **Strategic goal A – Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.** **Target 1** – By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably **Target 2** – By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Session 3

Introduction to policy trends (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 51-53: 5 minutes

Sources: India National Biodiversity Action Plan (2008)
http://nbaindia.org/uploaded/Biodiversityindia/NBAP.pdf

National Targets for Biodiversity 2012-2020 (2012),
http://nbaindia.org/uploaded/pdf/Strategic_Vison_tar.pdf

Instructions:

Facilitators to go through the National Biodiversity Action Plan and the National Biodiversity Targets currently (2012) being discussed in India.

For more background information about the Aichi Biodiversity Target, and the National Biodiversity Action Plan, refer to Module 1 facilitator Notes, Session 3.

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.

Currently (2012), the National Biodiversity Authority through the Ministry of Environment and Forests is undertaking a revision of National Biodiversity Action Plan and preparation of set of National Biodiversity Targets for the period 2012 – 2020. The below information is a draft prepared by the National Biodiversity Authority to seek inputs from relevant stakeholders on the revision of the Action Plan and the National Targets.

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.

Session 3

Introduction to policy trends (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 51-53: 5 minutes (cont.) **Sources**: India National Biodiversity Action Plan (2008) http://nbaindia.org/uploaded/Biodiversityindia/NBAP.pdf National Targets for Biodiversity 2012-2020 (2012), http://nbaindia.org/uploaded/pdf/Strategic_Vison_tar.pdf **Instructions (cont.):** Facilitators to go through the National Biodiversity Action Plan and the National Biodiversity Targets currently (2012) being discussed in India. For more background information about the Aichi Biodiversity Target, refer to Module 1 facilitator Notes, Session 3. **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. **Target 5** By 2020, achieve at least 5% increase in 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).

Time guidelines

Time guidelines	Time
Knowledge check – activity	**10 mins**

Session overview

The session will run by reminding the delegates of the session previously seen, followed up by a quick quiz of key concepts and terminology.

Session objective

Reinforce the explicit or implicit learning of the course, and provide an overview of the learning gaps in the group.

Session format

This session will be run by one course facilitator, who will talk through key concepts and definitions with delegates.

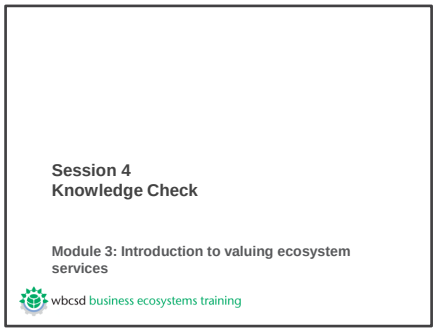
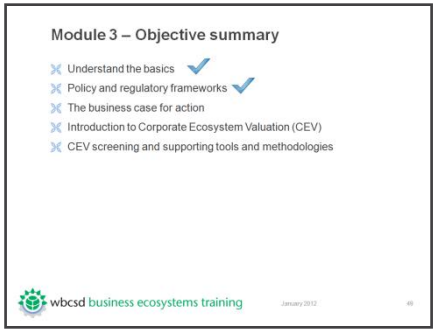
Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

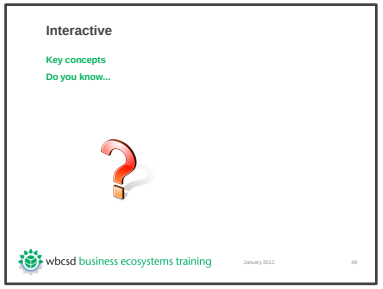
A glossary of terms used during the module will also be available in the course material desk pack.

Session 4

Knowledge check

Facilitators' notes	Media/activity/handout guidance
Slide 54: <1 minute **Objective:** knowledge check **Slide 55: 1 minute** **Total time for exercise:** 10 minutes **Instructions:** Facilitator to quickly review the key knowledge gained through the previous sessions (slide 49). Note to facilitator: do not stop to explain a specific concept, only list the sessions and the overall objective of each one. Gaps in knowledge should be identified after the delegates have responded to the "knowledge check" questions.	 

Knowledge check (cont.)

Facilitators' notes	Media/activity/handout
Slide 56: 8 minutes **Objective:** knowledge check **Instructions:** Facilitator will explain to delegates the purpose and approach used within the session. They will be asked a series of questions and individuals will write down their answers. Delegates asked to individually answer 5-6 questions on a piece of paper and discuss with the group during debrief. 1. Delegates will have a couple of minutes to answer the questions on a piece of paper 2. Facilitator to ask delegates to provide their answer 3. Facilitator will debrief and answer questions from delegates **Questions and Answers:** The facilitator should explore different types of answers and respond to question from delegates below. 1. **What is the difference between Public and Private Goods?** **Difference relates to excludability and consumption**. **Public goods** have two distinct aspects: non-excludability and non-rivalrous consumption. "Non-excludability" means that the cost of keeping non-payers from enjoying the benefits of the good or service is prohibitive. "Non-rivalrous consumption" means that a number of people can enjoy a resource at the same time (e.g., visiting a park without preventing another individual from visiting). **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. If there is competition between individuals to obtain the good and if consuming the good prevents someone else from consuming it, a good is considered a private good.	 2. **What is an externality?** An activity whose effects are not completely reflected in prices and market transactions. 3. **What is economic value?** Economic value is a measure of how much something (e.g. an ecosystem service) improves the wellbeing of an individual or of society as a whole. Instead of focusing only on direct commercial values, TEV also considers subsistence and non-market values, ecological functions and non-use benefits. 4. **What does 'direct /indirect use' mean?** **Direct use**: Raw materials and physical products that are used directly for production, consumption and sale. **Indirect use:** These include the ecological functions that maintain and protect natural and human systems through services.

Time guidelines

Time guidelines	Time
Identify the business case for valuing ecosystems – presentation and activity	**15 mins**

Session objective

Provide an overview of WBCSD CEV Building the Business Case and familiarize delegates with what it covers.

Session format

This session will be run by one course facilitator, who will talk through key concepts and definitions with delegates.

Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

A glossary of terms used during the module will also be available in the course material desk pack.

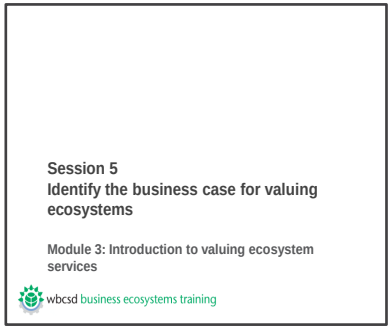
Session overview

This session focuses on exploring how to build the business case for Corporate Ecosystem Valuation within a company. It begins by reviewing business risks and opportunities covered by the framework.

It then moves to explaining how CEV can be used, and provides some examples.

Session 5

Identify the business case for valuing ecosystems

Facilitators' notes	Media/activity/handout guidance
Slide 57: <1 minute **Objective:** Overview of WBCSD CEV Building the Business Case - Review of business risks and opportunities framework. - Contrast against uses of Corporate Ecosystem valuation. - Introduce scoping and prioritisation framework. - Identify the business case on dependencies, include regulatory issues. **Total time for presentation:** 15 minutes presentation slides I**ntroduction:** This section of the module explores building a business case for Corporate Ecosystem Valuation within a company. The aim is to highlight the key considerations that will influence a company's decision whether to undertake CEV or not. The session is designed to be presented in 15 minutes, it is followed by a short Question & Answer exercise for delegates to share their experiences and thoughts around building a business case for ecosystem valuation. **Instructions:** The facilitators should read the content of this document thoroughly before the training to ensure that they are familiar with the terminology and can deliver clear messages. The facilitators should also prepare examples to illustrate the content, preferably tailored to the specific business context of the delegates.	

Session 5

Identify the business case for valuing ecosystems

Facilitators' notes	Media/activity/handout guidance

Slide 58: 1 minute (3 minutes if stand alone)

Instructions:

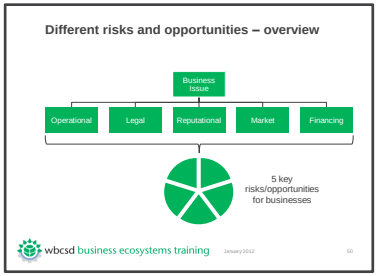
Facilitator briefly recap the 5 key business risks/opportunities.

Slide 59: 1-3 minutes - If following Module 1, read only the bold as quick recap. If Module 3 is being presented on its own, read full description with examples.

Recap: the business case for action

Facilitator to recap the key consequences of inaction, introduced in module 1, including one example of how a company has addressed this. Facilitator may wish to make the session interactive, asking delegates to describe risks/opportunities.

Sources:
WBCSD, *Guide to CEV – Detailed Presentation* (April 2011), *http://www.wbcsd.org/work-program/ecosystems/cev/downloads.aspx*
Examples from WRI: *http://www.wri.org/project/ecosystem-services-review/tools*

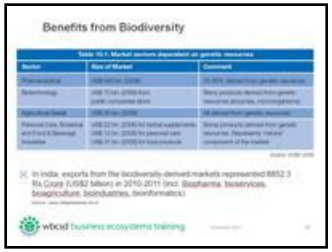


- **Operational risks: relate to a company's day-to-day activities, expenditures and processes. Risks may be having to pay more for ecosystem dependencies such as water, and for environmental externalities.** For example, Dow uses household wastewater on its Terneuzen industrial site in The Netherlands, which not only allows water to be re-used three times but also saves energy and chemicals previously used for water treatment.
- **Regulatory risks: include government policies, laws, and court actions.** For example, Mondi, an integrated paper and packaging producer, is leading a multi-stakeholder program in South Africa to help restore wetlands, incl. by lobbying for policy changes – even if this means the loss of commercial forests, it helps preserve all of its operations that highly dependent on water availability.
- **Reputational risks: affect a company's brand, image, "goodwill" and relationships with their customers and other stakeholders**. For example, in 2008, Unilever's CEO announced that all Unilever's palm oil will be certified sustainable by 2015. Before this announcement, Unilever had been targeted by pressure group Greenpeace as part of a campaign to highlight the environmental impact of the global increase in demand for palm oil. Unilever buys about 1.6 million tons of palm oil each year so this is a significant commitment.

Identify the business case for valuing ecosystems

Facilitators' notes	Media/activity/handout guidance
Slide 59: 1-3 minutes (cont.) • **Market risks: relate to product and service offerings, consumer preferences, and other market factors that affect corporate performance.** For example, Henkel's eco-friendly "Terra" cleaners and detergents use active ingredients that are based predominantly on plant-derived raw materials rather than petrochemicals. Car manufacturers developing hybrid cars are another example. US organic food sales are growing at 3 times the rate of the food sector • **Financing risks: affect the cost and availability of capital to companies.** For example, project finance loans can only be received if the company complies with the 'Equator Principles' and the underlying IFC biodiversity performance standards or a bank's own biodiversity policies. ChevronTexaco received approval in 2005 to convert a tapped-out drilling site in Louisiana into a 2,800-hectare wetland to generate credits for the U.S. wetland mitigation banking market – the company could earn more than $150 million selling the credits to developers. Rabobank has specific requirements regarding impacts on biodiversity for palm oil and soya (ref. TEEB for Business).	

Identify the business case for valuing ecosystems

Facilitators' notes	Media/activity/handout guidance
Slide 60: 1 minute (cont.) **Sources:** *TEEB for National and International Policy Makers,* (2010), http://www.teebweb.org/national-and-international-policy-making-report/ Ministry of External Affairs, Government of India, http://www.indiainbusiness.nic.in/ **Instructions:** Facilitator to present the contents of the two slides, that demonstrate the direct economic benefits that business gets from biodiversity • The table in the slide gives examples for market sectors dependent on genetic resources. We have not yet identified – let alone utilized – the full range of ecosystems services potentially available. • Many more economic sectors than we realise depend on natural capital. We can all appreciate the importance of healthy biodiversity and ecosystems for primary production like agriculture, forestry and fisheries. Yet natural capital also contributes significantly to manufacturing and the service economy. Source: TEEB report • 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.indiainbusiness.nic.in	

Session 5

Identify the business case for valuing ecosystems

Facilitators' notes	Media/activity/handout guidance
Slide 61: 2 minutes **Sources:** WBCSD, *Corporate Ecosystems Valuation – Building the Business Case* p6, *http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13554* WBCSD, *Guide to Corporate Ecosystem Valuation – Detailed Presentation (*April 2011) p6 **Instructions:** Facilitator to talk through slide supported by background notes below. This slide highlights the economic impacts that the degradation of ecosystem services can have. The Facilitator should be aware that TEEB was introduced already within session 2. **Background:** Ecosystem service degradation is not just a biological or ecological problem. It also has serious economic consequences – for all industries, sectors and social groups. Just over a decade ago, one of the first attempts was made, by 13 environmental economists, to value the world's ecosystem services. The results, which were published in an article in the scientific journal Nature, argued that the world's ecosystem services were worth some US$33 trillion a year (Constanza et al.) – a figure that was then almost twice as high as global gross domestic product (GDP). In contrast, the TEEB interim report calculated that the degradation of biodiversity & ecosystems, due to deforestation, means that each year the world loses natural capital worth between €1.35 trillion and €3.10 trillion (US$1.9 trillion and US$4.5 trillion). **Sources:** The Economics of Ecosystems & Biodiversity (TEEB) study demonstrated the huge value of biodiversity & ecosystem services lost each year. (reference to TEEB for Business report: *http://www.teebweb.org/LinkClick.aspx?fileticket=ubcryE0OUbw%3D*	 It is hard to imagine what these big numbers represent, so examples are provided: • **Loss due to deforestation: €1.35 trillion**/year, which is approximately the same as the total GDP of a country like the UK or France *(reference: http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx This provides a list of countries' **gross domestic product (GDP)** (the value of all final goods and services produced within a nation in a given year). The GDP dollar estimates given are derived from purchasing power parity (PPP) calculations.)* • **Contribution of insect pollination to agriculture outputs: US$190 billion**/year, which is approximately 8 times Walmart's operating income in 2010 (US$24 billion). **Source:** *http://walmartstores.com/sites/annualreport/2010/*

Session 5

Identify the business case for valuing ecosystems

Facilitators' notes	Media/activity/handout guidance

Slide 62-63: 2 minutes

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

TEEB, *Mainstreaming the Economics of Nature, A synthesis of the approach, conclusions and recommendations of TEEB (2010),* http://www.teebweb.org/wp-content/uploads/Study%20and%20Reports/Reports/Synthesis%20report/TEEB%20Synthesis%20Report%202010.pdf

Instructions:

Facilitator to talk through slide supported by background notes below. This slide highlights the cost of resource degradation and values provided by forests in India.

Background (slide 62)

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)

The replacement cost method has been used. This method works on the assumption that society needs to incur resource (costs) to bring back the ecological attributes of the natural resources from the polluted state to the non-polluted state (acceptable level).

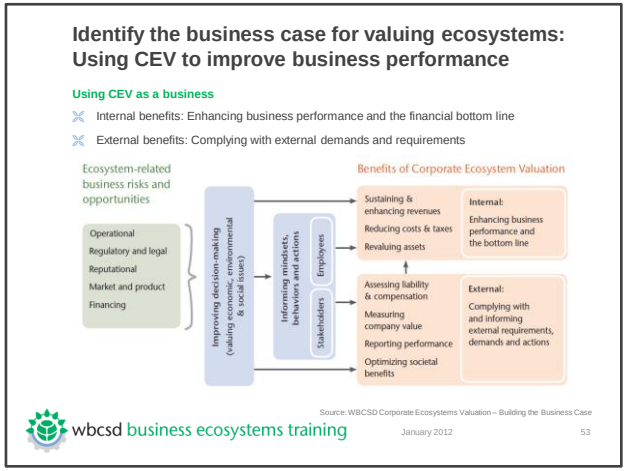
What are ecosystems services worth?

- 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). Includes value for nutrient loss, value for water recharge and flood benefits.

Background (slide 63):

- From TEEB: poorer households, in particular in rural areas, face disproportionate losses from the depletion of natural capital due to their relatively high dependence on certain ecosystem services for income and insurance against hard times. Biodiversity conservation and sustainable management of ecosystems should be key elements in strategies to eliminate poverty, contribute to internationally-agreed objectives, such as the Millennium Development Goals, as well as a target for poverty reduction policies at national and local levels
- An important finding of many studies reviewed by TEEB is the contribution of forests and other ecosystems to the livelihoods of poor rural households, and therefore the significant potential for conservation efforts to contribute to poverty reduction. For example, it has been estimated that ecosystem services and other non-marketed goods account for between 47% and 89% of the so-called 'GDP of the poor' (i.e. the effective GDP or total source of livelihood of rural and forest-dwelling poor households), whereas in national GDP agriculture, forestry and fisheries account for only 6% to 17% (see table in presentation slide)

Identify the business case for valuing ecosystems (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 64: 3 minutes **Sources:** WBCSD, *Corporate Ecosystems Valuation – Building the Business Case* pp. 9-12, http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13554 WBCSD, *Guide to Corporate Ecosystem Valuation*, p.21 **Instructions:** Facilitator to talk through the slide using the background notes below as context. The next page has optional additional background material around specific categories of business benefits that may be gained by using CEV. This additional information is required reading for the facilitator to understand the content of this slide. However the facilitator may wish to draw upon this additional material during the presentation to highlight one additional example. **Background:** The aim of corporate ecosystem valuation is to identify the ways in which businesses can better secure the operational, regulatory and legal, reputational, market and product, and financing opportunities afforded by ecosystem services, and more effectively avoid or mitigate the risks. These opportunities and risks, and the use of corporate ecosystem valuation, relate both to enhancing business performance and the financial bottom line, as well as to complying with external demands and requirements. Corporate ecosystem valuation can provide an important source of decision-support information for internal management planning – identifying ways to capture new income streams, saving costs, reducing taxes, sustaining revenues or revaluing company assets, for example.	 It also generates data that can assist businesses in assessing, complying with and reporting on the external requirements and demands that are placed on them by governments, regulators, shareholders, customers and the general public – such as assessing liability and compensation (including environmental offsets and credits), measuring company value and share price and reporting on performance.

Identify the business case for valuing ecosystems (cont.)

Facilitators' notes

Slide 64: 3 minutes (cont.)

Capturing and pricing new income streams: Corporate ecosystem valuation can help to identify opportunities for businesses by diversifying their product and customer base.

- Carbon credits, biodiversity offsets, payments for watershed services, nature-based recreation and eco-labelling or certification have all emerged as lucrative markets over recent years.
- Corporate ecosystem valuation provides a tool for informing the development of new markets/products, assessing how much ecosystem services are worth, and determining at what levels they might be priced or sold by the company and whether the returns are sufficiently high to warrant investing in market or product diversification.

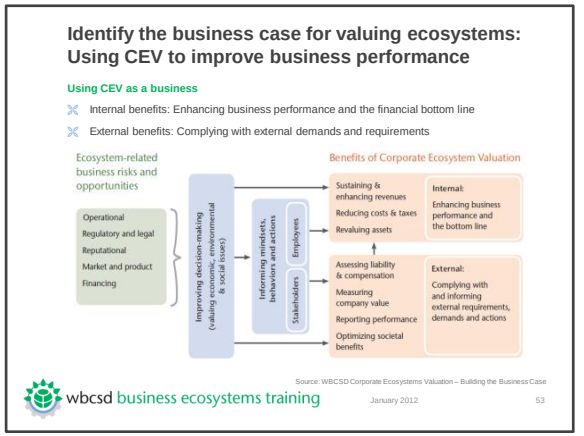
Saving costs: Corporate ecosystem valuation can identify ways to reduce costs and expenditures.

- Investing in securing ecosystem services such as water regulation, waste treatment and natural hazard regulation can generate considerable cost savings and avoided expenditures for businesses.

Measuring company value and share value: Corporate ecosystem valuation can improve how companies and their shares are being valued by external sources.

- Traditionally, environmental performance indicators have not been included when measuring a company's value. However where good environmental performance is generating clear benefits for the company or society, including these impacts can make a substantial difference to measures of company and share value.

Reporting performance: Corporate ecosystem valuation can allow for certain aspects of a company's environmental performance (i.e. its impacts on ecosystem services or resource/energy use efficiencies) to be measured in financial terms.



Reducing taxes: Corporate ecosystem valuation may identify opportunities to reduce a company's tax burden.

- In some countries companies may be eligible for tax relief or preferential tax rates when they own assets that generate ecosystem services, or choose to carry out their business in ways that generate broader social benefits for environmental reasons (for example conserving important biodiversity, using resources and energy efficiently or avoiding pollution).
- For example, in the US, Allegheny Power, an electric utility company, made use of a "bargain sale" provision in the federal tax code to claim a property's environmental value as a charitable contribution in connection with a sale, resulting in significant tax-related savings.

Identify the business case for valuing ecosystems (cont.)

Facilitators' notes

Slide 64: 3 minutes (cont.)

Sustaining revenues: Corporate ecosystem valuation can assess the monetary benefits of investing in ecosystem conservation and show how revenues can be sustained over the longer term.

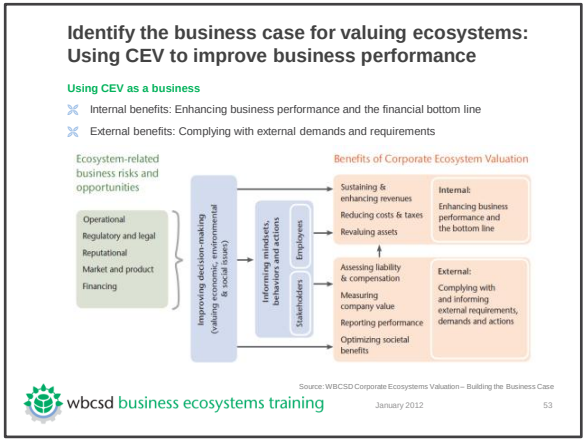
- Ecosystem services such as forest erosion control, for example, help to avoid reservoir siltation, while shoreline protection and flood attenuation assist in safeguarding buildings and other infrastructure.

Revaluing assets: Corporate ecosystem valuation is a way of more accurately valuing company assets.

- Traditionally, ecosystems are not considered to be part of a company's asset register, even though in many cases they constitute a valuable stock of natural capital and generate substantial income flows and returns on investment.

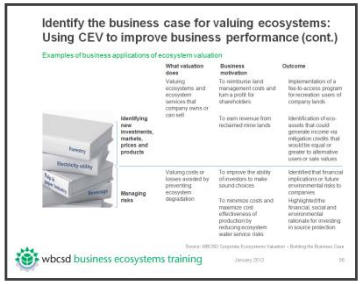
Assessing liability and compensation: Corporate ecosystem valuation can quantify in monetary terms a company's ecosystem impacts, thereby assessing its liabilities.

- As environmental regulations become evermore stringent, companies face an increasing array of penalties, fines and compensation claims when their operations damage ecosystems.
- Corporate ecosystem valuation provides a means for businesses to calculate the monetary risks of environmental harm when they are appraising projects and investments (for example as part of more conventional cost-benefit analysis, natural resource damages assessment, environmental and social impact assessment and strategic environmental assessment procedures).



Session 5

Identify the business case for valuing ecosystems (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 65-67: 9 minutes **Source:** WBCSD, *Corporate Ecosystems Valuation – Building the Business Case* p11-12 http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13554 **Instructions** These slides provides examples for how Corporate Ecosystem Valuation may be applied in a business context, using a range of sectors to illustrate the issue. - The facilitator should pick a selection of examples from the slides to talk through. If possible, the facilitator should prepare a hypothetical or real-life example of their own to further elaborate for the delegates.	  

Time guidelines

Time guidelines	Time
Knowledge share – activity	**15 mins**

Session overview

The session will draw on the previous sessions and aim to build on delegates previous experience within the field (this is expected to be limited –hence the short timeframe for this activity).

Session objective

Reinforce the explicit or implicit learning of the course, and provide an opportunity to address questions relating to specific experiences with valuation in the group.

Session format

This session will be run by one course facilitator, who will chair the questions and help to facilitate discussion.

Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

A glossary of terms used during the module will also be available in the course material desk pack.

Session 6

Knowledge share – business case for valuing ecosystems

Facilitators' notes	Media/activity/handout guidance
Slide 68: <1 minute **Objective:** knowledge share Q & A session **Total time for exercise:** 15 minutes **Introduction:** This section of the module explores the challenges and realities of building a business case for Corporate Ecosystem Valuation within a company. The aim is to share experiences between the delegates and translate the business case theory that was covered in the previous module into a more tangible situation to help absorb the information. The session is designed to be an interactive Question & Answer with delegates sharing their questions and answers or asking technical questions 15 minutes. **[Facilitator to focus on the benefits of accounting for ecosystems within business decision making.]**	

Session 6

Knowledge share – business case for valuing ecosystems (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 69-71: 5 minutes

Recap the risks and opportunities displayed on the slides

OPTION1: Slide 72: 10 minutes following the recap

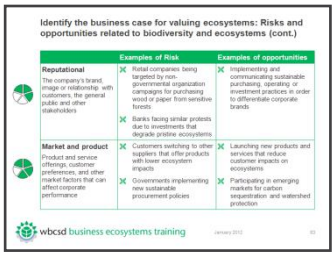
Instructions:

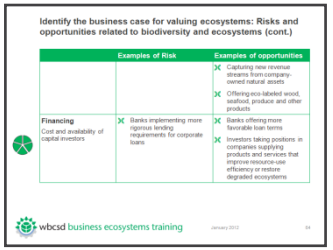
Facilitator to use this opportunity for the group to ask technical questions. If delegates are struggling to answer the question, the following prompts could be used:

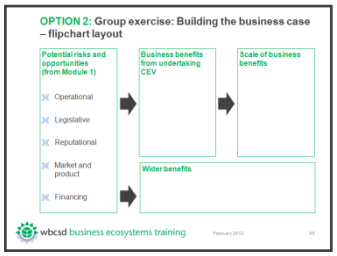
- Take a vote (raise hands) for which category of risk/opportunity is most relevant to the delegates in terms of their employers,
- Facilitator to ask delegates to consider how their own company might be affected by specific risks and opportunities.
- Take a vote (raise hands) for whether ecosystem change presents more of a risk or an opportunity
- Facilitator to ask why so?
- Facilitator to ask are there differences between different industries (find out what industries delegates represent)? Why?
- Facilitator to ask whether the risks, opportunities and business benefits of CEV differ between different operations/countries? Why?

OPTION 2: Slide 73: 5 minutes + 10 minutes feedback

[Flip chart option: facilitator to give groups 5 minutes to consider the risks and opportunities for one company, the business benefits, wider benefits and so on. These should be noted on the flip chart and then discussed during the feedback session with all groups.]







Facilitator to identify additional reading material of interest (from main reference list).

If questions overrun, take further discussions offline

Materials – the slide 64 should be left on the overhead projector to prompt conversation – it can also be printed as a wall chart.

Coffee

30 min.

Time guidelines

Time guidelines	Time
Brief introduction to Corporate Ecosystem Valuation (CEV) – presentation.	**30 mins**

Session objective

Overview of CEV guide and the description of its stages.

Session format

This session will be run by one course facilitator, who will talk through key concepts and definitions with delegates.

Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

Session overview

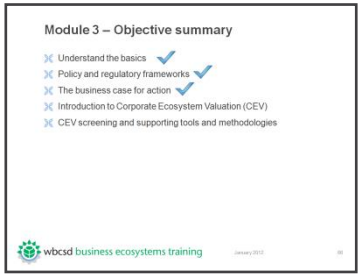
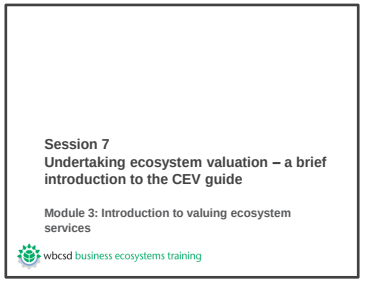
This session delivers a comprehensive look at what CEV covers, and how the guide is outlined in stages.

The session starts by explaining what CEV is and sets out clearly when delegates can use the guide.

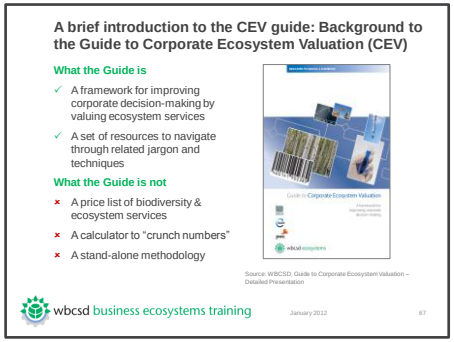
The session explains the different stages that CEV uses for valuing ecosystem services.

Session 7

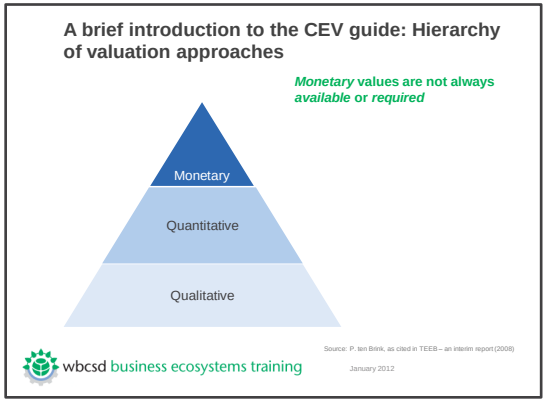
Brief introduction to Corporate Ecosystem Valuation (CEV)

Facilitators' notes	Media/activity/handout guidance
Slide 75: <1 minute Recap: Facilitator to recap what has been covered in the module so far **Slide 76: 1 minute read the introduction** **Objective:** Overview of CEV guide, the phases of CEV are described **Total time for presentation:** 15 minutes **Slide 77: 1 minute** **Introduction:** This section of the module gives a brief introduction to the WBCSD Corporate Ecosystem Valuation guide. The aim is to highlight the key features of the CEV approach so that the delegates understand what is involved and how the approach might apply (or not) to their operations. The session is designed to be presented in 15 minutes, it is followed by a 30 minute exercise to demonstrate the CEV methodology in action through a case study. Therefore it is critical that this is viewed as a high level overview of the CEV guide, not a detailed review of the methodology. **Instructions:** The facilitator should position this session as a high level review, this course is designed to make delegates aware of valuation and to determine whether they need to use it but not be a substitute for full training in environmental economics. This will manage delegate expectations and help the facilitator to keep to time (as delegates will be less likely to request additional information and take the discussion to a greater level of detail).	  

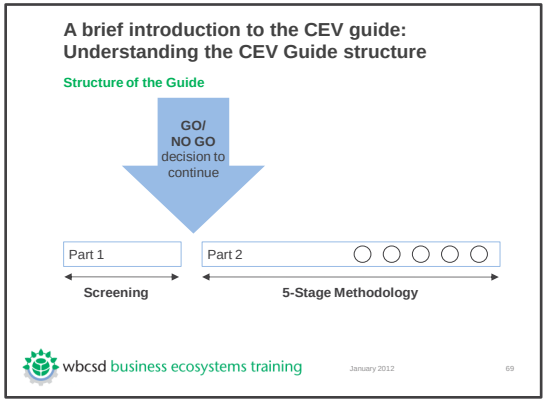
Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 78: 2 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation – Detailed Presentation* (April 2011), p15 http://www.wbcsd.org/work-program/ecosystems/cev/downloads.aspx **Instructions:** The facilitator should introduce the guide and focus delegates on what it is specifically designed for. For example, many delegates may hope for an "off-the-shelf" solution for ecosystem valuation. Unfortunately there is no 'one size fits all' where valuation is concerned, so the guide is designed to be a framework and set of resources that will help companies to undertake their own ecosystem valuation, tailored to their unique situation. For the last point (the Guide is not a stand-alone methodology) it is meant that the guide is complementary to other business tools (e.g. Environmental and Social Impact Assessment tools (ESIAs) or Life-Cycle Analysis tools (LCAs)). See "In summary" slide notes for more information on linkages. Complementary tools are discussed further in **Session 10**.	

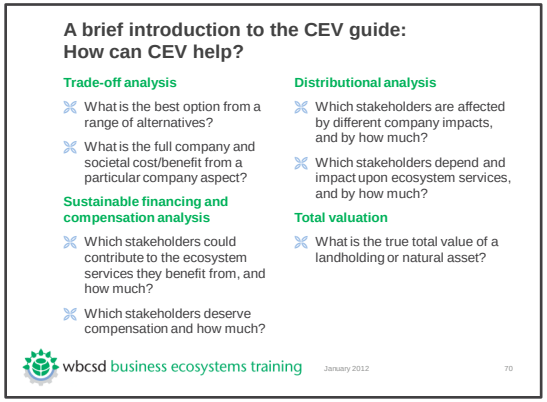
Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 79: 2 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation – Detailed Presentation* (April 2011), p15 **Instructions:** The facilitator should highlight the hierarchy of valuation approaches to delegates, as this underpins the CEV methodology. **Background** It is a common misconception that valuation must be expressed in terms of money (£X, $X etc.). The valuation methodology must be flexible to account for situations where monetary values cannot be calculated or are not required. CEV should generally begin with a qualitative assessment, then a quantitative and monetary approach if appropriate. Some situations might only require qualitative or quantitative assessments to inform the business decision to be made. However, monetary valuation does provide a particularly important means of aggregating, comparing and communicating different ecosystem service values. **Different approaches and methods** Imagine how a business impact could reduce the productivity of a lake fishery affecting revenues or local people. - A qualitative review may represent low, medium or high loss of value.	 - A quantitative assessment may say there was a reduction of 25% in fish caught by 40 fishermen. - A monetary valuation would say this resulted in losses of US$20,000/year. Even though monetary values are particularly powerful for decision making and communicating, they are not always necessary, or in fact available (not all ecosystem services have associated monetary values).

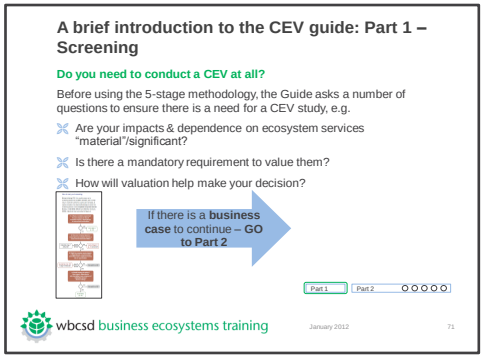
Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 80: 1 minute **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation – Detailed Presentation* (April 2011), p17 **Background** Following the hierarchy of evaluation approaches, the CEV guide is separated into two parts: an initial screening procedure to determine whether CEV is appropriate for the company/situation, followed by a 5-stage methodology to undertake the valuation. The GO/NO GO decision is perhaps the most important stage within the CEV guide. Correctly identifying whether CEV is appropriate is crucial to ensure that your time and resources are spent most effectively. An ideal methodology to assist/complement this screening process is the Corporate Ecosystem Services Review covered in module 2, (WRI, WBCSD and Meridian Institute, 2008). The CEV guide provides a decision tree (illustrated in the next slide) to help guide companies through the GO/NO GO decision process. The screening process is examined in more detail during a group exercise later in this course.	

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

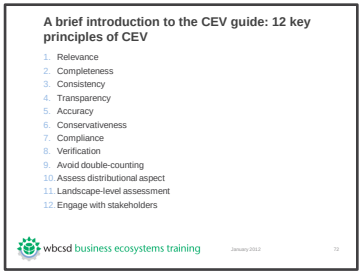
Facilitators' notes	Media/activity/handout guidance
Slide 81: 2 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation – Detailed Presentation* (April 2011), p24 **Background** There are four generic applications of CEV in business decision-making which have, in turn, been used in different ways by the CEV road testers. They can also be used in combination. *How can CEV help?* **Trade-off analysis** can assess the net financial and economic costs and benefits associated with different impacts to ecosystems caused by an intervention. This application is useful for impact assessments, option appraisals, pricing products, etc. **Total valuation** can determine the total value in terms of the flow of financial and economic benefits that ecosystems contribute to a business and society. This application is useful for asset revaluations, land management and risk assessments. **Distributional analysis** can identify the extent to which stakeholders depend and impact upon ecosystem services. This application is useful for determining winners and losers from any intervention, and for equitability, liability/compensation, practical and incentive-related reasons. **Sustainable financing and compensation analysis** can help identify ways a business can develop new or enhanced revenue streams and best compensate stakeholders in relation to ecosystem service dependencies and impacts. This application is useful for enhancing revenues and evaluating compensation claims.	 *Can CEV support existing company analytical approaches?* CEV aims to generate information that can be integrated into existing corporate planning and analysis processes. It essentially provides businesses with a more complete set of information (on ecosystem costs and benefits).

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 82: 1 minute **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation – Detailed Presentation* (April 2011), p17 **Note** Slide 2 shows the decision tree included as part of the CEV to aid the screening process, we will step through this in detail in an exercise during the next session. The facilitator should discuss with the group what constraints might prevent undertaking a CEV, i.e. budget, time, lack of evidence in addition to the main points below. The facilitator should highlight that an exercise will be used to help them consider these points later in the module. Main questions include: - Is there a mandatory requirement for reporting? - Does the company depend or impact upon ecosystem services or cause any environmental/social externalities? - Might these dependencies/impacts result in significant business risks? - Would knowing the value of these dependencies/impacts aid decision making?	

Session 7

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 83: 3 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011), p32 http://www.wbcsd.org/pages/adm/download.aspx?id=253&objecttypeid=7 **Instructions:** Facilitator should step through main points from the slide **Background:** Key principles for CEV 1. Relevance: Use data, methods, criteria and assumptions appropriate for the intended valuation and that meet the expectations and requirements of its intended users. 2. Completeness: Consider all potential ecosystem services affected in terms of both dependencies and impacts. The CEV should focus on the most significant and readily monetized values, and highlight other ecosystem services not monetized. 3. Consistency: Use data, methods, criteria and assumptions that allow for meaningful and valid comparisons. If monetary values are drawn from previous studies, they should be updated to current values using appropriate conversion factors. 4. Transparency: Provide clear and sufficient information for reviewers to assess the credibility and reliability of the valuations, particularly in relation to values and assumptions used. 5. Accuracy: Identify and reduce potential biases wherever possible. Do not give a false impression of accuracy by stating values at an unwarranted level of precision. Apply sensitivity analysis to illustrate residual uncertainty in values, and ensure that data and assumptions (especially bio-physical relationships) are "fit for purpose".	 6. Conservativeness: Use conservative assumptions, values, and methodologies when uncertainty is high and the cost of overcoming the uncertainty is disproportionately high. 7. Compliance: Ensure, where appropriate, that relevant national and international legislation and guidelines are adhered to. 8. Verification: Where possible, use participatory processes to elicit stakeholder values and preferences. If the results are to be relied upon externally, formal independent external verification of the process and values is advisable. 9. Avoid double-counting: Ensure that no values are included more than once, for example, as a result of applying multiple valuation techniques. 10. Assess distributional aspects: Identify who the winners and losers are in terms of different stakeholders affected. Where appropriate, highlight where the values arise on a spatial and temporal basis.

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes

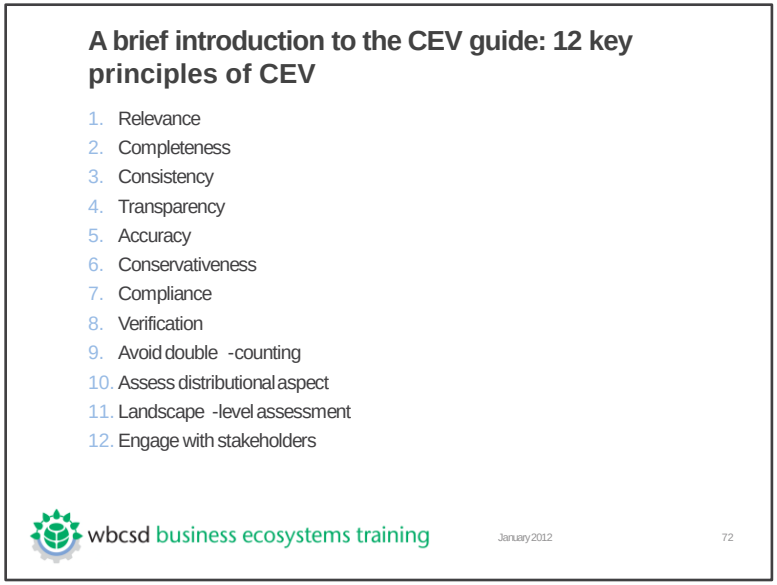
Slide 83: 3 minutes (cont.)

Source: WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011), p32
http://www.wbcsd.org/pages/adm/download.aspx?id=253&objecttypeid=7

Background

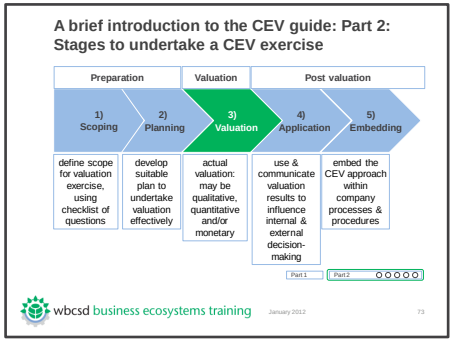
Key principles for CEV

11. Landscape-level assessment: CEV should be conducted at a "landscape level". This means issues of "connectivity" (i.e. interactions) between surrounding ecosystems, habitats and species, as well as landscape level impacts, should be taken into account.
12. Engage with stakeholders: Some degree of stakeholder engagement should ideally be undertaken throughout the CEV process, especially where external buy-in is essential for the intended outcome. Where the CEV may be sensitive, for internal purposes only or just used at a high level, stakeholder engagement may be more limited.

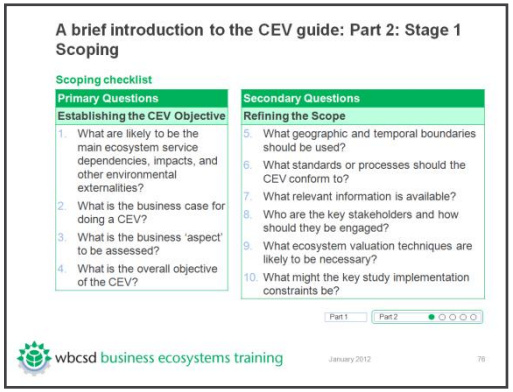


Session 7

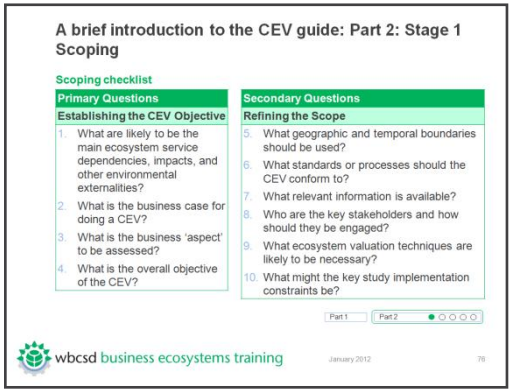
Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 84: 3 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation – Detailed Presentation (*April 2011), p18 **Instructions:** Facilitator to give a high-level overview of Part 2 and the CEV stages (see below). **Part 2 – Summary** Once the GO/NO GO decision has been taken. The methodology for undertaking ecosystem valuation is split into 5 key stages: **Stage 1 – Scoping:** This stage helps a company define the scope for the valuation exercise, using a checklist of questions. Only brief responses are required, and the process may involve numerous iterations. **Stage 2 – Planning:** This stage develops a suitable plan to undertake the valuation effectively. The plan should be more specific in terms of detail as compared to stage 1. **Stage 3 – Valuation:** This stage involves the actual valuation, which may be qualitative, quantitative and/or monetary. It begins by fully defining the company aspect to be valued, and ends up with subjecting the results to a sensitivity analysis. This is the most technical stage and is structured around 9 steps. **Stage 4 – Application:** This stage involves companies using and communicating the valuation results to influence internal and external decision-making. **Stage 5 – Embedding:** The final stage is to embed the CEV approach within company processes and procedures.	

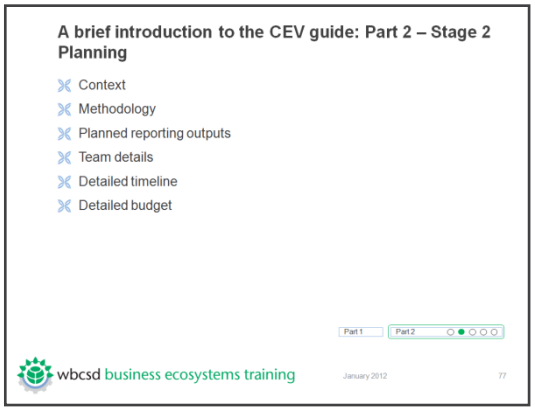
Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 85: 5 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011), pp34-36 http://www.wbcsd.org/pages/adm/download.aspx?id=253&objecttypeid=7 **Instructions:** Facilitator to walk through the scoping stage (see note below), only the scoping stage of the CEV is covered in detail as this module is a primer for economic valuation. **Scoping Stage:** The aim of the scoping stage is to determine the objective and scope of the CEV study, using a checklist of key questions. It involves developing a reasonably well-defined context, business case and scope for the valuation. This stage is equivalent to – or could be used for – preparing project documents such as concept notes, terms of reference or requests for proposals. If required, it could also be used to develop a strong business case to secure internal support and funding to conduct the CEV. The scoping checklist is comprised of ten main questions (included in slide). **There is no right or wrong way to complete the checklist. None of the questions are mandatory, and only brief responses are required at this stage.** Greater detail will, however, be needed on all these issues at the subsequent planning and valuation stages.	

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

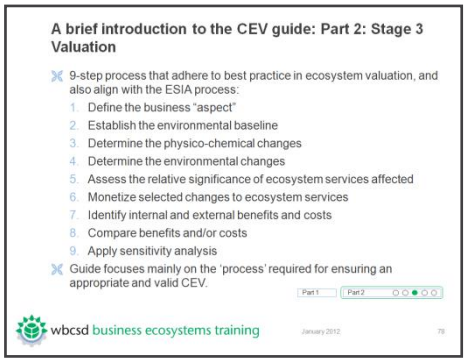
Facilitators' notes	Media/activity/handout guidance
Slide 85: 5 minutes (cont.) **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011), pp43-44 http://www.wbcsd.org/pages/adm/download.aspx?id=253&objecttypeid=7 **Helpful hints** The scoping stage is often an iterative process which involves several meetings and brainstorming sessions among a group of people. Involve someone with experience undertaking similar applied ecosystem valuation studies to help with the scoping, otherwise it could take a great deal of time and might fail to be accomplished. Where existing data availability for the site is uncertain, it may be advisable to undertake or commission a scoping study to help answer the scoping questions (and possibly complete stage 2 as well). Don't be too ambitious with the overall scope. Focus on one product or project to begin with, and use the questions to refine the scope to something achievable. An alternative approach is to do a high-level review of values (probably qualitatively) for a portfolio of products or projects to help prioritize actions, or to target more detailed valuation studies. If the scope of the valuation exercise is still a little uncertain, a flexible plan may be best. A provisional plan may be developed and modified as the study progresses. Alternatively, a scoping study could be undertaken. This could investigate the data available, prioritize the ecosystem services affected, assess alternative valuation methodologies and costs, and propose a way forward.	

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

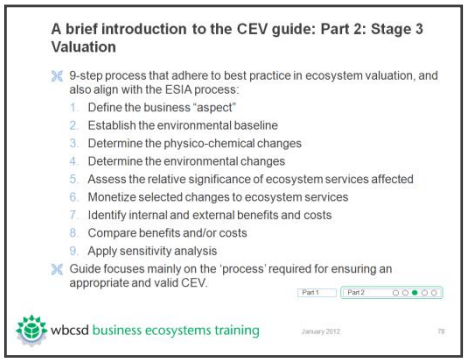
Facilitators' notes	Media/activity/handout guidance
Slide 86: 2 minutes **Sources:** WBCSD, Guide to Corporate Ecosystem Valuation pp43-45. WBCSD, Guide to CEV – long and detail presentation pp.22 **Instructions:** Facilitator to step through the main points on the slide **Background:** **Planning Stage** This stage involves developing a plan for undertaking ecosystem valuation. It elaborates how the valuation will be carried out, and specifies the time-frame, staff responsibilities and other planning parameters. Investing time in planning and anticipating how the valuation will actually be implemented should ensure a more timely and cost-effective outcome. The plan may be formulated internally. However, requesting an external organization (e.g. consultant, academic or NGO) to submit a plan or proposal can be effective, especially when done in conjunction with the company. **Context**: The context for the study should include, most importantly, the overall objective of the CEV. Other elements defined in the scoping stage can also be referenced here, including the business aspect and location of the study, as well as any internal or external processes or policies that the results will be fed into. **Methodology:** This section should provide details of the proposed valuation methodology. For example, it should describe how and by whom consultation and data collection will be undertaken, identify site visits and surveys that will be required, outline which valuation techniques will be used, and lay out how results will be analyzed. **Planned reporting outputs:** While defining the types of outputs to be produced, it should also identify internal or external reporting processes that the results should be aligned with, and highlight the stakeholders and audience for the analysis.	 Additional deliverable output, such as maps and GIS, should also be identified. **Team details:** The plan should provide details of the valuation team, clearly specifying their roles and responsibilities in relation to managing, carrying out, reporting on and responding to the CEV. Where external experts or organizations are involved, it may be necessary to develop a plan for cooperation and interaction. It is advisable to prepare brief Terms of Reference for key team members and, if required, contracts or agreements with external delegates. **Detailed timeline:** It is useful to set out a reasonably detailed timeline for the CEV, by using, for example, a Gantt chart. This should specify key milestones in data collection, analysis, reporting and communication. The timeline helps to clarify which deliverables are required, and when. **Detailed budget:** The budget for the CEV study should include all the basic input and cost elements that are required to carry it out, such as staff-time, external consultants, meetings, travel, publications and other items.

Session 7

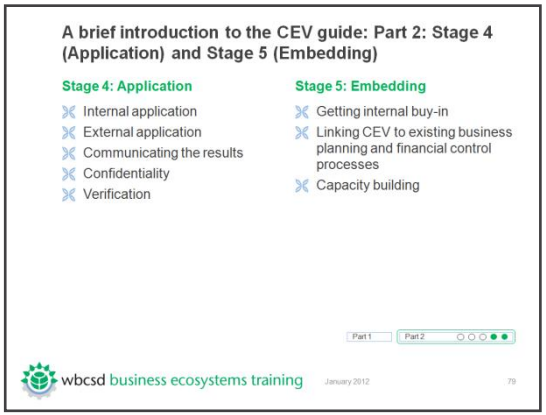
Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 87: 3 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011), pp47-48 http://www.wbcsd.org/pages/adm/download.aspx?id=253&objecttypeid=7 **Instructions:** Facilitator to step through the main points on the slide **Background:** **Valuation Stage** This stage involves undertaking the valuation itself, via a nine-step process. The steps adhere to best practice in ecosystem valuation, and also align with the ESIA process. The guidance provided focuses mainly on the "process" required for ensuring an appropriate and valid CEV. The nine steps involved in ecosystem valuation are summarized below. Although companies are encouraged to work through the complete nine-step process, this may not be necessary in all cases, given the broad range of potential CEV applications and ways of undertaking ecosystem valuation. 1. Define the business "aspect": Describe the key features of the company aspect to be valued. This is effectively the "with" scenario being valued. Also identify any other "alternative" scenarios (i.e. options) to be valued. 2. Establish the environmental baseline: Establish the environmental baseline conditions under the "without" or "do nothing" scenario. Identify the relevant ecosystems and determine the status of habitats, species, ecosystem services and associated stakeholders. For carbon and Other Environmental Externalities (OEEs), give details of existing baseline emissions.	 3. Determine the physico-chemical changes: Identify and quantify the relevant physico-chemical changes resulting from the company aspect (e.g. emissions, discharges and land-take). For carbon and OEEs, state the changes in emission levels between the scenarios. 4. Determine the environmental changes: Detail the changes in conditions in terms of quantity and quality of the relevant ecosystems (i.e. habitats and species). For carbon and OEEs, refer to the value transfers being used. 5. Assess the relative significance of ecosystem services affected: Undertake a qualitative assessment of ecosystem service changes to determine which are likely to be of high, medium or low significance. Where relevant, support the assessment with quantitative information. This step helps screen priority ecosystem service changes to value in step 6. For carbon and OEEs, state the relative significance of the changes.

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 87: 3 minutes (cont.) **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011), pp47-48 http://www.wbcsd.org/pages/adm/download.aspx?id=253&objecttypeid=7 **Background:** 6. Monetize selected changes to ecosystem services: Identify the ecosystem service changes for which monetary valuation is possible and relevant (e.g. the high and medium value ecosystem services in step 5 above). Select the most appropriate valuation technique(s) and determine the monetary values. 7. Identify internal and external benefits and costs: Identify which values are internal and external to the company. Determine which external values could become internalized either through company or external actions. 8. Compare benefits and/or costs: Aggregate the stream of benefits and/or costs and convert them into "present day values" using an appropriate discount rate. 9. Apply sensitivity analysis: Determine the sensitivity of the outcome to a few key variables whose values are uncertain, providing a high and low range of values. The specific requirements for, and focus of, each step may also differ, depending on the objectives and scope of the CEV, and on the application with which it is associated. Below are key differences in emphasis, depending on the generic application of the valuation: 1. Trade-offs: Measure the marginal change in quantity/quality of ecosystem services due to the company aspect (compared to without); multiply by the "marginal" value of each service.	 2. Total valuation: Identify all mutually-compatible ecosystem services provided; measure the quantity of each service provided; multiply by the value of each ecosystem service. 3. Distributional analysis: Determine the nature and size of costs and benefits accruing to different stakeholders. 4. Sustainable financing/compensation: Identify stakeholders that receive or cause significant benefits or losses, and identify appropriate means of generating revenues or compensating them.

Brief introduction to Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 88: 3 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011), pp59-69 http://www.wbcsd.org/pages/adm/download.aspx?id=253&objecttypeid=7 **Instructions:** Facilitator to step through the main points on the slide **Background:** **Application and Embedding Stages** Stage 4 – Application: Thinking about how the CEV results might be applied is a fundamental issue both at the beginning of the process (i.e. at the scoping stage) and after ecosystem valuation has been carried out. The intention of Stage 4 is to outline different strategies which can be used to help target the application of credible results. It focuses on five key areas: internal applications, external applications, communicating the results, dealing with confidentiality issues, and verification of the results. 1. Internal application: Highlights use of the generic applications of CEV and links to existing business analytical approaches to secure internal business benefits. 2. External application: Covers the same strategy as above, but with more focus on securing external business benefits. 3. Communicating the results: Provides advice on how best to communicate the results. 4. Confidentiality: Outlines how to deal with confidentiality issues. 5. Verification: Stresses the importance of verification of the results. Stage 5 – Embedding: This stage provides suggestions on the actions that companies can take to help ensure that CEV, if proven to be of value, is embedded within company processes and procedures.	 1. Getting internal buy-in: It is vital to develop a strong business case, and to identify champions at all levels within the company who are willing to promote CEV. 2. Linking CEV to existing processes: It is important to find ways to link CEV to existing processes, analytical approaches and tools within the company. 3. Capacity building: In order to stimulate the take-up of CEV it is essential to build capacity and awareness across the company.

Time guidelines

Time guidelines	Time
Screening for Corporate Ecosystem Valuation (CEV)	**25 mins**

Session overview

The session is a practical exercise that will help delegates determine when economic valuation is a suitable approach to use within business decisions.

Session objective

Enable respondents to conduct a screening for CEV, thus using the knowledge gained from the previous session in a practical case.

Session format

This session will be run by the two course facilitators – the outline of the session will be presented and the nature of the exercise explained. The delegates will then be asked to work in groups, the facilitators will be on hand to answer any questions.

Handouts

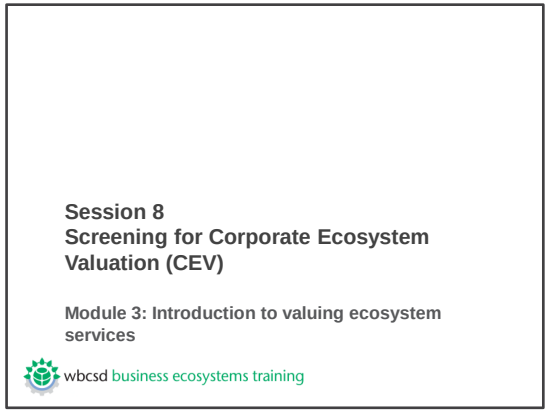
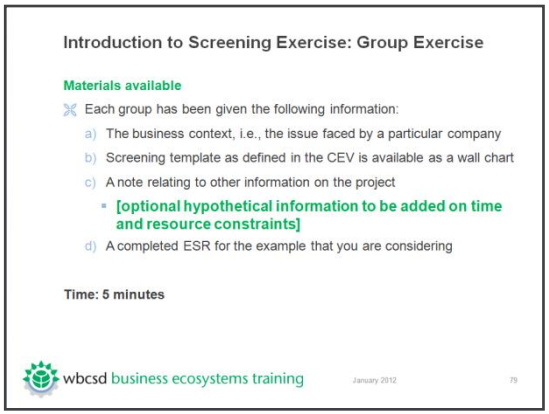
Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course.

In addition delegates will receive an ‘issue’ and a results handouts during this session.

The ‘CEV screening’ A1 wall chart will also be used.

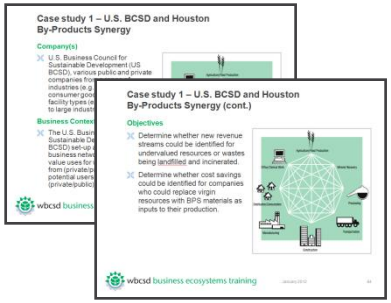
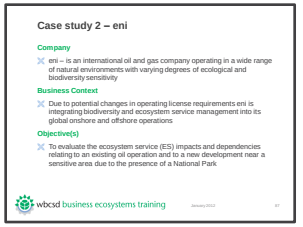
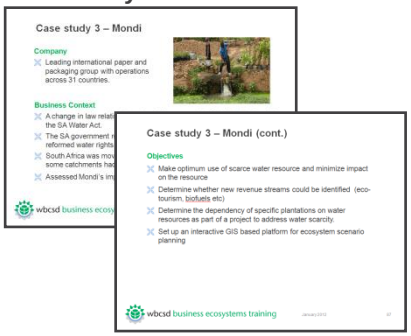
Session 8

Screening for Corporate Ecosystem Valuation (CEV)

Facilitators' notes	Media/activity/handout guidance
Slide 89: <1 minute **Slide 90: 1 minute read the introduction** **Objective:** Enable respondents to conduct a screening for CEV **Total time for exercise:** 25 minutes **Introduction** This exercise shows how to screen for corporate ecosystem valuation. Facilitator to go through the objectives of the exercise **Instructions** Facilitator to split delegates into three pre-determined groups and asked to move seats. Facilitator to walk through the information available for each case study (slide 2).	 

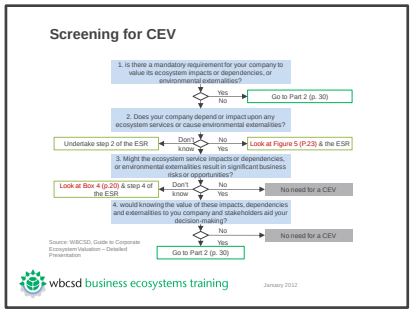
Session 8

Screening for Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 91-95: 3 minutes read the introduction to one case study **Source:** WBCSD, http://www.wbcsd.org/work-program/ecosystems.aspx **Instructions:** The facilitator will introduce the three case studies that will be used in this exercise (summarize the small introductory sections below), each group will be looking at a different case study. **Case study 1: Houston By-Product Synergy** Under the leadership of the U. S. Business Council for Sustainable Development (US BCSD), By-Product Synergy (BPS) is an active, collaborative process to match undervalued resources from one company with needs and opportunities at another. **Case study 2: eni** The area of interest is located in an onshore concession of strategic importance, being one of the largest onshore oil fields in Western Europe. Within this general context, you are to focus on eni's Exploration and Production (E&P) activities, in particular the presence of the flow lines network and related restoration activities. **Case study 3: Mondi** A change in law relating to water rights as a result of the introduction of the SA Water Act that could impact operations. The SA government removed all private ownership of water, no rights like riparian rights. The only right is the human right and environmental reserve. Consequently, the team wanted to understand and value dependencies among water users in the same watershed.	**NOTE: For more case studies, please refer to the CEV Road Test summaries on WBCSD's website:** http://www.wbcsd.org/work-program/ecosystems/cev/roadtesters.aspx Handouts include a complete ESR, The full business context, and Any additional information. **Case study 1**  **Case Study 2**  **Case Study 3** 

Session 8

Screening for Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 96: 2 minutes on screening decision tree **Source:** Guide to Corporate Ecosystem Valuation – Detailed Presentation April 2011 p17; **Instructions:** Facilitator to describe each of the screening steps in the screening decision tree. Key questions for delegates to consider include: - Is there a mandatory requirement for reporting? - Does the company depend or impact upon ecosystem services or cause any environmental/social externalities? - Might these dependencies/impacts result in significant business risks? - Would knowing the value of these dependencies/impacts aid decision making? - Is the ecosystem under consideration highly unique? - How much time and what resources do you have? - Is there any economic evidence available? Where would you look? Facilitators should distribute case study handouts to delegates and refer to the screening wall chart.	 The Information relating to the group exercise will be left displayed for the exercise.

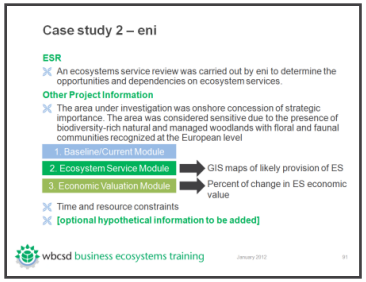
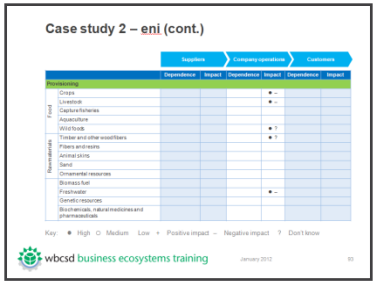
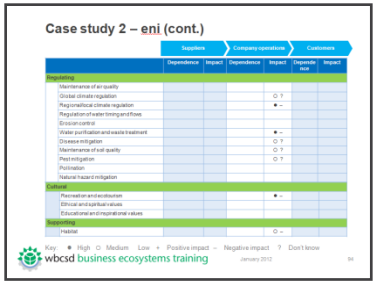
Session 8

Screening for Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 97-99: 3 minutes **Case study 1:** Handouts for case study 1, these include a **hypothetical** version of an ESR and additional project information such as time and resource constraints.	  

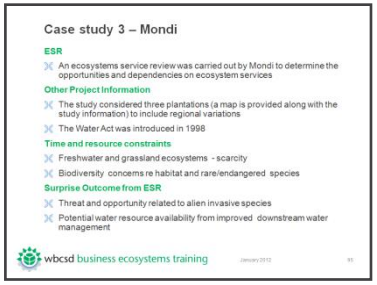
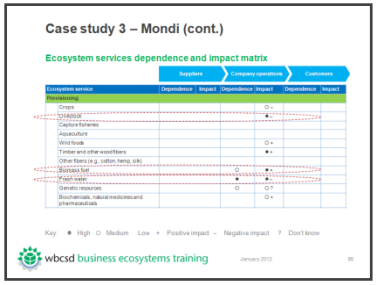
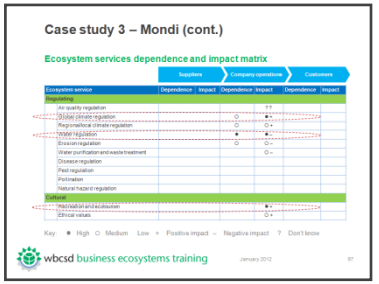
Session 8

Screening for Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 100-102: 3 minutes **Case study 2:** Handouts for case study 2, these include a **hypothetical** version of an ESR additional project information such as time and resource constraints.	  

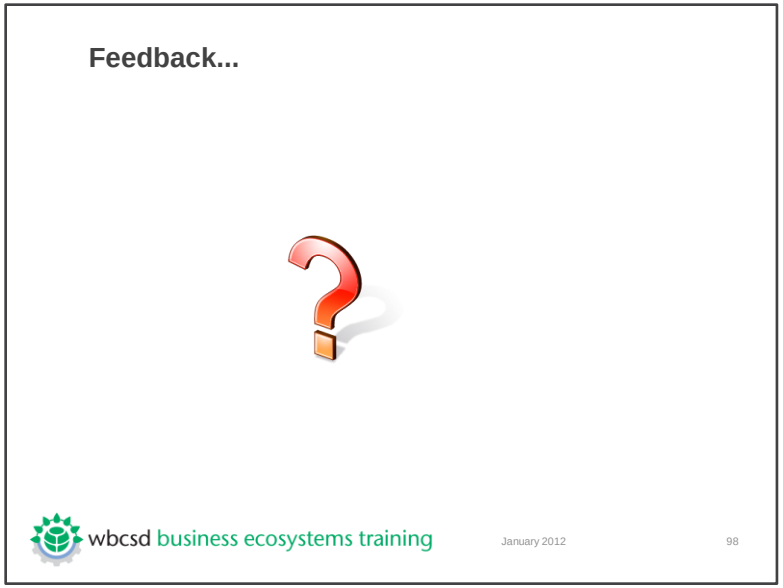
Session 8

Screening for Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 103-105: 3 minutes **Case study 3:** Handouts for case study 3, these include a completed ESR and additional project information such as time and resource constraints.	  

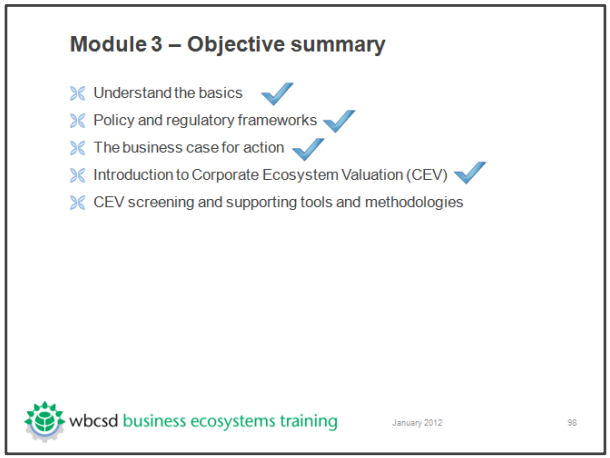
Session 8

Screening for Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 106: total 5-16 minutes **Instructions:** Each group will have 10 minutes to complete the screening template and decide whether a CEV should be carried out for each business context. Facilitators are to move between groups to check on progress and provide help where required. One person from each group will feedback the outputs of the screening template, (1 minute per group). Facilitator to summarize findings from the exercise (3 minutes). Facilitator to discuss any typical challenges completing the decision tree and who/how relevant information can be gathered? Facilitator should be aware that whether valuation is applicable to the specific issue being discussed depends on a number of different considerations. For example, even where timings appear difficult, individuals with the right resources can conduct valuation work in shorter periods of time. The need for any such work will depend on the sensitivities of the situation, the uniqueness of the resource in question, the need for monetary evidence, and the level of accuracy required. These are just a few points for consideration.	 **Material:** Flip chart

Session 8

Screening for Corporate Ecosystem Valuation (CEV) (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 107: <1 minute Recap on what has been covered in the module so far.	

Time guidelines

Time guidelines	Time
Ecosystem valuation techniques – presentation and case study – activity	**45 mins**

Session overview

This section of the module explores the application of ecosystem valuation using real case studies. The aim is to embed the theory of CEV with a tangible example of how it might be used in a business context.

The session is designed to be a presentation and group exercise.

Session objective

Overview of valuation techniques and case study examples of where they have been applied.

Session format

This session will be run in two phases:

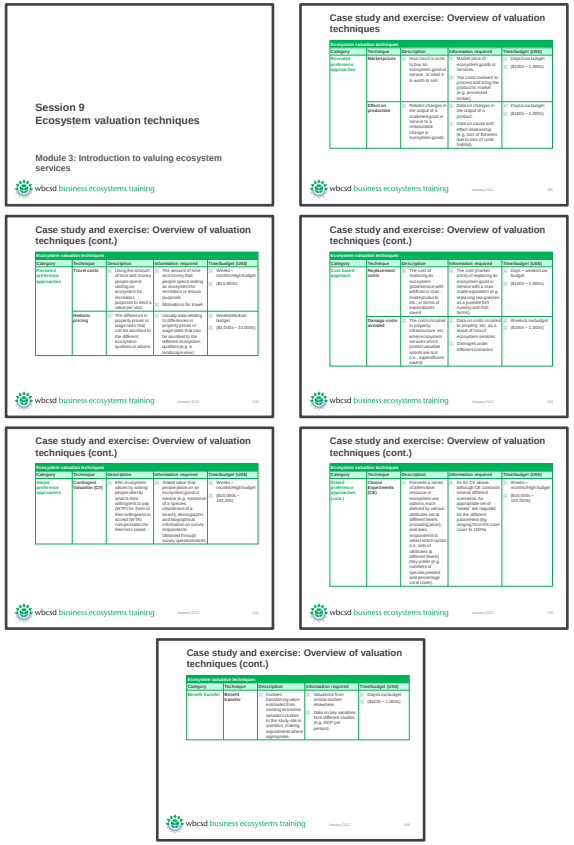
1. **Presentation:** A course facilitator will talk through key concepts and definitions.
2. **Interactive:** Two course facilitators will deliver a group activity.

Handouts

These handouts should be given upon arriving to this session, do not provide in the delegates' desk pack the slides for the interactive session (they will be provided separately).

Session 9

Ecosystem valuation techniques – case study

Facilitators' notes	Media/activity/handout guidance
Slides 108-114: 10 minutes **Objective:** Overview of valuation techniques and case study examples **Total time for presentation:** 10 minutes **Total time for exercise:** 20 minutes **Source:** WBCSD, *Corporate Ecosystem Valuation Additional Notes B Selection & Application of Ecosystem Valuation Techniques for CEV* pp4-5, http://www.wbcsd.org/pages/adm/download.aspx?id=5924&objecttypeid=7 **Introduction:** This section of the module explores the application of ecosystem valuation using real case studies. The aim is to embed the theory of CEV with a tangible example of how it might be used in a business context. The session is designed to be group exercise, with the facilitator separating the delegates into working groups of 4-5 people. In this section the facilitator will first introduce the ecosystem valuation techniques that are available, then present case study examples for delegates to consider. **Instructions:** These slides provide an overview of the valuation techniques that may be used during a CEV exercise. The facilitator should introduce these concepts thoroughly explaining that the following exercises will require delegates to consider which techniques they would apply to a given case study. At the end of the session, the facilitator will present the approach (if available) taken by the companies in the case studies.	 **Materials** – these slides should be provided as a handout for each delegate to refer to throughout the session.

Session 9

Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 115-118: 5 minutes

Source:

WBCSD CEV Road Test Case Studies, http://www.wbcsd.org/work-program/ecosystems/cev/roadtesters.aspx

Instructions:

This slide provides the case study context for each group to consider. The groups will be allowed to choose which of the three case studies they examine, based on their preference. The facilitator will coordinate the exercise to ensure that a mix of case studies are tackled.

The facilitator will circulate this slide as a handout and encourage the groups to spend a few minutes reading and discussing the context.

The facilitator will then explain that the groups will then be asked to consider the scope.

Delegates are to collect the following answers from the business context provided in the case study information.

Note: for additional information on the case studies, facilitator to refer to the road test summaries at: http://www.wbcsd.org/work-program/ecosystems/cev/roadtesters.aspx

Case study option 1:

- Rio Tinto

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?

Materials –case study context and objectivess hould be provided as a handout for each delegates to read in their groups.

Session 9

Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 119-124: 5 minutes

Source:

WBCSD CEV Road Test Case Studies, http://www.wbcsd.org/work-program/ecosystems/cev/roadtesters.aspx

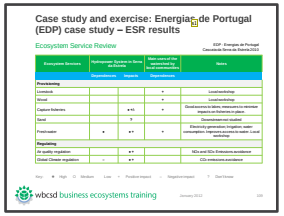
Background:

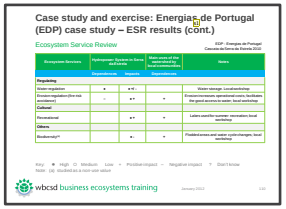
Case study option 2:

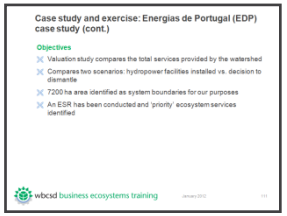
- Energias de Portugal (EDP)

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?

Materials –case study context, ESR results and objectives should be provided as a handout for each delegates to read in their groups.







Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 125-127: 5 minutes

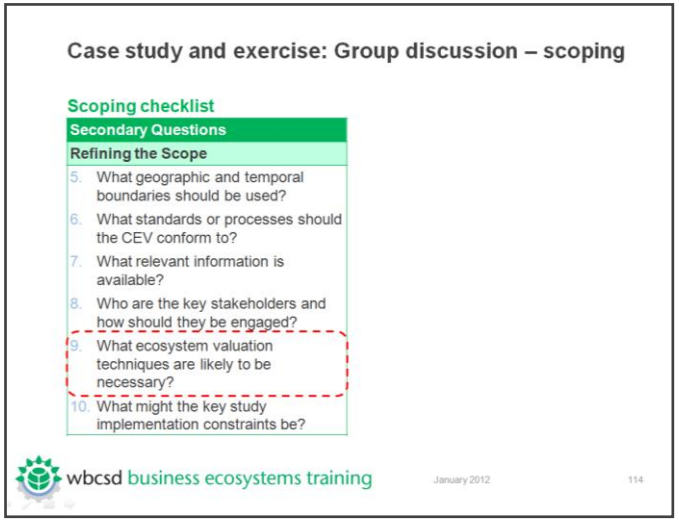
Case study option 3:

- GHD/South African Water Corporation (SA)

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?

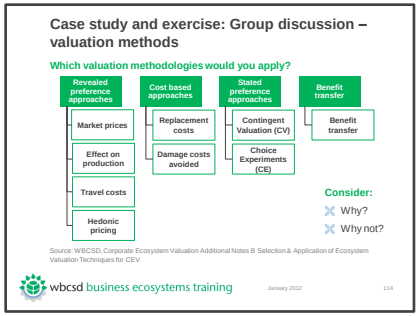
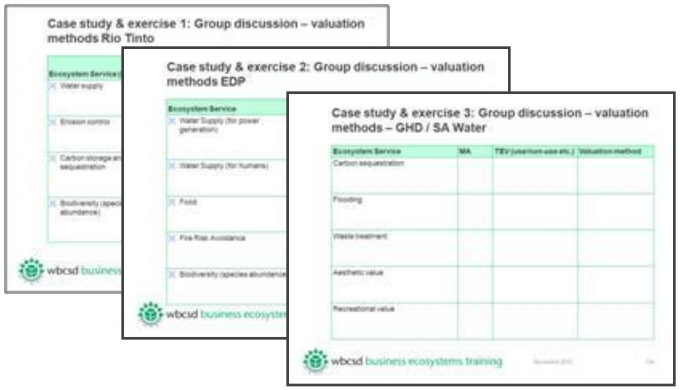
Materials –case study context and objectives should be provided as a handout for each delegates to read in their groups.

Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 128: 1 minute **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation* (April 2011) pp34-36 **Instructions:** The facilitator should tell delegates to concentrate on checkpoint 9, i.e. the valuation techniques that could be used for each case study. The facilitator should again emphasize that there are no "right" answers to this exercise – it is intended to provoke discussion and debate.	 **Materials** – this slide should be left on the projector during the group discussion.

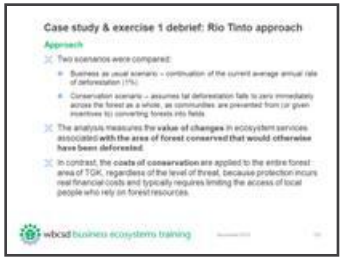
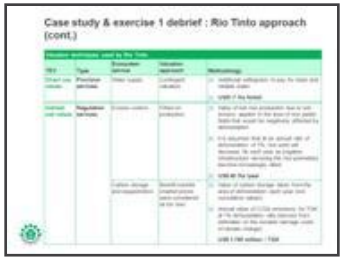
Session 9

Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 129-132: 15 minutes **Source:** WBCSD, *Corporate Ecosystem Valuation Additional Notes B Selection & Application of Ecosystem Valuation Techniques for CEV* pp4-5, http://www.wbcsd.org/pages/adm/download.aspx?id=5924&objecttypeid=7 **Instructions:** This slide focuses on what specific valuation methodologies might be appropriate for each specific case study. Facilitator to explain that the delegates should consider both the reasons in for **and** against particular valuation techniques. The Time/Budget column provided in the table of Ecosystem Valuation techniques handout is very useful for focusing delegates' thoughts. - The facilitator should emphasize that, in the interests of time, not all of the information needed to scope and select the "best" ecosystem valuation techniques has been provided. Therefore there are no "right" answers to this exercise – it is intended to provoke discussion and debate (10 minutes). - Facilitator to ensure delegates identify Millennium Ecosystem Assessment (MA) category for each ecosystem service identified in this exercise, i.e., provisioning service, regulating service, cultural service - Facilitator to collect feedback from each group as to the approaches they would take (1-2 minutes per group).	  **Materials** – this slide should be left on the projector during the group discussion.

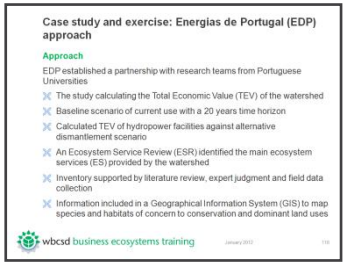
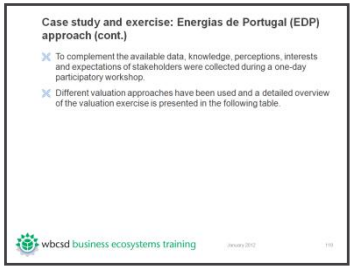
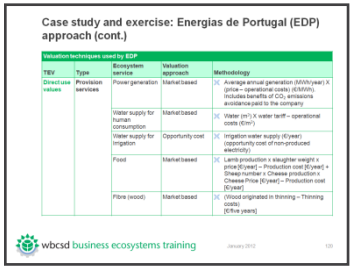
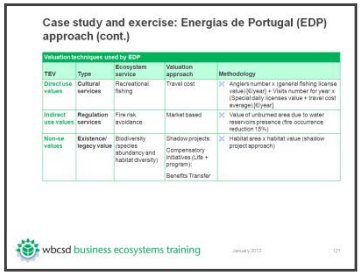
Session 9

Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 133-136: 5 minutes **Source:** WBCSD, *Corporate Ecosystem Valuation Additional Notes B Selection & Application of Ecosystem Valuation Techniques for CEV* pp4-5, http://www.wbcsd.org/pages/adm/download.aspx?id=5924&objecttypeid=7 **Instructions:** **Case study 1 – Rio Tinto** These slides explain the approaches that each company actually adopted in undertaking their ecosystem valuation. The facilitator will run through which techniques were used and then provide handouts with more detailed information. Facilitator to describe how well these approaches worked. **Materials** – these slides should be provided as a handout to the appropriate groups.	  

Session 9

Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 137-140: 5 minutes **Source:** WBCSD, *Corporate Ecosystem Valuation Additional Notes B Selection & Application of Ecosystem Valuation Techniques for CEV* pp4-5, http://www.wbcsd.org/pages/adm/download.aspx?id=5924&objecttypeid=7 **Instructions:** **Case study 2 - EDP** These slides explain the approaches that each company actually adopted in undertaking their ecosystem valuation. The facilitator will run through which techniques were used and then provide handouts with more detailed information. Facilitator to describe how well these approaches worked. **Materials** – these slides should be provided as a handout to the appropriate groups.	   

Ecosystem valuation techniques – case study (cont.)

Facilitators' notes	Media/activity/handout guidance

Slides 141-142: 5 minutes

Source:
WBCSD, *Corporate Ecosystem Valuation Additional Notes B Selection & Application of Ecosystem Valuation Techniques for CEV* pp4-5, http://www.wbcsd.org/pages/adm/download.aspx?id=5924&objecttypeid=7

Instructions:

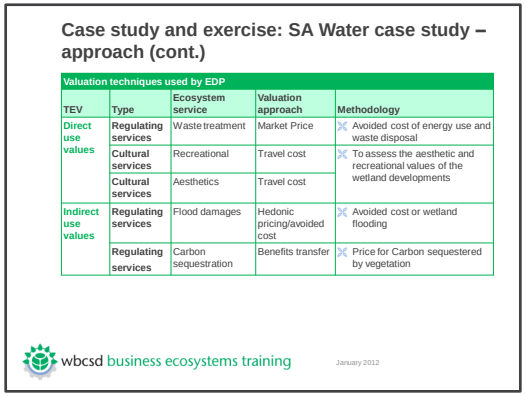
Case study 3 – SA Water

These slides explain the approaches that each company actually adopted in undertaking their ecosystem valuation.

The facilitator will run through which techniques were used and then provide handouts with more detailed information.

Facilitator to describe how well these approaches worked.

Materials – these slides should be provided as a handout to the appropriate groups.



Coffee break

15 min.

Time guidelines

Time guidelines	Time
Complementary tools – presentation	**10 mins**

Session overview

This session will highlight the links/complementarities with LCA, ESIA, other frameworks, value transfer guidelines, InVest, National accounting etc., by giving a brief introduction to these different tools.

Session objective

Understand other existing tools in this area and complementarities with other methodologies.

Session format

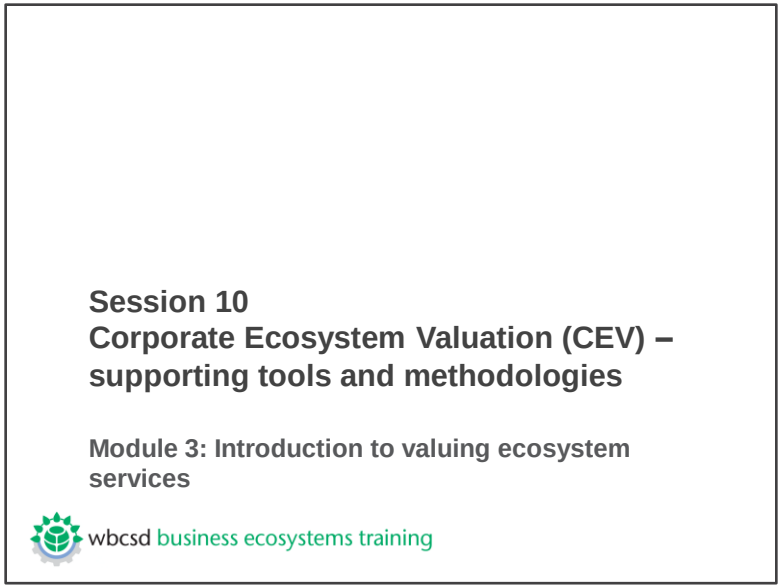
This session will be run by one course facilitator

Handouts

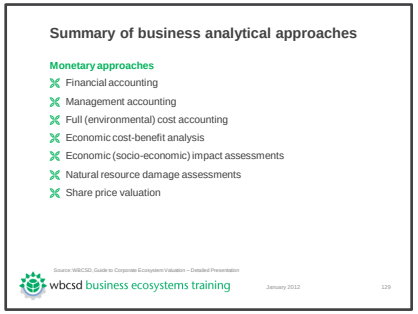
Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

Session 10

Supporting tools and methodologies

Facilitators' notes	Media/activity/handout guidance
Slide 144: <1 minute **Objective: to** understand other existing tools and the complementarities with other methodologies. **Total time for exercise:** 25 minutes **Introduction** The facilitator will briefly present a number of different tools that can ensure ecosystems are accounted for within decision making processes. **Instructions:** Highlight the links/complementarities with LCA, ESIA, other frameworks, value transfer guidelines, InVest, National accounting, etc.	

Supporting tools and methodologies

Facilitators' notes	Media/activity/handout guidance
Slide 145: 3 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation (long and detailed)* (slide 55) available from http://www.wbcsd.org/pages/adm/download.aspx?id=5922&objecttypeid=7 **Instructions:** Facilitator to set the context of the session from the following text. The facilitator will start to introduce the tools listed on slide 126. There will not be enough time to cover all of these tools, so the facilitator should prepare a summary of each and perhaps cover one example in detail. **Background:** CEV can potentially support and feed into most 'analytical approaches' used within a business to assist decision-making and reporting. It is important to define at the outset which analytical approach, if any, the valuation will be part of, or be used to inform. This will influence the objective and nature of the CEV adopted. However, the CEV could equally be a stand-alone assessment. There are numerous money-based analytical approaches for corporate decision-making. Accounting processes range from **financial** and **management accounting**, which assess costs and benefits that have a direct financial implication for a company's bottom line for external and internal uses respectively, to **full (environmental) cost accounting**, which recognizes all costs and benefits associated with an activity, including economic, environmental, health and social costs. **Economic cost-benefit analysis** is a monetary approach that compares all costs and benefits relating to a project or policy, including environmental externalities, from the perspective of the nation.	 **Economic impact assessments**, often conducted as part of compulsory Environmental and Social Impact Assessments (ESIA), evaluate the impacts of a project on the local economy, including knock-on effects, jobs created, and distributional impacts. **Natural resource damage assessments** focus specifically on the costs and compensation for environmental damages. **Share price valuation** use techniques such as discounted cash flows and 'real options' to estimate values for company shares.

Session 10

Supporting tools and methodologies

Facilitators' notes	Media/activity/handout guidance
Slide 146: 3 minutes **Source:** WBCSD, *Guide to Corporate Ecosystem Valuation (long and detailed)* (slide 56) available from: http://www.wbcsd.org/pages/adm/download.aspx?id=5922&objecttypeid=7 **Instructions:** The Facilitator will continue to introduce tools/approaches. There will not be enough time to cover all of these tools, so the facilitator should prepare a summary of each and perhaps cover one example in detail. **Tools and approaches:** In addition, numerous non-monetary decision-making approaches are also adopted. Increasingly, the outputs of CEVs are being linked to these approaches too. Examples include **company reporting**, which provides annual financial and sustainability updates to shareholders, as well as **ESIAs** and **Strategic Impact Assessments (SIAs)**, which provide systematic approaches for evaluating and minimizing the potential environmental and social impacts of developments, programs, and policies. **Environmental Management Systems** are internal frameworks designed to manage a company's environmental impacts. There are also a number of approaches for evaluating the longer-term social and environmental risks and impacts of company products or operations, including **risk assessment and life-cycle assessment.**	 Finally there are decision-making tools for assessing trade-offs, such as **multi-criteria analysis**, which compares alternative options using a quantitative scoring and weighting system, **cost-effectiveness analysis**, an approach that compares the outcomes and costs of several alternatives, and the **Ecosystem Services Review (covered in module 2)**, which focuses on developing corporate strategies around the risks and opportunities associated with company impacts and reliance upon ecosystem services. **Note**: for a description of InVEST, please refer to the "monetary approaches" slide– as InVEST is as much about non-monetary valuation (in biophysical quantitative terms) as monetary valuation.

Session 10

Supporting tools and methodologies

Facilitators' notes

Slide 147: 2 minutes

Source: WBCSD, *Business & Ecosystems: Corporate Ecosystem Valuation, A Scoping Report*, (2009), available from http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13553&NoSearchContextKey=true

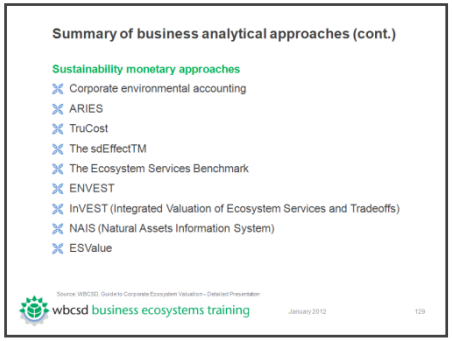
Instructions:

The Facilitator will continue to introduce the tools/approaches. There will not be enough time to cover all of these tools, so the facilitator should cover only a few examples in detail. The facilitator should check the assumptions, time and costs associated with the tools they describe.

Corporate Environmental Accounting and the Biodiversity Accountability Framework

Corporate environmental accounting stems from the fact that conventional accounting practices, developed to service financial reporting requirements, rarely illuminate environmental costs or stimulate better environmental performance. Work on corporate environmental accounting has focused on identifying, collecting and analyzing information on environmental costs principally to strengthen internal management decision-making, identify areas of cost-saving, and improve "eco-efficiency. **Source**: WBCSD

*"**ARIES** is a web-based technology offered to users worldwide to assist rapid ecosystem service assessment and valuation. Its purpose is to make environmental decisions easier and more effective. ARIES helps discover, understand, and quantify environmental assets and what factors influence their values, in a geographical area and according to needs and priorities set by its users. ARIES can accommodate a range of different use scenarios, including spatial assessments and economic valuations of ecosystem services, optimization of payment schemes for ecosystem services, and spatial policy planning."* **Source**: ARIES, http://www.ariesonline.org/about/intro.html



TruCost

TruCost plc is a UK-based environmental research organization (www.trucost.com), who has recently developed a set of tools to assist companies and investors to understand the environmental impacts of business activities. Ecosystem valuation, via an external cost methodology, is used by TruCost as a tool to present financial information on companies' environmental impacts. Assessments of the environmental damage costs resulting from an organization's direct and indirect emission of pollutants or extraction of raw materials are made using conventional economic tools such as marginal damage costs, abatement costs, environmental taxes and productive losses.

These calculations look at gross costs: they do not subtract any efforts at remediation or mitigation by the company. In addition to carrying out environmental cost calculations on companies, TruCost is currently developing a pilot framework to measure the links between corporate sustainable development performance, financial performance and the bottom line.

Supporting tools and methodologies

Facilitators' notes

Slide 147: 2 minutes (cont.)

Source: WBCSD, *Business & Ecosystems: Corporate Ecosystem Valuation, A Scoping Report*, (2009), available from :http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13553&NoSearchContextKey=true

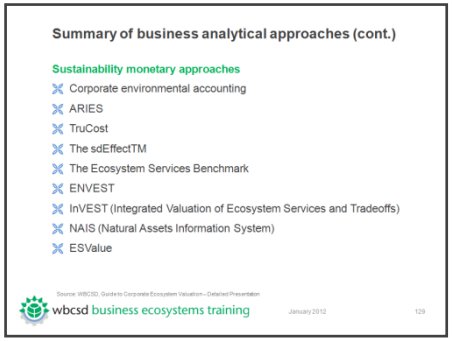
The sdEffectTM

Various analytical approaches have been used to try and relate corporate environmental and financial performance, but until recently these have focused mainly on non-monetary indicators.

Recently there has been growing interest in looking at company and share value, including via approaches that construct environmental rating systems based on correlation of environmental performance and management indicators to returns to stocks, and the use of "event studies" to show that new information regarding environmental performance or liability affects a company's stock price. One approach that is explicitly targeted at assessing up with these financial indicators is the sdEffectTM.

Risk management: The Ecosystem Services Benchmark and ENVEST

Risk management in relation to environmental conditions has emerged as a key issue facing the corporate sector. A number of initiatives have developed that provide tools with which to assess the potential impact of environmental pressures and liabilities on shareholder value and investors' risk, in financial frameworks consistent with those used for other business decision-making processes.



The **Ecosystem Services Benchmark** has been developed as part of the Natural Value Project (www.naturalvalueinitiative.org), a collaborative initiative involving Fauna & Flora International (FFI), UNEP's Finance Initiative, and the Brazilian business school FGV. It focuses specifically on the food, beverages and tobacco industries.

The World Resources Institute's program on Environmental Intelligence for Tomorrow's Markets (ENVEST – www.wri.org/project/envest) is similarly looking at the financial implications of environmental opportunities and risks.

Supporting tools and methodologies

Facilitators' notes

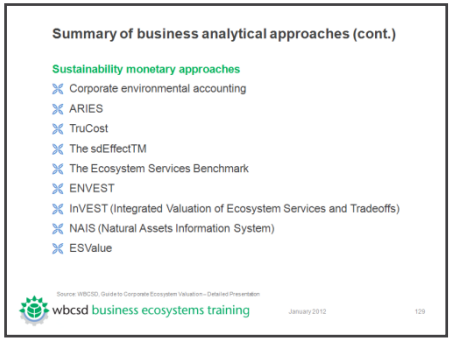
Slide 147: 2 minutes (cont.)

Source: WBCSD, *Business & Ecosystems: Corporate Ecosystem Valuation, A Scoping Report*, (2009), available from: http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13553&NoSearchContextKey=true

InVEST is designed to help local, regional, and national decision-makers incorporate ecosystem services into a range of policy and planning contexts for terrestrial, freshwater, and marine ecosystems, including spatial planning, strategic environmental assessments, and environmental impact assessments.

InVEST models are based on production functions that define how an ecosystem's structure and function affect the flows and values of ecosystem services. The models account for both service supply (e.g., living habitats as buffers for storm waves) and the location and activities of people who benefit from services (e.g., location of people and infrastructure potentially affected by coastal storms). Since data are often scarce, the first version of InVEST offers relatively simple models with few input requirements. These models are best suited for identifying patterns in the provision and value of ecosystem services. With validation, these models can also provide useful estimates of the magnitude and value of services provided.

NAIS: The Natural Assets™ Information System (NAIS) was developed by Spatial Informatics Group (SIG) to estimate Ecosystem Service Values (ESV) using "state of the art" value transfer methods and geospatial science. Value transfer involves the adaptation of existing valuation information to new policy contexts where valuation data is absent or limited.



For ESVs, this involves searching the literature for valuation studies on ecosystem services associated with ecological resource types (e.g., forests, wetlands, etc.) present at the policy site. Value estimates are then transferred from the original study site to the policy site based on the similarity of ecological resources at the policy site. Value transfer is a 'second-best' approach for gathering information about the value to humanity of ecosystem goods and services. However, the alternative, primary valuation research is extremely costly and is rarely feasible in the context of the policy and planning process. Therefore, value transfer integrated with geospatial science has proven to be a critical tool in decision making and planning.

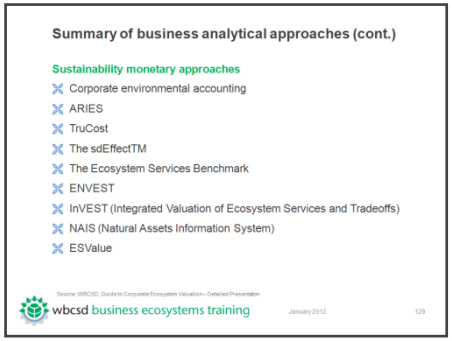
Supporting tools and methodologies

Facilitators' notes

Slide 147: 2 minutes (cont.)

Source: WBCSD, *Business & Ecosystems: Corporate Ecosystem Valuation, A Scoping Report*, (2009), available from :http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13553&NoSearchContextKey=true

ESValue: A strategic decision support tool that integrates scientific and economic information to show the impact and value of alternative environmental management strategies on ecosystem services. The objective of the tool is to integrate existing information and expert opinion with stakeholder values to efficiently and effectively identify the key site-specific ecological effects and resulting change in economic value for different management strategies.



Session 10

Supporting tools and methodologies

Facilitators' notes	Media/activity/handout guidance

Slide 148: 2 minutes

Source: WBCSD, *Business & Ecosystems: Corporate Ecosystem Valuation, A Scoping Report*, (2009), available from :http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=13553&NoSearchContextKey=true

Instructions

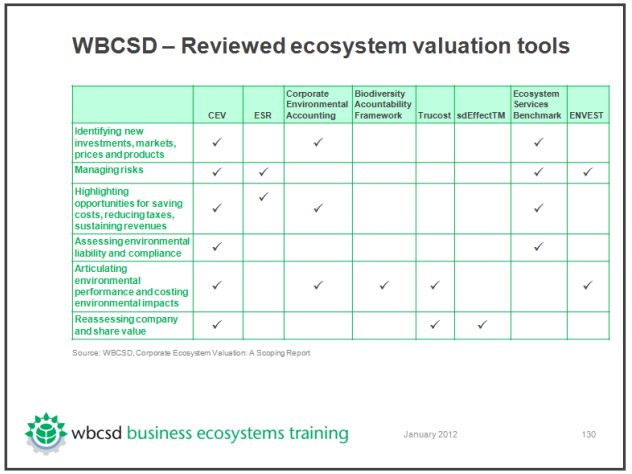
Facilitator to introduce the WBCSD Scoping study, stating that the study shows where some of the tools mentioned can be used. Other studies include the BSR study that looked at how different tools compare with each other. (BSR, 2011. Tools for Identifying, Assessing, and Valuing Ecosystem Services

Source:http://www.bsr.org/reports/BSR_ESTM_WG_Comp_ES_Tools_Synthesis3.pdf

Background

The study found that most of the tools and models that have recently been designed by and for the corporate sector, do not in fact make use of conventional ecosystem valuation methods. They mainly apply the techniques that are already commonly used by business for financial analysis, across a range of sector issues.

Businesses currently have very few methodological and technical resources available to them with which to carry out ecosystem valuation. Corporate ecosystem valuation is very much at an embryonic stage – it is clear that additional work needs to be carried out to advance its reach and hone its focus.



	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

Definitions (for facilitator to refer to and introduce)

Identifying new investments, markets, prices and products: Improving existing prices and production as well as identifying additional or alternative revenue streams based on ecosystem service markets.

Managing risk: Managing both environmental and economic risk in relation to ecosystem issues.

Highlighting opportunities for savings, reducing taxes and sustaining revenues: Avoiding unnecessary expenditures, as well as investing in ecosystem measures that will enhance production potential and efficiency.

Supporting tools and methodologies

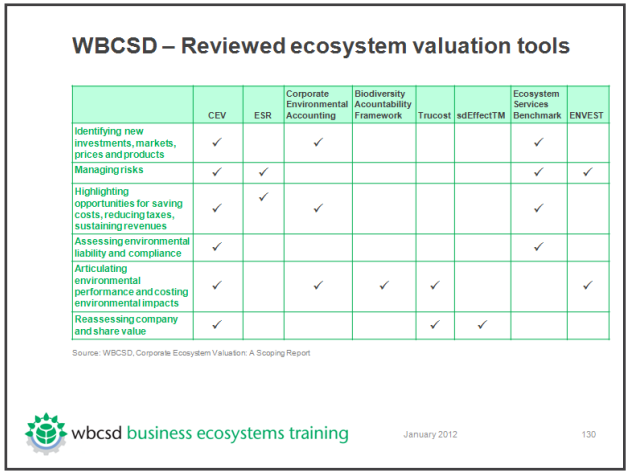
Facilitators' notes	Media/activity/handout guidance

Slide 148: 2 minutes (cont.)

Assessing environmental liability and compliance: Factoring in environmental liabilities and compliance levels is very limited in scope and number. Businesses currently have very few methodological and technical resources available to them with which to carry out ecosystem valuation.

Reassessing company and share value: Calculations made to inform companies themselves, as well as to generate information for their shareholders and for market and investment analysts.

Articulating environmental performance and costing environmental impacts: Internal management information needs as well as requirements for external and mandatory reporting, and public disclosure.



	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

Session 11: Wrap up

Time guidelines

Time guidelines	Time
Wrap up – presentation and activity	**15 mins**

Session objective

Review the key points of the module, compare with original delegate needs (flip chart from icebreaker) and plan for next steps.

Session format

This session will be run by the two course facilitators – it is your opportunity to make the delegates feel welcome and at ease and to start interactions with other course delegates.

Handouts

Delegates course material desk pack – hardcopies will be laid out on delegate desks in advance of their arrival at the course. This pack contains copies of all of the slides used throughout this course together with relevant handout materials required for each session.

Session overview

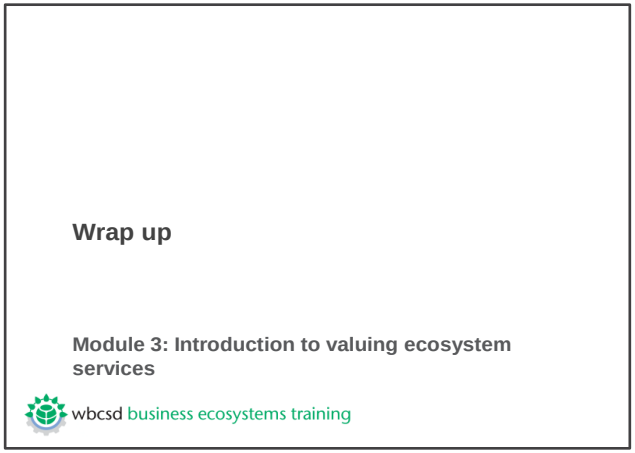
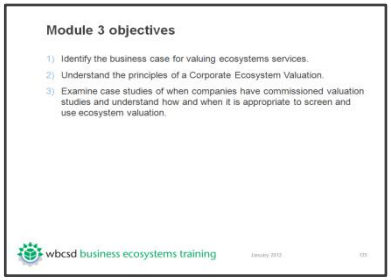
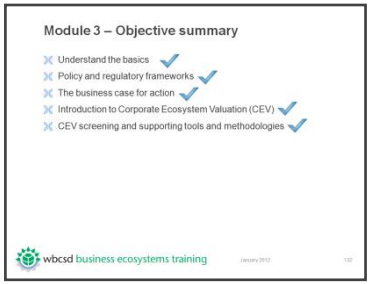
Delegates will be reminded of the module's agenda, which will enable them to recognize the knowledge acquired throughout the different sessions (set the scene).

The session will then continue with an high level evaluation of the module's objectives and whether they have been achieved.

Finally, the session will conclude with delegates developing steps going forward, considering actions needed by them and/or their company/business.

Session 11

Wrap up

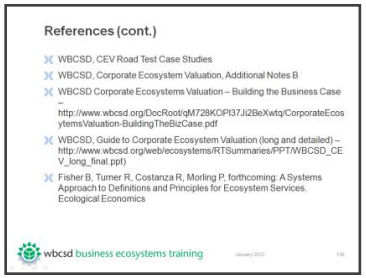
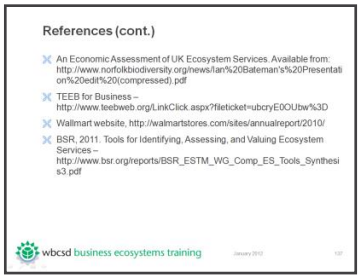
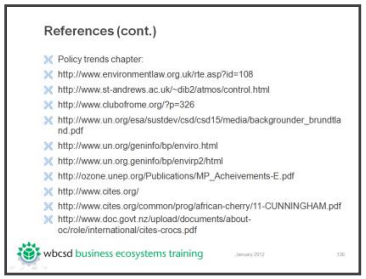
Facilitators' notes	Media/activity/handout guidance
Slide 149: <1 minute **Slides 150-151: 3 minutes** **Objective:** review the key points of the module, compare with original delegate needs (flip chart from icebreaker), plan for next steps **Instructions:** Facilitator to: - **Recap:** review the key learning points, module summary.	  

Wrap up (cont.)

Facilitators' notes	Media/activity/handout guidance
Slide 152: 2 minutes **Slide 153: 5 minutes to note the ways delegate companies may benefit** **Instructions:** The facilitator should evaluate the extent to which learning objectives and outcomes have been achieved, referring back to the learning objectives captured on the flip chart at the beginning of the session. **Interactive session: action planning** Facilitator to ask delegates to document 3 actions which they could take in relation to the potential risks and opportunities relevant to their own organisation. These actions should be as specific and time bound as possible. For example: - Arrange meetings with site managers from our three largest facilities over the next 2 months to discuss potential risks and opportunities, - Schedule a meeting this month with the Group Head of Risk to highlight impacts and dependencies on Ecosystems within our supply chain and review our management responses, - Review the WBCSD Responding to the Biodiversity Challenge report this week and prepare a briefing note for the team the following week. Available at: http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=22 The facilitator should gather responses from the delegates and consolidate them on a whiteboard/flipchart to share ideas for next steps.	 

Session 11

Wrap up (cont.)

Facilitators' notes	Media/activity/handout guidance
Slides 154-159: 5 minutes **Instructions:** Facilitator to refer to references provided in the main presentation. The Facilitator can also signpost to alternatives/other materials that will help continue their learning journey. This is supported by a handout in the training materials pack. Facilitator to talk through what participants can do next to integrate biodiversity and ecosystem services thinking into their company and working life: 1. Build awareness within your company 2. Review WBCSD case study examples, publications and other publications 3. Consider joining the WBCSD's Ecosystems Focus Area and Water Project working groups, and making use of the WRI's ecosystems experts directory 4. Piloting the use of a specific tool e.g. The CEV and/or ESR for measuring impacts within a small project, 5. Contact the WBCSD's Ecosystems Work Program team for further information about implementing BET Facilitator will refer to the Action Planning slides within the delegates slide packs (as shown opposite).	     

A1 Wall charts

Module 3: Introduction to valuing Ecosystem Services

wbcsd business ecosystems training

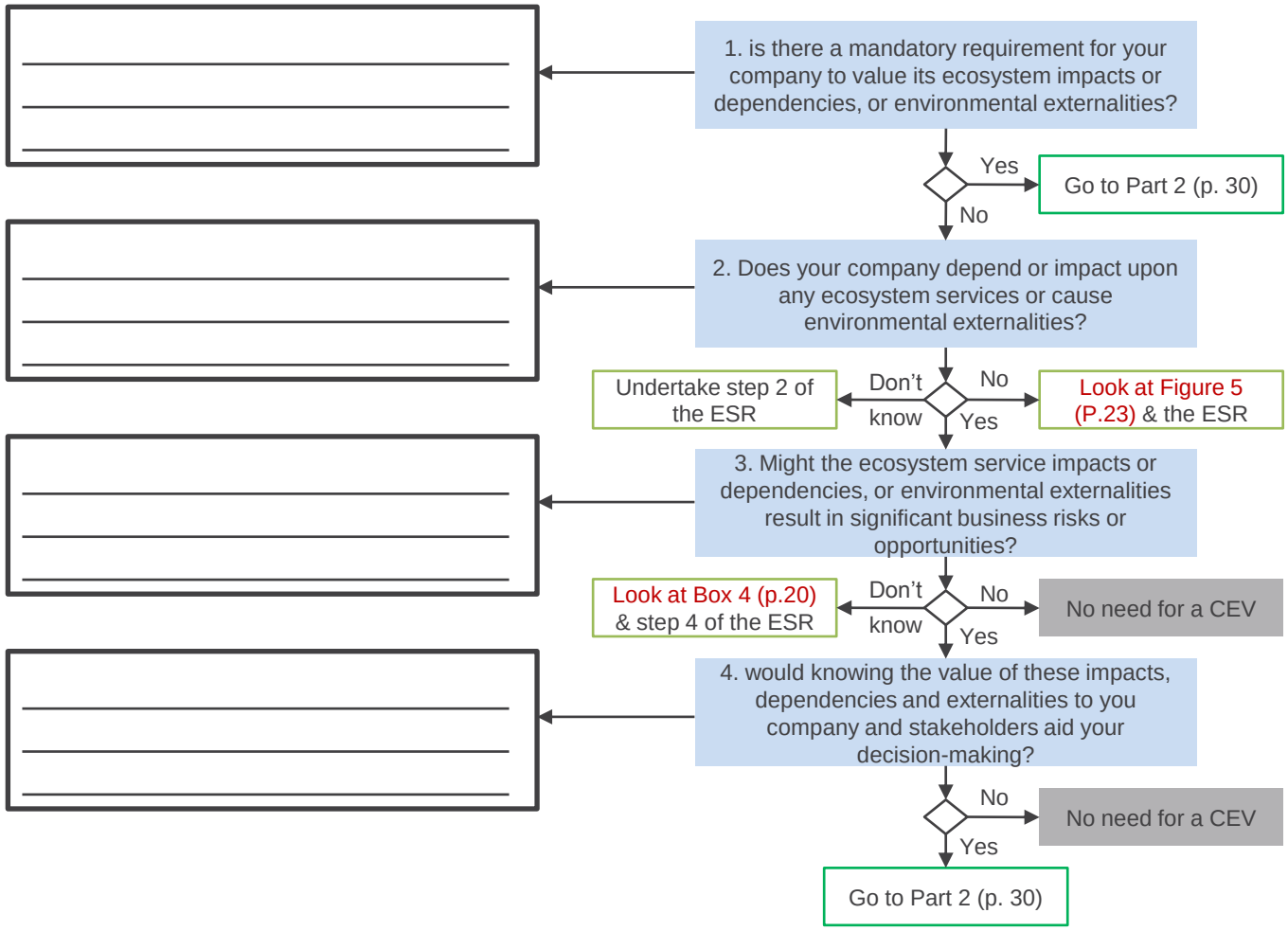
BET Module 3: Introduction to valuing Ecosystem Services

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

Screening for CEV – Handout



Case study and 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)			

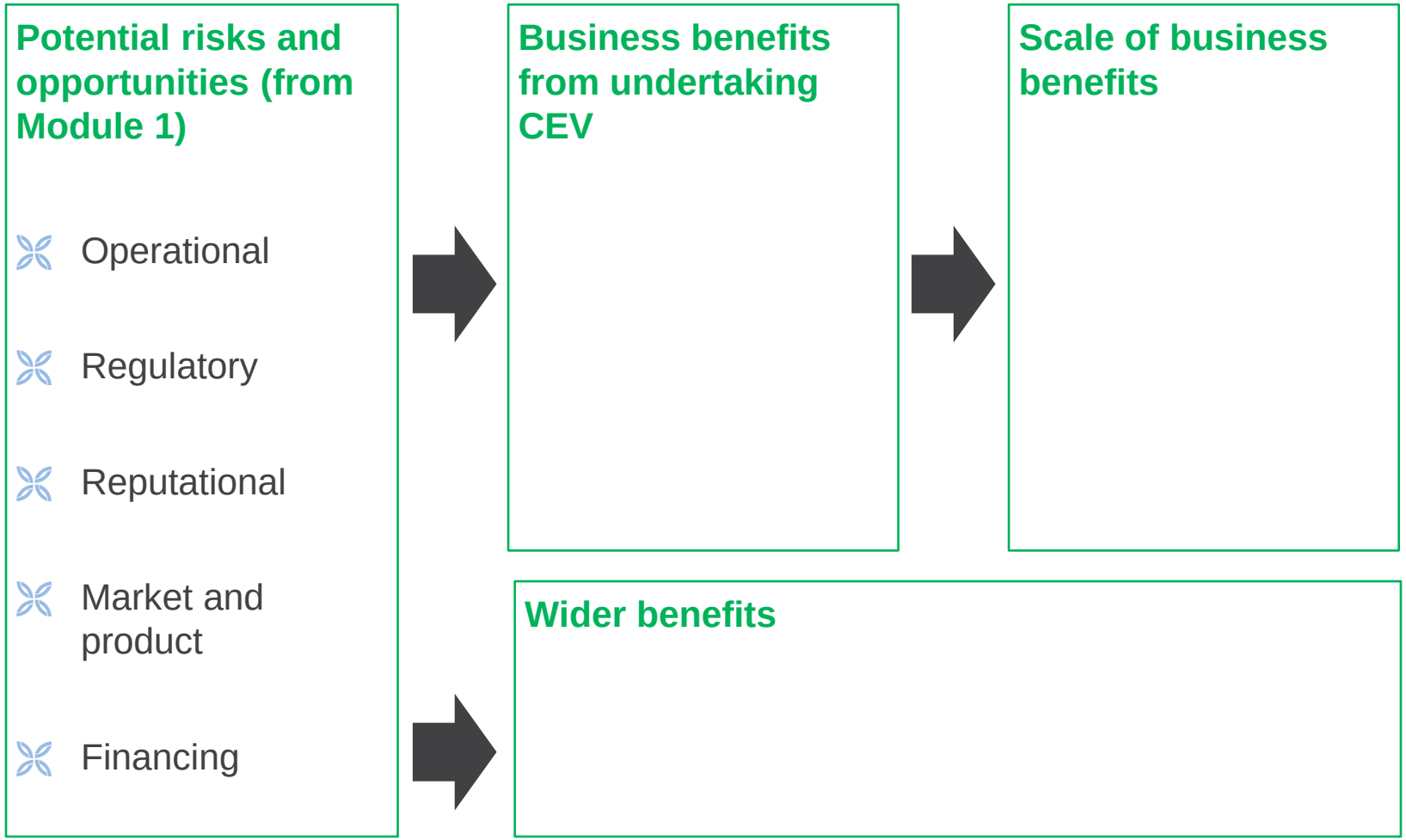
Case study and exercise 2: Group discussion – valuation methods EDP

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 and 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			

Group exercise: Building the business case – flipchart layout



Module 3 Session 8
4 HANDOUTS (Before the exercise)

Module 3: Introduction to valuing Ecosystem Services

wbcsd business ecosystems training

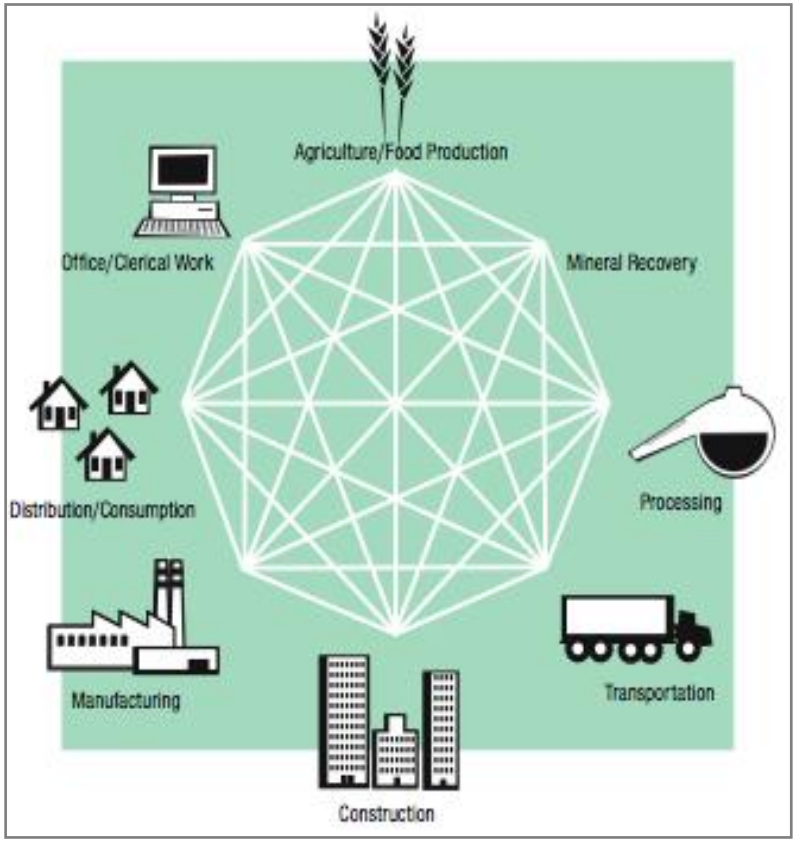
Case study 1 – U.S. BCSD and Houston By-Products Synergy

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

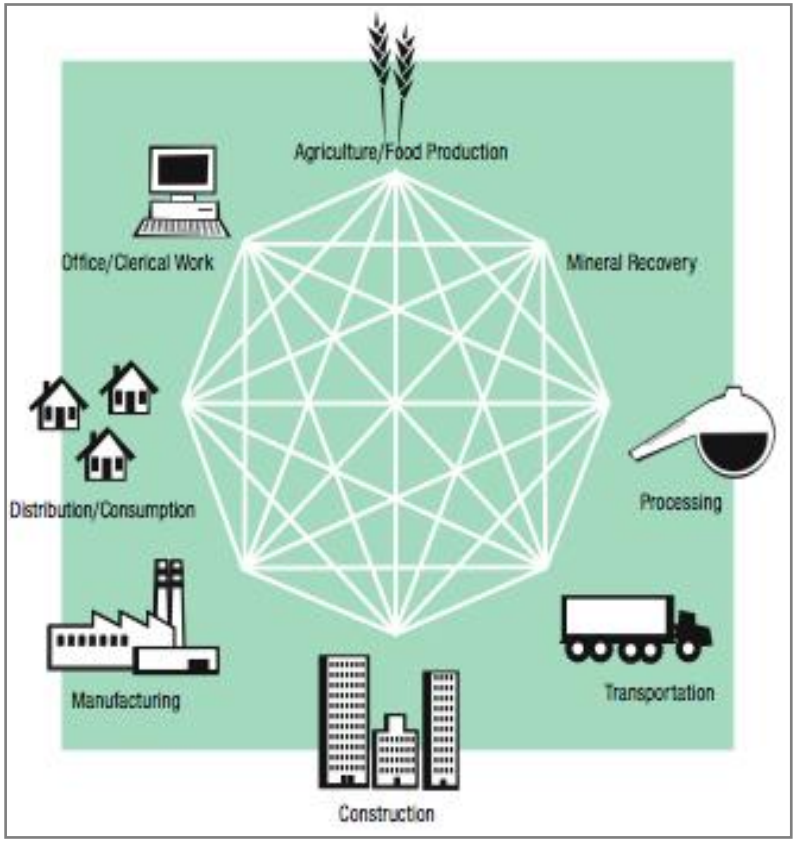
- The U.S. Business Council for Sustainable Development (US BCSD) set-up a collaborative business network to identify high value uses for waste/by-products from (private/public) facilities with potential users at other (private/public) facilities



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 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.

Time and resource constraints

[optional hypothetical information to be added on time and resource constraints]

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

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 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
- **[optional hypothetical information to be added]**

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

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

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

Module 3 Session 8
4 HANDOUTS (After the exercise)

Module 3: Introduction to valuing Ecosystem Services

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

Approach

- The data necessary for the project valuation were financial costs related to virgin material purchases and landfill disposal costs.
- The marginal value approach was utilized to measure the change in ecosystem services from this project.
- The Ecological Life Cycle Assessment Tool (Eco-LCA), was utilized to calculate the ecological benefits associated with the Houston BPS project. Eco-LCA provides physical quantification of ecosystem benefits based on economic input/output models such as tons of life cycle carbon emissions reduced, tons of non-renewable resources conserved, gallons of water conserved as well as over 100 other LCA and ecological metrics.
- The data utilized in the calculations for Eco-LCA were based on market prices for materials and resources and are subject to market variability.

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

Results

- As a result of the synergy opportunities identified through the BPS process, alternative uses have been identified for a wide range of materials and resources.
- 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.
- These BPS process synergy opportunities provide fuel, raw materials for construction and manufacturing as well as secondary chemical resources that result in life cycle ecosystem benefits estimated as the annual resource savings of:
  - $4.2 million dollars of waste disposal costs and virgin material purchases
  - 250 million gallons of water
  - 6 million barrels of oil equivalent of energy
  - 3,000 acres of land
  - 13,000 metric tons of carbon dioxide equivalents
  - 29,000 metric tons of non-renewable resources

Case study 2 – eni

Approach

- Eni first identified the baseline and current scenario:
  - Baseline: refers to the scenario that corresponds to a pre-disturbance time period;
  - Current: refers to the current situation (with a flow line network in place).
- It applied the ESR and identified the four main ES, following a stakeholder consultation:
  - Climate regulation
  - Food production
  - Water supply
  - Recreation
- It then identified the economic value of each identified ES using a range of economic values (not site-specific values) from existing studies combined with the GIS maps of likely provision of ES (collected from existing literature but adapted to site-specific geo-climatic conditions)

Case study 2 – eni

Results

- For the valuation, 3 hypothetical future scenarios, according to which the company is considering a new development, were identified:

1) **No mitigation scenario:** no mitigation activities would be performed and the natural environment would be expected to functionally recover within 15 years. After this period of time, the overall level of provision of ES would be evaluated to be at least 95%.
2) **Mitigation scenario:** moderate investment in restoration activities would be allocated. Within 10 years, the expected overall level of provision of ES would be evaluated to be at least 95%.
3) **Enhanced mitigation scenario:** substantial investment in restoration activities would be allocated. Within 5 years, the expected overall level of provision of ES would be evaluated to be at least 95%.

Case study 2 – eni

Results (cont.)

- The results of the economic analysis of the provision of key ES in the study area are summarized in the table below which illustrates the gain in economic value of ES provision under mitigation and enhanced mitigation scenarios with respect to the scenario without any mitigation.

	95% recoverability	
	Mitigation scenario	Enhanced mitigation scenario
Change in economic value of ES provision	3%	4%

- The approach and methodology might be applied to different operational contexts within different divisions of the company.

Case study 3 – Mondi

Note: the results of the Mondi Valuation study are not yet available

Module 3 Session 9
HANDOUTS

Module 3: Introduction to valuing Ecosystem Services

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Module 3 Session 9
HANDOUTS – EDP Case study

Module 3: Introduction to valuing Ecosystem Services

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Case study and exercise: Energias de Portugal (EDP) case study

Context

- 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 outside 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 and exercise: Energias de Portugal (EDP) case study (cont.)

- 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 and exercise: 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 and exercise: 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 and exercise: Energias de Portugal (EDP) case study (cont.)

Objectives

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

Module 3 Session 9
HANDOUTS – GHD/South Australia Water Corporation case study

Module 3: Introduction to valuing Ecosystem Services

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Case study and exercise: 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 and exercise: 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 and exercise: 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

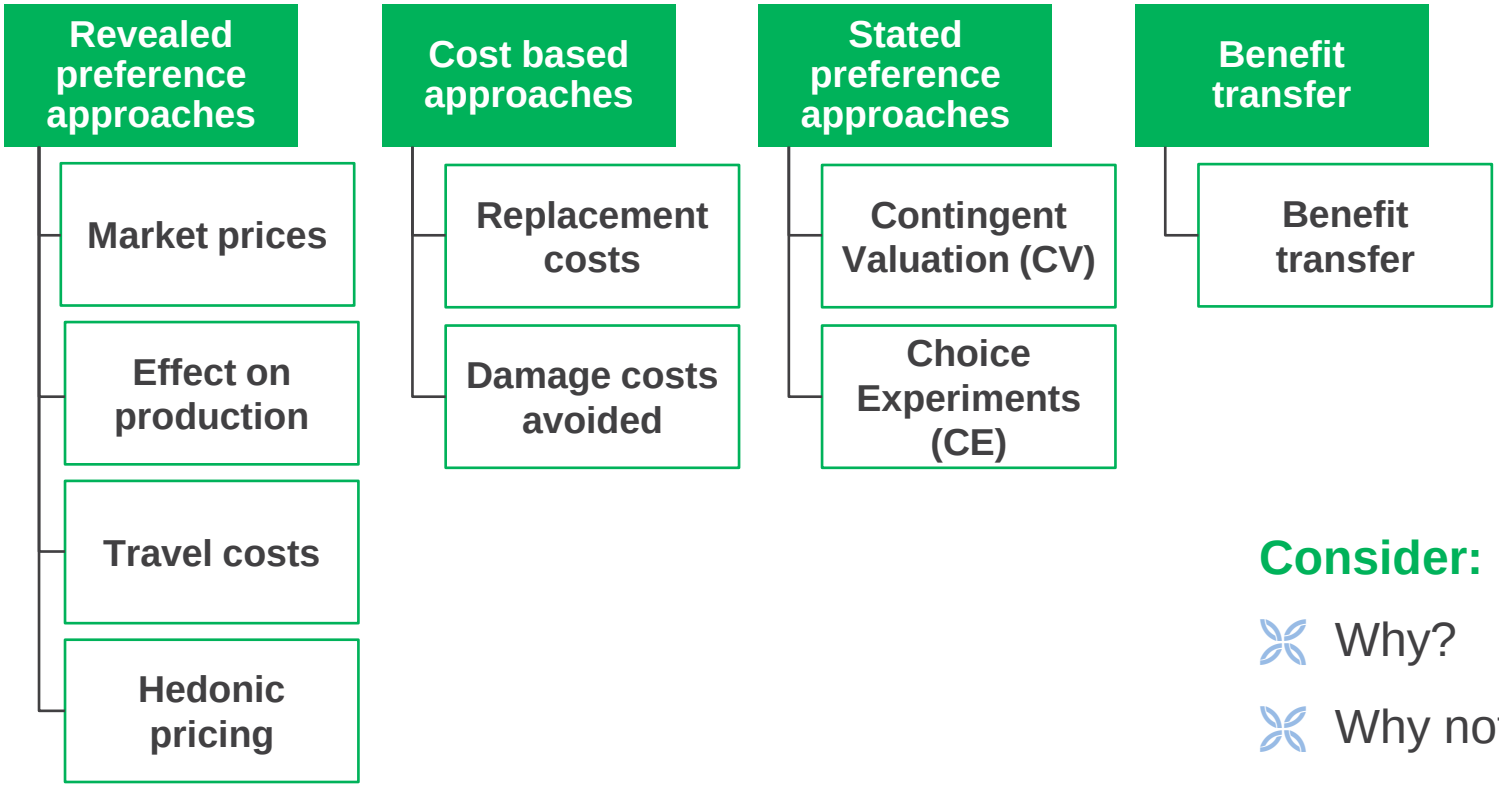
Case study and exercise: Group discussion – scoping

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 and 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

Module 3 Session 9
HANDOUTS – EDP Case study
CEV Approach

Module 3: Introduction to valuing Ecosystem Services

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Case study and exercise: 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 and exercise: 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 and exercise: 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 and exercise: 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)

Module 3 Session 9
HANDOUTS – GHD/South Australia Water Corporation case study
CEV Approach

Module 3: Introduction to valuing Ecosystem Services

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Case study and exercise: 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 and exercise: 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

Further details: GHD / SA Water

Module 3: Introduction to valuing Ecosystem Services

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GHD with South Australia Water Corporation (SA Water)

GHD with South Australia Water Corporation (SA Water)

Corporate Ecosystem Valuation (CEV) Road Test Summary (Work in progress)

GHD is an international company providing multi-disciplinary professional services in global markets of water, energy & resources, environment, property & buildings and transportation.

As part of the company's efforts to incorporate ecosystems into decision-making, it road tested the Guide to Corporate Ecosystem Valuation (2009-2010) in partnership with SA Water Corporation (SA Water), a major urban water utility, with support from the WBCSD. GHD water and economics specialists provided advice to the project team in SA Water. The study assessed the value of ecosystem services provided under several catchment management options. The ecosystem services evaluated included aesthetic and recreational values, erosion reduction, carbon sequestration and clean water.

GHD with South Australia Water Corporation (SA Water) (cont.)

Context

- SA Water is a government-owned water utility that supplies water and wastewater services across the state of South Australia. 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.
- As the first 'barrier' in a multi-barrier system, the condition of the catchment plays a vital role in the quality of the water. 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.

GHD with South Australia Water Corporation (SA Water) (cont.)

- Improved management of catchment areas to restore these ecosystem services reduces the amount of contamination (such as pathogenic micro-organisms, suspended sediment and nutrients that lead to nuisance algal blooms) that enters the water prior to treatment and thus reduces the amount of treatment that is required prior to the distribution of the water to customers, and the associated costs. From a risk management perspective, reduced contamination of water at its source or through interception and removal by instream wetlands also reduces reliance on the treatment plant as a single ‘barrier’ and thus reduces the risk of water of unacceptable quality being supplied to customers. This could present health risks to customers as well as issues of unpalatable tastes and odor.

GHD with South Australia Water Corporation (SA Water) (cont.)

- SA Water used the CEV process to revisit previous evaluations of catchment management projects in two key catchments; Cox Creek and Myponga. Both of these catchments support extensive agricultural and horticultural activities, which have led to impacts on the quality of the water in the downstream reservoir. In the case of Cox Creek, 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.
- The original study, completed in 2005, focused on operational issues such as reduced water treatment costs and did not take into account a broad range of ecosystem services such as the improved recreational and aesthetic values associated with wetland development and carbon sequestration by riparian vegetation. In the case of Myponga, elevated pathogenic microorganism inputs into the reservoir have been recorded in the past. Unlike the Cox Creek study, the original Myponga study, completed in 2009, did incorporate some ecosystems services such as carbon sequestration. The current CEV framework, however, is broader and includes additional ecosystem services that were not considered in the original study, such as aesthetic values and increased recreational opportunities.

GHD with South Australia Water Corporation (SA Water) (cont.)

Objectives

- The overarching aim for GHD was to develop valuation frameworks for use by water businesses in incorporating ecosystem valuation into business planning, accounting systems and decision making.
- SA Water used the valuation study to assess the benefits of reinstating ecosystem services to improve water quality compared to conventional water treatment methods. Ultimately one objective was to reduce treatment costs

GHD with South Australia Water Corporation (SA Water) (cont.)

Approach

SA Water used previous evaluations as a basis for the study. For the Cox Creek study, a series of incremental catchment management scenarios were designed, each of which added additional catchment management activities to the previous scenario. The activities included on-farm management actions, construction of artificial wetlands, constructing or replacing a sewer system in a township, and riparian revegetation activities. Modeling 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. As part of the review, additional valuations were undertaken including:

- Travel cost method to assess the aesthetic and recreational values of the wetland developments
- Avoided cost of energy use and waste disposal
- Benefit transfer of hedonic pricing or avoided costs of flood reticulation of wetlands, and
- Benefit transfer of market price for carbon sequestration by vegetation

GHD with South Australia Water Corporation (SA Water) (cont.)

Approach (cont.)

- For the Myponga study, the previous study developed a number of scenarios that included differential levels of fencing to exclude livestock from creeks in the catchment, as well as catchment management actions such as the introduction of dung beetles to the catchment.
- Maintenance and treatment costs avoided by the different management scenarios were estimated, as were the value of a number of ecosystem services. Benefit transfer of market prices was used to estimate biodiversity benefits (which include the value of reduced erosion and improved riparian condition) and carbon sequestration benefits. Farm production benefits in the form of reduced injury and disease and improved milk production from improved drinking water quality for livestock were calculated using market prices.
- Additional valuations similar to those undertaken for the Cox Creek study could be undertaken to assess the aesthetic and recreational values of improved catchment condition, as well as reduced energy use and waste generation from treatment activities.

GHD with South Australia Water Corporation (SA Water) (cont.)

Results

The results for the Cox Creek study showed clearly that the benefits of additional catchment management activities outweighed the costs to implement them (total costs: $1,646,865, total benefits: $2,810,684, hence a benefit/cost ratio of 1.7 – costs are shown on next slide)

Benefits	
$	
Returns from vegetable production	13,850,274
Reductions in SA Water treatment costs	2,193,103
Infrastructure salvage value	
Sedimentation pond near Brookes Bridge	16,868
Woodhouse wetland	28,113
Total benefits	**16,088,358**
Incremental benefits above Scenario 1 (do-nothing scenario)	2,810,684

GHD with South Australia Water Corporation (SA Water) (cont.)

Results (cont.)

Costs	
$	
On farm works	
Independent soil testing and advisory service	23,040
Sediment traps	28,770
Buffer strips	10,569
Balancing fertilizer to crop requirements	0
Improved cover crops	19,917
Balancing irrigation to crop requirements	637,328
Land management agreements	1,920
Information and extension	5,000
Off farm works	
Sedimentation pond near Brookes Bridge	358,933
Woodhouse wetland	561,388
Total costs	**1,646,865**

GHD with South Australia Water Corporation (SA Water) (cont.)

Applications

- SA Water intends to use the CEV method in future catchment management planning within SA Water. As part of its 'multiple-barrier approach' to drinking water quality management, the catchment is a key barrier for investment in works to improve downstream water quality and reduce the costs of water treatment. SA Water requires a method to enable catchment management actions to be compared with conventional water treatment methods.
- While the costs associated with catchment management actions are relatively straightforward to calculate for the purposes of comparison with conventional treatment, valuing the benefits and outcomes of such actions presents a challenge.
- The CEV guide offers a framework for placing value on the services that the catchment provides to SA Water in terms of natural water filtration and nutrient assimilation and the value of reinstating these services through improved catchment management. The framework also enables a more holistic view of catchment management and enables valuation of broader benefits such as recreational and aesthetic values and carbon sequestration.

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